Long Island Sound Study

A Partnership to Restore and Protect the Sound

Comprehensive Conservation and Management Plan Update

Investing in a Regional Asset

Supplemental Document

Implementation Actions

8 September 2014 Draft

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WaterVision, LLC

Dedicated to assessing and restoring New England's surface waters

www.WaterVisionLLC.com

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A Guide to the Implementation Actions

The CCMP Update has a 20-year horizon and includes specific implementation actions organized by theme to help attain the plan goals and ecosystem targets. In addition to the work of ongoing programs, these specific, tactical actions will address the strategies over the next five years. Implementation actions may apply to one or more strategies, but are organized around the main strategy addressed. Review and development of implementation actions every five years will allow for adaptive management and inclusion of emerging scientific and technological advances. Refining the implementation actions every five years will keep the CCMP current and incorporate the most effective management practices on a regular basis.

Implementation actions are presented by theme; however, many of the actions will achieve progress in multiple theme areas. The actions with the highest priority were chosen for their timeliness, application to ecosystem indicators and targets, and support of the CCMP underlying principles. These actions will likely be completed within the first five years of implementation. These priority actions are indicated in bold blue within the Implementation Action tables in the CCMP and below.

Each implementation action includes:

- A description and background about the proposed action,
- The agencies or organizations that will carry out or collaborate on the task,
- The level of funds needed and source of the funds. The levels of funding roughly fall into the following categories –
    - $ <$25,000;
    - $$ - $25,000 to $150,000;
    - $$$ - $150,000 to $1,000,000, and
    - $$$$ - greater than $1,000,000
- Expected outputs or products that the action will generate,
- Indicators that will be used to measure the success of the implementation action,
- The implementation status of the action – either a new action or one that is already underway, and
- An approximate timeframe for action completion.

Section 1
Implementation Actions

Clean Waters and Healthy Watersheds (WW) Theme

Comprehensive Conservation and Management Plan

Table 1. Clean Waters and Healthy Watersheds (WW) Implementation Actions (Priority actions are shaded in bold blue)

Implementation Action Number	Implementation Action Title	Major Strategy Addressed
WW-1	Evaluate impact of the changing Connecticut and New York Long Island Sound Watershed population on wastewater treatment plant/combined sewer overflow loads.	1-1a1
WW-2	Using the results of the population/loading analysis (Action WW-1), strategically plan for, and implement BMPs to mitigate combined sewer overflow loadings.	1-1a2
WW-3	Explore expansion of point source and nonpoint source nutrient trading programs for the Long Island Sound watershed.	1-1a2
WW-4	**Encourage wastewater treatment plant upgrades, combined sewer overflow mitigation and elimination (where possible) to support goals and targets of LISS programs.**	**1-1a2**
WW-5	**Continue enhanced implementation of the Long Island Sound TMDL for dissolved oxygen and evaluate revision of those TMDL targets.**	**1-1a4**
WW-6	**Modify the reporting requirements of MS4 communities to improve dissolved oxygen TMDL implementation tracking and to better quantify the success of control measure actions.**	**1-1a6**
WW-7	**Improve and enforce pesticide/herbicide /fertilizer regulations and other Best Management Practices (BMPs) for agriculture and urban turf.**	**1-1a7**
WW-8	Provide technical guidance for incorporating Low Impact Development (LID) / Green Infrastructure into development and redevelopment projects and through zoning and planning changes.	1-1a8
WW-9	Conduct a population and land use change study in the Long Island Sound upper and lower watersheds to determine nutrient load stressors as a result of new development and redeveloped areas.	1-1a8
WW-10	**Develop a nonpoint source and stormwater tracking system tool for the Long Island Sound watershed.**	**1-1a8**
WW-11	Reduce the amount of impervious cover that discharges directly into waterbodies.	1-1a8
WW-12	Fix leaking sewer pipes and collection infrastructure.	1-1a8
WW-13	Remediate abandoned and underutilized sites (brownfields).	1-1a9
WW-14	Develop improved policies for packaged/decentralized wastewater treatment facilities and on-site septic systems.	1-1a10
WW-15	Improve understanding, management, and design of denitrifying on-site wastewater treatment systems to reduce nitrogen and pathogens.	1-1a10

Implementation Action Number	Implementation Action Title	Major Strategy Addressed
WW-16	**Modify septic system use and siting policies to accommodate climate change and sea level rise (SLR).**	**1-1a11**
WW-17	**Improve efficiency and resiliency of existing/new waste treatment systems including septic, WWTF and stormwater infrastructure to accommodate sea level rise (SLR).**	**1-1a11**
WW-18	Track implementation and effectiveness of approved watershed plans by local municipalities.	1-1b1
WW-19	Promote establishment and protection of riparian corridors and wetland buffers at the municipal level through development of local ordinances and promoting permanent land protection.	1-1b2
WW-20	Increase land protection efforts by municipalities and land protection organizations that permanently protect wetlands and riparian areas and buffers.	1-1b2
WW-21	Improve environmental practices (boat wrap, bottom paint, pump out etc.) at marinas.	1-2a1
WW-22	Develop water quality monitoring programs associated with coastal habitat restoration projects.	1-3b6
WW-23	**Identify and recommend removal or protection of sensitive infrastructure in the coastal zone (e.g., oil tanks, pump/power stations, etc.) and work to enact legislation to prevent future siting of such infrastructure in vulnerable coastal floodplains.**	**1-1a11**
WW-24	Encourage state, and local health departments to adopt emerging rapid bacterial detection technologies that would allow shorter administrative beach/shellfish closings than those based on rainfall only.	1-2b2
WW-25	**Monitor and track occurrences and contributing factors of biotoxin and HAB outbreaks.**	**1-3b4**
WW-26	Evaluate challenges to implementation of bioextraction in Long Island Sound, including use conflicts, economic viability, permitting and testing requirements and potential environmental impacts, and make recommendations to overcome.	1-2c2
WW-27	Improve the permitting and certification process for new aquaculture projects with products intended for human consumption, particularly those with a bioextraction focus.	1-2c2
WW-28	Estimate future phosphorus loading to Long Island Sound and its impact on Long Island Sound nutrient dynamics.	1-3a1
WW-29	Improve ability of models and/or estimated load studies to evaluate contaminant and nutrient loads in critical areas and the effectiveness of remedial actions.	1-3a2

Implementation Action Number	Implementation Action Title	Major Strategy Addressed
WW-30	Maintain and enhance the utility and efficiency of water quality monitoring of nutrient loads to Long Island Sound science and management efforts.	1-3b1
WW-31	Develop and implement a water quality monitoring strategy for nitrogen in the upper basin states of Massachusetts, Vermont, and New Hampshire.	1-3b1
WW-32	Continue to develop and implement emerging technologies to maximize the effectiveness of monitoring programs.	1-3b3
WW-33	Establish a monitoring program to identify and assess the impact of emerging and legacy contaminants on the ecosystem services and biota of Long Island Sound.	1-3b5
WW-34	Through peer review, determine the adequate level of spatial and temporal sampling needed to assess Long Island Sound water quality as it is impacted by climate change drivers. (SLR, Acidification)	1-3b7
WW-35	Continue to support, improve, and utilize the Sentinel Monitoring 'Data Citation Clearinghouse' and other data synthesis, storage, and sharing efforts.	1-3d1
WW-36	**Complete sentinel monitoring pilot programs and evaluate results to guide strategy development and future implementation of full-scale sentinel monitoring effort.**	**1-3d1**
WW-37	Conduct periodic (5 year) review and revision of Sentinel Monitoring Strategy Document.	1-3d1
WW-38	Develop a Long Island Sound specific marine debris reduction action plan.	1-2a3
WW-39	Assess sources of nutrient and pathogen contamination to Long Island Sound embayments	1-1a3

Implementation Action: WW-1

Evaluate impact of the changing Connecticut and New York Long Island Sound Watershed population on WWTF/CSO loads.

Theme:	Clean Waters and Healthy Watersheds
Goal:	1: Attain water quality objectives by reducing contaminant and nutrient loads to the land and the waters impacting Long Island Sound.
Outcome:	1-1: Contaminant and nutrient loads from land based sources in the watershed of Long Island Sound are reduced.
Objective:	1-1a: To reduce contaminant and nutrient loads from point and nonpoint sources
Strategy:	1-1a1: Evaluate and reduce contaminant and nutrient contributions from Combined Sewer Overflows (CSOs) incorporating climate change and sea level rise in planning, regulation, and Best Management Practices (BMPs) 1-1a2: Evaluate and reduce contaminant and nutrient loads from WWTFs, conveyance systems and other associated sewer lines.

Project Description/Background As population in the coastal area changes, the demands on sewer infrastructure can increase. It is important to understand the impact of changes in population over the lifespan of the infrastructure when designing and implementing upgrades. Municipalities and state agencies will incorporate population and sewer use analyses in their planning and construction proposals for WWTF (wastewater treatment facility) nutrient removal upgrades and cleanup of polluted runoff.

Cooperators and Partners The state agencies of Connecticut and New York and their respective state municipalities.

Funding Sources A combination of state and federal grants and loans primarily funded through each states' respective SRF loan and grant programs. Some limited amount of academic study/modeling could be grant funded (Possibly Enhancement grant or Futures Fund).

Level of Funds Needed Study and Report: $$, Strategic planning and implementation $$$$

Expected Outputs Report on impact of population change on loadings. Phase 2, target BMP implementation for CSO nitrogen and contaminant loading mitigation. Eventually, reduced nitrogen and contaminant loads to Long Island Sound waters.

Performance Metric(s) Reports and analyses of population trends based on US census results. Planning grants will include estimates of expected sewer use and population fluctuation as well as anticipated flow rates and nutrient levels. Completed CSO mitigation and construction projects.

Implementation Status New

Expected Timeframe Analysis Report 2016-2018. Implementation 2019-2023.

Other CCMP Objectives Supported 3-5a

Implementation Action: WW-2

Using the results of the population/loading analysis (WW-1), strategically plan for, and implement BMPs to mitigate CSO loadings.

Theme: Clean Waters and Healthy Watersheds
Goal: 1: Attain water quality objectives by reducing contaminant and nutrient loads to the land and the waters impacting Long Island Sound.
Outcome: 1-1: Contaminant and nutrient loads from land based sources in the watershed of Long Island Sound are reduced.
Objective: 1-1a: To reduce contaminant and nutrient loads from point and nonpoint sources
Strategy: 1-1a2: Reduce contaminant and nutrient loads from WWTFs

Project Description/Background As population in the coastal area changes, the demands on sewer infrastructure can increase. It is important to understand the impact of changes in population over the lifespan of the infrastructure when designing and implementing upgrades.

Cooperators and Partners The state agencies of Connecticut and New York and their respective state municipalities.

Funding Sources A combination of state and federal grants and loans primarily funded through each states' respective SRF loan and grant programs. Some limited amount of academic study/modeling could be grant funded (Possibly Enhancement grant or Futures Fund).

Level of Funds Needed $$
Could possibly fund from Futures Fund, Enhancement grant or other partner grant funding

Expected Outputs Report on impact of population change on loadings

Performance Metric(s) Reports and analyses of population trends based on US census results. Planning grants will include estimates of expected sewer use and population fluctuation as well as anticipated flow rates and nutrient levels.

Implementation Status New

Expected Timeframe Report 2-3 years. Implementation 2020-2025

Other CCMP Objectives Supported 3-4a

Implementation Action: WW-3

Explore expansion of point source and nonpoint source nutrient trading programs for the Long Island Sound watershed.

Theme:	Clean Waters and Healthy Watersheds
Goal:	1: Attain water quality objectives by reducing contaminant and nutrient loads to the land and the waters impacting Long Island Sound.
Outcome:	1-1: Contaminant and nutrient loads from land based sources in the watershed of Long Island Sound are reduced.
Objective:	1-1a: To reduce contaminant and nutrient loads from point and nonpoint sources and other point sources
Strategy:	1-1a2: Reduce contaminant and nutrient loads from WWTFs

Project Description/Background Nutrient trading programs are important because they provide economic market based incentives to support cost effective nutrient reduction strategies. State agencies will continue support of existing point source nutrient trading programs (such as Connecticut's Nitrogen General Permit and Nitrogen Credit Exchange Program) and support expansion of potential new nonpoint source trading programs implemented at the municipal level throughout the Long Island Sound watershed as well.

Cooperators and Partners The state environmental agencies of Connecticut and New York (as well as the upper basin states) and their respective state municipalities.

Funding Sources A combination of state Clean Water SRF funding and local municipal and private funding sources.

Level of Funds Needed $$$$
Eventually could be self-sustaining by implementing a true trading program rather than marketplace.

Expected Outputs Reduced nutrient loads from terrestrial point source and nonpoint sources. More efficient use of infrastructure upgrade funds.

Performance Metric(s) Number of municipalities participating in credit exchange. Number of credits exchanged.

Implementation Status Underway
Connecticut Nitrogen General Permit and Nitrogen Trading program is underway. The New York permits are underway and if they implement a trading program it will be new.

Expected Timeframe Maintaining current point source trading: 2015-2020. Inclusion of nonpoint source trading: 2020-2030

Other CCMP Objectives Supported 1-1b, 1-1a5, 3-4a

Implementation Action: WW-4

Encourage WWTF upgrades, CSO mitigation and elimination (where possible) to support goals and targets of LISS programs.

Theme:	Clean Waters and Healthy Watersheds
Goal:	1: Attain water quality objectives by reducing contaminant and nutrient loads to the land and the waters impacting Long Island Sound.
Outcome:	1-1: Contaminant and nutrient loads from land based sources in the watershed of Long Island Sound are reduced.
Objective:	1-1a: To reduce contaminant and nutrient loads from point and nonpoint sources
Strategy:	1-1a2: Reduce contaminant and nutrient loads from WWTFs

Project Description/Background Though many WWTFs have already upgraded to advanced wastewater treatment, additional upgrades may be necessary to meet water quality and habitat (e.g. eelgrass) goals. Upgrading wastewater treatment facilities with best available technologies for nitrogen and nutrient removal remains one of the most cost effective management strategies to accomplish these goals.

Cooperators and Partners The state environmental agencies of Connecticut and New York (and the upper basin states) and their respective state municipalities.

Funding Sources A combination of state and federal grants and loans primarily funded through each states' respective SRF loan and grant programs

Level of Funds Needed $$$$

Expected Outputs Through onsite monitoring and monthly discharge reports (DMRs) municipalities will report on nitrogen discharge levels of their wastewater treatment facilities. Through participation in each states' individual permit or general permit program and through aiming for the goals of the Bi-state Long Island Sound TMDL municipalities will work with the State agencies to identify and improve nitrogen removal capabilities in WWTF systems.

Performance Metric(s) Reduced Nitrogen loads to Long Island Sound waters from WWTFs

Implementation Status Underway
Both states have already spent hundreds of millions of dollars on nutrient removal upgrades over the last 15 years.

Expected Timeframe Plans in place but still underway to meet 2014 TMDL. Future upgrade timeline depends on changes to TMDL.

Implementation Action: WW-5

Continue enhanced implementation of the Long Island Sound TMDL for dissolved oxygen and evaluate revision of those TMDL targets.

Theme: Clean Waters and Healthy Watersheds
Goal: 1: Attain water quality objectives by reducing contaminant and nutrient loads to the land and the waters impacting Long Island Sound.
Outcome: 1-1: Contaminant and nutrient loads from land based sources in the watershed of Long Island Sound are reduced.
Objective: 1-1a: To reduce contaminant and nutrient loads from point and nonpoint sources
Strategy: 1-1a4: Continue enhanced implementation of existing 2000 Total Maximum Daily Load (TMDL) for nitrogen in Long Island Sound and embayments, and adapt and revise as appropriate based on monitoring, modeling, and research findings

Project Description/Background It is important and necessary to scientifically support the existing sound-wide TMDL for dissolved oxygen. The states of Connecticut, New York, Massachusetts, New Hampshire and Vermont will continue to work with EPA to continue current WWTF upgrades, implement a tributary state WWTF permitting strategy, assess current stormwater and NPS control effectiveness, understand nitrogen loading to groundwater, and continue development of a feasible tracking system for NPS nitrogen reductions. The 5-state workgroup will continue to work toward revision of the Long Island Sound TMDL.

Cooperators and Partners EPA, CTDEEP, NYSDEC, MADEP, NHDES and VTDEC, and local government agencies

Funding Sources Federal and state funding would likely be necessary, Including CWF, SRF and other funding

Level of Funds Needed Contractor support for TMDL revision - $$
Implementation to achieve revised TMDL - $$$$

Expected Outputs Implementation of Long Island Sound TMDL and progress toward a 5-state revision

Performance Metric(s)
Attainment of 2000 TMDL wasteload allocation; Completion of an evaluation of and plan for TMDL Revision

Implementation Status Underway
The TMDL Work Group is developing enhancements to the existing TMDL.

Expected Timeframe 2015-2020

Other CCMP Objectives Supported 1-1a, 1-1b

Implementation Action: WW-6

Modify the reporting requirements of MS4 communities to improve TMDL implementation tracking and to better quantify the success of control measure actions.

Theme:	Clean Waters and Healthy Watersheds
Goal:	1: Attain water quality objectives by reducing contaminant and nutrient loads to the land and the waters impacting Long Island Sound
Outcome:	1-1: Contaminant and nutrient loads from land based sources in the watershed of Long Island Sound are reduced.
Objective:	1-1a: To reduce contaminant and nutrient loads from point and nonpoint sources
Strategy:	1-1a6: Encourage cross-department collaboration and cooperation at the municipal level to meet MS4 BMPs (e.g., involve highway departments)

Project Description/Background MS4 communities are required to report actions taken to address the six minimum control measures for stormwater runoff and other actions to reduce pollutant loads to impaired waters. Current reporting does not provide sufficient information to determine the impact of the actions. Improved information from the regulated communities will allow the states and LISS to better assess and track the actions taken to address water quality and the relative success of each action. For example, current reporting requires only a listing of actions, but does not require an estimate of the improvement to the entire system. This action also encourages greater state oversight of MS4 permits/permittees. Also included will be the evaluation of the relative source contribution of nitrogen loading to groundwater, e.g., OSWTS, lawn fertilizer, agricultural, legacy land use, etc.

Cooperators and Partners The states of New York, Connecticut, and Massachusetts and MS4 regulated municipalities.

Funding Sources State agency funds would be required to implement revised requirements.

Level of Funds Needed $$
Some costs may be incurred by municipalities to collect additional data and modify reporting systems.

Expected outputs New reporting requirements and a better understanding of the relative success of control measures.

Performance Metric(s) Municipal tracking that reports actions in terms of percentage improvement of the entire stormwater collection/treatment system and volume of discharge treated.

Implementation Status: Underway
The MS4 programs in both states are currently fully implemented. This particular reporting task would not be a new action 9now currently required under the MS4 regulations.

Expected Timeframe 2015-2018 to develop and implement a new reporting system

Other CCMP Objectives Supported 1-1a

Implementation Action: WW-7

Improve and enforce pesticide/herbicide regulations and other Best Management Practices (BMPs) for agriculture and urban turf.

Theme:	Clean Waters and Healthy Watersheds
Goal:	1: Attain water quality objectives by reducing contaminant and nutrient loads to the land and the waters impacting Long Island Sound.
Outcome:	1-1: Contaminant and nutrient loads from land based sources in the watershed of Long Island Sound are reduced.
Objective:	1-1a: To reduce contaminant and nutrient loads from point and nonpoint sources
Strategy:	1-1a7: Reduce contaminant and nutrient loads from agricultural nonpoint sources of runoff

Project Description/Background Both state environmental agencies and agriculture agencies regulate statewide manufacture, sales and use of pesticides and herbicides. Connecticut has recently passed legislation controlling the use of pesticides at daycare and school facilities as well as fertilizer laws for the agricultural use of fertilizers and pesticides. Each state will continue to regulate safe and prudent standards of and permits for chemical applications to the lands within the Long Island Sound watershed. Furthermore, states will continue to evaluate new BMPs with respect to pesticide/herbicide and fertilizer application.

Cooperators and Partners The state agencies of Connecticut and New York and their respective state municipalities. Some assistance may be provided by Cooperative Extensions particularly with respect to the future of Integrated Pest Management strategies (IPMs).

Funding Sources A state and federal grants and loans primarily funded through each states' respective SRF loan and grant programs and through EPA Grants. Other local grants.

Level of Funds Needed $$

Expected Outputs Reduced contaminated storm water runoff to Long Island Sound tributaries. Healthier soils and reduced human exposure to potential chemical hazards.

Performance Metric(s) Recorded number of new state regulations for pesticide use. Number of integrated pest management programs being implemented in the Long Island Sound watershed.

Implementation Status Underway
Steps were taken under the first LISS CCMP and will be continued by both states.

Expected Timeframe 2015 – December 2020

Other CCMP Objectives Supported 3-1b

Implementation Action: WW-8

Provide technical guidance for incorporating Low Impact Development (LID) / Green Infrastructure into development and redevelopment projects and through zoning and planning changes.

Theme:	Clean Waters and Healthy Watersheds
Goal:	1: Attain water quality objectives by reducing contaminant and nutrient loads to the land and the waters impacting Long Island Sound.
Outcome:	1-1: Contaminant and nutrient loads from land based sources in the watershed of Long Island Sound are reduced.
Objective:	1-1a: To reduce contaminant and nutrient loads from point and nonpoint sources
Strategy:	1-1a8: Reduce contaminants, nutrients and runoff volume from new and existing residential development

Project Description/Background Low impact development and green infrastructure can reduce demand on wastewater treatment plants, and decrease amount and concentration of nutrients and contaminants entering stormwater and/or groundwater flows into Long Island Sound. State agencies will continue support of LID and Green Infrastructure practices for managing stormwater runoff. States will also assist municipalities in incorporating LID and Green Infrastructure BMPs into local land use regulations and building codes in the Long Island Sound watershed to contribute to smart growth, increased groundwater recharge, and restoration of hydrologic functions to subwatersheds. Municipalities will implement LID/GI practices at the local level. Reduction of stormwater runoff from impervious surfaces directly to surface water bodies will be accomplished through a number of practices but not limited to:

- Removing deteriorated impervious surfaces and replacing with new pervious surface porous materials (or restoring open vegetated areas).
- Diverting runoff from existing impervious surfaces to green BMP infrastructure.
- Containing excessive stormwater runoff in grey infrastructure for post storm treatment at municipal waste water treatment plants.

Cooperators and Partners The state agencies of Connecticut and New York and their respective state municipalities. LISS NPS workgroup. New York/Connecticut Sea Grant and NEMO programs. NGOs and other public and private groups could assist with implementation.

Funding Sources A combination of state and federal grants and loans primarily funded through each states' respective SRF loan and grant programs and through EPA Grants. LISFF, other local grants.

Level of Funds Needed $$-$$$$
Individual projects range from 20-30K up to several million dollars depending on size and scope.

Expected Outputs: Reduced nutrient loads from terrestrial nonpoint sources. Increased awareness of need for LID.

Performance Metric(s) Increased number of development/re-development projects and private facilities with green BMPs.

Implementation Status Underway
Both states have sponsored LID/GI workshops and symposiums

Expected Timeframe 2015 - 2020

Other CCMP Objectives Supported 1-1b, 3-4c, 3-6a

Implementation Action: WW-9

Conduct a population and land use change study in the Long Island Sound upper and lower watersheds to determine nutrient load stressors as a result of new development and redeveloped areas.

Theme:	Clean Waters and Healthy Watersheds
Goal:	1: Attain water quality objectives by reducing contaminant and nutrient loads to the land and the waters impacting Long Island Sound.
Outcome:	1-1: Contaminant and nutrient loads from land based sources in the watershed of Long Island Sound are reduced.
Objective:	1-1a: To reduce contaminant and nutrient loads from point and nonpoint sources
Strategy:	1-1a8: Reduce contaminants, nutrients and runoff volume from new and existing residential development

Project Description/Background Measure how much of the Long Island Sound watershed and ground-watershed population growth since 1990 (TMDL baseline) has occurred in portions of the watershed that are unsewered (manages sewage via septic system). Measure how increased developed land and impervious cover have influenced drivers of nitrogen loading from developed lands, and likewise, how changes in agricultural practices and land cover have changed nitrogen loading stressors in the watershed. This action also encourages enforcement of existing local laws that govern use of turf fertilizers and developing a better understanding of the impact and importance of turf management to nitrogen load to groundwater.

Cooperators and Partners The state agencies of Connecticut, New York, Massachusetts, New Hampshire and Vermont and their respective state municipalities. Local water resource planning agencies. A contract/research study may be necessary to facilitate policy development.

Funding Sources A combination of state and federal grants and loans primarily funded through each states' respective SRF loan and grant programs and through EPA Grants. Long Island Sound Futures Fund, other local grants and private funds.

Level of Funds Needed $$$ (may be provided by LISFF)

Expected Outputs Data to enable state and municipal managers to implement best management practices for mitigating nutrient stressors to surface and groundwater runoff. Improved efficiency of nutrient and contaminant removal in human sewage from small decentralized treatment and onsite sewage systems. Improve ground water quality and reduced surface water contamination from failed systems. Reduce water load on WWTFs

Performance Metric(s) Population shift data and land cover and land use changes over time. Recorded number of state municipalities incorporating special sewer districts and number of decentralized treatment systems installed in the Long Island Sound watershed.

Implementation Status New

Expected Timeframe Conduct study 2016-2018. Broad scale implementation in 2020-2030.

Other CCMP Objectives Supported 3-6b 4-1a, 3-1c

Implementation Action: WW-10

Develop a nonpoint source and stormwater tracking system tool for the Long Island Sound Watershed.

Theme:	Clean Waters and Healthy Watersheds
Goal:	1: Attain water quality objectives by reducing contaminant and nutrient loads to the land and the waters impacting Long Island Sound.
Outcome:	1-1: Contaminant and nutrient loads from land based sources in the watershed of Long Island Sound are reduced.
Objective:	1-1a: To reduce contaminant and nutrient loads from point and nonpoint sources
Strategy:	1-1a8: Reduce contaminants, nutrients and runoff volume from new and existing residential development

Project Description/Background The Long Island Sound TMDL and NPS & Watersheds Workgroups identified the need to develop a tracking system in order to account for on-the-ground activities related to reducing nitrogen from nonpoint sources and stormwater. The tool will act as a database for both qualitative and quantitative activities, allow for implementation planning through adjustments to scenarios, and permit a more quantitative evaluation of progress relative to the TMDL required nitrogen reductions.

Cooperators and Partners EPA Region 1, EPA LISS, States of Connecticut, New York, Massachusetts, New Hampshire and Vermont. A contract with a qualified consultant to complete the required tasks will be necessary.

Funding Sources LISS above-base funding.

Level of Funds Needed $$
Additional funds will likely be needed in order to obtain required data for the entire watershed once pilot project is complete.

Expected Outputs A functional tracking and accountability system to store implementation activities related to reducing nitrogen and qualitatively track progress towards attainment of the TMDL. The Tracking system will establish consistency for data collection, implementation planning, and determining progress across the Long Island Sound watershed.

Performance Metric(s) Complete and adopt Tracking Tool, successfully implement pilot program

Implementation Status Underway
Enhancement grant has already been awarded to a contractor to research and assist LISS in developing an NPS tracking tool.

Expected Timeframe One year to complete RFP process and select contractor. Two years to complete the above two phases. Several years to fully populate the Tracking System.

Other CCMP Objectives Supported 1-1a,1-1b

Implementation Action: WW-11

Reduce the amount of impervious cover that discharges directly into waterbodies.

Theme:	Clean Waters and Healthy Watersheds
Goal:	1: Attain water quality objectives by reducing contaminant and nutrient loads to the land and the waters impacting Long Island Sound.
Outcome:	1-1: Contaminant and nutrient loads from land based sources in the watershed of Long Island Sound are reduced.
Objective:	1-1a: To reduce contaminant and nutrient loads from point and nonpoint sources
Strategy:	1-1a8: Reduce contaminants, nutrients and runoff volume from new and existing residential development

Project Description/Background The percent of impervious cover impacts water quality as subsurface infiltration and filtration is reduced and contaminants from auto exhaust and leakage, landscaping, and road treatment are rapidly incorporated into runoff that discharges directly to surface water bodies or storm sewers. Appropriate regulations, active promotion and support of innovative stormwater management and LID/Green Infrastructure practices by states and municipalities for managing stormwater runoff will curb direct runoff. Provide training and resources to promote establishment of green infrastructure and LID BMPs in municipal codes. Municipalities will implement LID/GI practices at the local level.

Cooperators and Partners The state agencies of Connecticut and New York and their respective state municipalities.

Funding Sources Municipal and private funding. Possible Long Island Sound Futures Funding for projects.

Level of Funds Needed $$-$$$$
Estimated planning costs = $50K per project. Implementation costs vary

Expected Outputs Reduced contaminant loads from terrestrial point source and nonpoint sources.

Performance Metric(s) % impervious cover.

Implementation Status Underway

Expected Timeframe 2015 – 2019

Other CCMP Objectives Supported 1-1b, 3-5a

Implementation Action: WW-12

Fix leaking sewer pipes and collection infrastructure.

Theme:	Clean Waters and Healthy Watersheds
Goal:	1: Attain water quality objectives by reducing contaminant and nutrient loads to the land and the waters impacting Long Island Sound.
Outcome:	1-1: Contaminant and nutrient loads from land-based sources in the watershed of Long Island Sound are reduced
Objective:	1-1a: To reduce contaminant and nutrient loads from point and nonpoint sources
Strategy:	1-1a8: Reduce contaminants, nutrients and runoff volume from new and existing residential development

Project Description/Background Failing sewer infrastructure is a significant contributor to bacterial contamination and groundwater nutrient loading in many coastal municipalities. In New York, 37% of sewer infrastructure is assessed as in "fair" or worse condition, with 21% assessed as "poor" or "very poor". (http://www.dec.ny.gov/docs/water_pdf/infrastructurerpt.pdf) It is a critical priority to invest the time and money necessary to locate and repair leaking/damaged sewer infrastructure, while at the same time, making infrastructure more resilient to future damage and climate change

Cooperators and Partners New York and Connecticut municipalities. State agencies and LISS could provide logistical and planning assistance and possibly some funding.

Funding Sources LISFF could fund some tracking studies etc. and work with states to prioritize upgrades based on expected system benefit and need could be developed to optimize the use of funds. Funding for repairs would primarily have to come from municipalities or states (Clean Water SRF), and could be recouped to a limited extent through sewer rates for end users. USDA and EPA have some infrastructure grant programs as well.

Level of Funds Needed $$$$

NYSDEC estimates that the cost of repairing aging sewer infrastructure in that state is roughly 6.6 billion dollars (http://www.dec.ny.gov/docs/water_pdf/infrastructurerpt.pdf). While this includes a large amount of area outside of the Long Island Sound watershed, the cost for the Long Island Sound portions of New York and Connecticut could cost billions of dollars. (funding provided from State and municipal bonds or federal grants through the SRF programs)

Expected Outputs Reduced nitrogen and pathogen loading into Long Island Sound. Reduced shellfish/beach closures.

Performance Metric(s) Increased repairs of sewer infrastructure.

Implementation Status Underway, however a comprehensive strategic planning effort would be a new undertaking.

Expected Timeframe Ongoing. Should be addressed on a rolling basis, since infrastructure that is now performing acceptably will become faulty/obsolete. If upgrades are addressed as need arises, emergencies would be reduce and costs would be spread out.

Other CCMP Objectives Supported 3-5a

Implementation Action: WW-13

Remediate abandoned and underutilized sites (Brownfields).

Theme:	Clean Waters and Healthy Watersheds
Goal:	1: Attain water quality objectives by reducing contaminant and nutrient loads to the land and the waters impacting Long Island Sound.
Outcome:	1-1: Contaminant and nutrient loads from land based sources in the watershed of Long Island Sound are reduced.
Objective:	1-1a: To reduce contaminant and nutrient loads from point and nonpoint sources
Strategy:	1-1a9: Reduce contaminants, nutrients and runoff from commercial/industrial development/re-development including supporting reductions from power plants and other industrial sources

Project Description/Background Obtain and provide funding to municipalities for remediating former industry and abandoned commercial/industrial sites. Including cleaning up contaminated superfund sites and restoring and replacing derelict structures in coastal districts around Long Island Sound to contribute to smart growth and development of public access and vibrant shoreline communities.

Cooperators and Partners The state agencies of Connecticut (DECD & DEEP http://www.ct.gov/deep/cwp/view.asp?a=2715&q=489000&deepNav_GID=1626#ABCProgram) and New York (http://www.dec.ny.gov/chemical/8450.html) , their respective state municipalities, redevelopment agencies and other quasi-government organizations. Non-profit land acquisition organizations (TNC, Audubon)

Funding Sources A combination of state and federal grants and loans primarily funded through each states' respective SRF loan and grant programs and through EPA Grants. See http://www.ctbrownfields.gov/ctbrownfields/site/default.asp and http://www.dec.ny.gov/chemical/brownfields.html. Private/non-profit funding may assist.

Level of Funds Needed $$$$
Individual projects can easily exceed $1M. Expected funds equal more than $10 million.

Expected Outputs Eliminate contaminated soils and sediments around Long Island Sound and reduced polluted storm water runoff and leaching of contaminants into ground water.

Performance Metric(s) # acres restored/remediated

Implementation Status New
While some efforts may have been made, a formal process to undertake systematic removal would be a new process

Expected Timeframe Ongoing. Specific action plan needs to be written. (January 2015 – December 2020)

Other CCMP Objectives Supported 1-2b, 3-6a

Implementation Action: WW-14

Develop improved policies for packaged/decentralized wastewater treatment plants and on-site septic systems.

Theme: Clean Waters and Healthy Watersheds
Goal: 1: Attain water quality objectives by reducing contaminant and nutrient loads to the land and the waters impacting Long Island Sound.
Outcome: 1-1: Contaminant and nutrient loads from land based sources in the watershed of Long Island Sound are reduced.
Objective: 1-1a: To reduce contaminant and nutrient loads from point and nonpoint sources
Strategy: 1-1a10: Improve and manage decentralized, package, and on-site wastewater treatment systems (OSWTSs) to reduce contaminant and nutrient loading

Project Description/Background Provide training and resources to watershed management, septic system inspectors and planning agencies for developing and implementing best available technology for decentralized treatment plants and on-site sewage systems, including upgrades consistent with SCDHS 2014 Comprehensive Water Resources Management Plan. Utilizing existing EPA guidance documents the two state Health agencies will oversee and implement regulations for decentralized treatment plants and on-site septic systems. LISS urges Connecticut and New York to implement the management components of the EPA's **'Voluntary National Guidelines for Management of Onsite and Clustered (Decentralized) Wastewater Treatment Systems' (2003**) and encourages the two state Health agencies to discuss nutrient removal systems. This action also encourages development, implementation, and/or enforcement of local laws and ordinances that promote and/or govern comprehensive management of onsite and decentralized wastewater treatment systems.

Cooperators and Partners The state, county and municipal agencies of Connecticut and New York. A contract/research study may be necessary to facilitate policy development.

Funding Sources A combination of state and federal grants and loans primarily funded through each states' respective SRF loan and grant programs and through EPA Grants. Possible Long Island Sound Futures Fund, other local grants or private funds could be used for studies or pilot projects.

Level of Funds Needed $$$

Expected Outputs Improved efficiency of nutrient and contaminant removal in human sewage from small decentralized treatment and onsite sewage systems. Improve ground water quality and reduced surface water contamination. Reduce water load on WWTFs

Performance Metric(s) Recorded number of state municipalities incorporating special sewer districts and number of decentralized treatment systems installed in the Long Island Sound watershed. # of conventional systems replaced with decentralized systems.

Implementation Status New

Expected Timeframe 2-3 years to solicit and implement study. Broad scale implementation in 2020-2030 time range

Other CCMP Objectives Supported 3-6b 4-1a, 3-1c

NOTE: Project Description/Background: The New York State Department of Health Design Standards for individual onsite systems (appendix 75A) do not address nutrient removal systems. Of particular relevance the NYSDOH does not consider nitrogen to be a public health issue statewide – as a result nitrogen removal systems are not in their design standards. There is also a split authority between NYSDOH and NYSDEC for decentralized systems – DOH has jurisdiction for systems 1000 gpd or less – DEC greater than 1000 gpd. As a result residential nitrogen removal systems do not get addressed at the state level – falls to Suffolk County (little focus in Nassau County on onsite nitrogen removal systems for residential use. (Per Kristina Heineman, EPA Region 2)

Implementation Action: WW-15

Improve understanding, management, and design of denitrifying on-site wastewater treatment systems (OSWTSs) to reduce nitrogen and pathogens.

Theme: Clean Waters and Healthy Watersheds
Goal: 1: Attain water quality objectives by reducing contaminant and nutrient loads to the land and the waters impacting Long Island Sound.
Outcome: 1-1: Contaminant and nutrient loads from land based sources in the watershed of Long Island Sound are reduced.
Objective: 1-1a: To reduce contaminant and nutrient loads from point and nonpoint sources
Strategy: 1-1a10: Improve and manage decentralized, package, and on-site wastewater treatment systems (OSWTSs) to reduce contaminant and nutrient loading

Project Description/Background Substantial effort has been invested in increasing wastewater treatment facility infrastructure to remove nitrogen, and we are now approaching if not the limit of technology, certainly the point of diminishing returns, with respect to continued WWTF upgrades as a focus of the Long Island Sound nitrogen management strategy. More attention needs to be paid to other sources of nitrogen, and of these, sewage nitrogen from unsewered areas, particularly those near the coast, is among the largest remaining contributors. Approximately half of the homes and businesses in the watershed have OSWTS (http://longislandsoundstudy.net/wp-content/uploads/2010/03/fact13.pdf). The technology exists to remove nitrogen from these sources, but it is still expensive, rarely required by law, and in some cases, still under development. We must understand how best to utilize these systems, and when to require their implementation, and how much of an impact they can have on the nutrient budget of Long Island Sound.

Cooperators and Partners Research would likely be conducted by an academic or consulting agency partner. Implementation would fall on the municipalities. LISS can assist with logistics and possibly some funding

Funding Sources Planning grants could target LISFF. Implementation would require extramural funding or have to come out of state/municipal coffers

Level of Funds Needed Feasibility study $$$ Implementation $$$$
Upgrading to a nitrogen removing septic system costs $20-50K depending on size, which would require external funding for subsidized loan programs etc...

Expected Outputs Planning/research reports on nitrogen removing OSWTS. Eventual N load reductions resulting from implementation

Performance Metric(s) # of nitrogen removing septic systems installed or extant (difficult to track)

Implementation Status Underway/New
Efforts to understand the impact of OSWTS are underway in New York and Connecticut. A comprehensive study would be a new action that would assist these efforts

Expected Timeframe Ongoing. To do this right would probably require a comprehensive study of 2 years on the immediate term, followed by legislation to phase in new technology over the next 20 or so years.

Other CCMP Objectives Supported 1-1b, 1-2a, 1-2c, 1-3b, 3-5a, 4-4a

Implementation Action: WW-16

Modify septic system use and siting policies to accommodate climate change and sea level rise (SLR).

Theme:	Clean Waters and Healthy Watersheds
Goal:	1: Attain water quality objectives by reducing contaminant and nutrient loads to the land and the waters impacting Long Island Sound.
Outcome:	1-1: Contaminant and nutrient loads from land based sources in the watershed of Long Island Sound are reduced.
Objective:	1-1a: To reduce contaminant and nutrient loads from point and nonpoint sources
Strategy:	1-1a11: Incorporate climate change and sea level rise in planning, regulation and BMPs to control contaminant and nutrient loads

Project Description/Background Provide training and resources to shoreline municipalities and planning agencies for developing and implementing coastal adaptation and resiliency strategies for decentralized treatment plants and on-site sewage systems located within the coastal flood zones of the Long Island Sound municipalities. This also includes implementing strategies to deal with groundwater depth changes as a result of climate change. Utilizing existing EPA guidance documents the two state Health agencies will work with the municipalities to oversee and implement regulations for decentralized treatment plants and on-site septic systems.

Cooperators and Partners The state agencies of Connecticut and New York and their respective state municipalities. CTDOH/NYSDEC (for systems over 1000gpd).

Funding Sources A combination of state and federal grants and loans primarily funded through each states' respective SRF loan and grant programs and through EPA Grants. Long Island Sound Futures Fund, other local grants and private funds.

Level of Funds Needed $$$

Expected Outputs Report on changes necessary to incorporate sea level rise into existing policies.

Performance Metric(s) N/A

Implementation Status New

Expected Timeframe Ongoing; Five year action. (January 2015 – December 2020)

Other CCMP Objectives Supported 3-5a

Implementation Action: WW-17

Improve efficiency and resiliency of existing/new waste treatment systems including septic, WWTF and stormwater infrastructure to accommodate sea level rise.

Theme:	Clean Waters and Healthy Watersheds
Goal:	1: Attain water quality objectives by reducing contaminant and nutrient loads to the land and the waters impacting Long Island Sound.
Outcome:	1-1: Contaminant and nutrient loads from land based sources in the watershed of Long Island Sound are reduced.
Objective:	1-1a: To reduce contaminant and nutrient loads from point and nonpoint sources
Strategy:	1-1a11: Incorporate climate change and sea level rise in planning, regulation and BMPs to control contaminant and nutrient loads

Project Description/Background State agencies will work with municipalities to improve and protect waste water treatment plants and storm sewer infrastructure operations and efficiencies from the impacts of flood waters due to increased precipitation events and rising sea levels as a result of climate change. To minimize and prevent flood induced discharges of untreated or partially treated sewage containing excess nutrients and pollutants.

A comprehensive study needs to be done to identify where improvements are necessary and the costs associated with those improvements. Assist municipalities in applying for funding for projects to upgrade infrastructure for nonpoint source pollution control equipment and facilities.

Cooperators and Partners The state agencies of Connecticut and New York and their respective state municipalities.

Funding Sources Initial study could be LISFF funded. Implementation would be a combination of state and federal grants and loans primarily funded through each state's respective SRF loan and grant programs, to seek funding for NPS infrastructure upgrades.

Level of Funds Needed Initial Study $$ Implementation $$$$

Expected Outputs Reduced nutrient and contaminant loads to Long Island Sound (LIS). Report on required upgrades. Long term, monthly discharge reports and reporting of emergency raw sewage discharges. Track grants and loans awarded for WWTF and infrastructure projects protecting facilities from impacts of SLR and climate change resiliency.

Performance Metric(s) Amount of funding committed to infrastructure upgrades.

Implementation Status New

Expected Timeframe Five year action. (January 2015 – December 2020) Report should take one year (outside consultant funding) and should be implemented within 2-3 years. Implementation of report recommendations likely in 2020-2030 timeframe.

Other CCMP Objectives Supported 3-5a

Implementation Action: WW-18

Track implementation and effectiveness of approved watershed plans by local municipalities.

Theme:	Clean Waters and Healthy Watersheds
Goal:	1: Attain water quality objectives by reducing contaminant and nutrient loads to the land and the waters impacting Long Island Sound.
Outcome:	1-1: Contaminant and nutrient loads from land based sources in the watershed of Long Island Sound are reduced.
Objective:	1-1b: To restore and protect the hydrologic and ecological functions of the Long Island Sound watershed to protect groundwater and reduce contaminant/nutrient load to Long Island Sound
Strategy:	1-1b1: Preserve hydrologic function in developing watersheds

Project Description/Background While it is important and necessary to manage on a Soundwide basis, it is also necessary to consider individual watersheds, embayments, and municipalities, as localized physics and geography/geology often render these waterbodies oceanographically distinct from Long Island Sound proper. In order to better understand the impact of localized implementation of municipal watershed plans, it is necessary to centrally track which towns have approved plans and how they are implementing them.

Cooperators and Partners States (CTDEEP, NYSDEC), municipalities, and watershed organizations (e.g. nonprofits)

Funding Sources A combination of state and federal grants and loans primarily funded through each states' respective SRF loan and grant programs and through EPA Grants. Long Island Sound Futures Fund, other local grants.

Level of Funds Needed $$

Expected Outputs Database of town by town approved watershed plans

Performance Metric(s) Towns with approved watershed plans (weak), Number of water bodies delisted per watershed.

Implementation Status New

Expected Timeframe The tracking process would be relatively rapid to implement (1 year) but it would likely take at least 5-10 years to get all of the municipalities on board.

Other CCMP Objectives Supported 1-1b, 3-4b

Implementation Action: WW-19

Promote establishment and protection of riparian corridors and wetland buffers at the municipal level through development of local ordinances and promoting permanent land protection.

Theme: Clean Waters and Healthy Watersheds
Goal: 1: Attain water quality objectives by reducing contaminant and nutrient loads to the land and the waters impacting Long Island Sound.
Outcome: 1-1: Contaminant and nutrient loads from land based sources in the watershed of Long Island Sound are reduced.
Objective: 1-1b:To restore and protect the hydrologic and ecological functions of the Long Island Sound watershed to reduce contaminant/nutrient load to Long Island Sound
Strategy: 1-1b2: Protect wetlands, riparian buffers, and existing open land to minimize land disturbance and impervious cover

Project Description/Background Riparian buffers provide ecosystem services and can greatly mitigate the flow of nutrients and contaminants into water bodies, reduce "flashiness" of streams, and provide "urban oases" for wildlife. By providing training and resources to promote establishment of riparian corridors and vegetated wetland buffers at the municipal level we can improve the green infrastructure properties of wetlands, streams and rivers.

Cooperators and Partners The state agencies of Connecticut and New York and their respective state municipalities. Some assistance with specific guidance/BMPs may be provided by organizations such as CLEAR, NEMO, etc… NGOs and other public and private groups could assist with implementation

Funding Sources A combination of state and federal grants and loans primarily funded through each states' respective SRF loan and grant programs and through EPA Grants. Long Island Sound Futures Fund, other local grants.

Level of Funds Needed $$

Expected Outputs Reduced impervious cover and contaminated storm water runoff to Long Island Sound tributaries. Improved ground water infiltration and recharge. Restored hydrologic function of riparian areas and wetlands. Provide connectivity of wildlife corridors and greenways.

Performance Metric(s) Number of municipalities incorporating riparian and buffer zone regulations into planning and zoning.

Implementation Status New

Expected Timeframe Five year action. (January 2015 – December 2020)

Other CCMP Objectives Supported 3-4a

Implementation Action: WW-20

Increase land protection efforts by municipalities and land protection organizations that permanently protect wetlands and riparian areas and buffers.

Theme:	Clean Waters and Healthy Watersheds
Goal:	1: Attain water quality objectives by reducing contaminant and nutrient loads to the land and the waters impacting Long Island Sound.
Outcome:	1-1: Contaminant and nutrient loads from land based sources in the watershed of Long Island Sound are reduced.
Objective:	1-1b: To restore and protect the hydrologic and ecological functions of the Long Island Sound watershed to reduce contaminant/nutrient load to Long Island Sound
Strategy:	1-1b2: Protect wetlands, riparian buffers, and existing open land to minimize land disturbance and impervious cover

Project Description/Background Riparian buffers are critical to the preservation of local and sound wide water quality. Studies have shown that even narrow buffers around rivers and streams can dramatically (50-80%) reduce loading of nitrogen to these waterbodies. Riparian buffers also stabilize stream banks, reducing erosion, and help buffer storm impacts by increasing transit time of runoff and have important socio economic value. Protecting these areas with conservation easements and keeping them undeveloped is central to protecting water quality.

Cooperators and Partners States (CTDEEP, NYSDEC), municipalities, and land protection organizations (e.g. Nature Conservancy, Audubon, Land trusts, etc…)

Funding Sources: LISS, land protection organization acquisition budgets, grants, state land protection funds

Level of Funds Needed $$$$

Expected Outputs increase in protected buffer acres (can set quantitative target)

Performance Metric(s): Riparian buffer acres (already tracked by UCONN CLEAR)

Implementation Status Underway
The protection of wetlands/riparian zones is already a priority for many organizations

Expected Timeframe ongoing, would need to set a 5 year target.

Other CCMP Objectives Supported 1-1b, 1-1b, 1-2a, 2-1a, 2-1b, 2-1c, 2-2d, 4-5a,3-6a, 3-5a

Implementation Action: WW-21

Improve environmental practices (boat wrap, bottom paint, pump out etc...) at marinas.

Theme:	Clean Waters and Healthy Watersheds
Goal:	1: Attain water quality objectives by reducing contaminant and nutrient loads to the land and the waters impacting Long Island Sound.
Outcome:	1-2: The negative impact of contaminants and nutrients in the waters and sediments of Long Island Sound and tributaries/embayments are reduced.
Objective:	1-2a: To reduce direct sources of nutrients and contaminants to the Long Island Sound ecosystem
Strategy:	1-2a1: Minimize vessel/marina discharge impacts 1-2a3: Reduce generation of marine debris and improve and increase its cleanup in Long Island Sound waters

Project Description/Background Marinas and recreational boating are an important source of direct and indirect revenue for Long Island Sound, but can also be a major source of pollution. Boat wrap is typically non-biodegradable plastic, and is susceptible to being blown into the sound by winds. Bottom paint contains toxic chemicals (generally copper and/or other pesticides), which can contaminate the Sound or nearshore ecosystems when boats are sanded/chipped prior to being repainted each year. Improper dumping or handling of vessel holding tanks can be a source of bacterial or nutrient contamination. In general, improving the environmental sustainability of this industry will yield benefits both to the economy, to Long Island Sound, and to those who use it. Information can be found at the Connecticut Clean Marina Program/ New York Sea Grant Environmental Best Management Practices website.

Cooperators and Partners States & municipalities, marina owner/operators (with LISO assistance) CTDEEP web site

Funding Sources LISFF might fund development/public information campaign. Ultimately, marina owners would shoulder the cost of implementation, which would presumably be passed on to the recreational boating community. States/municipalities would shoulder the cost of enforcing the program but could possibly recoup this cost through implementing fines.

Level of Funds Needed $$

The ultimate cost of enacting the program would be highly variable from marina to marina depending on their current practices.

Expected Outputs Reduced pollution of Long Island Sound by the recreational boating industry.

Performance Metric(s) Number of marinas that adopt these practices.

Implementation Status New/underway. Both Connecticut and New York have programs that deal with this issue.

Expected Timeframe 2015-2017 issue an RFP and grant to spread information on BMPs.
2015 - 2025 for States/municipalities to come on board and phase regulations in to enforce.

Other CCMP Objectives Supported: 3-1c, 3-3a, 3-6b

Notes: This would be relatively easy to design, though the resources to enforce it could be costly. It could possibly start off as a volunteer participation program with a ‘green marina’ designation.

Implementation Action: WW-22

Develop water quality monitoring programs associated with coastal habitat restoration projects

Theme: Clean Waters and Healthy Watersheds
Goal 1: Attain water quality objectives by reducing contaminant and nutrient loads to the land and the waters impacting Long Island Sound..
Outcome: 1-3: Research, monitoring, and modeling to support attainment of water quality objectives is maintained and improved.
Objective: 1-3b: To research, monitor, and assess water quality and factors that contribute to water quality change.
Strategy: 1-3b6: Understand impacts of climate change (e.g., acidification, sea level rise, temperature) on Long Island Sound water quality and biota

Project Description/Background In order to understand the impact of habitat restoration projects on water quality it is necessary to better understand water quality conditions and changes at in and around habitat restoration projects. This will document baseline (pre-restoration) conditions and post restoration conditions so that post restoration management can be improved.

Cooperators and Partners Various - based on lead partner for projects, and/or property owner; water quality monitoring groups (ex, at state and municipal level); LISS-NPS workgroup

Funding Sources Various federal, state, and local funding sources

Level of Funds Needed $$-$$$ Will vary depending on project and partners

Expected Outputs

- *Water quality database to document water quality changes at restoration project sites*
- A list of resources and contacts that can be called upon to develop water quality monitoring plans/programs.

Performance Metric(s)

- Number of water quality monitoring programs developed for coastal habitat restoration projects.
- Accessible WQ database for coastal habitat restoration projects
- List of specific areas of anticipated water quality improvement for certain restoration projects (ex. impervious surface reduced, riparian buffer widened etc.)

Implementation Status New

Expected Timeframe

2015 - Identify existing and planned restoration projects to be monitored (pre- and post-restoration).
2016 - Initiate water quality monitoring
2017-2020 continue to identify and monitor restoration sites

Implementation Action: WW-23

Identify and recommend removal or protection of sensitive infrastructure in the coastal zone (e.g., oil tanks, pump/power stations, etc.) and work to enact legislation to prevent future siting of such infrastructure in vulnerable coastal floodplains.

Theme:	Clean Waters and Healthy Watersheds
Goal:	1: Attain water quality objectives by reducing contaminant and nutrient loads to the land and the waters impacting Long Island Sound.
Outcome:	1-1: Contaminant and nutrient loads from land based sources in the watershed of Long Island Sound are reduced.
Objective:	1-1a: To reduce contaminant and nutrient loads from point and nonpoint sources
Strategy:	1-1a11: Incorporate climate change and sea level rise in planning, regulation and BMPs to control contaminant and nutrient loads 1-2a2: Maintain and improve spill prevention and disaster preparedness and response planning

Project Description/Background Coastal infrastructure such as oil storage facilities, public works facilities, power infrastructure etc. can be vulnerable to increased threat of storm surges and sea level rise. Identification and relocation/retrofitting of these facilities will help to reduce damage and prevent releases of pollutants to Long Island Sound. This action will include training and providing resources to legislators and municipal managers on coastal resiliency, planning and adaptation to enact better laws and guidance on siting and to provide the tools needed for appropriate placement of municipal infrastructure in safe flood protected areas. Coastal Management Act CGS Section 22a-92(b)(1)(E) already disallows the siting within the coastal boundary of new tank farms and other new fuel and chemical storage facilities which can reasonably be located inland and requires any new storage tanks which must be located within the coastal boundary to abut existing storage tanks or to be located in urban industrial areas and to be adequately protected against floods and spills. This action is, therefore, consistent with the Coastal Management Act.

Cooperators and Partners The state legislatures and the state agencies of Connecticut and New York and their respective state municipalities. The LISS CAC and other Long Island Sound stakeholders.

Funding Sources Planning/study could be funded by Long Island Sound Futures Fund, other local grants. Actual expenses for moving/protection would have to come from SRFs

Level of Funds Needed $$

Expected Outputs Secure and adaptable coastal resiliency plans that will protect infrastructure and reduce the impacts of accidental pollutant releases due to natural weather disasters and sea level rise (SLR). Reduced accidental spill events due to weather and flooding events.

Performance Metric(s) # of infrastructure upgrades completed/hazardous facilities removed/relocated.

Implementation Status New

Expected Timeframe Planning study should be completed within five year action window. (January 2015 – December 2020) Execution during next 5 year window (2020-2025)

Other CCMP Objectives Supported 3-4b

Implementation Action: WW-24

Encourage state and local health departments to adopt emerging rapid bacterial detection technologies that would allow shorter administrative beach/shellfish closings than those based on rainfall only.

Theme: Clean Waters and Healthy Watersheds
Goal: 1: Attain water quality objectives by reducing contaminant and nutrient loads to the land and the waters impacting Long Island Sound.
Outcome: 1-1: Contaminant and nutrient loads from land-based sources in the watershed of Long Island Sound are reduced
Objective: 1-2b: To mitigate impacts of nutrients and contaminants to human health and the Long Island Sound biota and ecosystems
Strategy: 1-2b2: Reduce human health risk through increased beach and embayment monitoring and fish and shellfish contaminant testing

Project Description/Background While temporary beach and shellfish closures in the wake of large rainstorms are an important management tool to avoid bacterial contamination and illness, present methods (fixed rainfall amounts) by nature, must be overly cautious. Rapid testing techniques for *E.coli* and fecal coliform are becoming less expensive and more reliable, and as such, should be relied on more to determine when beaches need to close, and when they can re-open. Furthermore, as we continue to improve sewage and storm sewer infrastructure, closing frequency may be able to be adjusted.

Cooperators and Partners Individual municipalities would ultimately be responsible. LISS could provide logistical and planning assistance and possibly some funding for pilot programs in association with state shellfish and beach safety programs. In Connecticut, the State Department of Public Health would oversee monitoring detections technologies for bathing beach monitoring programs and the State Department of Agriculture, Division of Shellfish and Aquaculture would oversee for detection monitoring of shellfish areas.

Funding Sources LISFF could fund pilot studies etc. Other assessment funding would come from interested municipalities, which already generally do some monitoring.

Level of Funds Needed $$

Expected Outputs Reduced beach and shellfish closures and safe beaches and shellfish. Better science informing management decisions.

Performance Metric(s)

- If a method can be shown to be effective, fewer beach/shellfish bed closure days compared to rainfall based criteria only.

Implementation Status New

Expected Timeframe 2-5 years for wide scale implementation once the program gets rolling.

Other CCMP Objectives Supported 1-1b, 1-2b, 1-2-2c2c

Notes: New York already does 24 hour testing for shellfish closure/re-opening. A1 fecal coliform method

Implementation Action: WW-25

Monitor and track occurrences and contributing factors of biotoxin and HAB outbreaks.

Theme:	Clean Waters and Healthy Watersheds
Goal:	1: Attain water quality objectives by reducing contaminant and nutrient loads to the land and the waters impacting Long Island Sound.
Outcome:	1-3: Research, monitoring, and modeling to support attainment of water quality objectives is maintained and improved.
Objective:	1-3b: To research, monitor and assess water quality and factors that contribute to water quality change
Strategy:	1-3b4: Research, monitor and assess Harmful Algae Blooms (HABs) and their impacts on water quality 1-2b2: Reduce human health risk through increased beach and embayment monitoring and fish and shellfish contaminant testing

Project Description/Background Red tides, shellfish biotoxin (PSP, DSP), and other Harmful Algal Blooms (HABs) can have significant deleterious effects on biota and ecosystems services provided by Long Island Sound in addition to direct and indirect financial impacts (e.g. beach and shellfish closures). While there are a wide range of drivers, human activity, particularly eutrophication, is linked to an increased frequency of these events. Accurate monitoring and documentation is necessary to help tease apart the causal factors of HABs and understand the impact of nutrient reduction actions for mitigating HABs.

This is particularly true because recreational and commercial shellfish are an important source of direct and indirect revenue for Long Island Sound while the seafood industry provides an important link to the ocean for residents and tourists alike. However, it is important that seafood be safe to eat.

Cooperators and Partners Some monitoring is conducted by the states (CTDEEP/IEC/NYSDEC). Additional sampling at a municipal/embayment level may be necessary. States/municipalities need to pay for testing, which could be passed on to harvesters via license fee

Funding Sources Limited funding for this is included in the LISS base budget. Additional study would likely require either an extramurally funded research grant, or a commitment to increased long term monitoring.

Level of Funds Needed Pilot $$. Full monitoring program $$$

Expected Outputs A better understanding of HABs and the factors which drive them, better tracking of pollutants to Long Island Sound (from embayment monitoring), and safer seafood.

Performance Metric(s): Frequency & duration of HABs/HAB related closures. Frequency of pass/fail for DSP/PSP in shellfish

Implementation Status Ongoing

Expected Timeframe Establishing a monitoring program could be done within 2 years, but to be effective, it would need sustained funding over a 10 year + period.

Other CCMP Objectives Supported: 1-2b, 1-2c, 1-3b4, 4-1a, 4-1b, 2-2c

Implementation Action: WW-26

Evaluate challenges to implementation of bioextraction in Long Island Sound, including use conflicts, economic viability, permitting and testing requirements and potential environmental impacts, and make recommendations to overcome.

Theme: Clean Waters and Healthy Watersheds
Goal: 1: Attain water quality objectives by reducing contaminant and nutrient loads to the land and the waters impacting Long Island Sound.
Outcome: 1-2: The negative impact of contaminants and nutrients in the waters and sediments of Long Island Sound and tributaries/embayments are reduced.
Objective: 1-2b: To mitigate impacts of nutrients and contaminants to human health and the Long Island Sound biota and ecosystems
Strategy: 1-2b3: Develop and implement methods (e.g. bioextraction) for removal of nutrients and contaminants

Project Description/Background Pilot studies have demonstrated that aquaculture of shellfish and seaweeds such as kelp may have benefits in reducing nitrogen in the sound. However, more widespread implementation of bioextraction will be difficult without further evaluation of the potential for use conflicts, economic viability, potential environmental impacts, public health concerns, and permitting and testing requirements. Shellfish filter the water, removing suspended solids, nutrients, and contaminants, and some algal species have very high growth and nitrogen assimilation rates. These aquaculture industries have the benefit of providing an ecosystem service, while also producing jobs and saleable consumer goods. However, the process of establishing bioextraction based aquaculture facilities is hampered by uncertainties about where the activities can take place and whether the activities can be sustainable over time.

Cooperators and Partners LISS could provide logistical and planning assistance and possibly some funding for a third party evaluation.

Funding Sources LISFF. Possibly a LISS enhancement grant could fund the evaluation.

Level of Funds Needed $$

Expected Outputs Report on factors affecting implementation of bioextraction in Long Island Sound and adoption by aquaculture industry.

Performance Metric(s) Implementation of bioextraction evaluation and permitting in Long Island Sound based on informed decisions by industry and regulators.

Implementation Status New

Expected Timeframe 2016- 2020, 2 - 5 years to contract and complete analysis.

Other CCMP Objectives Supported 1-1b, 1-2b, 1-3b. 1-2b3, 3-6a, 4-1b

Notes: The potential for bioextraction to substantially improve Long Island Sound water quality is dependent on a scale of implementation that may not be feasible in the near future, but there is also potential in embayments

Implementation Action: WW-27

Improve the permitting and certification process for new aquaculture projects with products intended for human consumption, particularly those projects with a bioextraction focus.

Theme: Clean Waters and Healthy Watersheds
Goal: 1: Attain water quality objectives by reducing contaminant and nutrient loads to the land and the waters impacting Long Island Sound.
Outcome: 1-2: The negative impact of contaminants and nutrients in the waters and sediments of Long Island Sound and tributaries/embayments are reduced.
Objective: 1-2b: To mitigate impacts of nutrients and contaminants to human health and the Long Island Sound biota and ecosystems
Strategy: 1-2b3: Develop and implement methods (e.g. bioextraction) for removal of nutrients and pollutants

Project Description/Background The ecosystem services benefits provided by shellfish and rooted macrophytic seaweeds (e.g. kelp) are well known. Shellfish filter the water, removing suspended solids, nutrients, and contaminants, and some algal species have very high growth and nitrogen assimilation rates. Aquaculture industries have the benefit of providing an ecosystem service, while also producing jobs and saleable consumer goods. However, the process of establishing bioextraction based aquaculture facilities is hampered by the inability of these sites to be permitted for human consumption. Testing and permitting currently is a very lengthy process, involving many permit applications, regulatory constraints, and fees. A more streamlined process needs to be implemented.

Cooperators and Partners State agencies responsible for permitting. LISS/Sea Grant could provide logistical and planning assistance and possibly some funding for pilot programs.

Funding Sources LISFF could fund pilot studies etc. Funding would ultimately come from the states, but in this case, the farmers might be asked to pay for their own expenses, as long as a process is in place.

Level of Funds Needed $$

Expected Outputs More bioextraction based aquaculture operations. Improved and streamlined ingredient testing procedures. Streamlined and timely permitting processes.

Performance Metric(s) Acreage of bioextraction based aquaculture operations or N removal from bioextraction.

Implementation Status New

Expected Timeframe 5 years to implement a program. Once a program is in place, probably an additional 5-10 years before there is a significant amount of bioextractive aquaculture going on.

Other CCMP Objectives Supported 1-1b,1-2b, 1-3b, 3-6a, 4-1b
Notes: On the one hand, if an unwieldy permit process for the human consumption approval is a barrier to entry for bioextraction, this is a relatively easy fix. On the other hand, in the short term, the potential for bioextraction to substantially improve Long Island Sound water quality is dependent on a scale of implementation that may not be feasible in the near future. There are substantial differences between New York and Connecticut on this front.

Implementation Action: WW-28

Estimate future phosphorus loading to Long Island Sound and its impact on Long Island Sound nutrient dynamics.

Theme:	Clean Waters and Healthy Watersheds
Goal:	1: Attain water quality objectives by reducing contaminant and nutrient loads to the land and the waters impacting Long Island Sound.
Outcome:	1-3: Research, monitoring, and modeling to support attainment of water quality objectives is maintained and improved.
Objective:	1-3a: To continue management efforts that improve understanding of the causes and impacts of hypoxia.
Strategy:	1-3a1: Understand the effects that nutrient ratios (nitrogen, phosphorous, carbon) have in freshwater, embayments, and Long Island Sound ecosystem function and consider them in setting nutrient control policies.

Project Description/Background A great deal of attention is devoted to the management of nitrogen into Long Island Sound and reduction of nitrogen loading. As nitrogen loads continue to decrease, however, understanding phosphorus loads will become more important, as nearshore and mesohaline areas may begin to transition to Phosphorus limitation of primary production. Since phosphorus is the nutrient of concern in freshwater systems, we need to better understand the impact of these upstream management efforts on Long Island Sound nutrient dynamics.

Cooperators and Partners University/ independent research, with logistical and possibly funding assistance from LISS

Funding Sources LISS could fund this type of research through a research grant. This type of proposal might also make a convincing research proposal to Sea Grant or another similar institution.

Level of Funds Needed $$$

Expected Outputs A better understanding of phosphorus dynamics on nutrient cycling in Long Island Sound. Incorporation into modeling efforts

Performance Metric(s) N/A

Implementation Status New

Expected Timeframe At present, this is not a high concern, though it could become a concern within the next 10 years or so. At that point, it would be relatively straightforward to commission a 1-2 year study to address this problem.

Other CCMP Objectives Supported 1-1a, 1-1b, 1-2a, 1-3b, 4-1a, 4-1c

Notes:
A medium term action that has the potential to become relevant in 5-10 years. Worth putting on the radar, but not worth substantial $/time investment in the immediate future.

Implementation Action: WW-29

Improve ability of models and/or estimated load studies to evaluate contaminant and nutrient loads in critical areas and the effectiveness of remedial actions.

Theme:	Clean Waters and Healthy Watersheds
Goal:	1: Attain water quality objectives by reducing contaminant and nutrient loads to the land and the waters impacting Long Island Sound.
Outcome:	1-3: Research, monitoring, and modeling to support attainment of water quality objectives is maintained and improved.
Objective:	1-3a: To continue management efforts that improve understanding of the causes and impacts of hypoxia.
Strategy:	1-3a2: Better understand eutrophication dynamics, effects and mechanisms and continue support for modeling and synthesis efforts and their application to management scenarios

Project Description/Background Despite extensive development, present ecosystem models of Long Island Sound are insufficiently sensitive to accurately run predictive scenarios. By supporting projects from academic and independent analysts using modeling tools to estimate impact of nutrient (and potentially contaminant) load scenarios to Long Island Sound we can better understand how potential management scenarios will impact the biology, chemistry, and physics of Long Island Sound.

Cooperators and Partners The LISS Management Conference partners and independent contractors. 5-state TMDL workgroup.

Funding Sources EPA/NOAA research grants. Long Island Sound Futures Fund, other local grants.

Level of Funds Needed $$$

Expected Outputs Run a number of modeling scenarios. Long term: Make management decisions based on modeled load estimates. Reduced nutrient loads based on management actions.

Performance Metric(s) N/A

Implementation Status Underway
This IA would build on substantial ongoing modeling efforts in Long Island Sound

Expected Timeframe Five year action. (January 2015 – December 2020)

Other CCMP Objectives Supported 4-1c

Implementation Action: WW-30

Maintain and enhance the utility and efficiency of water quality monitoring of nutrient loads to Long Island Sound science and management efforts.

Theme:	Clean Waters and Healthy Watersheds
Goal:	1: Attain water quality objectives by reducing contaminant and nutrient loads to the land and the waters impacting Long Island Sound
Outcome:	1-3 Research, monitoring, and modeling to support attainment of water quality objectives is maintained and improved.
Objective:	1-3b: To research, monitor and assess water quality and factors that contribute to water quality change
Strategy:	1-3b1: Research, monitor and assess sources (e.g., watershed, groundwater, atmospheric deposition) and sinks of nutrients and their impacts on water quality

Project Description/Background The Long Island Sound Study has a long standing commitment to water quality monitoring. With the recent expenditures by Connecticut and New York towards improving nutrient loading and hypoxia, it is critical to maintain a comprehensive but efficient monitoring program, and to invest in new technologies to improve the efficiency and/or resolution of our monitoring as we strive to manage adaptively in response to these changes.

Cooperators and Partners CTDEEP & IEC/NEIWPCC presently conduct the LISS funded monitoring program USGS and UCONN as well as many smaller agencies have other extant monitoring programs.

Funding Sources Approximately $1M of the LISS budget supports water quality monitoring, with additional funds *(approximately $200k)* coming from the state and from EPA 604(b) funding.

Level of Funds Needed $$$-$$$$
Current program costs approximately $1M/yr.

Expected Outputs Long term water quality monitoring dataset

Performance Metric(s) N/A

Implementation Status Underway

Expected Timeframe The program is ongoing. A systematic review is recommended within the next 2-3 years, and within the next 5-10 years, it is likely that substantial infrastructure investment will be warranted to increase the number of buoys and outfit them with new sensors (e.g. *in situ* nutrients)

Other CCMP Objectives Supported 4-1b, 4-4a

Implementation Action: WW-31

Develop and implement a water quality monitoring strategy for nitrogen in the upper basin states of Massachusetts, Vermont, and New Hampshire.

Theme:	Clean Waters and Healthy Watersheds
Goal:	1: Attain water quality objectives by reducing contaminant and nutrient loads to the land and the waters impacting Long Island Sound.
Outcome:	1-3: Research, monitoring, and modeling to support attainment of water quality objectives is maintained and improved.
Objective:	1-3b: To research, monitor and assess water quality and factors that contribute to water quality change
Strategy:	1-3b1: Research, monitor and assess sources (e.g., watershed, atmospheric deposition) and sinks of nutrients and their impacts on water quality

Project Description/Background Develop and implement water quality monitoring strategy for nitrogen in the upper basin states with a stream gage near the Massachusetts/New Hampshire/Vermont state border on the Connecticut River. Consider the use of these data to calibrate existing watershed models and/or conduct Nitrogen trend analysis and to confirm if TMDL allocations for the upper basin states have been achieved. Conduct Nitrogen trend analysis and subsequent modeling (as needed) using in-basin and upper basin ambient water quality monitoring data on watershed contributions of nitrogen delivered to the Sound by source, tributary, and state. Enhance the most recent in-stream nitrogen trend study with additional analyses to examine the influences of precipitation and in-stream flow on nitrogen loading, and implications for nitrogen source load (nonpoint versus point source).

Cooperators and Partners The state agencies of Massachusetts, New Hampshire, and Vermont their respective state municipalities. LISS TMDL workgroup and the New England Interstate Water Pollution Control Commission (NEIWPCC)

Funding Sources A combination of state and federal grants and loans primarily funded through each state's' respective SRF loan and grant programs and through EPA Grants. Long Island Sound Futures Fund, LISS Enhancement grants or other local grants.

Level of Funds Needed $$$

Expected Outputs Reduced impervious cover and contaminated storm water runoff to Long Island Sound tributaries. Improved groundwater infiltration and recharge.

Performance Metric(s) Recorded number of state municipalities incorporating LID regulations.

Implementation Status New

Expected Timeframe Five year action. (January 2015 – December 2020)

Implementation Action: WW-32

Continue to develop and implement emerging technologies to maximize the effectiveness of monitoring programs.

Theme:	Clean Waters and Healthy Watersheds
Goal:	1: Attain water quality objectives by reducing contaminant and nutrient loads to the land and the waters impacting Long Island Sound.
Outcome:	1-3: Research, monitoring, and modeling to support attainment of water quality objectives is maintained and improved.
Objective:	1-3b: To research, monitor and assess water quality and factors that contribute to water quality change
Strategy:	1-3b3: Improve identification and source tracking of NPS nutrients and contaminants

Project Description/Background With billions of dollars invested in infrastructure upgrades to improve water quality in Long Island Sound, water quality monitoring, including local embayment monitoring, is more critical than ever, since a comprehensive water quality monitoring program will help us adaptively manage and react to how the system responds to existing and future upgrades. Unfortunately, in a shrinking budget climate, funds for monitoring are sparse, but fortunately, rapid advancements in automation and miniaturization have fueled the development of new instruments and sensors which can greatly reduce lab and field sample analysis times. It is critical for LISS to invest in these technologies as soon as they are proven to be robust and reliable, as the long term cost savings could be substantial.

Cooperators and Partners LISS research and monitoring partners (DEEP, IEC, NOAA, UCONN, etc…). LISS could provide logistical support and possibly funding through the Water Quality working group.

Funding Sources University grants, NSF, Sea Grant. LISFF, Research Grant program could fund to a limited degree.

Level of Funds Needed $$$
New sensors typically cost on the order of $50-100K apiece. There are also substantial time costs associated with intercalibration, training, maintenance, and data processing.

Expected Outputs Better spatial and temporal water quality coverage and potential cost savings

Performance Metric(s) N/A

Implementation Status Underway

Expected Timeframe 2015 -2020 and ongoing.

Other CCMP Objectives Supported 1-3a, 4-1a,4-1b

Implementation Action: WW-33

Establish a monitoring program to identify and assess the impact of emerging (e.g. PBDE, pharmaceuticals) and legacy (e.g. heavy metals, PCBs) contaminants on the ecosystem services and biota of Long Island Sound.

Theme:	Clean Waters and Healthy Watersheds
Goal:	1: Attain water quality objectives by reducing contaminant and nutrient loads to the land and the waters impacting Long Island Sound.
Outcome:	1-3 Research, monitoring, and modeling to support attainment of water quality objectives is maintained and improved.
Objective:	1-3b: To research, monitor and assess water quality and factors that contribute to water quality change
Strategy:	1-3b5 Research, monitor and assess emerging and legacy contaminants and their impacts on water quality

Project Description/Background While many advances have been made with respect to reducing sources and managing legacy loads of contaminants such as heavy metals and PCBs, we are just now collecting the body of research evidence regarding the potential impacts of many emerging contaminants such as *pharmaceuticals, PBDEs, triclosan etc…* and no doubt future research will reveal new contaminants which are not even being considered today. In order to minimize environmental damage, we must work quickly to understand and regulate new and emerging contaminants.

Cooperators and Partners Academic partners, USEPA

Funding Sources LISS could fund small pilot tests/localized programs if identified. EPA funding for larger scale EPA based effort.

Level of Funds Needed $$$$

Expected Outputs A better understanding of loadings, drivers, impacts, and management options for emerging contaminants

Performance Metric(s) N/A

Implementation Status New

Expected Timeframe Ongoing.

Other CCMP Objectives Supported 1-2b, 4-1b, 4-3b

Implementation Action: WW-34

Through peer review, determine the adequate level of spatial and temporal sampling needed to assess Long Island Sound water quality as it is impacted by climate change drivers (SLR, warming, acidification).

Theme:	Clean Waters and Healthy Watersheds
Goal:	1: Attain water quality objectives by reducing contaminant and nutrient loads to the land and the waters impacting Long Island Sound.
Outcome:	1-3: Research, monitoring, and modeling to support attainment of water quality objectives is maintained and improved.
Objective:	1-3b: To research, monitor and assess water quality and factors that contribute to water quality change
Strategy:	1-3b7: Understand the impacts of climate change (acidification, sea level rise, temperature) on Long Island Sound water quality and biota.

Project Description/Background With billions of dollars invested in infrastructure upgrades to improve water quality in Long Island Sound, water quality monitoring is more critical than ever, since a comprehensive water quality monitoring program will help us adaptively manage and react to how the system responds to existing and future upgrades and to the impacts of climate change on those processes. Our understanding of how estuarine systems respond to the combined climate stressors of sea level rise, temperature increase, and acidification is limited. Unfortunately, in a shrinking budget climate, funds for monitoring are sparse, so it is critical to statistically assess and review the extent (spatial and temporal) of monitoring which is necessary to detect anticipated results, and adjust our monitoring program to be as efficient as possible.

Cooperators and Partners This is predominantly a research based project, and would likely be undertaken by a university or outside consulting firm. Probably with funding assistance from and oversight by LISS.

Funding Sources LISS through LISFF, the research program, or the enhancement grant (Base +) program.

Level of Funds Needed $$-$$$

Expected Outputs A more streamlined monitoring program and potential cost savings

Performance Metric(s) N/A

Implementation Status New
Some preliminary groundwork for this type of study is already underway

Expected Timeframe This study would probably take one year. Depending on recommendations, it could take 1-2 years to implement changes, or potentially more if substantial infrastructure purchases (e.g.. buoys) are required.

Other CCMP Objectives Supported 1-3a, 4-1b

Implementation Action: WW-35

Continue to support, improve, and utilize the Sentinel Monitoring 'Data Citation Clearinghouse' and other data synthesis, storage, and sharing efforts.

Theme: Clean Waters and Healthy Watersheds
Goal: 1 Attain water quality objectives by reducing contaminant and nutrient loads to the land and the waters impacting Long Island Sound.
Outcome: 1-3: Research, monitoring, and modeling to support attainment of water quality objectives is maintained and improved.
Objective: 1-3d: To incorporate the sentinel monitoring program in Long Island Sound programs to evaluate and address the impacts of climate change on Long Island Sound and its embayments
Strategy: 1-3d1: Fully implement the sentinel monitoring program in Long Island Sound to evaluate and address the impacts of climate change on Long Island Sound and its embayments

Project Description/Background A bi-state effort for the development of a sentinel monitoring climate change program in Long Island Sound was formally adopted in 2009 and has continued efforts since then. The program was developed in response to a request from the Management Committee to be able to incorporate climate change data and impacts into their management decisions. A formal strategy was finalized and published to the LISS website in June 2011. In response to need for a publically-available, geospatial database to serve as a central repository of research pertaining specifically to climate change in Long Island Sound, an online data citation clearinghouse was developed which includes data type, location, years of data collection and researcher contacts. The clearinghouse will facilitate collaboration, encourage data assessment and synthesis, and aid in the identification of data gaps and other research priorities. This will improve management of resources and climate adaptation Sound-wide.

This project is ongoing. A computer server was purchased to house the clearinghouse at UCONN. A web portal cover page is currently being developed on the Long Island Sound Resources Center (LISRC) web site to allow for data manipulation. Long-term, it is anticipated that the DCC will be housed at UCONN's/Connecticut DEEP's newly created Connecticut Institute for Resiliency and Climate Adaptation (CIRCA).

Cooperators and Partners The bi-state Sentinel Monitoring work group has representation from USEPA, NYSDEC, CTDEEP, NOAA, and Connecticut Sea Grant. Additionally, the work group has state leads that can and have organized state technical work groups to contribute to the development of the program.

Funding Sources Long Island Sound Study. EPA climate ready estuaries program

Level of Funds Needed Maintenance $ Substantial Upgrades: $$

Expected Outputs Improved data sharing and collaboration

Performance Metric(s) N/A

Implementation Status Underway

Expected Timeframe Ongoing

Other CCMP Objectives Supported 1-3c, 3-3c, 4-1b, 4-4a, 4-1a, 4-1b

Notes: This database structure may serve as a model for other programs, so this action may be 're-usable' across many programs.

Implementation Action: WW-36

Complete sentinel monitoring pilot programs and evaluate results to guide strategy development and future implementation of full scale sentinel monitoring effort.

Theme:	Clean Waters and Healthy Watersheds
Goal:	1: Attain water quality objectives by reducing contaminant and nutrient loads to the land and the waters impacting Long Island Sound.
Outcome:	1-3: Research, monitoring, and modeling to support attainment of water quality objectives is maintained and improved.
Objective:	1-3d: To incorporate the sentinel monitoring program in Long Island Sound programs to evaluate and address the impacts of climate change on Long Island Sound and its embayments
Strategy:	1-3d1: Fully implement the sentinel monitoring program in Long Island Sound to evaluate and address the impacts of climate change on Long Island Sound and its embayments

Project Description/Background A bi-state effort for the development of a sentinel monitoring climate change program in Long Island Sound was formally adopted in 2009 and has continued efforts since then. A formal strategy was finalized and published to the LISS website in June 2011. The program was developed in response to a request from the Management Committee to be able to incorporate climate change impacts into their management decisions. This project proposes to transition the current status of pilot sentinel monitoring for climate change into the full LIS monitoring priorities.

Cooperators and Partners The bi-state work group has representation from USEPA, NYSDEC, CTDEEP, NOAA, New York Sea Grant, and Connecticut Sea Grant. Additionally, the work group has state leads that can and have organized state technical work groups to contribute to the development of the program. The responsibility for a full scale monitoring effort would likely fall on the states.

Funding Sources Long Island Sound Study. EPA climate ready estuaries program.

Level of Funds Needed $$$
Pilot monitoring efforts have been on the order of $150K/yr. In order to sustain a full scale monitoring program, $200-300K/yr, with initial startup funds for equipment purchase.

Expected Outputs A summary of the new and current data for the three sentinels identified in the project. Create an on-line database of climate change sentinels in Long Island Sound. Finalize a Synthesis report of project data and development of next steps in the implementation of the strategy

Performance Metric(s) Full scale sentinel monitoring effort implemented

Implementation Status Underway

Expected Timeframe 2015-2020 Data and reports from 2 initial pilot monitoring programs will likely be in hand by 2015. Transition from pilot to full scale monitoring program would likely take on the order of 5 years.

Other CCMP Objectives Supported 1-2b, 4-1b
Notes: The transitioning of this monitoring program to full scale would be contingent on successful results from ongoing pilot programs, but proven effective, would likely be a high priority.

Implementation Action: WW-37

Conduct periodic (5 year) review and revision of Sentinel Monitoring Strategy Document.

Theme:	Clean Waters and Healthy Watersheds
Goal:	Attain water quality objectives by reducing contaminant and nutrient loads to the land and the waters impacting Long Island Sound.
Outcome:	1-3: Research, monitoring, and modeling to support attainment of water quality objectives is maintained and improved.
Objective:	1-3d: To incorporate the sentinel monitoring program in Long Island Sound programs to evaluate and address the impacts of climate change on Long Island Sound and its embayments
Strategy:	1-3d1: Fully implement the sentinel monitoring program in Long Island Sound to evaluate and address the impacts of climate change on Long Island Sound and its embayments

Project Description/Background A bi-state effort for the development of a Sentinel Monitoring Climate Change Program (SMCCP) in Long Island Sound was formally adopted in 2009 and has continued efforts since then. A formal strategy was finalized and published to the LISS website in June 2011. The program was developed in response to a request from the Management Committee to be able to incorporate climate change impacts into their management decisions. The Sentinel Monitoring for Climate Change Strategic Plan identified 'Long Term Next Steps' that included "this strategy is intended to be a dynamic document, the bi-state work group recommends that it is reviewed in five years. In the long-term, the SMCCP will also seek funding for a full-fledged sentinel monitoring program."

Cooperators and Partners The bi-state work group has representation from USEPA, NYSDEC, CTDEEP, NOAA, New York Sea Grant, and Connecticut Sea Grant. Additionally, the work group has state leads that can and have organized state technical work groups to contribute to the development of the program. The workgroup members would be responsible for review/revision

Funding Sources Long Island Sound Study. EPA climate ready estuaries program

Funding Level $
Since this task would be completed primarily by WG members, minimal funding would be required, but a small amount of funding would allow specific experts to help evolve the program.

Expected Outputs Up to date sentinel monitoring strategy

Performance Metrics N/A

Implementation Status New

Expected Timeframe The SMCCP Strategic Plan was finalized and published June 2011. It is expected that the Bi-State SMCCP Workgroup will conduct a 5-year review/revision in 2016.

Implementation Action: WW-38

Develop a Long Island Sound specific marine debris reduction action plan.

Theme:	Clean Waters and Healthy Watersheds
Goal:	1: Attain water quality objectives by reducing contaminant and nutrient loads to the land and the waters impacting Long Island Sound.
Outcome:	1-2: The negative impact of contaminants and nutrients in the waters and sediments of Long Island Sound and tributaries/embayments are reduced.
Objective:	1-2a: To reduce direct sources of nutrients and contaminants to the Long Island Sound ecosystem
Strategy:	1-2a3: Reduce generation of marine debris and improve and increase its cleanup in Long Island Sound waters.

Project Description/Background Marine debris can come from many sources, ranging from residential, commercial and industrial development to fishing and boating, to storm damage. Regardless of the source, debris can damage habitats, harm biota, and reduce the aesthetic and recreational value of Long Island Sound. A Long Island Sound-specific action plan should be developed to complement and expand regional efforts to both reduce sources of marine debris and mitigate/remove marine debris that is already in the ecosystem.

Cooperators and Partners EPA, States of New York and Connecticut and their respective municipalities, in coordination with regional marine debris control initiatives. Local non-profit and regional grassroots groups.

Funding Sources LISFF or other sources of grant funding (e.g., non-profit sector).

Level of Funds Needed Planning process: $$ Implementation: $$$
Initial funding needed to develop the plan. Further funding recommendations will be part of this plan

Expected Outputs

- Long Island Sound specific marine debris reduction action plan.
- long term: reduction in amount of marine debris in Long Island Sound

Performance Metric(s) Debris collected per unit effort in clean-ups.

Implementation Status New

Expected Timeframe The process of selecting an organization to compile the plan, and compiling and reviewing the plan would likely take 2-3 years.

Notes: Example project http://www.oceanconservancy.org/our-work/trash-free-seas-alliance/

Implementation Action WW-39

Assess sources of nutrient and pathogen contamination to Long Island Sound Embayments.

Theme:	Waters and Watersheds
Goal:	Attain water quality objectives by reducing contaminant and nutrient loads to the land and the waters impacting Long Island Sound.
Outcome:	1-1: Contaminant and nutrient loads from land based sources in the watershed of Long Island Sound are reduced
Objective:	1-1a: To reduce contaminant and nutrient loads from Waste Water Treatment Plants and other point sources
Strategy:	1-1a3: Develop Embayment Total Maximum Daily Loads for nutrients and pathogens or alternate control plans for Long Island Sound harbors, coasts and embayments

Project Description/Background Embayments and near-shore area are in close proximity to sources of contamination from point and nonpoint sources and in many cases are hydrographically distinct from the main body of the sound. While steps have been taken to reduce overall loading to LIS, Sound wide reductions are often insufficient to address localized embayment level concerns. Pathogen contamination causes beach and shellfish closures and excess nutrients have the potential to affect wetlands and other resources and cause blooms of macroalgae and phytoplankton, including Harmful Algae Blooms, which can impact human health. It is necessary to evaluate the relative contribution of sources of pathogens and nutrients to LIS embayments through sampling and modeling as a first step in the development of TMDLs or other management plans to protect resources and human use.

Cooperators and Partners NYSDEC, CTDEEP and local governments

Funding Sources States of NY and CT and local governments, nonprofits and citizen action groups

Level of Funds Needed $$$

Expected Output Enumeration and/or estimation of pathogen and nutrient loads from point and nonpoint sources to embayments

Performance Metrics N/A

Implementation Status Ongoing. An LISS research project (Vaudrey, et. al) is measuring and modeling nutrients in embayments and NYS will be evaluating embayment pathogen and nutrient sources. CT is developing TMDLs.

Expected Timeframe 2015 - 2020

Other CCMP Objectives Supported 1-1b, 1-2a, 1-12b, 1-3b 1-1c1

Section 2
Implementation Actions

Thriving Habitats and Abundant Wildlife (HW) Theme

Comprehensive Conservation and Management Plan

Table 2. Thriving Habitats and Abundant Wildlife (HW) Implementation Actions (Priority actions are shaded in bold blue)

Implementation Action Number	Implementation Action Title	Major Strategy Addressed
HW-1	Develop a list of current and new / innovative restoration techniques.	2-1a1
HW-2	**Complete projects that result in river miles reconnected and/or contiguous acres of coastal habitat that are protected or restored.**	**2-1a1**
HW-3	Develop or apply connectivity models and metrics for all restoration and protection projects.	2-1a2
HW-4	Pursue and leverage additional research, monitoring, and habitat restoration funding.	2-1a4
HW-5	**Develop and apply habitat quality metrics and assessment methodology across priority habitat types.**	**2-1b1**
HW-6	**Develop a habitat quality index for tracking habitat restoration projects and programs.**	**2-1a1**
HW-7	Use the updated LISS Stewardship Initiative Geographic Tool (SIGT) to prioritize future conservation investment and management plan development for Long Island Sound's most significant imperiled terrestrial and intertidal coastal habitats.	2-1b1
HW-8	Conduct an ecological assessment of land surrounding Long Island Sound Stewardship Sites and design green infrastructure/low impact development (GI/LID) pilot projects that minimize negative impacts and enhance beneficial ecosystem services of lands within or surrounding the Sites.	2-1b1
HW-9	Assess level of habitat connectivity to determine priority level for habitat restoration and land protection (acquisition) projects.	2-1a2
HW-10	Develop a habitat quality assessment tool for research and analysis.	2-4a1
HW-11	Authorize pilot studies for permanent living shoreline construction projects.	2-1c2
HW-12	Develop programs to assist landowners with using habitat protection and management methods on their own properties.	2-2d1
HW-13	Use remote sensing, mapping tools, and field verification to determine sites that are likely to be impacted by Sea Level Rise (SLR), and which sites are ideal for habitat migration.	2-1b1
HW-14	Promote volunteer-driven invasive species reconnaissance and removal work.	2-2a1
HW-15	Reduce and manage threats to and monitor populations of targeted listed species.	2-2b2

Implementation Action Number	Implementation Action Title	Major Strategy Addressed
HW-16	Develop and implement invasive/nonnative species management plans for priority sites including promoting the widespread use of Best Management Practices (BMPs) or Hazard Analysis and Critical Control Point (HACCP) plans	2-2a1
HW-17	**Design, develop, and promote coupled habitat restoration and monitoring projects that incorporate meaningful citizen and municipal engagement and participation, particularly in urban areas.**	**2-3b1**
HW-18	Promote strong and effective legislation that targets prevention and spread of invasive/ non-native species.	2-2a2
HW-19	**Conduct data collection and habitat restoration projects that target priority species.**	**2-2b1**
HW-20	Develop a shellfish management plan and support Best Management Practices (BMPs) for aquaculture, recreation, and restoration that ensure sustainable marine populations.	2-2c1
HW-21	Assess new habitats for inclusion in LISS priority habitat list.	2-1a2
HW-22	Continue Long Island Sound eelgrass abundance surveys.	2-4a2

The twelve priority habitat types identified by the Long Island Sound Study are for the purposes of restoration and management are:
- Beaches and Dunes
- Cliffs and Bluffs
- Estuarine Embayments
- Coastal and Island Forests
- Freshwater Wetlands
- Coastal Grasslands
- Intertidal Flats
- Rocky Intertidal Zones
- Riverine Migratory Corridors
- Submerged Aquatic Vegetation Beds
- Shellfish Reefs
- Tidal Wetlands

Implementation Action: HW-1

Develop a list of current and new/innovative restoration techniques.

Theme:	Thriving Habitats and Abundant Wildlife
Goal:	2: Restore and protect the Sound's ecological balance in a healthy, productive, and resilient state for the benefit of both people and the natural environment.
Outcome:	2-1: Ecosystem services are maintained by protecting, restoring, and enhancing habitats.
Objective:	2-1a: To restore and enhance priority habitat types
Strategy:	2-1a1: Develop and implement innovative and effective habitat restoration projects and plans including restoring quality and quantity of coastal habitat and fish passage 2-1c1: Promote the use of living shoreline habitat protection methods (dunes, shorelines, and coastal marshes)

Project Description/Background This project involves creating a list of new or innovative restoration techniques to restore habitats in the Long Island Sound Area. The list will include a short description of each technique, examples of where it was used, and contact information of the organization/project manager. The purpose of the list is to provide habitat restoration practitioners in the Long Island Sound a resource to draw on for new, innovative or ground tested practices that might apply to or enhance the habitat they want to restore.

Cooperators and Partners LISS Habitat Restoration Work Group

Funding Sources LISS Base Program Funds

Level of Funds Needed $
List will be maintained, edited, updated as needed – no cost estimate available for this; updates expected to be minimal

Expected Outputs

- A list of new and innovative restoration techniques to be shared with restoration practitioners in the LIS Study Area.
- A list of resources that can be used to develop restoration plans/programs.

Performance Metric(s) An annotated list of habitat restoration techniques

Implementation Status New

Expected Timeframe 1-2 months plus workgroup review

Other CCMP Objectives Supported 2-1c

Implementation Action: HW-2

Complete projects that result in river miles reconnected and/or contiguous acres of coastal habitat protected or restored.

Theme:	Thriving Habitats and Abundant Wildlife
Goal:	2: Restore and protect the Sound's ecological balance in a healthy, productive, and resilient state for the benefit of both people and the natural environment.
Outcome:	2-1: Ecosystem services are maintained by protecting, restoring, and enhancing habitats.
Objective:	2-1a: To restore and enhance priority habitat types
Strategy:	2-1a1: Develop and implement innovative and effective habitat restoration projects and plans including restoring quality and quantity of coastal habitat and fish passage

Project Description/Background This action will help to promote habitat restoration projects that result in increased habitat connectivity (either terrestrial or aquatic) in the LISS Area. We will create priority lists of potential habitat restoration sites and assign a higher priority to those ,which will increase connectivity across the landscape. We will also work with local and regional funding program administrators to prioritize grant proposal reviews in a similar manner.

Cooperators and Partners LISS Habitat Restoration Work Group, LISS Stewardship Work Group, The Nature Conservancy, NRCS, USFWS

Funding Sources LISS Base Program Funds; various for project design and implementation

Level of Funds Needed $$/project. Budget will vary depending on priority task at hand; e.g.,. next year cost will be low as the HRWG will work with the USFWS LCCs to pilot a connectivity tool in the Connecticut River watershed for further and future application throughout the LISS area. Subsequent years may require direct funding. *Define costs of outputs listed below, restoration costs, land protection costs*

Expected Outputs

- A list (ideally viewable in a map format as well) of potential habitat restoration projects prioritized by habitat continuity
- GIS data generated for potential and completed habitat restoration projects that, when viewed on a map, clearly demonstrate the habitat connectivity accomplished (or proposed)
- Letters to funding program administrators requesting that prioritization by connectivity be added to their ranking criteria

Performance Metric(s)

- number of sites on the potential sites list to start
- number of sites removed from list and added to completed list
- amount of and availability of GIS data related to these potential and completed sites

Implementation Status Underway

Expected Timeframe Ongoing

Implementation Action: HW-03

Develop or apply connectivity models and metrics for all restoration and protection projects.

Theme:	Thriving Habitats and Abundant Wildlife
Goal:	2: Restore and protect the Sound's ecological balance in a healthy, productive, and resilient state for the benefit of both people and the natural environment.
Outcome:	2-1: Ecosystem services are maintained by protecting, restoring, and enhancing habitats.
Objective:	2-1a: To restore and enhance priority habitat types
Strategy:	2-1a2: Restore and enhance connectivity of priority habitat types

Project Description/Background In order to promote habitat restoration and protection projects that result in increased habitat connectivity (either terrestrial or aquatic) in the LISS Area practitioners will need priority lists, models, maps and other metrics that identify potential sites.

Cooperators and Partners LISS Habitat Restoration and Stewardship Work Groups, USFWS Landscape Conservation Cooperatives

Funding Sources LISS Base Program Funds; USFWS Region 5 funds

Level of Funds Needed $$
USFWS grant program

Expected Outputs

- A list of prioritized sites to increase connectivity across a defined area (Connecticut River Watershed to start)
- Piloted UMass connectivity tool in the Connecticut River Watershed
- If needed, modification of connectivity tool based on input from Stewardship Work Group and others in the connectivity working group to make it more applicable for use in LISS Area

Performance Metric(s)

- number of sites on the potential sites list to start
- number of sites removed from list and added to completed list
- amount of and availability of GIS data related to these potential and completed sites
- Timeframe: on-going / continuous

Implementation Status New

Expected Timeframe 6-12 months

Other CCMP Objectives Supported 2-1c

Implementation Action: HW-04

Pursue and leverage additional research, monitoring, and habitat restoration funding.

Theme:	Thriving Habitats and Abundant Wildlife
Goal:	2: Restore and protect the Sound's ecological balance in a healthy, productive, and resilient state for the benefit of both people and the natural environment.
Outcome:	2-1: Ecosystem services are maintained by protecting, restoring, and enhancing habitats.
Objective:	2-1a: To restore and enhance priority habitat types
Strategy:	2-1a3: Develop and implement innovative and effective habitat restoration projects and habitat restoration plans

Project Description/Background Partners work with one another to pursue additional and new sources of funding to carry out LISS CCMP activities. Site and project specific funding will be sought through private and corporate grant funders as well as through governmental sources.

Cooperators and Partners All LISS partners equally responsible for pursuing and leveraging funds

Funding Sources Various federal and state (primarily) funding sources

Level of Funds Needed various partner operating budgets and staff salaries

Expected Outputs

- increased funding for research, monitoring, and habitat restoration
- A list of funding sources for habitat restoration, land acquisition, research, and other CCMP activities
- Additional successfully completed projects

Performance Metric(s)

- amount of additional funds obtained
- number of habitat restoration projects completed
- acres restored and miles reconnected
- acres protected through land acquisition
- amount of other work done as a result

Implementation Status Underway

Expected Timeframe Ongoing

Other CCMP Objectives Supported 2-1a, 2-1b, 2-1c, 2-2d, 2-4a

Implementation Action: HW-05

Develop and apply habitat quality metrics and assessment methodology across priority habitat types.

Theme:	Thriving Habitats and Abundant Wildlife
Goal:	2: Restore and protect the Sound's ecological balance in a healthy, productive, and resilient state for the benefit of both people and the natural environment.
Outcome:	2-1: Ecosystem services are maintained by protecting, restoring, and enhancing habitats.
Objective:	2-1b: To protect priority habitat types through acquisition and other mechanisms
Strategy:	2-1b1: Use a repeatable criteria-based process to minimize bias, supplemented by expert knowledge, to identify high priority areas to protect

Project Description/Background Ecologists working in the Long Island Sound coastal boundary must balance needs of the urban population with the needs of valuable ecological communities. To do this, a targeted understanding of land conservation and restoration priorities is a must. Establishing metrics and assessment methodology allows us to better understand the condition of our habitats and how they have changed over time. Having an idea of the quality or overall health of those habitats is an integral piece in collaborative efforts to forward sound conservation action and to inform management decisions.

Cooperators and Partners USFWS, LISS HRWG, TNC-NY, NYSERDA, NYC DPR, CT DEEP, Other state federal and non-profit partners as expertise is needed

Funding Sources Various funding sources connected to organizations above

Level of Funds Needed unknown- based on project size and needs

Expected Outputs

- Consistent way to evaluate priority habitats
- Document to teach others how to apply this method going forward

Performance Metric(s)

- Number of adopted protocols for this methodology across each priority habitat

Implementation Status Underway

Expected Timeframe SLAMM/Marsh Modeling expected 2014-2015; SAV expected 2014; tidal wetlands expected in 2016; other habitat types still in early stages

Other CCMP Objectives Supported 2-1a, 2-4a

Implementation Action: HW-06

Develop a habitat quality index for tracking habitat restoration projects and programs.

Theme:	Thriving Habitats and Abundant Wildlife
Goal:	2: Restore and protect the Sound's ecological balance in a healthy, productive, and resilient state for the benefit of both people and the natural environment.
Outcome:	2-1: Ecosystem services are maintained by protecting, restoring, and enhancing habitats.
Objective:	2-1a: To restore and enhance priority habitat types
Strategy:	2-1a1: Develop and implement innovative and effective habitat restoration projects and plans including restoring quality and quantity of coastal habitat and fish passage

Project Description/Background Evaluate existing habitat restoration projects and programs to determine the most successful ones and why. Apply those successful techniques to other projects to increase quality. Also evaluate the success of project design and implementation practitioners and develop a list of qualified professionals.

Cooperators and Partners various - based on lead partner for projects, and/or property owner

Funding Sources LISS base funds; various - also required of some federal grant programs, such as USFWS grant programs

Level of Funds Needed Seasonal Employee $ per year

Expected Outputs

- Habitat quality index
- list of qualified restoration practitioners selected by success of restoration projects

Performance Metric(s)

- Positive feedback on usefulness of index
- Number of sites where index is applied

Implementation Status New

Expected Timeframe 1-2 years following completion of corresponding habitat quality assessment

Other CCMP Objectives Supported 2-4a

Implementation Action: HW-07

Use the updated LISS Stewardship Initiative Geographic Tool (SIGT) to prioritize future conservation investment and management plan development for Long Island Sound's most significant and imperiled terrestrial and intertidal coastal habitats.

Theme: Thriving Habitats and Abundant Wildlife
Goal: 2: Restore and protect the Sound's ecological balance in a healthy, productive, and resilient state for the benefit of both people and the natural environment.
Outcome: 2-1: Ecosystem services are maintained by protecting, restoring, and enhancing habitats.
Objective: 2-1b: To protect priority habitat types through acquisition and other mechanisms
Strategy: 2-1b1: Use a repeatable criteria-based process to minimize bias, supplemented by expert knowledge, to identify high priority areas to protect

Project Description/Background This project will use the LISS Stewardship Initiative Geographic Tool (SIGT) to help identify priority coastal habitats for possible nomination as Stewardship areas or Stewardship sites. The tool is expected to provide a geo-referenced list of sites or areas that meet ecological evaluation criteria in the first phases of a multi-phase screening process to identify sites or areas most worthy of additional investment of LISS conservation resources. Management plans are essential to upkeep of priority habitat and targeted (listed) species. Having management plans in place for publicly owned land allows long term planning and accountability to landowners.

Cooperators and Partners LISS Stewardship Initiative Workgroup in collaboration with partners on the SIGT team, NYOPRHP, NYSDEC, USFWS

Funding Sources LISS base funds and additional funds through partner collaborators

Level of Funds Needed $$ - Phase 2 funding-define boundaries for existing and proposed Stewardship Sites Additional phases and funding to be determined.

Expected Outputs

- Clear delineation of existing Stewardship Areas and Stewardship Sites
- Prioritized list of sites or areas that can help best direct limited conservation resources
- Habitat management plans created for publicly owned land throughout the LIS watershed.
- Management plans that specifically focus on targeted (listed) species

Performance Metric(s)

- Number of sites or areas determined to be worthy of Stewardship site or area designation
- Number of management plans created
- Number of publicly owned land owners participating in the development of management plans for their properties.

Implementation Status New

Expected Timeframe 3 years-2017

Other CCMP Objectives Supported 2-1c, 2-2d, 2-3b, 2-4a

Implementation Action: HW-08

Conduct an ecological assessment of land surrounding Long Island Sound Stewardship Sites and design green infrastructure/low impact development (GI/LID) pilot projects that minimize negative impacts and enhance beneficial ecosystem services of lands within or surrounding the Sites.

Theme: Thriving Habitats and Abundant Wildlife
Goal: 2: Restore and protect the Sound's ecological balance in a healthy, productive, and resilient state for the benefit of both people and the natural environment.
Outcome: 2-1: Ecosystem services are maintained by protecting, restoring, and enhancing habitats.
Objective: 2-1b: To protect priority habitat types through acquisition and other mechanisms
Strategy: 2-1b1: Use a repeatable criteria-based process to minimize bias, supplemented by expert knowledge, to identify high priority areas to protect

Project Description/Background Stewardship Sites represent essential, rare habitat found throughout Long Island Sound that support a diversity of plant and wildlife species, open space for people to enjoy, and outdoor laboratories for research. These sites possess high ecological value but in many cases are surrounded by urban development that brings with it threats (runoff, erosion, pollution) to the Site's ecological integrity. It is essential that the sites and their surrounding areas be evaluated for the possibility of initiating green infrastructure (GI) and low impact development (LID) practices can be adopted at or near Stewardship Sites to address these threats and ensure site preservation.

This project will also seek to engage municipalities and the public through outreach and community meetings. This outreach will create greater public awareness of Stewardship Sites and serve to increase a sense of stewardship ethic in urban communities surrounding the sites. The GI/LID design process as a whole will serve as a model for National Estuary Programs with urban areas of high ecological value.

Cooperators and Partners LISS Stewardship Initiative Workgroup, NEIWPCC

Funding Sources NEIWPCC

Level of Funds Needed $

Expected Outputs

- Two urban area Stewardship pilot site(s) (one in New York and one in Connecticut) selected for analysis and future land management recommendations.
- Summary report describing the methodology and results of a rapid assessment of the ecological/conservation values at the two selected Stewardship Sites and adjacent lands.
- A list of existing and potential threats to the identified ecological/conservation values, and opportunities and practices for mitigating potential adverse impacts within the study areas' boundaries.
- At least two GI/LID conceptual designs (one for each pilot area) that address how the major threats to Stewardship Site resources can be avoided, minimized, and mitigated.
- Report outlining an engagement protocol with a focus on how future contractors, partners or Stewardship Workgroup co-leaders could establish new partnerships and a stronger rapport with town officials and residents within the pilot project area.

Performance Metric(s)

- Number of community meetings held.
- Number of municipalities and officials involved in decision making.
- Number people that attend the community meetings.
- Number of GI/LID designs produced.

Implementation Status Underway

Expected Timeframe 1 year-2015

Other CCMP Objectives Supported 2-1c, 2-2d, 2-3b, 2-4a

Implementation Action: HW-9

Assess level of habitat connectivity to determine priority level for habitat restoration and land protection (acquisition) projects.

Theme: Thriving Habitats and Abundant Wildlife
Goal: 2: Restore and protect the Sound's ecological balance in a healthy, productive, and resilient state for the benefit of both people and the natural environment.
Outcome: 2-1: Ecosystem services are maintained by protecting, restoring, and enhancing habitats.
Objective: 2-1a: To restore and enhance priority habitat types
Strategy: 2-1a2: Restore and enhance connectivity of priority habitat types

Project Description/Background In many ways, habitat connectivity can be as important to wildlife as habitat condition. If habitat areas are not of sufficient size or don't have connectivity to other quality habitat areas, a pristine habitat can become effectively useless to the species that depend on it. Connecting quality habitats is another tool we can use to improve overall habitat function and value.

Cooperators and Partners Stewardship Work Group, USFWS Landscape, Conservation Cooperatives, Habitat Restoration Work Group

Funding Sources LISS Base Program Funds; USFWS Region 5 funds

Level of Funds Needed $ - Seasonal Employee (2 months)
USFWS grant program / funding level to be determined

Expected Outputs

- GIS data layers for various coastal habitats from which connectivity can be assessed
- Recommendations for where to prioritize habitat restoration and land acquisition

Performance Metric(s)

- Generation of lists that prioritize areas for acquisition and restoration
- Restoration and acquisition of priority areas

Implementation Status New

Expected Timeframe 1-2 months plus workgroup review

Other CCMP Objectives Supported 2-1c, 2-2d

Implementation Action: HW-10

Develop a habitat quality assessment tool for research and analysis.

Theme:	Thriving Habitats and Abundant Wildlife
Goal:	2: Restore and protect the Sound's ecological balance in a healthy, productive, and resilient state for the benefit of both people and the natural environment.
Outcome:	2-1: Ecosystem services are maintained by protecting, restoring, and enhancing habitats.
Objective:	2-4a: To enhance knowledge of habitats and living resources through research and collaboration and distribute useful habitat and living resource data
Strategy:	2-4a1: Support ecosystem science research to enhance protection of living terrestrial and aquatic resources for example support important habitat modeling and landscape design efforts including the USFWS LCC Connecticut River Pilot and future steps and iterations of this work and dissemination research (ex. Through a web-based file share /server for easy access to Long Island Sound research studies and other related reports)

Project Description/Background This action involves the collection of sound biological data that will help to properly assess habitat quality throughout Long Island Sound. We will promote, fund, and assist with data collection that will allow us to identify priority habitat, habitat vulnerable to climate change, and habitat that is currently largely unknown. We also want to promote data collection that allows us to understand and address habitat changes and overall ecosystem health. This information is vital to site managers and help guide management plans. We can work with local and regional funding program administrators to prioritize grant proposals that include biological data collection that will address these issues.

Cooperators and Partners
USFWS, TNC-NY, NYSERDA, NYC DPR, CT DEEP, Other state federal and non-profit partners as expertise is needed

Funding Sources Various funding sources connected to organizations above

Level of Funds Needed $$
New tool development; total costs depends on how many tools are developed.

Expected Outputs
- Consistent way to evaluate priority habitats
- Document to teach others how to apply this method going forward

Performance Metric(s)
- Protocols for this methodology

Implementation Status Underway

Expected Timeframe Submerged aquatic vegetation habitat evaluation expected 2014; tidal wetlands expected in 2016; other habitat types still in early stages

Implementation Action: HW-11

Authorize pilot studies for permanent living shoreline construction projects.

Theme:	Thriving Habitats and Abundant Wildlife
Goal:	2: Restore and protect the Sound's ecological balance in a healthy, productive, and resilient state for the benefit of both people and the natural environment.
Outcome:	2-1: Ecosystem services are maintained by protecting, restoring, and enhancing habitats.
Objective:	2-1c: To increase or maintain resiliency of coastal habitats and the services they provide
Strategy:	2-1c2: Identify and prioritize upland and aquatic habitats that are vulnerable to climate change impacts and take action to mitigate or adapt to these impacts (e.g., remove or mitigate impediments to coastal processes, habitat migration)

Project Description/Background Living shorelines provide an alternative, natural edge structure, oyster reefs, and submerged aquatic vegetation, and mussel beds, as opposed to a hardened structure, such as bulkheads and seawalls. These "softened" shorelines can provide a more stabilized shoreline, natural aquatic and terrestrial habitat, and improve water quality. Little is known about the environmental response of living shoreline projects in Long Island Sound because very few, if any, have ever been done. Promoting pilot living shoreline projects around the Long Island Sound will provide useful data to regulators as well as to coastal property owners.

Cooperators and Partners various - based on lead partner for projects, and/or property owner; water quality monitoring groups (state and local), NYC Parks, municipalities, NYSDEC, CTDEEP

Funding Sources Various federal and state (primarily) funding sources, LISS FF

Level of Funds Needed $$$
Over next 5 years for planning and implementation projects

Expected Outputs

- A variety of living shoreline pilot projects implemented throughout the LIS
- Data collected on living shoreline pilot project performance (habitat value, water quality improvement, erosion control)

Performance Metric(s)

- Number and variety of pilot studies implemented
- Effectiveness of the funded projects in terms of meeting their objectives (i.e., erosion management, habitat creation/restoration, water quality)

Implementation Status Underway

Expected Timeframe Ongoing

Other CCMP Objectives Supported 2-1c, 2-2d, 2-3b

Implementation Action: HW-12

Develop programs to assist landowners with using habitat protection and management methods on their own properties.

Theme:	Thriving Habitats and Abundant Wildlife
Goal:	2: Restore and protect the Sound's ecological balance in a healthy, productive, and resilient state for the benefit of both people and the natural environment.
Outcome:	2-1: Ecosystem services are maintained by protecting, restoring, and enhancing habitats.
Objective:	2-1c: To increase or maintain resiliency of coastal habitats and the services they provide
Strategy:	2-2d1: Promote projects that protect and restore biological and ecological diversity

Project Description/Background Develop programs that encourage and assist landowners with habitat protection projects and management methods on their own property. Programs will highlight native plant species, discouragement of invasive/nonnative plant species, erosion, proper disposal of pollutants (pesticides, paint, cleaners, pharmaceuticals, etc.).

Cooperators and Partners various - based on lead partner for projects, and/or property owner; municipalities, water quality monitoring groups (state and local)
LISS Communications, CT Sea Grant, NY Sea Grant, Citizens Campaign for the Environment

Funding Sources Various federal and state (primarily) funding sources

Level of Funds Needed $$$
Over 5 years of implementation

Expected Outputs

- Websites, brochures, pamphlets, etc., with the information people need to assist them
- A list of resources that can be called upon to develop landowner restoration plans/programs.

Performance Metric(s) Number of homeowners and municipalities utilizing this information on private property; number of states/towns utilizing this info on public land

Implementation Status New

Expected Timeframe Ongoing

Other CCMP Objectives Supported 2-2d

Implementation Action: HW-13

Use remote sensing, mapping tools, and field verification to determine sites that are likely to be impacted by Sea Level Rise (SLR), and which sites are ideal for habitat migration.

Theme:	Thriving Habitats and Abundant Wildlife
Goal:	2: Restore and protect the Sound's ecological balance in a healthy, productive, and resilient state for the benefit of both people and the natural environment.
Outcome:	2-1: Ecosystem services are maintained by protecting, restoring, and enhancing habitats.
Objective:	2-1c: To increase or maintain resiliency of coastal habitats and the services they provide
Strategy:	2-1b1: Use a repeatable criteria-based process to minimize bias, supplemented by expert knowledge, to identify high priority areas to protect

Project Description/Background In order to plan properly for Sea Level Rise (SLR), it is important to know which habitats will be impacted by SLR and which habitats are ideal for habitat migration. Through remote sensing, mapping tools, and field verification techniques, we will be able to plan for restoration projects to improve habitat for SLR and target buffer land acquisition that will allow for habitat migration.

Cooperators and Partners USFWS, LISS HRWG, LISS SWG, TNC-CT, TNC-NY, NYSERDA, NYC DPR, TNC-CT

Funding Sources Various funding sources connected to sources above

Level of Funds Needed $$ per project

Expected Outputs

- Maps and list of sites impacted by SLR
- Maps and lists of sites that are ideal for habitat migration

Performance Metric(s)

- Number of sites impacted by SLR
- Number of sites that are ideal for habitat migration

Implementation Status Underway

Expected Timeframe SLAMM/Marsh Modeling expected 2014-2015; SAV expected 2014; tidal wetlands expected in 2016; other habitat types still in early stages

Other CCMP Objectives Supported 2-1b, 2-2d, 2-4a

Implementation Action: HW-14

Promote volunteer-driven invasive species reconnaissance and removal work.

Theme:	Thriving Habitats and Abundant Wildlife
Goal:	2: Restore and protect the Sound's ecological balance in a healthy, productive, and resilient state for the benefit of both people and the natural environment.
Outcome:	2-2: Ecosystem resiliency and function are maintained by diverse, balanced, and abundant populations of fishes, birds, and wildlife
Objective:	2-2a: To manage invasive species
Strategy:	2-2a1: Develop volunteer stewardship programs to manage invasive species to ensure habitats are resilient to climate change 2-2a2: Teach and promote measures that will help to prevent the introduction of invasive biota in Long Island Sound and connected upland areas

Project Description/Background Invasive/nonnative species are detrimental to priority habitat in Long Island Sound. These species can disrupt ecosystem balance, reduce diversity, and form monocultures within habitats. In order to manage invasive/nonnative species, it is essential to obtain funds to determine the distribution and magnitude of invasion of these species (reconnaissance work), remove them from these locations, and create a network of volunteers to involve in species removal and long term management at these sites.

Cooperators and Partners various - based on lead partner for projects, and/or property owner; water quality monitoring groups, NYC Parks, New York and Connecticut municipalities

Funding Sources Various federal and state (primarily) funding sources

Level of Funds Needed $$ per year to pay for various programs

Expected Outputs

- A list and/or map of locations and distribution of invasive species.
- Active removal of invasive species
- Creation of a network of volunteers to manage these locations.

Performance Metric(s)

- Number of funding sources secured for invasive species reconnaissance work, removal, and volunteer coordination.
- Completed lists and/or maps indicating invasive species distribution
- Number of invasive species removal projects
- Number of volunteers involved in the management of invasive species.

Implementation Status Underway

Expected Timeframe Ongoing

Other CCMP Objectives Supported 2-3c

Implementation Action: HW-15

Reduce and manage threats to and monitor populations of targeted listed species.

Theme:	Thriving Habitats and Abundant Wildlife
Goal:	2: Restore and protect the Sound's ecological balance in a healthy, productive, and resilient state for the benefit of both people and the natural environment.
Outcome:	2-2: Ecosystem resiliency and function are maintained by diverse, balanced, and abundant populations of fishes, birds, and wildlife
Objective:	2-2b: To manage state and federal listed species and species of concern
Strategy:	2-2b2: Advance research and manage habitat and threats to protect targeted Trust species (e.g., climate change driven threats and predator-prey relationships)

Project Description/Background Habitat restoration is an important tool to reduce and manage threats to populations of targeted listed species, but there are other needs such as consistent monitoring and management, decreasing human disturbance, and effective predator management that must be met. Long Island Sound supports a considerable number of state and federally listed threatened and endangered species, including Piping Plovers, a species that in recent years has shown significant declines on Long Island. Every effort must be put forth to reduce these trends in Piping Plovers and in other species and to reach recovery goals. This action will support research to look at climate change driven threats to targeted listed species, as well as predator-prey relationships. In addition, this action will support monitoring and management efforts.

Cooperators and Partners NY Audubon, CT Audubon, NYSDEC, CT DEEP

Funding Sources Audubon, LIS Futures Fund, USFWS, LIS Research Grant, NOAA Species Recovery Grants to States

Level of Funds Needed $$ - Total for 5 years to support research, management, and monitoring in New York and Connecticut

Expected Outputs

- Creation of monitoring programs, management plans, and research projects that will continue/begin to determine the impacts of climate driven threats and predator-prey relationships
- Collection of data from research projects, monitoring efforts, and management strategies that can help to determine the impacts of climate driven threats and predator-prey relationships

Performance Metric(s)

- Number of research projects conducted
- Number of monitoring programs initiated
- Number of management efforts initiated
- Population trends for targeted listed species

Implementation Status New

Expected Timeframe Ongoing

Implementation Action: HW-16

Develop and implement invasive/ non-native species management plans for priority sites including promoting the widespread use of Best Management Practices (BMPs) or Hazard Analysis and Critical Control Point (HACCP) plans.

Theme: Thriving Habitats and Abundant Wildlife
Goal: 2: Restore and protect the Sound's ecological balance in a healthy, productive, and resilient state for the benefit of both people and the natural environment.
Outcome: 2-2: Ecosystem resiliency and function are maintained by diverse, balanced, and abundant populations of fishes, birds, and wildlife
Objective: 2-2a: To manage invasive species
Strategy: 2-2a1: Develop volunteer stewardship programs to manage invasive species to ensure habitats are resilient to climate change

Project Description/Background Invasive/nonnative species can be detrimental to the ecological integrity of priority habitats. It is essential to develop and promote widespread use of BMPs and/or HACCP plans for various groups around Long Island Sound in order to prevent the inadvertent movement or introduction of non-native species.

Cooperators and Partners LISS-HRWG, NY Sea Grant, CT Sea Grant, USFWS

Funding Sources Various federal and state (primarily) funding sources, local municipalities, LISS Communications and Outreach team; LISFF

Level of Funds Needed $$ - Total for 5 years. $$ Seasonal staff costs for 2 years to promote work

Expected Outputs

- A list of BMPs and HACCP plans that will assist various groups with reducing inadvertent movement of invasive/non-native species.
- Plan to provide this information to target audiences.
- Training in how to apply HACCP to field work and develop plans or BMPs to minimize a risk of spreading or moving invasive species between sites.
- Funding obtained for the implementation of invasive/nonnative species management plans.
- Creation of invasive/nonnative species management plans for priority habitats across LIS
- Implementation of invasive/nonnative species management plans for priority habitats across LIS

Performance Metric(s)

- List of BMPs and HACCP plans. This list could be distributed to various groups in an informational pamphlet and also will be available on the LISS website.
- Number of trainings held
- Number of individuals or entities trained
- Number of shared model BMPS
- Number of invasive/nonnative species management plans created
- Number of invasive/nonnative species management plans implemented

Implementation Status Underway

Expected Timeframe 1-2 years

Implementation Action: HW-17

Design, develop, and promote coupled habitat restoration and monitoring projects that incorporate meaningful citizen engagement and participation, particularly in urban areas.

Theme: Thriving Habitats and Abundant Wildlife
Goal: 2: Restore and protect the Sound's ecological balance in a healthy, productive, and resilient state for the benefit of both people and the natural environment.
Outcome: 2-3: The public is educated and involved in restoration and protection of habitats and living resources
Objective: 2-3a: To support education and outreach programs that focus on priority habitat types and living resources
Strategy: 2-2a1: Develop volunteer stewardship programs to manage invasive species to ensure habitats are resilient to climate change

Project Description/Background Citizen scientists can assist researchers and practitioners with biological monitoring and habitat restoration projects. With proper training, citizen scientists can collect data on wildlife and habitat around the Long Island Sound. In order to receive scientifically accurate and useable data it is essential to promote science based biological/habitat training to all individuals involved in this data collection. In order for the public to feel engaged and develop a sense of stewardship regarding the environment and their local natural area, it is important to involve citizens in hands-on activities at habitat restoration sites.

If a volunteer component can be designed and developed from the start of habitat restoration project then citizens can be involved in several project components such as implementation (planting) to maintenance (invasive species removal, watering) to monitoring (bird and fish surveys, water quality monitoring, vegetation monitoring). This type of work will develop a sense of stewardship within volunteers and sense of appreciation for local ecosystems. In order to engage citizens from urban areas it is essential conduct outreach within the neighbor, with assistance from established local organizations (i.e., environmental justice, religious group, non-profits, etc.).

Cooperators and Partners various – NY Sea Grant, CT Sea Grant, NYS Parks, LISS Habitat, Restoration Workgroup, LISS Communications Team, The Nature Conservancy, NYC Parks Department, NY Audubon, CT Audubon

Funding Sources Various funding sources

Level of Funds Needed $$$ over 5 years

Expected Outputs

- Trained citizen scientists that are capable of collecting scientifically based data during monitoring efforts (i.e., water quality, invasive species removal, alewife surveys, avian studies, etc.).
- A selection of events/workshops hosted by researchers and/or practitioners for citizen scientists to participate in in order to collect scientifically based, useable data.
- Biological data collected from around the Long Island Sound
- Public outreach events that will educate the public regarding the importance of the habitat restoration project and attract volunteers for planting, weeding, monitoring, etc.
- Creation of volunteer activities at restoration sites (i.e., planting, watering, weeding, monitoring) that are open to the public.

Performance Metric(s)

- Number of citizen scientists trained to collect scientifically based data during monitoring efforts.
- Number of events/workshops that promote and educate the public on citizen science-based data collection.
- Number of sites around the Long Island Sound monitored by citizen scientists
- Number of volunteer projects developed that are linked to habitat restoration projects.
- Number of public outreach events to the community to educate and encourage citizens about the restoration project.
- Number of volunteers participating in habitat restoration project activities.

Implementation Status Underway

Expected Timeframe Ongoing

Other CCMP Objectives Supported 2-2a, 2-3b, 2-2a, 2-3c

Implementation Action: HW-18

Promote strong and effective legislation that targets prevention and spread of invasive/non-native species.

Theme:	Thriving Habitats and Abundant Wildlife
Goal:	2: Restore and protect the Sound's ecological balance in a healthy, productive, and resilient state for the benefit of both people and the natural environment.
Outcome:	2-2: Ecosystem resiliency and function are maintained by diverse, balanced, and abundant populations of fishes, birds, and wildlife
Objective:	2-2a: To manage invasive species
Strategy:	2-2a2: Teach and promote measures that will help to prevent the introduction of invasive biota in Long Island Sound and connected upland areas

Project Description/Background Invasive/nonnative species are detrimental to priority habitat in Long Island Sound. These species can disrupt ecosystem balance, reduce diversity, and form monocultures within habitats. In order to successfully manage invasive species across LISS it is necessary to establish strong and effective legislation that targets prevention of the spread of invasive species within and across Long Island Sound. After legislation is passed educating target audiences about these new regulations will follow.

Cooperators and Partners Save the Sound, CAC, LISS Communications Team, NY Sea Grant, CT Sea Grant

Funding Sources Various federal and state (primarily) funding sources

Level of Funds Needed $$ various partner operating budgets and staff salaries

Expected Outputs

- New legislation is passed to target the prevention of the spread of invasive species.
- New legislation is effective in stopping the spread of invasive species

Performance Metric(s)

- Number of legislation passed.
- Number of species targeted with new legislation.

Implementation Status Underway

Expected Timeframe Ongoing

Implementation Action: HW-19

Conduct data collection and habitat restoration projects that target priority species.

Theme:	Thriving Habitats and Abundant Wildlife
Goal:	2: Restore and protect the Sound's ecological balance in a healthy, productive, and resilient state for the benefit of both people and the natural environment.
Outcome:	2-2: Ecosystem resiliency and function are maintained by diverse, balanced, and abundant populations of fishes, birds, and wildlife
Objective:	2-2b: To manage state and federal listed species and species of concern
Strategy:	2-2b1: Prioritize habitat restoration projects for targeted Trust species.

Project Description/Background Although data should be collected on all species living within the Long Island Sound watershed, it is essential to collect information on the listed species (endangered, threatened, species of special concern). These particular species are facing a variety of threats to their survival (habitat loss, pollution, invasive/nonnative species, etc.), decreasing population numbers. The data collected on these species will help in evaluating the health of the population. Often times, the reason that listed species population numbers have dwindled is solely due to habitat loss or habitat degradation. Restoring these habitats to the Long Island Sound watershed will provide the needed breeding, feeding, and resting areas these species rely on for survival.

Cooperators and Partners various, The Nature Conservancy, USFWS, NYSOPRHP, NYC Parks, NY Audubon, CT Audubon, Cornell Cooperative Extension, NYC Parks, CTDEEP, NYSDEC, USFWS

Funding Sources Various federal and state (primarily) funding sources

Level of Funds Needed $$$ - total for 5 years
$$ Seasonal staff costs per year for 10 seasonal staff at different agencies to collect data

Expected Outputs

- Data on population size and distribution for a variety of listed species.
- Habitat restoration projects are completed to support listed species.
- Listed species make use of the newly restored habitat

Performance Metric(s)

- Number of listed species within Long Island Sound watershed
- Number of individuals found within a population for all listed species found in Long Island Sound watershed
- List of locations (distribution) of listed species within Long Island Sound watershed.
- Number of habitat restoration projects completed to support listed species.
- Number and variety of listed species recorded using these restored habitats.

Implementation Status Underway

Expected Timeframe Ongoing

Other CCMP Objectives Supported 2-4a, 2-1a, 2-2c, 2-2d

Implementation Action: HW-20

Develop a shellfish management plan (SMP) and support Best Management Practices (BMPs) for aquaculture, recreation, and restoration that ensures sustainable marine populations.

Theme:	Thriving Habitats and Abundant Wildlife
Goal:	2: Restore and protect the Sound's ecological balance in a healthy, productive, and resilient state for the benefit of both people and the natural environment.
Outcome:	2-2: Ecosystem resiliency and function are maintained by diverse, balanced, and abundant populations of fishes, birds, and wildlife
Objective:	2-2c: To manage and restore populations of harvested species
Strategy:	2-2c1: Create or update species management plans for commercially / recreationally important species

Project Description/Background Develop a plan that will determine the impacts of aquaculture, recreation, and restoration on Long Island Sound water quality and habitat. This plan will identify policies and practices that protect and enhance Long Island Sound's natural shellfish habitat and ecosystem services and promote agricultural viability and sustainable harvest.

Cooperators and Partners CT Sea Grant, aquaculturalists, TNC
various - based on lead partner for projects, and/or property owner; NOAA, USDA, USACE, USFWS, CT Department of Agriculture-Bureau of Aquaculture; NYSDEC Bureau of Marine Resources

Funding Sources Various federal and state (primarily) funding sources

Level of Funds Needed Various - dependent upon scope of project or level of effort put into developing the SMP. *($3500 for Shellfish Reefs habitat restoration chapter, already funded through LISS Base-plus)*

Expected Outputs

- Final LIS Shellfish Management Plan (SMP)
- Section of SMP devoted to restoration of shellfish reefs as habitat, including benefits to aquaculture industry from the restoration of such reefs. The forth-coming Shellfish Reefs chapter of the LISS Habitat Restoration may qualify as the habitat restoration section of the SMP.

Performance Metric(s)

- Completion of SMP (in stages)

Implementation Status Underway

Expected Timeframe 1-2 years plus workgroup review

Other CCMP Objectives Supported 2-1c

Implementation Action: HW-21

Assess new habitats for inclusion in LISS priority habitat list.

Theme:	Thriving Habitats and Abundant Wildlife
Goal:	2: Restore and protect the Sound's ecological balance in a healthy, productive, and resilient state for the benefit of both people and the natural environment.
Outcome:	2-1: Habitats are protected, restored, and enhanced to sustain the ecosystem services they provide.
Objective:	2-1c: To increase or maintain resiliency of coastal habitats and the services they provide
Strategy:	2-1a2: Restore and enhance connectivity of priority habitat types

Project Description/Background There has been active discussion about and demand for HRWG partners to add more submerged aquatic habitats to the LISS' list of priority habitat types. More information is needed on these submerged aquatic habitats before meaningful decisions can be made. After necessary research and study, a list of additional habitats will be compiled for inclusion on the LISS priority habitat list.

Cooperators and Partners various
Cornell Cooperative Extension, NOAA, LDEO, SUNY SB, UCONN, URI, UNH, USGS

Funding Sources Various federal and state (primarily) funding sources- Long Island Sound Cable Fund Settlement

Level of Funds Needed $$$$ - Existing/ongoing LIS Cable Fund project
$$$$ - For additional, more in-depth research around Long Island Sound

Expected Outputs

- Data collected on the various submerged aquatic habitat
- Report on habitats based on meetings with habitat experts
- Additional chapter in LISS Habitat Restoration Manual.
- A list of submerged aquatic habitat that can be included into the LISS priority habitat list.

Performance Metric(s)

- Number of submerged aquatic habitat assessed.
- Number of submerged aquatic habitat included into the LISS priority habitat list

Implementation Status Underway

Expected Timeframe 1-5 years; LIS Cable Fund project due date 2014.

Other CCMP Objectives Supported 2-1a, 2-1b, 2-4a

Implementation Action: HW-22

Continue Long Island Sound eelgrass abundance surveys.

Theme: Thriving Habitats and Abundant Wildlife
Goal: 2: Restore and protect the Sound's ecological balance in a healthy, productive, and resilient state for the benefit of both people and the natural environment.
Outcome: 2-4: Knowledge of habitats and living resources is advanced through monitoring, assessment, and research
Objective: 2-4a: To enhance knowledge of habitats and living resources through research and collaboration and distribute useful habitat and living resource data
Strategy: 2-4a2: Inventory trends in quality and quantity of priority habitats and species

Project Description/Background The LISS has several years of eelgrass data from aerial surveys that date back to 2002. These surveys were undertaken about every 3 years and gave us reliable abundance and distribution data. Eelgrass surveys should be continued into the future so that our baseline dataset can be expanded upon and so that we can more reliably evaluate trends in eelgrass populations. Future surveys may or may not be done through the same methodology.

Cooperators and Partners various - USFWS, NYSDEC, CTDEEP, Cornell Cooperative Extension, UConn, USGS, NOAA

Funding Sources Various federal (primarily) funding sources

Level of Funds Needed $100,000 - $150,000 per survey

Expected Outputs

- Eelgrass survey report highlighting the locations and extent of eelgrass beds in LIS.

Performance Metric(s)

- Number of maps and aerial photos indicating the location and extent of eelgrass beds in LIS.

Implementation Status New/Underway

Expected Timeframe Ongoing-These surveys are completed every three years. The next surveys should occur in 2015 and 2018

Other CCMP Objectives Supported 2-4a, 2-1c

Section 3
Implementation Actions

Sustainable and Resilient Communities (SC)

Comprehensive Conservation and Management Plan

Table 3. Sustainable and Resilient Communities (SC) Implementation Actions (Priority actions are shaded in bold blue)

Implementation Action Number	Implementation Action Title	Major Strategy Addressed
SC-1	Provide technical and grant assistance to support festivals and celebrations that encourage appreciation and use of the Sound.	3-1a1
SC-2	Provide support through technical and grant assistance to organizations that promote environmentally sustainable recreational activities at Stewardship sites and other shoreline access points.	3-1a1
SC-3	Seek a National Heritage Area Designation for Long Island Sound that will promote the Sound's heritage as the "Urban Sea" and the Sound's cultural, historical, maritime, and natural resources.	3-1a2
SC-4	Continue state programs to promote youth and adult fishing as a healthy and sustainable recreational sport.	3-1a2
SC-5	**Provide technical and grant assistance to support federal and local initiatives that increase appreciation and understanding of the Sound for underprivileged and non-traditional audiences in urban areas.**	**3-1a3**
SC-6	Produce informational materials that can be distributed through multiple formats, including, print, web, social media, and traveling displays to increase the public's understanding of the ecological, cultural, and recreational value of Long Island Sound, and to encourage the stewardship of Long Island Sound.	3-1b1
SC-7	Develop and distribute multilingual information materials, including signage, about the ecological health of Long Island Sound to reach non-traditional audiences.	3-1a3
SC-8	Develop innovative projects with partners to disseminate knowledge and results from Long Island Sound monitoring and research.	3-1b1
SC-9	Raise awareness through various media formats about the Sound's water quality conditions that could impact human health.	3-1b1
SC-10	Develop a website and use other media to educate the public about the impacts of climate change on Long Island Sound and in Long Island Sound Stewardship Areas.	3-1b1
SC-11	Provide technical and grant assistance to local volunteer organizations working towards the ecological restoration of the Sound.	3-1c1
SC-12	Continue staff support for Sound Stewardship volunteer projects and other outreach activities at New York and Connecticut Stewardship Sites.	3-1c1
SC-13	Continue the Long Island Sound Citizens Summit, and support other Sound wide events that encourage dialogue between resource managers, environmental stakeholders, and residents.	3-1c1

Implementation Action Number	Implementation Action Title	Major Strategy Addressed
SC-14	Provide Natural Landscaping guidance to communities and homeowners to encourage the use of alternatives to chemical and nutrient intensive landscaping, and establishment of natural vegetated buffers near bodies of water.	3-1c2
SC-15	**Support efforts through technical and grant assistance to develop community-based behavior change campaigns that result in measurable environmental improvements to the Sound's ecosystem.**	**3-1c2**
SC-16	Develop a Sound wide marketing campaign to increase the public's use of the Sound.	3-1c2
SC-17	Continue programs such as the Long Island Sound Mentor-Teacher Program that provide formal and informal K-12 educators with opportunities to learn how to include Long Island Sound instruction into their classrooms.	3-2b2
SC-18	Provide technical and grant assistance to encourage informal education activities on Long Island Sound.	3-2c1
SC-19	Create a "get out on Long Island Sound day" of informal education activities around the Sound to promote "on-the-water" experiences.	3-2c1
SC-20	Provide training to municipalities on low impact development and green infrastructure.	3-3a1
SC-21	**Develop and implement regional outreach programs on innovative/sustainable flood and erosion control for municipalities.**	**3-3a1**
SC-22	Provide support, including funding and technical assistance, for the development and dissemination of environmental technical manuals and environmental management studies to environmental decision makers and resource managers.	3-3a2
SC-23	**Conduct a Sound-wide citizen survey, and compare with the 2006 baseline survey, in order to identify the public's perception of the health of Long Island Sound and their understanding of the environmental issues.**	**3-3a2**
SC-24	Support the efforts of LISS to circulate the availability of grant programs, including through social media and personal contacts.	3-3b1
SC-25	**Support Communities as they develop and adopt new stand-alone Municipal Sustainability Plans**	**3-4b2**
SC-26	**Support Communities as they develop and adopt new or updated Coastal Resiliency Plans**	**3-4b2**
SC-27	Develop standards, best practices and educational materials for Green Infrastructure/Low Impact Development Planning and Implementation.	3-4b1
SC-28	Develop regional outreach programs and training modules on sustainability and resiliency planning topics.	3-4b1

Implementation Action Number	Implementation Action Title	Major Strategy Addressed
SC-29	Develop a municipal sustainability recognition program that incorporates ideas from other states to incentivize sustainable development and economic planning.	3-5a1
SC-30	Develop guidance for quantifying the benefits and costs of sustainability activities and economic development to incorporate into sustainability and resiliency planning efforts.	3-4b1
SC-31	**Develop a Public Access Plan to increase public access points and the length of shoreline accessible by the public to the Sound and its rivers.**	**3-5a1**
SC-32	Encourage the sustainable use of natural coastal areas, including Long Island Sound stewardship sites, through support of sustainable blueways, bikeways, and greenways.	3-5a3

Implementation Action: SC-1

Provide technical and grant assistance to support festivals and celebrations that encourage appreciation and use of the Sound.

Theme:	Sustainable and Resilient Communities
Goal:	Support vibrant, informed, and engaged communities that use, appreciate, and help protect Long Island Sound.
Outcome:	3-1: Residents have the awareness, knowledge, and skills to protect the Sound. (also 3-2: Future generations have the skills to become leaders and stewards for the Sound.)
Objectives:	3-1a: To increase appreciation of Long Island Sound and opportunities for residents to get a meaningful experience on the Sound and on its shoreline.
Strategies:	3-1a1: Encourage opportunities to enjoy Long Island Sound and activities such as fishing, swimming, and bird watching on the Sound and its shoreline.

Project Description/Background

Although the Long Island Sound Study (LISS) does not coordinate and implement festivals and celebrations of the Sound, the Study supports these activities, such as National Estuaries Day and Earth Day. The support may include, but is not limited to, financial assistance as part of the Long Island Sound Futures Fund, marketing assistance as part of the social media and the LISS website, or networking assistance by connecting festival/celebration organizers with other organizations that may also support their activities, festivals, and celebrations of the Sound.

Cooperators and Partners NEIWPCC, New York Sea Grant, Connecticut Sea Grant

Funding Sources

Long Island Sound Futures Fund

Level of Funds Needed $$$ - Entire Project $-$$ per project

Expected Outputs:

- Number of festivals and celebrations
- Number of visitors attending festivals and celebrations

Performance Metric(s):

- Number of visitors that have reported that they increased their knowledge about the health of Long Island Sound assessed by surveys
- Number of visitors that have reported that they increased their appreciation of Long Island Sound assessed by surveys

Implementation Status Underway

Expected Timeframe Ongoing

Other LISS Objectives Supported

SC 3-2c: To provide youth with opportunities to learn about Long Island Sound and its related issues.
SC 3-1b: To increase citizen knowledge and understanding of the health of Long Island Sound

Implementation Action: SC-2

Provide support through technical and grant assistance to organizations that promote environmentally sustainable recreational activities at Stewardship sites and other shoreline access points.

Theme: Sustainable and Resilient Communities
Goal: Support vibrant, informed, and engaged communities that use, appreciate, and help protect Long Island Sound.
Outcome: 3-1: Citizens have the awareness, knowledge, and skills to protect the Sound.
Objective: 3-1a: To increase the awareness and appreciation of Long Island Sound by citizens and visitors (Also: 3-1b, 3-1c)
Strategy 3-1a1: Encourage opportunities to enjoy Long Island Sound and activities such as fishing, swimming, and bird watching on the Sound and its shoreline. (Also: 3-1a2, 3-1a3, 3-1b, 3-1c2, 3-2a1, 3-2b2)

Project Description/Background In the past, Connecticut Sea Grant conducted the "Don't Dump Bait" campaign at Connecticut marinas to help control the spread of bait seaweed packing materials (http://web2.uconn.edu/seagrant/whatwedo/ais/btwrms.pdf). To help users use the Sound in a sustainable manner, the LISS Communications Team can provide the informational resources that partners can then use to help educate their constituents on ways to ensure continued enjoyment of Long Island Sound resources. Activities using Long Island Sound resources include fishing, boating, kayaking, hiking, and birding. Working with marinas, boat sellers and marine supply businesses, recreational fishing businesses, and coastal sporting goods businesses, the LISS Communications Team can generate and provide print resources, with useful information such as the annual tide chart, that help get the sustainable stewardship message to multiple end users.

Cooperators and Partners NEIWPCC, New York Sea Grant, Connecticut Sea Grant, Stewardship Site managers, local businesses and marinas.

Funding Sources Long Island Sound Futures Fund or printing grant from funding agency. Could also be funded by larger businesses with mutual interest in protection and recreational use of the Sound.

Level of Funds Needed $

Expected Outputs

- Number of informational materials distributed

Performance Metric(s)

- Number of informational materials requested.
- Knowledge of sustainable recreation of shoreline areas is increased as assessed by surveys.

Implementation Status New

Expected Timeframe Ongoing

Implementation Action: SC-3

Seek a National Heritage Area designation for Long Island Sound that will promote the Sound's heritage as the "Urban Sea" and the Sound's cultural, historical, maritime, and natural resources.

Theme: Sustainable and Resilient Communities
Goal: Support vibrant, informed, and engaged communities that use, appreciate, and help protect Long Island Sound.
Outcome: 3-1: Citizens have the awareness, knowledge, and skills to protect the Sound.
Objectives: 3-1a: To increase appreciation of Long Island Sound and opportunities for citizens to get a meaningful experience on the Sound and on its shoreline.
Strategies: 3-1a2: Support maritime and cultural heritage awareness.

Project Description/Background Long Island Sound has been described by Congress as a "National Treasure" and an "Estuary of National Significance." Despite these tributes, much more can be done to raise awareness -- both nationally and locally -- of the unique natural, cultural, and historical resources that the Sound has to offer. This is important to do because Instilling pride of place and an enduring stewardship ethic should make it easier to engage citizens to value the Sound's natural resources. One way to help communicate the Sound's strong cultural heritage to benefit the Sound is to seek the National Park Service designation of a National Heritage Area (NHA). NHAs are designated by Congress. Participating regions in the northeast include the Hudson Valley, Lake Champlain, and Quinebaug and Shetucket Rivers Valley. NHA entities support historic preservation, natural resource conservation, recreation, heritage tourism, and educational projects. NHA partnerships through tourism and visitation and leveraging funds contribute nearly $13 billion to the national economy. Hiring a grant writer for the effort would be needed to complete the National Park Service application, which includes developing a management plan to conserve and interpret the regions' nationally significant stories and resources.

LISS should also support through the Futures Fund associated projects such as a travelling Long Island Sound exhibit to help tell the story of the Sound's cultural, historical, maritime, and natural resources.

Cooperators and Partners
NEIWPCC, New York Sea Grant, Connecticut Sea Grant, CTDEEP, NYSDEC, USFWS, LISS Stewardship Initiative partners

Funding Sources LISS and state and local tourism agencies

Level of Funds Needed $$

Expected Outputs
- An application, which includes a management plan for a National Heritage Area, is completed and sent to the National Park Service
- Establishment of an exhibit that promotes the historical, cultural, and ecological resources of Long Island Sound.

Performance Metric(s) Increase in the number of events that promote the region's national significance.

Implementation Status New

Expected Timeframe Two years to get the application prepared; five years for project completion

Other CCMP Objectives Supported SC 3-5a

Implementation Action: SC-4

Continue state programs to promote youth and adult fishing as a healthy and sustainable recreational sport.

Theme: Sustainable and Resilient Communities
Goal: Support vibrant, informed, and engaged communities that use, appreciate, and help protect Long Island Sound.
Outcome: 3-1: Citizens have the awareness, knowledge, and skills to protect the Sound.
Objective: 3-1a: To increase appreciation of Long Island Sound and opportunities for citizens to get a meaningful experience on the Sound and on its shoreline.
Strategy: 3-1a2: Support maritime and cultural heritage awareness.

Project Description/Background

Encouraging fishing and promoting sustainable fishing are important parts of the effort to promote interest in Long Island Sound and to become good stewards of the environment. The states of Connecticut and New York recognize this need through youth fishing programs - I Fish New York in New York and the Connecticut Aquatic Education Resources (CARE) in Connecticut. In addition, both states have programs to encourage opportunities for responsible marine fishing on the shoreline, including improving access at state public boating launch sites.

Cooperators and Partners

CTDEEP, NYSDEC Bureau of Marine Resources, and USFWS

Funding Sources CTDEEP and NYSDEC

Level of Funds Needed $$$/yr (CARE), $ - Fish New York, $$$ NYSDEC Bureau of Marine Resources Marine Fishing Access (MFA) Unit.

Expected Outputs

- Number of children and adults that participate in fishing education programs

Performance Metric(s)

- Number of children and adults that learn the importance of protecting fish habitats as assessed by surveys
- Number of NOAA recreational fishing catch
- Number of NOAA recreational fishing trips
- Number of improved boating launch and shoreline fishing sites

Implementation Status Underway

Expected Timeframe Ongoing

Implementation Action: SC-5

Provide technical and grant assistance to support federal and local initiatives that increase appreciation and understanding of the Sound for underprivileged and non-traditional audiences in urban areas.

Theme: Sustainable and Resilient Communities
Goal: Support vibrant, informed, and engaged communities that use, appreciate, and help protect Long Island Sound.
Outcome: 3-1: Citizens have the awareness, knowledge, and skills to protect the Sound. (also 3-2)
Objectives: 3-1a: To increase appreciation of Long Island Sound, and opportunities for citizens to get a meaningful experience on the Sound and on its shoreline
Strategies: 3-1a3: Connect/reconnect urban populations, including underserved and non-English language communities, to the Sound

Project Description/Background

According to a LISS public perception survey, Long Island Sound residents who live in highly urbanized areas are less likely to participate in activities on the Sound. They also are less likely to have a favorable view of water quality. To increase use of public access sites in urban communities, grant programs such as the Long Island Sound Futures Fund (LISFF) should support local community groups that bring residents to urban waters, support municipal efforts to restore degraded waterfronts and natural areas, and engage citizen volunteers to help in the restoration. LISS also should be an important resource for federal urban initiatives that have a presence in the Long Island Sound watershed, including the Urban Oases project in New Haven Harbor watershed, part of the USFWS's Urban Wildlife Refuge Partnership, and EPA's support of the Bronx River restoration effort, part of its Urban Waters Federal Partnership.

Cooperators and Partners

NEIWPCC, New York Sea Grant, Connecticut Sea Grant, LISS Stewardship Initiative partners, USFWS, Audubon Connecticut

Funding Sources NFWF, EPA, USFWS

Level of Funds Needed $$/year (through the Long Island Sound Futures Fund)

Expected Outputs

- Number of students and adults involved in Long Island Sound activities in urbanized areas
- Number of wildlife demonstration sites developed in New Haven through the Urban Oases project

Performance Metric(s)

- Number of students in urban areas who have a greater appreciation of the Sound through experiences as assessed by surveys.
- Extent of environmental improvements as a result of technical and grant assistance (e.g., number of low impact development projects that improve water quality)

Implementation Status Underway

Expected Timeframe Ongoing; New Haven project should be completed by 2015

Other CCMP Objectives Supported SC 3-1b, SC 3-2a, SC 3-2b, SC 3-2c

Implementation Action: SC-6

Produce informational materials that can be distributed through multiple formats, including, print, web, social media, and traveling displays to increase the public's understanding of the ecological, cultural, and recreational value of Long Island Sound, and to encourage the stewardship of Long Island Sound.

Theme: Sustainable and Resilient Communities
Goal Support vibrant, informed, and engaged communities that use, appreciate, and help protect Long Island Sound.
Outcome: 3-1: Citizens have the awareness, knowledge, and skills to protect the Sound.
3-3: Policy makers, resource managers, and stakeholders in New York, Connecticut, and the upper basin states have the resources to undertake collaborative efforts to restore and protect the Sound.
Objective: 3-1b: To increase citizen knowledge and understanding of the ecological health of Long Island Sound.
Strategy: 3-1b1: Provide information products that educate communities about the health of Long Island Sound, and about the collaborative efforts to restore and protect the Sound.

Project Description/Background A Public Perception Survey, conducted by the Long Island Sound Study in 2006, suggests that Long Island Sound residents are not well informed when it concerns environmental issues and terms (http://longislandsoundstudy.net/wp-content/uploads/2010/03/LIS.Public.Perception.Survey2006.pdf). For example, less than one-third questioned in the survey knew that storm drains empty into the Sound and its tributaries. The survey also indicated that environmentally knowledgeable residents are more likely to engage in behaviors to prevent pollution (such as lawn care practices to reduce fertilizer runoff into storm drains). As such, the LISS Communications Team along with project partners, work together to produce attractive and engaging print, web, social media, traveling display, and promotional materials to distribute to a wide range of audiences. This information ultimately helps increase the public's understanding of the ecological, cultural, and recreational value of Long Island Sound, and to encourage the stewardship of Long Island Sound.

Cooperators and Partners NEIWPCC, New York Sea Grant, Connecticut Sea Grant. Additional assistance may be provided by other LISS staff and project partners.

Funding Sources LISS

Level of Funds Needed $$/year Special projects would warrant additional funding.

Expected Outputs Long Island Sound Study website

- Printed reports on health of Long Island Sound are produced on a regular basis (i.e., Sound Health)
- Printed reports on management efforts to restore Long Island Sound are produced on a regular basis (i.e., Protection and Progress)
- Print and web-based newsletters are produced on a regular basis (i.e., Sound Update, Sound Bytes)
- Long Island Sound Study social media presence (Facebook, Instagram, etc.)
- Promotional materials

Performance Metric(s)

- Percentage of people knowledgeable about Long Island Sound issues as measured through surveys
- Number of people accessing Long Island Sound websites and social media sites

Implementation Status Underway

Expected Timeframe Ongoing

Other CCMP Objectives Supported SC 3-1a, SC 3-1c, SC 3-3a

Implementation Action: SC-7

Develop and distribute multilingual information materials, including signage, about the ecological health of Long Island Sound to reach non-traditional audiences.

Theme: Sustainable and Resilient Communities
Goal Support vibrant, informed, and engaged communities that use, appreciate, and help protect Long Island Sound.
Outcome: 3-1: Citizens have the awareness, knowledge, and skills to protect the Sound.
Objective: 3-1a: To increase appreciation of Long Island Sound and opportunities for citizens to get a meaningful experience on the Sound and on its shoreline.
Strategy: 3-1a3: Reconnect urban populations, including underserved and non-English language communities, to the Sound.

Project Description/Background According to the US Census 2011 Language Mapper, the population of Long Island Sound watershed residents includes people that speak multiple languages. Languages include, but are not limited to, English, Spanish, French, French Creole, Italian, Portuguese, German, Russian, Polish, Persian, Chinese, Japanese, Korean, Vietnamese, Tagalog, and Arabic. As such, there is a need to provide attractive and engaging Long Island Sound educational resources and promotional materials and translate existing signage about safe areas to fish and shellfish in multiple languages to engage a wide range of diverse audiences.

To accomplish the task of developing multilingual information and promotional materials about the ecological health of Long Island Sound, LISS will need to partner with a local organization that understands the culture of the target audience to identify the best method to reach the audience. Once identified, LISS will work with the local partnering organization to identify a contractor to conduct the translation services. As the translation services are conducted, the translation contractor will need to be in frequent consultation with LISS and the partnering organization. As for the distribution of the materials, the local partnering organization will be instrumental, as they will be helpful in identifying the best method to distribute the informational and promotional materials to reach the highest percentage of the target audience.

Cooperators and Partners NEIWPCC, New York Sea Grant, Connecticut Sea Grant. Additional assistance may be provided by other LISS staff and project partners. A contractor to conduct translation services will be needed to conduct translation of the informational materials in multiple languages. Potential partners to help distribute multilingual information include, but are not limited to, immigrant population cultural groups, boating clubs, schools, supermarkets/grocery stores, county health departments, etc.

Funding Sources LISS

Level of Funds Needed $/yr

Expected Outputs Number of multilingual information and promotional materials about the ecological health of Long Island Sound (may be print or web-based depending upon the target audience)

Performance Metric(s) Knowledge about the environmental conditions of the Sound has increased as a result of the informational and promotional materials as assessed by surveys.

Implementation Status Underway

Expected Timeframe Ongoing

Other CCMP Objectives Supported SC 3-1b

Implementation Action: SC-8

Develop innovative projects with partners to disseminate knowledge and results from Long Island Sound monitoring and research.

Theme:	Sustainable and Resilient Communities
Goal:	Support vibrant, informed, and engaged communities that use, appreciate, and help protect Long Island Sound.
Outcome:	3-1: Citizens have the awareness, knowledge, and skills to protect the Sound. 3-2: Future generations have the skills to become leaders and stewards for the Sound 3-3: Decision makers and stakeholder groups collaborate and have the resources to be effective in protecting and improving the health of Long Island Sound
Objective:	3-1b: To increase citizen knowledge and understanding of the ecological health of Long Island Sound.
Strategy:	3-1b1: Provide information that educates community about the health of Long Island Sound, and about the collaborative efforts to restore and protect the Sound.

Project Description/Background To identify the research priorities of Long Island Sound, the Communications Team regularly attends LISS STAC meetings. Also, the Communications Team meets with Long Island Sound researchers to assist with disseminating their monitoring and research results. To assist researchers in disseminating their monitoring and research results, the Communications Team can utilize innovative methods working with the STAC and community partners. Some possible methods could include traveling exhibits, citizen science engagement, interactive websites, mobile applications, web-based games, videos, etc. These projects would provide citizens with a better understanding of the efforts to protect and restore the Sound.

Cooperators and Partners NEIWPCC, New York Sea Grant, Connecticut Sea Grant, STAC, LISS researchers, community partners

Funding Sources Long Island Sound Futures Fund, Foundation or private industry depending on venue.

Level of Funds Needed $$/project

Expected Outputs Dissemination of information to new audiences; new partnerships between science and citizens; increased visibility for LISS

Performance Metric(s)

- Number of people and organizations engaged
- Increased interest in Long Island Sound research projects through requests on Long Island Sound websites and social media sites

Implementation Status New

Expected Timeframe Ongoing

Other CCMP Objectives Supported SC 3-1b, SC 3-1c, SC 3-2a, SC 3-2b, SC 3-3a, SC 3-5a

Implementation Action: SC-9

Raise awareness through various media formats about the Sound's water quality conditions that could impact human health.

Theme:	Sustainable and Resilient Communities
Goal	Support vibrant, informed, and engaged communities that use, appreciate, and help protect Long Island Sound.
Outcome:	3-1: Citizens have the awareness, knowledge, and skills to protect the Sound. (also: 3-3)
Objective:	3-1b: To increase citizen knowledge and understanding of the ecological health of Long Island Sound.
Strategy:	3-1b1: Provide information that educates community about the health of Long Island Sound, and about the collaborative efforts to restore and protect the Sound.

Project Description/Background The LISS Communications Team, along with project partners, will work together to provide access to fact sheets on Long Island Sound's water quality health and safety concerns. These fact sheets will be distributed to a wide range of audiences, and will address water quality health and safety concerns such as fecal contamination of shellfish, unsafe levels of toxic contaminants in fish, emerging toxic contaminants, harmful algal blooms, invasive species, combined sewer overflows, and pathogen levels at bathing beaches that lead to beach closings. This information ultimately helps people appreciate and understand the ecological health of the Sound.

Cooperators and Partners NEIWPCC, New York Sea Grant, Connecticut Sea Grant. Additional assistance may be provided by other LISS staff and project partners. Potential partners to help distribute food and water quality information include, but are not limited to, supermarkets/grocery stores, farmers markets, county health departments, etc.

Funding Sources LISS

Level of Funds Needed $$/year

Expected Outputs

- Number of print and web-based health and safety fact sheets

Performance Metric(s)

- Number of copies of fact sheets distributed
- Number of public service announcements on safe harvesting and handling of shellfish
- Number of people that request (print) or view (web) the health and safety fact sheets
- Number of people knowledgeable about Long Island Sound water quality issues as assessed by surveys
- Health risks associated with human consumption of shellfish and finfish are reduced.
- Health risks associated with swimming in waters affected by harmful algal blooms are reduced.
- Health risks associated with invasive species are reduced.
- Health risks associated with human exposure to combined sewer overflows are reduced.
- Health risks associated with swimming in waters affected by high pathogen levels and beach closing are reduced.

Implementation Status Underway

Expected Timeframe Ongoing

Other CCMP Objectives Supported SC 3-3b

Implementation Action: SC-10

Develop a website and use other media to educate the public about the impacts of climate change on Long Island Sound and in Long Island Sound Stewardship Areas.

Theme: Sustainable and Resilient Communities
Goal: Support vibrant, informed, and engaged communities that use, appreciate, and help protect Long Island Sound.
Outcome: 3-1: Citizens have the awareness, knowledge, and skills to protect the Sound.
Objective: 3-1b: To increase citizen knowledge and understanding of the ecological health of Long Island Sound
Strategy: 3-1b1: Provide information that educates community about the health of Long Island Sound, and about the collaborative efforts to restore and protect the Sound.

Project Description/Background Natural coastal areas have shown to play an important role in protecting the coast following extreme weather events such as hurricanes. But there is concern that the impacts of climate change might lead to changes in the environment such as sea level rise that will degrade coastal areas. The public should be made more aware of the critical role natural areas play in protecting the coast, and what can be done by citizens and communities to assure that a natural shoreline will continue to exist. The LISS Communications Team and the Sentinel Monitoring for Climate Change work group will work together to develop messages for the public and to produce web pages on the science of climate change, how climate change impacts the biota and non-living resources of Long Island Sound, and information on adaptation, and preparedness for Long Island Sound citizens.

Cooperators and Partners NEIWPCC, New York Sea Grant, Connecticut Sea Grant, LISS Sentinel Monitoring for Climate Change work group, USFWS, and NOAA

Funding Sources LISS

Level of Funds Needed $

Expected Outputs

- Number of enhanced web pages
- Number of print products such as posters and signage at Stewardship areas
- Number of postings to social media

Performance Metric(s)

- The public has increased understanding of climate change issues and knowledge on how to prepare for climate change as assessed by surveys.
- Number of visits to the climate change website.

Implementation Status New

Expected Timeframe Ongoing

Other CCMP Objectives Supported SC 3-1c

Implementation Action: SC-11

Provide technical and grant assistance to local volunteer organizations working towards the ecological restoration of the Sound.

Theme: Sustainable and Resilient Communities
Goal: Support vibrant, informed, and engaged communities that use, appreciate, and help protect Long Island Sound.
Outcome: 3-1: Citizens have the awareness, knowledge, and skills to protect the Sound.
Objective: 3-1c: To increase citizen stewardship, at home and in the community, to protect the natural resources of Long Island Sound.
Strategy: 3-1c1: Promote citizen participation in the cleanup and restoration of Long Island Sound through volunteerism and community action.

Project Description/Background The LISS Communications Team can assist in the promotion of volunteer and community activities by making this information available through its website, as well as assisting with select promotional materials based on the project. The Long Island Sound Study maintains a "Volunteer Opportunities" web page for Connecticut and New York, where volunteers can view descriptions of community organizations that conduct environmental volunteer work. On this web page, the Long Island Sound Study maintains a calendar of upcoming volunteer events. To expand the webpage into a "volunteer portal," the Long Island Sound Study Communications Team will work with a contractor to add a searchable database of volunteer opportunities. The volunteer section is also nested under the "Get Involved" section of the LISS website; as such, there is information for volunteers to use on individual behavior change that can help reduce pollution and protect habitats. In addition, the LISS Communications Team will seek input from volunteer organizations to make the volunteer web page user-friendly, which will ultimately lead to an increase in volunteerism in the Long Island Sound watershed.

The Long Island Sound Study website will also provide a centralized "portal" for volunteerism for the Sound, based on models available in other parts of the country such as ***Volunteer Guide***, and Puget Sound's ***VolunteerMatch****. This program will actively seek partnerships with academic institutions that require service learning or community service components, agencies that seek matches with community service hours, volunteers for coastal and Source to Sea cleanups, volunteer water quality monitoring, and could ultimately seek to match volunteers with research and monitoring opportunities based on the model of ***EarthWatch***, (http://earthwatch.org/expeditions), and even Elder Hostel opportunities.
*(http://www.volunteerguide.org/?gclid=CPip_7zF-LoCFbFxOgodqgwAFA, http://www.volunteermatch.org/search/org15697.jsp)

Cooperators and Partners NEIWPCC, New York Sea Grant, Connecticut Sea Grant

Funding Sources LISS

Level of Funds Needed $

Expected Outputs
- LISS "Volunteer Opportunities"/ "volunteer portal" webpage.
- Number of volunteers participating in volunteer opportunities

Performance Metric(s)
- Work accomplished (e.g., trash collected, trails created, numbers of people engaged, numbers of organizations reached, work done, and demand for and visibility of site).
- Number of visitors to the LISS "Volunteer Opportunities"/ "volunteer portal" webpage.

Implementation Status Underway

Expected Timeframe Ongoing

Other CCMP Objectives Supported SC 3-1a, SC 3-1b, SC 3-2c

Implementation Action: SC-12

Continue staff support for Sound Stewardship volunteer projects and other outreach activities at New York and Connecticut Stewardship Sites.

Theme:	Sustainable and Resilient Communities
Goal	Support vibrant, informed, and engaged communities that use, appreciate, and help protect Long Island Sound.
Outcome:	3-1: Citizens have the awareness, knowledge, and skills to protect the Sound. (also: 3-2: Future generations have the skills to become leaders and stewards for the Sound.)
Objective:	3-1c: To increase citizen stewardship, at home and in the community, to protect the natural resources of Long Island Sound.
Strategy:	3-1c1: Promote citizen participation in the cleanup and restoration of Long Island Sound through volunteerism and community action.

Project Description/Background The Long Island Sound Study's Stewardship, Habitat Restoration, and Communications Work Groups (USFWS, CTDEEP, NYSDEC, NEIWPCC, New York Sea Grant, and Connecticut Sea Grant), along with project partners, will work together to provide Sound Stewardship volunteer projects and other outreach activities at New York and Connecticut Stewardship Sites to reach a wide range of audiences.

Cooperators and Partners USFWS, CTDEEP, NYSDEC, NEIWPCC, New York Sea Grant, Connecticut Sea Grant

Funding Sources Base funding for the LISS staff. Additional funding will be needed for mini-grant stewardship projects for Long Island Sound Stewardship Sites.

Level of Funds Needed $$ - mini grant stewardship projects. Special projects would warrant additional funding.

Expected Outputs

- Stewardship Day educational and hands-on volunteer projects for the general public
- Sound Stewards citizen science educational projects for K-12 and college students
- National Trails Day and interpretive nature walks for the general public
- Installation of Stewardship network signage

Performance Metric(s)

- Number of volunteers participating in stewardship programs, such as Stewardship Day, Sound Stewards, National Trails Day, interpretive nature walks, etc.
- Public perception of the health of Sound has increased as assessed by surveys.

Implementation Status Underway

Expected Timeframe Ongoing

Other CCMP Objectives Supported SC 3-1a, SC 3-2a, SC 3-2c

Implementation Action: SC-13

Continue the Long Island Sound Citizens Summit and support other Soundwide events that encourage dialogue between resource managers, environmental stakeholders, and residents.

Theme: Sustainable and Resilient Communities
Goal: Support vibrant, informed, and engaged communities that use, appreciate, and help protect Long Island Sound.
Outcome: 3-1: Citizens have the awareness, knowledge, and skills to protect the Sound.
3-3: Policy makers, resource managers, and stakeholders in New York, Connecticut, and the upper basin states have the resources to undertake collaborative efforts to restore and protect the Sound.
Objective: 3-1c: To increase citizen stewardship, at home and in the community, to protect the natural resources of Long Island Sound.
Strategy: 3-1c1: Promote citizen participation in the cleanup and restoration of Long Island Sound through volunteerism and community action.

Project Description/Background Since the early 1990s, the Long Island Sound Study has been helping to support the Long Island Sound Citizens Summit, a day-long forum for residents of Long Island Sound to learn about important issues affecting the Sound, and for residents to inform LISS and its partners about environmental priorities from a citizen perspective. The Summit venue alternates each year between Connecticut and New York. In recent years the Summit has been organized by Save the Sound/Connecticut Fund for the Environment through a contract managed by NEIWPCC.

Cooperators and Partners Save the Sound/Connecticut Fund for the Environment, NEIWPCC, New York Sea Grant, Connecticut Sea Grant

Funding Sources LISS

Level of Funds Needed $/year

Expected Outputs

- Long Island Sound Citizens Summit conference

Performance Metric(s)

- Number of citizens and stakeholders that attend the conference
- Residents increase their knowledge about important Long Island Sound issues as assessed by surveys
- LISS and its stakeholders receive feedback that help inform environmental decision-making

Implementation Status Underway

Expected Timeframe Ongoing

Other CCMP Objectives Supported SC 3-3b

Implementation Action: SC-14

Provide natural landscaping guidance to communities and homeowners to encourage the use of alternatives to chemical and nutrient intensive landscaping and the establishment of natural vegetated buffers near bodies of water.

Theme: Sustainable and Resilient Communities
Goal: Support vibrant, informed, and engaged communities that use, appreciate, and help protect Long Island Sound.
Outcome: 3-1: Citizens have the awareness, knowledge, and skills to protect the Sound.
3-4: New and existing development is sustainable and resilient
Objective: 3-1c: To increase citizen stewardship, at home and in the community, to protect the natural resources of Long Island Sound.
Strategy: 3-1c2: Promote campaigns to encourage citizens, both homeowners and renters, to engage in environmentally friendly practices around their homes and communities.

Project Description/Background Through the University Extension Master Gardener Program, LISS, and Sea Grant programs, conduct annual Advanced Master Gardening certificate program(s) designed to provide an understanding of the link between chemical and nutrient intensive residential landscaping and the water quality of Long Island Sound. Program offers design and implementation alternatives, with emphasis on native plants, vegetated buffers, and other green solutions to stormwater runoff, and living shorelines (as it relates to sea level rise and storm abatement). Field component links LISS Stewardship Sites, habitat restoration and management principles. Significant outreach component ensures dissemination of information to peers, neighbors and communities. Develop program as pilot for adoption through the Cooperative Extension/Land Grant University model in other NEP sites in the northeast. Explore use of incentives (monetary and otherwise) to encourage adoption of alternative practices. Spring and/or Fall training over two weeks (classes/field component); outreach over 5 months. Outreach oversight/input from CTSG and collaborating partners; participants' follow up through outreach tracking forms. Graduation and advanced master gardener certification relies on successful outreach completion; program also provides accreditation for NOFA Organic Land Care professionals.

Cooperators and Partners Connecticut Sea Grant, county Master Gardening Programs in Connecticut

Funding Sources LISS base program funds; small grants or foundation support opportunity

Level of Funds Needed $-$$

Expected Outputs

- Number of training sessions
- Number of resources developed and distributed to professionals, municipal officials and volunteers
- Numbers of Master Gardeners trained
- Number of outreach opportunities organized by Master Gardeners

Performance Metric(s)

- Foster individual stewardship and behavior change as assessed by surveys
- Support professional development of informal and formal educators

Implementation Status Underway

Expected Timeframe Ongoing

Other CCMP Objectives Supported SC 3-4

Implementation Action: SC-15

Support efforts through technical and grant assistance to develop community-based behavior change campaigns that result in measurable environmental improvements to the Sound's ecosystem.

Theme:	Sustainable and Resilient Communities
Goal	Support vibrant, informed, and engaged communities that use, appreciate, and help protect Long Island Sound.
Outcome:	3-1: Citizens have the awareness, knowledge, and skills to protect the Sound.
Objective:	3-1c: To increase citizen stewardship, at home and in the community, to protect the natural resources of Long Island Sound.
Strategy:	3-1c2: Promote campaigns to encourage citizens, both homeowners and renters, to engage in environmentally friendly practices around their homes and communities.

Project Description/Background A Public Perception Survey, conducted by the Long Island Sound Study in 2006, reveals that many Long Island Sound residents unknowingly engage in practices around their home and yard that result in pollution that can eventually discharge into streams and rivers and Long Island Sound (http://longislandsoundstudy.net/wp-content/uploads/2010/03/LIS.Public.Perception.Survey2006.pdf). To address this issue, Community Based Social Marketing (CBSM) campaigns identify the barriers that prevent people from doing the right thing and use marketing tools such as incentives or establishing new social norms to try to change habits. Past Long Island Sound CBSM campaigns have focused on reducing stormwater runoff, groundwater contamination, and coastal marine debris. Future campaigns may include, but are not limited to, best practices for turf management and the protection and maintenance of on-site wastewater treatment systems. The LISS Communications team will lead this effort by providing information on CBSM via a LISS webpage, workshops, webinars, and other methods to encourage community groups to develop their own CBSM projects.

Cooperators and Partners NEIWPCC, New York Sea Grant, Connecticut Sea Grant

Funding Sources Long Island Sound Futures Fund

Level of Funds Needed $$/ a year

Expected Outputs

- Number of LISFF grant applications that propose or incorporate CBSM
- Number of LISFF grants funded to implement CBSM projects
- Number of webpages, workshops, webinars, or other methods conducted to promote the development of CBSM to community groups

Performance Metric(s)

- Number of LISFF grant applications that propose or incorporate CBSM
- Number of LISFF grants funded to implement CBSM projects
- Number of attendees at CBSM workshops and webinars
- Number of visitors to the CBSM webpage
- Number of people who commit to changing behaviors that lead to environmental improvements
- Extent of environmental improvements as a result of CBSM projects (e.g., acres of lawn with environmentally-friendly lawn practices)

Implementation Status Underway

Expected Timeframe Ongoing

Implementation Action: SC-16

Develop a Sound wide marketing campaign to increase the public's use of the Sound.

Theme: Sustainable and Resilient Communities
Goal: Support vibrant, informed, and engaged communities that use, appreciate, and help protect Long Island Sound.
Outcome: 3-1: Citizens have the awareness, knowledge, and skills to protect the Sound.
Objective: 3-1c: To increase citizen stewardship, at home and in the community, to protect the natural resources of Long Island Sound.
Strategy: 3-1c2: Promote campaigns to encourage citizens, both homeowners and renters, to engage in environmentally friendly practices around their homes and community.

Project Description/Background Citizens who appreciate and use the Sound are more likely to be advocates for restoring and protecting the Sound. Interest in the Sound, however, is low in urban areas and declines the farther away people live from the shore, according to a 2006 Public Perception Survey. To increase awareness and appreciation of the Sound, LISS would like to work with its partners to develop a Sound wide marketing campaign to promote the use of publicly accessible sites in the Sound closest to where people live. The campaign would serve a dual purpose through the development of consistent messages that can be shared among LISS's partners to raise awareness around the Sound of how they can reduce water pollution by making smart environmental choices around their yard and home and their community.

Cooperators and Partners CTDEEP, NYSDEC, NEIWPCC, New York Sea Grant, Connecticut Sea Grant, representative groups on the CAC, and Long Island Sound Stewardship Site managers.

Funding Sources LISS will fund the first year. Funding for years two through five will be through a collaboration of funders, including EPA, NYSDEC, CTDEEP, different groups on the CAC, and local foundations.

Level of Funds Needed Year one will be $20,000 to design the campaign. Years two and three will be $70,000 to $100,000 to pay for implementing the campaign with the amount of money determined by the ability to raise funds.

Expected Outputs

- An outreach campaign that will include highlighting events at Long Island Sound Stewardship Areas
- Number of posters and poster ads displayed at venues such as railroad stations and nature centers
- Number of billboard displays
- New website content, including web videos
- Number of public service ads on radio and cable television

Performance Metric(s)

- Attendance at public access sites along the Sound will increase.
- Use of LISS's website and social media sites to find out about Long Island Sound and activities on the Sound will increase.

Implementation Status New

Expected Time frame One year to design campaign; two more years to implement campaign.

Other CCMP Objectives Supported SC 3-1a

Implementation Action: SC-17

Continue programs such as the Long Island Sound Mentor-Teacher Program that provide formal and informal K-12 educators with opportunities to learn how to include Long Island Sound instruction in their classrooms.

Theme: Sustainable and Resilient Communities
Goal Support vibrant, informed, and engaged communities that use, appreciate, and help protect Long Island Sound.
Outcome: 3-2: Future generations have the skills to become leaders and stewards for the Sound.
Objective: 3-2b: To provide educators with the knowledge to bring Long Island Sound education into the classroom and informal settings.
Strategy: 3-2b2: Support professional development of informal and formal educators.

Project Description/Background Since 2002, the Long Island Sound Mentor Teachers Program has engaged educators to share their successful strategies for implementing Long Island Sound into existing curricula with their peers in professional development workshops. All workshop lessons and activities designed for use in the classroom or field are aligned to the content standards of the Connecticut/New York Science Frameworks and/or the National Science Education Standards, in a format that can be easily implemented into existing curricula. The Long Island Sound Mentor teachers plan interdisciplinary sessions on varying topics related to Long Island Sound, such as nonpoint source pollution, invasive/ non-native species, water quality, and geology. All sessions include a field component within the Long Island Sound watershed. All workshop participants receive a tote bag of resources, in addition to the workshop material presented. The goal of these teacher professional development workshops is to encourage teachers to incorporate the teaching of Long Island Sound in their classrooms.

In addition to the Long Island Sound Mentor Teachers program, teachers can participate in other environmental education professional development workshops (e.g., NOAA Teachers at Sea Program, Project WET, Project WILD, WILD Aquatic, etc.) to learn how to incorporate the teaching of Long Island Sound into their classrooms.

Cooperators and Partners The Long Island Sound Mentor Teacher Program is coordinated by Connecticut Sea Grant and New York Sea Grant. Coordination of other teacher workshops is conducted by partner organizations.

Funding Sources LISS base funding for the coordination of the Long Island Sound Mentor Teacher Program by Connecticut Sea Grant and New York Sea Grant.

Level of Funds Needed **$$/** year

Expected Outputs

- Number of Long Island Sound Mentor Teacher Workshops

Performance Metric(s)

- Number of attendees in the Long Island Sound Mentor Teacher Workshops
- Number of students reached as a result of the educator attending the Long Island Sound Mentor Teacher workshop
- Number of teachers that incorporate the teaching of Long Island Sound in their classrooms as assessed through surveys

Implementation Status Underway

Expected Timeframe Ongoing

Implementation Action: SC-18

Provide technical and grant assistance to encourage informal education activities on Long Island Sound.

Theme:	Sustainable and Resilient Communities
Goal	Support vibrant, informed, and engaged communities that use, appreciate, and help protect Long Island Sound.
Outcome:	3-2: Future generations have the skills to become leaders and stewards for the Sound.
Objective:	3-2c: To provide youth with opportunities to learn about Long Island Sound and its related issues.
Strategy:	3-2c1: Support informal education at aquariums, museums, and coastal environments with facilities such as nature centers.

Project Description/Background Informal education institutions (e.g., aquariums, nature centers, science centers, etc.) provide students and adults alike with field experiences of the Sound. To encourage the continuation of these field experiences on Long Island Sound, the LISS Communications Team will provide technical and grant assistance to these informal education institutions to encourage them to continue their field experiences. Technical guidance materials, such as manuals or field guides, will be developed to compliment the Long Island Sound field experiences.

Cooperators and Partners
Informal education institutions, NEIWPCC, New York Sea Grant, Connecticut Sea Grant

Funding Sources LISS

Level of Funds Needed $5,000 to $20,000 a year.

Expected Outputs
- Technical guidance provided to informal education institutions
- Grant assistance provided to informal education institutions
- Technical guidance materials will be developed and distributed to informal education institutions

Performance Metric(s)
- Number of informal education institutions that seek technical guidance from LISS
- Number of informal education institutions that seek grant assistance from LISS
- Number of technical guidance materials distributed to informal education institutions

Implementation Status Underway

Expected Timeframe Ongoing

Other CCMP Objectives Supported SC 3-2a

Implementation Action: SC-19

Create a "get out on Long Island Sound Day" of informal educational activities around the Sound to promote "on-the-water" experiences.

Theme: Sustainable and Resilient Communities
Goal: Support vibrant, informed, and engaged communities that use, appreciate, and help protect Long Island Sound.
Outcome: 3-2: Future generations have the skills to become leaders and stewards for the Sound
Objective: 3-2c: To provide youth with opportunities to learn about Long Island Sound and its related issues.
Strategy: 3-2c1: Support informal education at aquariums, museums, and coastal environments with facilities such as nature centers.

Project Description/Background Facilitate the bringing together of informal education organizations that provide on-the-water experiences for the public to celebrate a "get out on Long Island Sound" day. A variety of informal education organizations have boats that they use to conduct tours or do outreach/education on Long Island Sound. By providing sound-wide publicity for an event, the public will have a better understanding of where to go to be able to experience the Sound in a truly meaningful way. This event could be combined with a near shore "local flotilla" that encourages a water parade for anyone owning a small boat. Educational materials could be created specific to this event, including the coupling of the water experience with a Stewardship Sites land component and a map(s) of points of interest and entry for an on-the-water Long Island Sound experience.

Cooperators and Partners NEIWPCC, New York Sea Grant, Connecticut Sea Grant, maritime non-profits and museums that use boats to promote the use, appreciation, and understanding of Long Island Sound.

Funding Sources Long Island Sound Futures Fund, or could seek funding associated with tourism in Connecticut and New York.

Level of Funds Needed $$ - part time coordinator/year

Expected Outputs

- Number of events

Performance Metric(s)

- Number of participants
- Diversity of organizations that participant in the event(s)
- Free media exposure
- Increase in public awareness of Long Island Sound as assessed by surveys

Implementation Status New

Expected Timeframe Ongoing

Other CCMP Objectives Supported SC 3-2a, SC 3-2b

Implementation Action: SC-20

Provide training to municipalities on low impact development and green infrastructure.

Theme: Sustainable and Resilient Communities
Goal: Support vibrant, informed, and engaged communities that use, appreciate, and help protect Long Island Sound.
Outcome: 3-3: Policy makers, resource managers, and stakeholders in New York, Connecticut, and the upper basin states have the resources to undertake collaborative efforts to restore and protect the Sound.
Objective: 3-3a: To ensure that policy makers, environmental professionals, and stakeholders have the best available information in order to make decisions that will improve the management of Long Island Sound.
Strategy: 3-3a1: Support the dissemination of the best practices to reduce pollution, improve water quality, and protect habitats through professional development training and workshops.

Project Description/Background Develop and implement regional training to municipalities on low impact development and green infrastructure. Topics include, but are not limited to, vegetated buffers, living shorelines, bioretention, pervious pavement, etc. The training will target municipalities (i.e., public works, wetlands commissioners, property managers) and will draw on the expertise of consulting town engineers and will provide information on Best Management Practices (BMPs). Create blog/listserve for ongoing communication among/between participants.

Cooperators and Partners Army Corps of Engineers, FEMA, NRCS, appropriate academic institutions, coastal engineering consulting companies, New York and Connecticut Sea Grant, NEMO

Funding Sources Long Island Sound Futures Fund

Level of Funds Needed $$/year for speakers, transportation, supplies, meeting space, printed material, marketing

Expected Outputs

- Training workshops
- Demonstration BMPs installed in conjunction with training workshop

Performance Metric(s)

- Results of pre- and post-surveys at each training that indicate a change in knowledge
- Number of people trained in LID/GI
- Follow-up surveys to assess BMP implementation

Implementation Status Underway

Expected Timeframe Ongoing

Other CCMP Objectives Supported 1-1c2, 1-1c3

Implementation Action: SC-21

Develop and implement regional outreach programs on innovative/sustainable flood and erosion control for municipalities.

Theme: Sustainable and Resilient Communities
Goal: Support vibrant, informed, and engaged communities that use, appreciate, and help protect Long Island Sound.
Outcome: 3-3: Policy makers, resource managers, and stakeholders in New York, Connecticut, and the upper basin states have the resources to undertake collaborative efforts to restore and protect the Sound.
Objective: 3-3a: To ensure that policy makers, environmental professionals, and stakeholders have the best available information in order to make decisions that will improve the management of Long Island Sound.
Strategy: 3-3a1: Support the dissemination of the best practices to reduce pollution, improve water quality, and protect habitats through professional development training and workshops.

Project Description/Background Develop and implement regional outreach program on innovative/sustainable flood and erosion control, including vegetated buffers and living shorelines, for municipalities (public works, wetlands commissioners, property managers) that draws on expertise of consulting town engineers and provides site-based implementation demonstrations. Exercises to include development of model regulations. Program to include sources of funding for implementation of alternative (green infrastructure) technologies. Create blog/listserve for ongoing communication among/between participants. Program may best be developed/implemented on a county basis to be relevant to municipalities (covering site specific issues among audiences that are local).

Cooperators and Partners NEMO, RPAs/COGs, private contractor?

Funding Sources Long Island Sound Futures Fund

Level of Funds Needed $$/yr (Speakers, transportation, supplies, meeting space, printed material, marketing)

Implementation Status Underway

Expected Timeframe Planning for one year; implementation over 3 years (pilot)

Other CCMP Objectives Supported 1-1b, 1-1c, 1-1d

Implementation Action: SC-22

Provide support, including funding and technical assistance, for the development and dissemination of environmental technical manuals and studies to environmental decision makers and resource managers.

Theme:	Sustainable and Resilient Communities
Goal	Support vibrant, informed, and engaged communities that use, appreciate, and help protect Long Island Sound.
Outcome:	3-3: Policy makers, resource managers, and stakeholders in New York, Connecticut, and the upper basin states have the resources to undertake collaborative efforts to restore and protect the Sound.
Objective:	3-3a: To ensure that policy makers, environmental professionals, and stakeholders have the best available information in order to make decisions that will improve the management of Long Island Sound.
Strategy:	3-3a2: Update and disseminate information on the best available scientific, socioeconomic, and environmental trends to policy makers, resource managers, and stakeholders.

Project Description/Background A 2006 Public Perception Survey of Long Island Sound residents indicated that residents need a greater understanding of how issues in their own homes and communities affect the Sound. Local municipalities and local environmental organizations can offer the most direct way to reach residents. As such, the Long Island Sound Study's Communications Team (NEIWPCC, New York Sea Grant, and Connecticut Sea Grant), along with project partners, work together to produce print and/or web-based resources (manuals, etc.) that are be used by environmental decision makers to help inform Long Island Sound residents of local environmental issues.

Cooperators and Partners NEIWPCC, New York Sea Grant, Connecticut Sea Grant, NEMO

Funding Sources Base funding for the Communications team staff; Long Island Sound Futures Fund

Level of Funds Needed $ to $$/yr

Expected Outputs

- Print and/or web-based resources (manuals, etc.) developed for environmental decision makers

Performance Metric(s)

- Number of environmental decision makers that utilize LISS developed resources as assessed by surveys

Implementation Status Underway

Expected Timeframe Ongoing

Other CCMP Objectives Supported 3-3b

Implementation Action: SC-23

Conduct a Soundwide citizen survey, and compare with the 2006 baseline survey, in order to identify the public's perception of the health of Long Island Sound and their understanding of the environmental issues.

Goal: Support vibrant, informed, and engaged communities that use, appreciate, and help protect Long Island Sound.
Outcome: 3-3: Policy makers, resource managers, and stakeholders in New York, Connecticut, and the upper basin states have the resources to undertake collaborative efforts to restore and protect the Sound.
Objective: 3-3a: To ensure that policy makers, environmental professionals, and stakeholders have the best available information in order to make decisions that will improve the management of Long Island Sound.
Strategy: 3-3a2: Update and disseminate information on the best available science and environmental trends to policy makers, resource managers, and stakeholders.

Project Description/Background In 2006, LISS funded a Public Perception Survey that provided baseline information on residential opinions of the Sound's water quality. This survey also provided information on residents' knowledge of the Sound's environmental problems, where residents access environmental information, and what lawn care and other outdoor practices they engage in that may contribute to pollution in the Sound and its tributaries.

A follow-up survey will help LISS and resource managers assess whether residents perceive that there is progress in restoration efforts and whether residents are willing to take on a more active role in helping to clean up the Sound. The survey will help LISS understand what external forces such as the national debate on climate change, the great recession of 2008, and extreme weather events such as Hurricane Sandy have on people's interest in environmental issues and in restoring and protecting the Sound.

Cooperators and Partners New York Sea Grant, Connecticut Sea Grant, NEIWPCC, survey contractor, and CAC.

Funding Sources LISS

Level of Funds Needed $$

Expected Outputs
The contractor will provide a report based on a questionnaire to randomly selected residents (developed with assistance from a LISS survey work group). The report will contain an executive summary of the study's major findings, divided into major topics, including:

- Recreational use of Long Island Sound.
- Perceived water quality.
- Enactment of behaviors that have some impact on water quality.
- Attitudes towards environment in general and willingness to change behaviors that affect Long Island Sound.
- Residents' exposure to different media sources conducted in the Long Island Sound (Long Island Sound) watershed from 2006 to the present.

Performance Metric(s)
The survey's effectiveness will be measured by its impact on:

- Providing information to resource managers, the public, and policy makers that will help increase understanding on the issues facing the Sound.
- The development of socio-economic indicators that will help resource managers assess how residents impact the environment of Long Island Sound.
- Its utility in helping LISS and its partners develop outreach and behavior change campaigns.
- Helping to track the results of a proposed Soundwide marketing campaign.

Implementation Status Ongoing

Expected Timeframe Completed by 2017

Other CCMP Objectives Supported 3-1b

Implementation Action: SC-24

Support the efforts of LISS to circulate the availability of grant programs, including through social media and personal contacts.

Theme: Sustainable and Resilient Communities
Goal: Support vibrant, informed, and engaged communities that use, appreciate, and help protect Long Island Sound.
Outcome: 3-3: Policy makers, resource managers, and stakeholders in New York, Connecticut, and the upper basin states have the resources to undertake collaborative efforts to restore and protect the Sound.
Objective: 3-3a: To ensure that policy makers, environmental professionals, and stakeholders have the best available information in order to make decisions that will improve the management of Long Island Sound.
Strategy: 3-3a2: Update and disseminate information on the best available science and environmental trends to policy makers, resource managers, and stakeholders.

Project Description/Background From 2005-2013, the Long Island Sound Futures Fund has involved hundreds of thousands of people in Long Island Sound activities--from enjoying an educational sail to helping to restore a habitat or install a green roof. LISS and NFWF should continue to prioritize education outreach in the large and mini-grants programs of the Futures Fund to ensure that residents have the opportunity to appreciate the Sound, and they should also seek out companies that want to contribute to efforts to promote citizen involvement in protecting the Sound.

Cooperators and Partners NFWF, New York Sea Grant, Connecticut Sea Grant, NEIWPCC, CAC

Level of Funds Needed $

Expected Outputs

- Fund projects that restore habitats, open rivers miles for fish passage, improve water quality, and educate and involve residents about Long Island Sound.

Performance Metric(s)

- Number of nonfederal partners contributing to the Futures Fund increases.

Implementation Status Underway

Expected Timeframe Ongoing

Other CCMP Objectives Supported SC 3-1a, SC 3-2c

Implementation Action SC-25

Support communities as they develop and adopt new or updated stand-alone Municipal Sustainability Plans

Theme: Sustainable and Resilient Communities
Goal: Support vibrant, informed, and engaged communities that use, appreciate, and help protect Long Island Sound
Outcome: 3-4: New and existing development is sustainable and resilient
Objective: 3-4a: To encourage and facilitate revised, regional, state, and local comprehensive plans that integrate sustainability, resiliency, and adaptability objectives and are integrated into the appropriate hazard mitigation plans
Strategies: 3-4b2: Implement revised and updated comprehensive plans for all municipalities to ensure that sustainability/resiliency/adaptability concepts are employed in new and existing development
3-4b3: Ensure that waterfront communities balance recreational, commercial, and industrial uses according to their sustainability/resiliency/adaptability plans
3-4b4: Promote the design and construction of stormwater and wastewater treatment systems that are sustainable and resilient
3-5a3: Encourage communities to balance recreational, commercial, industrial and residential uses according to their sustainability plans and resiliency efforts.

Project Description/Background Sustainability planning for energy and water use, water quality, natural infrastructure and sustainable land use practices, water dependent uses, and access to the water will form the basis of community sustainability efforts. In particular, the following components of municipal sustainability plans are important to the sustainable conservation and management of Long Island Sound.

1. Evaluation of long term needs and reduction of energy use and water use.
2. Evaluation of drinking water infrastructure and long term needs.
3. Reduction of water quality impacts especially from nonpoint sources,
4. Improvement of sustainable transportation options and opportunities for walkable communities with waterfront access.
5. Promotion of water-dependent uses, including public access on waterfront parcels.
6. Identification of infrastructure/natural system needs to allow for waterfront recreation and access consistent with sustainability plans and smart growth programs.
7. Identification of one or more municipal staff to coordinate and implement these plans.
8. Develop and update a list of resources and contacts (e.g., such as model regulations and appropriate planning agencies, including the Connecticut/New York Planners Associations) to assist with municipal and regional resiliency planning.
9. Development and implementation of municipal ordinances to make them consistent with sustainability plans

Cooperators and Partners Municipalities within the New York and Connecticut Coastal Long Island Sound Watershed, New England Municipal Sustainability Network, EPA Brownfields, New York Department of State, Connecticut DEEP, New York and Connecticut Sea Grant, USEPA, Regional Planning Entities and Councils of Governments, State Planning Associations

Funding Sources Hurricane Sandy Relief Funds, Comprehensive Plan Funding Sources, EPA Smart growth, Brownfields Wide Area Planning

Level of Funds Needed $$/municipality depending on size and density

Expected Outputs Sustainability Plans for each municipality or planning area linked to comprehensive plan, resiliency plan and other guiding municipal and regional planning documents

Performance Metric(s)

- Number of municipalities with completed sustainability plans
- Number of municipalities implementing sustainability plans
- Number of implemented sustainability plans

Implementation Status New

Expected Timeframe 2015 to 2018

Implementation Action SC-26

Support communities as they develop and adopt new, or updated, Coastal Resiliency Plans.

Theme: Sustainable and Resilient Communities
Goal: Support vibrant, informed, and engaged communities that use, appreciate, and help protect Long Island Sound
Outcome: 3-4: New and existing development is sustainable and resilient
Objective: 3-4a: To encourage and facilitate revised, and integrated regional, state, and local comprehensive plans that integrate sustainability, resiliency, and adaptability objectives
Strategy: 3-4b2: Implement revised and updated comprehensive plans for all municipalities to ensure that sustainability/resiliency/adaptability concepts are employed in new and existing development

Project Description/Background New resiliency plans should be developed and, or, existing plans augmented to incorporate concepts that serve to protect natural habitat and built infrastructure. Understanding potential impacts to both natural habitat and man-made infrastructure due to climate change and incorporating findings into resiliency planning will help protect Long Island Sound and municipal economies. In particular, the following components of municipal coastal resiliency plans are important to the long-term conservation and management of Long Island Sound.

1. Identification and protection of important natural and man-made infrastructure and habitats that are vulnerable to impact from natural hazards or infrastructure failures due to climate change.
2. Incorporation of natural infrastructure/habitat (Green infrastructure) based solutions into planning activities. Where appropriate, encourage beneficial use of dredged material in these solutions.
3. Identification of infrastructure/natural system needs to allow for waterfront recreation and access consistent with resiliency needs.
4. Develop applied research, standards and best practices to encourage implementation of nature-based solutions.
5. Coordination of Hazard Mitigation and Resiliency planning (i.e. NHMP through FEMA) including flood and erosion control programs incorporating both natural systems and hard infrastructure.
6. Re-design, upgrade and/or retrofit WWTFs, stormwater infrastructure, and drinking water facilities to be resilient in a changing climate
7. Where appropriate, implement Connecticut 2013 legislation to require consideration of sea level rise in the design of WWTF construction and upgrades.
8. Identification of one or more municipal staff to coordinate and implement these plans.
9. Develop and update a list of resources and contacts to assist with municipal and regional resiliency planning.
10. Development and implementation of municipal ordinances to make them consistent with resiliency plans
11. Provide information/access to funding sources for municipalities and residents (including low-interest loans) and streamline/coordinate federal/state/local permitting processes

Cooperators and Partners Municipalities within the New York and Connecticut Coastal Long Island Sound Watershed, FEMA – community rating system, New York Department of State, Connecticut DEEP, New York and Connecticut Sea Grant, Regional Planning Entities and Councils of Governments, The Nature Conservancy, Connecticut Institute for Resilience and Climate Adaptation, HUD-DOT Partnership for Sustainable Communities

Funding Sources Hurricane Sandy Relief Funds, Comprehensive Plan Funding Sources, Cleaner Greener programs in New York, HUD, HUD-DOT Partnership for Sustainable Communities, FEMA, Brownfields Area-wide Planning

Level of Funds Needed $$/ municipality depending on the size and density of municipal development.

Expected Outputs Resiliency Plans for each municipality or planning area linked to comprehensive plans, sustainability plans, and other guiding municipal and regional planning documents

Performance Metric(s)

- Number of municipalities with completed resiliency plans
- Number of municipalities implementing resiliency plans
- Number of implemented resiliency plans

Implementation Status New

Expected Timeframe 2015 to 2018

Implementation Action SC-27

Develop standards, best practices, and educational materials for Green Infrastructure/LID Planning and Implementation

Theme: Sustainable and Resilient Communities
Goal: Support vibrant, informed, and engaged communities that use, appreciate, and help protect Long Island Sound
Outcome: 3-4: New and existing development is sustainable and resilient
Objective: 3-4b: To integrate sustainability, climate change adaptation, and resiliency objectives into new and existing development, housing, transportation, emissions control, energy efficiency, and job creation programs
Strategy: 3-4b1: Provide technical assistance and training for homeowners, municipal officials, developers, engineers, and consultants on sustainability, adaptation, and resiliency concepts and opportunities for implementation

Project Description/Background Green infrastructure is an approach to water management that protects, restores, or mimics the natural water cycle (American Rivers website). It is an approach to stormwater management and water resource protection that communities can use to maintain healthy waters, provide multiple environmental benefits, and support sustainable communities. Unlike single-purpose gray stormwater infrastructure, which uses pipes to dispose of rainwater, green infrastructure uses vegetation and soil to manage rainwater where it falls. By weaving natural processes into the built environment, green infrastructure provides not only stormwater management, but also flood mitigation, air quality management, and much more (USEPA website).

Preliminary steps:

- Develop a catalog of ecosystem services. This catalog of services, their associated value and optimal usage can then be used in community and natural resource planning. Ecosystem services are those that the environment provides that protect or provide resources including water, timber, and habitat for fisheries, and pollination of native and agricultural plants.
- Develop programs to teach and inform on ecosystem services, green infrastructure, and associated best practices.

Cooperators and Partners LISS, Municipal Planning Employees, New York and Connecticut Sea Grant, Regional Planning Entities and Councils of Governments, Connecticut Institute for Resilience and Climate Adaptation, EPA-Soak up the Rain program, Seek non-traditional partners from service industries to inform implementation (e.g. builders, engineering firms. landscape architects, ecologists, etc.)

Funding Sources LISS, Hurricane Sandy Relief Funds, Comprehensive Plan Funding Sources

Level of Funds Needed $$

Expected Outputs A guidance document and materials for use in planning, education, and outreach

Performance Metric(s)

- Document provided to all interested communities and stakeholders

Implementation Status New

Expected Timeframe 2015 to 2017

Implementation Action SC-28

Provide technical assistance to local, state, and regional authorities to aid them in developing model statutes, consistent with sustainability and resiliency standards for use in zoning, permitting, and other regulatory activities.

Theme: Sustainable and Resilient Communities
Goal: Support vibrant, informed, and engaged communities that use, appreciate, and help protect Long Island Sound
Outcome: 3-4: New and existing development is sustainable and resilient
Objective: 3-4b: To integrate sustainability, climate change adaptation, and resiliency objectives into new and existing development, housing, transportation, emissions control, energy efficiency, and job creation programs
Strategy: 3-4b1: Revise zoning, permitting, and other regulatory authority to ensure that future development and redevelopment actually conforms to the sustainability/resiliency/adaptation objectives incorporated into local, state, and regional comprehensive plans

Project Description/Background Local, State, and Regional jurisdictions need the zoning, permitting and other authority to ensure that sustainability and resiliency plans are consistent and enforceable. This activity would provide technical assistance to develop such support. Workshops, bringing together these jurisdiction, will provide the means to develop the model legislation

Cooperators and Partners Municipalities within the New York and Connecticut Coastal Long Island Sound Watershed, Regional Planning Entities and Councils of Governments, New York Sea Grant, Connecticut Sea Grant CTDEEP, NYDOS, NEMO, The Nature Conservancy, Connecticut Institute for Resilience and Climate Adaptation

Funding Sources EPA Smart Growth assistance, HUD-DOT-EPA Partnership for Sustainable Communities, EPA Energy Star Portfolio Training (for municipal buildings or housing authorities perhaps?), EPA Assistance and Pollution Prevention Office resources, Additional funding sources could include agencies, entities and organizations (including private foundations) that address coastal resiliency and hazard mitigation

Level of Funds Needed $

Expected Outputs Workshop(s) to aid the jurisdiction in the production of model statute language

Performance Metric(s) Number of communities engaged in sustainability and resiliency workshop(s); degree of consensus on model language for use in developing legislation

Implementation Status New

Expected Timeframe 2015-2016

Implementation Action SC-28

Develop regional outreach programs and training modules on sustainability and resiliency planning topics.

Theme: Sustainable and Resilient Communities
Goal: Support vibrant, informed, and engaged communities that use, appreciate, and help protect Long Island Sound
Outcome: 3-4: New and existing development is sustainable and resilient
Objective: 3-4b: To integrate sustainability, climate change adaptation, and resiliency objectives into new and existing development, housing, transportation, emissions control, energy efficiency, and job creation programs
Strategy: 3-4b1: Provide technical assistance and training for home owners, municipal officials, developers, engineers, and consultants on sustainability, adaptation, and resilience concepts and opportunities for implementation

Project Description/Background As municipalities develop sustainability and resiliency plans, training, and maintaining resources to support these efforts will enable effective development and implementation of the plans. Outreach programs will also involve developing a peer network of municipalities working on sustainability.

Cooperators and Partners Municipalities within the New York and Connecticut Coastal Long Island Sound Watershed, Regional Planning Entities and Councils of Governments, New York Sea Grant, Connecticut Sea Grant, CTDEEP, NYDOS, NEMO, The Nature Conservancy, Connecticut Institute for Resilience and Climate Adaptation

Funding Sources EPA Smart Growth assistance, HUD-DOT-EPA Partnership for Sustainable Communities, EPA Energy Star Portfolio Training (for municipal buildings or housing authorities), EPA Assistance and Pollution Prevention Office resource. Additional funding sources could include agencies, entities, and organizations (including private foundations) that address coastal resiliency and hazard mitigation

Level of Funds Needed $$

Expected Outputs Up to date online tools and training to support resiliency and sustainability planning

Performance Metric(s) Number of communities engaged in sustainability and resiliency workshops per year

Implementation Status New

Expected Timeframe 2014-2015

Implementation Action SC-29

Develop a municipal sustainability recognition program that incorporates ideas from other states to incentivize sustainable development and economic planning.

Theme: Sustainable and Resilient Communities
Goal: Support vibrant, informed, and engaged communities that use, appreciate, and help protect Long Island Sound
Outcome: 3-5: Public access and sustainable economic activities along the waterfront are enhanced and balanced
Objective: 3-5a: To encourage communities to identify priority waterfront economic development activities and then to implement economic development strategies and infrastructure planning that result in vibrant and environmentally sustainable communities
Strategy: 3-5a1: Establish programs and provide support to communities to help them in obtaining recognition for exemplary sustainability programs

Project Description/Background Many states and regions recognize leadership and progress in municipal sustainability. Review these programs and, where appropriate develop comparable Long Island Sound program to encourage Connecticut and New York municipalities to pursue municipal sustainability and incorporate sustainability concepts in their land use, coastal resilience, and economic planning.

Include the creation of a community sustainability standard and criteria to determine levels of sustainability as part of the recognition. Reward multiple communities (rather than just one) at various levels (bronze, silver, gold, platinum, etc.) to encourage all communities to participate.

Cooperators and Partners Municipalities within the New York and Connecticut Coastal Long Island Sound Watershed, Regional Planning Entities and Councils of Governments, New York Sea Grant, Connecticut Sea Grant

Funding Sources Varied community development programs.

Level of Funds Needed $$

Expected Outputs Documentation of a framework for soliciting nominations, providing recognition, and incentivizing municipal sustainability.

Performance Metric(s) Number of communities nominated/per year; number of recognitions given.

Implementation Status Underway

Expected Timeframe 2015-2018

Implementation Action SC-30

Develop guidance for quantifying the benefits and costs of sustainability activities and economic development to incorporate into sustainability and resiliency planning efforts

Theme: Sustainable and Resilient Communities
Goal: Support vibrant, informed, and engaged communities that use, appreciate, and help protect Long Island Sound
Outcome: 3-4: New and existing development is sustainable and resilient
Objective: 3-4b: To integrate sustainability, climate change adaptation, and resiliency objectives into new and existing development, housing, transportation, emissions control, energy efficiency, and job creation programs
Strategy: 3-4b1: Provide technical assistance and training for home owners, municipal officials, developers, engineers, and consultants on sustainability, adaptation, and resilience concepts and opportunities for implementation

Project Description/Background Developing an understanding of sustainability, adaptation, and resiliency concepts for many levels of professionals and citizens is important to developing effective plans and programs. It is important to determine the benefits and costs of sustainability and resiliency program over appropriate time scales. The guidance should include the following:

- Quantify the relative magnitude of waterfront and nearshore uses in municipalities.
- Incorporate a means to connect water dependent business uses to recreational and commercial fisheries.

Consider using "full-cost accounting" and "life-cycle cost accounting" processes to capture more of the true costs that are often externalized in traditional cost-benefit analyses. Also consider costs based on ecosystem parameters (coastal watershed communities) that extend from uplands to coasts and into the offshore areas, which might allow some innovative and equitable payments for ecosystem services or ecological impact fees to be assessed to mitigate watershed and offshore impacts.

Cooperators and Partners LISS, Municipal Planning Employees, New York and Connecticut Sea Grant, Regional Planning Entities and Councils of Governments, EPA Smart growth program (N. Kingstown, RI model)

Funding Sources LISS, Hurricane Sandy Relief Funds, Comprehensive Plan Funding Sources

Level of Funds Needed $$

Expected Outputs A guidance document and materials for use in planning, education, and outreach

Performance Metric(s) Document provided to all interested communities and stakeholders

Implementation Status Underway

Expected Timeframe 2015 to 2017

Implementation Action: SC-31

Develop a Public Access Plan to increase public access points and the length of shoreline accessible by the public to the Sound and its rivers.

Theme: Sustainable and Resilient Communities
Goal: Support vibrant, informed, and engaged communities that use, appreciate, and help protect Long Island Sound.
Outcomes: 3-5: Public access and sustainable economic activities along the waterfront are enhanced and balanced.
3-1: Citizens have the awareness, knowledge, and skills to protect the Sound. (also 3-2)
Objectives: 3-5a: To encourage communities to implement economic development strategies and infrastructure planning that result in vibrant and sustainable communities which balance recreational, commercial, industrial, and residential uses.
Strategies: 3-5a1: Establish programs and provide support to communities to help them in obtaining recognition for exemplary sustainability programs.

Project Description/Background In many areas around the Long Island Sound watershed, residents are deprived of access to streams, rivers, and the Sound. In other areas, public access exists but barriers such as lack of parking or public transportation limit use. And in other cases residents are unaware that good access to the shoreline in their communities even exists. To ensure people's ability to use and appreciate the Sound, LISS should take the initial step of developing a public access plan that would list recommendations on where new public access sites should be built and suggestions on how existing public access sites, such as Long Island Sound Stewardship Sites, can be improved. An access plan should include a target on the number of access sites that will be added or improved by 2030. Also, funding sources will be identified. When considering an access site, sensitivity of resident species will be evaluated as part of the planning process.

Additionally, access points to the Sound might not be ADA (Americans with Disabilities Act) accessible and in compliance with federal ADA regulations. As such, access areas need to be inspected to see if they are in compliance with the ADA regulations. New York Sea Grant is currently conducting this work along the Hudson River in partnership with the Cornell Northeast ADA Center (http://www.ilr.cornell.edu/edi/p-neada.cfm). If this is deemed important in Long Island Sound, a similar program can be brought to Long Island Sound via New York Sea Grant.

Cooperators and Partners NYSDEC, CTDEEP, USFWS, NEIWPCC, New York Sea Grant, Connecticut Sea Grant

Funding Sources LISS

Level of Funds Needed $$

Expected Outputs A report that describes the state of public access in Long Island Sound, and provides recommendations for improvement. If deemed important in Long Island Sound, ADA compliance inspection reports of public access points.

Performance Metric(s) Targets are established to add and improve public access sites by 2030.

Implementation Status New

Expected Timeframe The plan should be completed by year 2017. The targets should be established by 2017.

Other CCMP Objectives Supported SC 3-1a, SC 3-2c

Implementation Action: SC-32

Encourage the sustainable use of natural coastal areas, including Long Island Sound Stewardship sites, through support of sustainable blueways, bikeways, and greenways.

Theme:	Sustainable and Resilient Communities
Goal:	Support vibrant, informed, and engaged communities that use, appreciate, and help protect Long Island Sound.
Outcome:	3-5: Public access and sustainable economic activities along the waterfront are enhanced and balanced.
Objective:	3-5a: To encourage communities to implement economic development strategies and infrastructure planning that result in vibrant and sustainable communities which balance recreational, commercial, industrial, and residential uses
Strategy:	3-5a3: Encourage communities to balance recreational, commercial, industrial, and residential uses according to their sustainability and mitigation plans and resiliency efforts.

Project Description/Background LISS Communications team would provide Long Island Sound-specific literature that could assist a larger and multiple-agency/partnership effort to create a region-wide system of publicly accessible recreational and educational trails that bridge land and water within the estuary region. This would be part of a bi-state, recreational, tourism, and public health collaborative that enlists multiple non-traditional partners, including (but not limited to): health districts, Connecticut Forest and Park Association, multiple tourism councils, regional/local chambers of commerce, marinas/recreational boating industry, Connecticut and New York State Parks, private recreational sporting/outdoor clubs, and LISS Stewardship Sites.

Cooperators and Partners New York Sea Grant, Connecticut Sea Grant, NEIWPCC, LISS Stewardship Site managers

Funding Sources Long Island Sound Futures Fund, but potential to tap into a number of larger funding agencies according to emphasis (e.g., educational or public health related granting funds).

Level of Funds Needed $$$ - Depending on number of partners and scope could be substantial

Expected Outputs

- Educational literature
- Web-based support materials
- Number of participants
- Number of events
- Number of collaborators
- Number of communities
- Regional scope could all be tracked as outputs
- Stewardship Atlas maintained on the LISS website (http://longislandsoundstudy.net/issues-actions/stewardship/stewardship-areas-atlas/)

Performance Metric(s)

- Amount of dollars generated and benefitting local economies from events hosted through partnership effort;
- Number of requests for information
- Success in creating, improving, and expanding stewardship areas/ greenways/ blueways/ bikeways.
- Number of visitors to the Stewardship Atlas webpage

Implementation Status Underway

Expected Timeframe Ongoing

Other CCMP Objectives Supported SC 3-1a, SC 3-1c

Section 4
Implementation Actions

Sound Science and Inclusive Management (SM) Theme

Comprehensive Conservation and Management Plan

Table 4. Sound Science and Inclusive Management (SM) Implementation Actions (Priority actions are shaded in bold blue)

Implementation Action Number	Implementation Action Title	Major Strategy Addressed
SM-1	**Identify and communicate high priority science needs relating to the understanding and attainment of management objectives and ecosystem targets.**	**4-1a1**
SM-2	Support research priorities through the Long Island Sound Study Research Program, and the Connecticut and New York Sea Grant Programs.	4-1a2
SM-3	**Complete seafloor mapping conducted under the Sound Cable Fund.**	**4-1b1**
SM-4	Identify key datasets needed to support Coastal and Marine Spatial Planning for Long Island Sound.	4-1b2
SM-5	Develop an integrated Monitoring Plan considering developing technologies.	4-1b3
SM-6	Develop an integrated Data Management Plan considering local, regional, and national observing initiatives.	4-1b3
SM-7	Incorporate the Interstate Environmental Commission's (IEC) monitoring efforts into the Long Island Sound water quality monitoring program.	4-1b3
SM-8	Continue National Coastal Assessment monitoring of LIS.	4-1b3
SM-9	**Coordinate and leverage community water quality monitoring programs, enhancing the utility and application of data.**	**4-1b4**
SM-10	Complete LISS Sentinel Monitoring for Climate Change pilot projects and evaluate results to guide strategy development and future implementation.	4-1b5
SM-11	**Integrate the LISS Sentinel Monitoring for Climate Change Program with regional and national efforts such as the Northeast Regional Ocean Council, Northeast Regional Association of Ocean Observing Systems, and the National Estuarine Research Reserve System.**	**4-1b5**
SM-12	Assess options for establishing a secure, long-term Long Island Sound data portal that can be accessed by other regional data systems, such as the Northeast Ocean Data Portal.	4-1b6
SM-13	Improve the use and utility of Long Island Sound data for GIS applications.	4-1b6

Implementation Action Number	Implementation Action Title	Major Strategy Addressed
SM-14	**Enhance modeling of eutrophication in Long Island Sound to support nitrogen management and dissolved oxygen TMDL implementation.**	**4-1c1**
SM-15	Make publically available the Systemwide Eutrophication Model code and products to enhance transparency and collaboration.	4-1c1
SM-16	Link water quality models of Long Island Sound to watershed and groundwater models to better elucidate nutrient and water budgets.	4-1c1
SM-17	Continue program administrative, financial, and technical assistance support to Management Conference.	4-2a1
SM-18	Continue state program coordination and involvement in the Management Conference.	4-2a1
SM-19	Optimize structure and function of the Management Conference with a focus on implementation of the revised CCMP.	4-2a1
SM-20	Reauthorize Clean Water Act sections 119 and 320, and other relevant statutes to support Long Island Sound.	4-2a1
SM-21	Support involvement of and communication with the bi-state Long Island Sound Congressional Caucus and bi-state Connecticut and New York legislative caucus on issues of common concern.	4-2a1
SM-22	**Support involvement of, and communication with, local governments, which have front line authority for implementing many of the CCMP strategies.**	**4-2a1**
SM-23	**Reach out to traditionally underrepresented stakeholders and encourage them to participate in the Management Conference.**	**4-2a1**
SM-24	Incorporate relevant updated elements of the CCMP into state regulatory and planning programs such as coastal zone management program consistency reviews and state environmental equality reviews (SEQRA in New York).	4-2a2
SM-25	Convene senior EPA and State management to help direct, inform, and coordinate policy relevant to Long Island Sound.	4-2a3
SM-26	Foster involvement of the tributary states in Management Conference activities by maintaining the Five State/EPA TMDL Work Group.	4-2a4

Implementation Action Number	Implementation Action Title	Major Strategy Addressed
SM-27	Develop a bi-state framework (or guidance) for Coastal and Marine Spatial Planning for Long Island Sound to more comprehensively manage Long Island Sound resources.	4-2a5
SM-28	Conduct primary valuations of the critical ecosystem goods and services supported by Long Island Sound and its coastal habitats.	4-2b4
SM-29	Conduct return-on investment analysis for Long Island Sound restoration and preservation strategies to inform priority-setting for implementation of the CCMP.	4-2b1
SM-30	Capitalize Connecticut Clean Water Fund and New York State Revolving Fund adequately to finance Clean Water infrastructure needs.	4-2b1
SM-31	**Research and develop innovative, locally appropriate funding mechanisms to provide sustained, reliable sources of investment capital to restore and protect ecosystem services.**	**4-2b2**
SM-32	Coordinate and target funding for implementation of CCMP public involvement and education priorities. Develop an annual budget of the United States Government regarding each Federal department and agency involved in the protection and restoration of the Long Island Sound watershed.	4-2b2
SM-33	Coordinate and target funding for implementation of CCMP water, habitat and living resources priorities.	4-2b3
SM-34	Incorporate climate change-driven factors such as temperature and sea level rise in model applications to assess factors that can influence future attainment of water quality standards and habitat protection and restoration goals.	4-3a1
SM-35	Incorporate desired ecosystem outcomes for planning and implementation of Hurricane Sandy Relief funds.	4-3a2
SM-36	Collaborate with the Connecticut Institute for Resiliency and Climate Adaptation (CIRCA).	4-3a2
SM-37	**Refine the ecosystem metrics and targets based on the underlying science of the Long Island Sound ecosystem to clearly identify the characteristics of a "restored" Long Island Sound.**	**4-3b1**
SM-38	Incorporate bioextraction analyses in nitrogen TMDL assessments on the assimilative capacity of Long Island Sound to process nutrients without loss of designated uses.	4-3b2

Implementation Action Number	Implementation Action Title	Major Strategy Addressed
SM-39	Prepare and make available to the public annually the LISS Implementation Tracking Report using E-Sound.	4-3b3
SM-40	Develop, complete, and evaluate a “report card” on water quality conditions in Long Island Sound.	4-3b3
SM-41	Refine and communicate information on the Long Island Sound ecosystem and watershed using environmental indicators (drivers, pressures, conditions, and response indicators).	4-3b3
SM-42	Develop annual Long Island Sound Study work plans that consider progress made and recommendations for improving implementation of the implementation actions.	4-3b4
SM-43	Every five years develop a comprehensive, specific, target-oriented implementation plan engaging all Long Island Sound partners.	4-3b4

Implementation Action: SM-1

Identify and communicate high priority science needs relating to the understanding and attainment of management objectives and ecosystem targets

Theme:	Sound Science and Inclusive Management
Goal	4: Manage Long Island Sound using sound science and cross-jurisdictional governance that is inclusive, adaptive, innovative, and accountable.
Outcome:	4-1: The scientific understanding of Long Island Sound to support management is increased through strengthened research, monitoring, assessment, mapping, and modeling
Objective:	4-1a: To enhance the research portfolio to answer questions relevant to LIS management
Strategy:	4-1a1: Develop and maintain an integrated science plan that transparently link outcomes and objectives to strategies and actions, setting priorities based on management relevance and scientific merits

Project Description/Background Science is an integral element of integrated management of the ecosystem. This action will bring up to date a scientific needs assessment that has not been revised in many years. Given the new Long Island Sound synthesis book and the CCMP update it is imperative that a new and improved science needs assessment is undertaken. The science objectives must directly support the attainment of management objectives and ecosystem targets. The LISS will annually consider elements of the science and monitoring plans that are high priority for funding

Cooperators and Partners LISS MC, LISS STAC, NYSG, and CTSG

Funding Sources LISS

Level of Funds Needed $ for consultant support and website development, $ for workshop

Expected Outputs

- A searchable database and website collating all past funded scientific projects (including associated final reports and publications appended);
- Workshops to develop science priorities;
- A website/report outlining prioritized scientific needs (i.e., research, monitoring, assessment, and modeling) to support the attainment of management objectives and ecosystem targets

Performance Metric(s)

- Fully functional website of past scientific projects (searchable, with research products)
- Completed technical workshop with summary notes and recommendations,
- Fully functional website/report with enumerated scientific priorities for the subsequent 5 years tied to CCMP goals and objectives.
- Funded science projects that produce results, including published reports and peer reviewed journal articles relevant to objectives of the CCMP

Implementation Status New

Expected Timeframe The process will begin in 2015 and require contractor or staff support to construct a science inventory (web based) and meetings to aid in preparing the needs assessment. This is expected to take 1 year to complete. Afterwards the science needs assessment will be used to prioritize scientific project proposals; this will be undertaken every 2 years.

Other CCMP Objectives Supported This action will provide scientific guidance for all four CCMP goals; details will be dependent upon science needs articulated in the CCMP as well as from the workshop

Implementation Action: SM-2

Support research priorities through the Long Island Sound Study Research Program, and the Connecticut and New York Sea Grant Programs.

Theme:	Sound Science and Inclusive Management
Goal	4: Manage Long Island Sound using sound science and cross-jurisdictional governance that is inclusive, adaptive, innovative, and accountable.
Outcome:	4-1: The scientific understanding of Long Island Sound to support management is increased through strengthened research, monitoring, assessment, mapping, and modeling
Objective:	4-1a: To enhance the research portfolio to answer questions relevant to LIS management
Strategy:	4-1a2: Support a focused Long Island Sound research program

Project Description/Background Accurate and timely scientific information is necessary to support optimal management options to protect and restore Long Island Sound. The LISS has supported Biennial solicitations for scientific research that over the past 14 years has resulted in 33 investigations, numerous publications, and improved knowledge upon which to base management of Long Island Sound. The Connecticut and New York Sea Grant Programs also conduct biennial research competitions that can provide support for Long Island Sound research.

Cooperators and Partners LISS STAC, CTSG, and NYSG

Funding Sources LISS

Level of Funds Needed $$/yr

Expected Outputs

- Research results published in peer-reviewed scientific journals.
- New knowledge that supports the attainment of CCMP goals and objectives.

Performance Metric(s)

- biennial scientific solicitation;
- external peer reviews of applications;
- timely award and completion of projects;
- final project reports and presentations of findings.

Implementation Status Underway

Expected Timeframe The next solicitation cycle will begin the spring of 2014 for scientific projects to begin in 2015. The sequence of biennial solicitations will be 2016, 2018, and 2020.

Other CCMP Objectives Supported This program supports the scientific needs for multiple objectives.

Implementation Action: SM-3

Complete Seafloor Mapping conducted under the Sound Cable Fund.

Theme:	Sound Science and Inclusive Management
Goal	4: Manage Long Island Sound using sound science and cross-jurisdictional governance that is inclusive, adaptive, innovative, and accountable.
Outcome:	4-1: The scientific understanding of LIS to support management is increased through strengthened research, monitoring, assessment, mapping, and modeling
Objective:	4-1b: To maintain and enhance monitoring and assessment programs to increase understanding of Long Island Sound and assess progress toward management outcomes
Strategy:	4-1b1: Characterize and map open and shallow water habitats to support resource management and marine spatial planning

Project Description/Background As a condition for permitting an underwater cable in Long Island Sound, a 2004 settlement between the states of Connecticut and New York, two power companies, and a cable company provided funding for a LIS Research and Restoration Fund. CTDEEP, NYSDEC, & EPA directed that the fund be used to map the seafloor of Long Island Sound to provide sound science in support of future review of proposed projects. A Sound Cable Fund Steering Committee is overseeing the mapping effort being conducted by a consortium of federal and university scientists. In an effort to better understand, describe, and analyze these seafloor (or "benthic") environments federal and state agencies, regional organizations, and academic institutions use high resolution underwater imaging techniques to characterize & map specific geographic locations.

Cooperators and Partners Cable Fund Steering Committee (i.e., EPA Region 1 & Region 2, NYSDEC, CTDEEP, CTSG, NYSG)

Funding Sources Lawsuit settlement

Level of Funds Needed $$$$ Approximately $7M was made available through the settlement fund. As products are completed, the cost of obtaining additional spatial coverage or detail will be assessed.

Expected Outputs Completed digital maps of Long Island Sound seafloor environment including: acoustic intensity and seafloor topography, sediment texture and grain size distribution, sedimentary environment and chemistry, benthic habitats and ecological processes, and physical oceanographic characterization.

Performance Metric(s)

- Percent of Long Island Sound mapped.
- Products used in support of infrastructure planning.
- Demarcation of species and habitats, and increased understanding of the general physical, chemical, and biologic nature of the Long Island Sound seafloor.

Implementation Status Underway

Expected Timeframe Phase 1 was completed in March 2014. Phase 2 will begin in fall 2014 and extend to 2016.

Implementation Action: SM-4

Identify key datasets needed to support coastal and marine spatial planning for Long Island Sound.

Theme:	Sound Science and Inclusive Management
Goal	4: Manage Long Island Sound using sound science and cross-jurisdictional governance that is inclusive, adaptive, innovative, and accountable.
Outcome:	4-1: The scientific understanding of LIS to support management is increased through strengthened research, monitoring, assessment, mapping, and modeling
Objective:	4-1b: To maintain and enhance monitoring and assessment programs to increase understanding of Long Island Sound and assess progress toward management outcomes
Strategy:	4-1b2: Characterize and map human uses (recreational/commercial) of open and shallow water habitats to support resource management and marine spatial planning

Project Description/Background Coastal and Marine Spatial Planning (CMSP) is a process that brings together multiple users of the ocean – including energy, industry, government, conservation, and recreation – to make informed and coordinated decisions about how to use marine resources sustainably. CMSP generally uses maps to create a more comprehensive picture of a marine area – identifying where and how an ocean area is being used and what natural resources and habitat exist. It is similar to land-use planning, but for marine waters.

Cooperators and Partners Sound Spatial Planning Work Group (SSPWG), led by Connecticut Sea Grant and The Nature Conservancy.

Funding Sources
In-kind services

Level of Funds Needed In-house staff support is being provided by CTSG and TNC.

Expected Outputs The SSPWG is expected to identify and evaluate important data required to support CMSP

Performance Metric(s) An inventory of relevant data sources and a suitability assessment of potential data

Implementation Status New

Expected Timeframe 2015

Implementation Action: SM-5

Develop an integrated Monitoring Plan considering developing technologies.

Theme:	Sound Science and Inclusive Management
Goal	4: Manage Long Island Sound using sound science and cross-jurisdictional governance that is inclusive, adaptive, innovative, and accountable.
Outcome:	4-1: The scientific understanding of Long Island Sound to support management is increased through strengthened research, monitoring, assessment, mapping, and modeling
Objective:	4-1b: To maintain and enhance monitoring and assessment programs to increase understanding of Long Island Sound and assess progress toward management outcomes
Strategy:	4-1b3: Evaluate, enhance, integrate, and coordinate ongoing monitoring programs

Project Description/Background Assessing the status and trends of the condition of Long Island Sound requires regular measurements of important ecological variables. The LISS has funded water quality monitoring since 1987, adding elements over time and supporting survey of important habitats. This action is to develop an integrated monitoring plan (LIS-IMP) which will include an upgrade and integration assessment of the collection and analysis methods of the multiple agencies that currently comprise the program. Planning should consider offshore monitoring objectives related to assessment of wind energy activities and essential fish habitats, as well as focus on local embayment monitoring.

Cooperators and Partners EPA, NOAA, USGS, NYSDEC, CTDEEP, IEC, LISS STAC

Funding Sources LISS

Level of Funds Needed $$

Expected Outputs A coordinated, integrated monitoring plan with recommended actions.

Performance Metric(s)

- A workshop involving agency and academic scientists to assess the current monitoring in the light of new technologies, new management needs, and funding constraints.
- Modifications in the monitoring program.

Implementation Status New

Expected Timeframe Complete by 2016

Implementation Action: SM-6

Develop an integrated Data Management Plan considering local, regional, and national observing initiatives

Theme:	Sound Science and Inclusive Management
Goal	4: Manage Long Island Sound using sound science and cross-jurisdictional governance that is inclusive, adaptive, innovative, and accountable.
Outcome:	4-1: The scientific understanding of LIS to support management is increased through strengthened research, monitoring, assessment, mapping, and modeling
Objective:	4-1b: To maintain and enhance monitoring and assessment programs to increase understanding of Long Island Sound and assess progress toward management outcomes
Strategy:	4-1b3: Evaluate, enhance, integrate, and coordinate ongoing monitoring programs

Project Description/Background The LISS has funded water quality monitoring since 1987, adding elements over time and supporting survey of important habitats. This program involves multiple agencies and sources. There is a need to develop a holistic framework to provide data users with an efficient means to access, download, evaluate, or otherwise utilize the data from these multiple sources. In addition, there are significant historical data that need to be rescued and included into a digital form that is usable by the scientific community. A Long Island Sound Integrated Data Management plan (LIS-IDP) should be able to serve the multiple needs of the Long Island Sound community while also allowing seamless access to regional and national observing systems.

Cooperators and Partners EPA, NOAA, USGS, NYSDEC, CTDEEP, IEC, LISS STAC

Funding Sources LISS

Level of Funds Needed $$

Expected Outputs A Long Island Sound integrated data management plan

Performance Metric(s) Adopted guidelines and systems to store, manage, and access data.

Implementation Status New

Expected Timeframe 2017

Implementation Action: SM-7

Incorporate the Interstate Environmental Commission's (IEC) monitoring efforts into the Long Island Sound water quality monitoring program.

Theme:	Sound Science and Inclusive Management
Goal	4: Manage Long Island Sound using sound science and cross-jurisdictional governance that is inclusive, adaptive, innovative, and accountable.
Outcome:	4-1: The scientific understanding of LIS to support management is increased through strengthened research, monitoring, assessment, mapping, and modeling
Objective:	4-1b: To maintain and enhance monitoring and assessment programs to increase understanding of Long Island Sound and assess progress toward management outcomes
Strategy:	4-1b3: Evaluate, enhance, integrate, and coordinate ongoing monitoring programs

Project Description/Background Assessing the status and trends of the condition of Long Island Sound requires regular measurements of important ecological variables. Since 1991 the CTDEEP has been providing monitoring support for the measurement of hypoxia related environmental variables in Long Island Sound. In addition, the IEC has been providing similar monitoring support for the western-most areas of Long Island Sound. The action will provide the necessary processes to combine the CTDEEP and IEC monitoring efforts into a unified whole.

Cooperators and Partners EPA, NOAA, USGS, NYSDEC, CTDEEP, IEC, LISS STAC through a water quality monitoring work group.

Funding Sources LISS

Level of Funds Needed Most of the work is being performed in-house through the work group. There may be annually costs for implementing the recommendations.

Expected Outputs A modified IEC monitoring plan.

Performance Metric(s) Incorporation of IEC data in Soundwide data analysis and representation.

Implementation Status New

Expected Timeframe 2016

Implementation Action: SM-8

Continue National Coastal Assessment monitoring of LIS

Theme:	Sound Science and Inclusive Management
Goal	4: Manage Long Island Sound using sound science and cross-jurisdictional governance that is inclusive, adaptive, innovative, and accountable.
Outcome:	4-1: The scientific understanding of LIS to support management is increased through strengthened research, monitoring, assessment, mapping, and modeling
Objective:	4-1b: To maintain and enhance monitoring and assessment programs to increase understanding of Long Island Sound and assess progress toward management outcomes
Strategy:	4-1b3: Evaluate, enhance, integrate, and coordinate ongoing monitoring programs

Project Description/Background To address questions about national coastal condition, the EPA, the National Oceanic and Atmospheric Administration (NOAA), and the U.S. Fish and Wildlife Service (USFWS) agreed to participate in a multi-agency effort to assess the condition of the nation's coastal resources. The agencies chose to assess condition using nationally consistent monitoring surveys to minimize the problems created by compiling data collected using multiple approaches. The results of these assessments are compiled periodically into a National Coastal Condition Report (NCCR). This series of reports contains one of the most comprehensive ecological assessments of the condition of our nation's coastal bays and estuaries (EPA, 2012). The next scheduled field program under the National Coastal Assessment Program is in 2015.

Cooperators and Partners EPA, CTDEEP, NYSDEC, Stony Brook University

Funding Sources EPA

Level of Funds Needed $$

Expected Outputs Field data incorporated into the EPA Coastal Condition report.

Performance Metric(s)

- Field work conducted
- Environmental indicators using the data are updated.

Implementation Status Underway

Expected Timeframe Field work in 2015, with report after all quality assurance and analysis is completed.

Notes

Reference: EPA, 2012. National Coastal Condition Report IV. U. S. Environmental Protection Agency, Office of Research and Development, Office of Water, Washington, D. C., EPA-842-R-10-003, 368 pp.

Implementation Action: SM-9

Coordinate and leverage community water quality monitoring programs, enhancing the utility and application of data.

Theme:	Sound Science and Inclusive Management
Goal	4: Manage Long Island Sound using sound science and cross-jurisdictional governance that is inclusive, adaptive, innovative, and accountable.
Outcome:	4-1: The scientific understanding of LIS to support management is increased through strengthened research, monitoring, assessment, mapping, and modeling
Objective:	4-1b: To maintain and enhance monitoring and assessment programs to increase understanding of Long Island Sound and assess progress toward management outcomes
Strategy:	4-1b4: Strengthen monitoring of embayments and near-shore waters, and integrate data and assessments into agency open water monitoring programs

Project Description/Background In order to gage the effectiveness of management and restoration projects it is necessary to have near-field water quality and other monitoring data available. The LISS has funded an analysis aimed at evaluating the feasibility of developing a framework for coordinating community-based water quality monitoring groups around the Sound. The report summarized the data needs of agencies charged with the protection of near-shore environments, identified existing LIS monitoring groups, developed a framework to guide implementation of a long-term community-based monitoring program, and a provided generalized QAPP template suitable in such a program (Vaudrey and Alonzo, 2013). The action here involves implementing a LISS Embayment Monitoring Cooperative (LISEMCO) based on the recommendations of the initial analysis.

Cooperators and Partners LISS

Funding Sources LISS base funding

Level of Funds Needed $$ (2015, 2016), $$ (2017-2020)

Expected Outputs The next phase in the development of the LISEMCO is to solicit various entities to oversee and implement the program. The next phase would include securing an appropriate entity to oversee the program and to implement its elements.

Performance Metric(s) RFP for the selection of an organization (or consortium) to administer the LISEMCO; Selection of the entity and the development of an initial implementation plan by the selected organization. Coordination with entity will be ongoing.

Implementation Status Underway

Expected Timeframe The solicitation process should begin in 2014 with the selection of organization by early 2015. The products from the selected organization should be completed within 6 months of selection.

Notes Reference: Vaudrey, J.M.P., Alonzo, J., 2013. Evaluation of Current Community-Based Monitoring Efforts and Recommendations for Developing a Cohesive Network of Support for Monitoring Long Island Sound Embayments. NEIWPCC, LISS, 231 pp.

Implementation Action: SM-10

Complete LISS Sentinel Monitoring for Climate Change pilot projects and evaluate results to guide strategy development and future implementation.

Theme:	Sound Science and Inclusive Management
Goal	4: Manage Long Island Sound using sound science and cross-jurisdictional governance that is inclusive, adaptive, innovative, and accountable.
Outcome:	4-1: The scientific understanding of LIS to support management is increased through strengthened research, monitoring, assessment, mapping, and modeling
Objective:	4-1b: To maintain and enhance monitoring and assessment programs to increase understanding of Long Island Sound and assess progress toward management outcomes
Strategy:	4-1b4: Strengthen monitoring of embayments and near shore waters and integrate data and assessments into open water monitoring programs.

Project Description/Background A comprehensive plan to monitor climate change impacts on key wildlife and ecosystem resources in Long Island Sound has been initiated. The focus is on coastal indicators with high biological potential to show climate responses, available historical data, ease of cost-effective future data collection, and the ability to inform real-world management decisions. A project has been funded to collect new data which and to compile existing data.

Cooperators and Partners LISS Sentinel Monitoring Workgroup; NEIWPCC, UCONN, CTDEEP

Funding Sources No funds needed

Level of Funds Needed In-kind

Expected Outputs A summary of the new and current data for the three sentinels identified in the project.

Performance Metric(s)

- A database for sentinel (I): several metrics of abundance, distribution, productivity, and phenology for focal bird species that depend on tidal marshes, beaches, and mudflats.
- A database for Sentinel (v): in zones where marine transgression is likely, in focal habitats (coastal forests, shrublands, grasslands) avian community composition, presence of tidal marsh plant indicators, and tree mortality.
- A database for sentinel (vi): areal cover, diversity, species composition, and phenology of dominant saltmarsh plants in conjunction with the bird monitoring, and at sites with past data
- Synthesis report of project data and development of next steps in the implementation of the strategy

Implementation Status New

Expected Timeframe Compilation of existing data has begun; field work will occur from spring-fall 2013; Analysis, parameter assessment, and public release of results will be completed in spring 2014; Synthesis and development of next stage in Sentinel Monitoring implementation, summer 2014

Implementation Action: SM-11

Integrate the LISS Sentinel Monitoring for Climate Change Program with regional and national efforts such as the Northeast Regional Ocean Council, Northeast Regional Association of Ocean Observing Systems, and the National Estuarine Research Reserve System.

Theme:	Sound Science and Inclusive Management
Goal	4: Manage Long Island Sound using sound science and cross-jurisdictional governance that is inclusive, adaptive, innovative, and accountable.
Outcome:	4-1: The scientific understanding of LIS to support management is increased through strengthened research, monitoring, assessment, mapping, and modeling
Objective:	4-1b: To maintain and enhance monitoring and assessment programs to increase understanding of Long Island Sound and assess progress toward management outcomes
Strategy:	4-1b5: Improve regional identification, storage, and sharing of spatial and temporal data

Project Description/Background The Sentinel Monitoring for Climate Change (SMCC) in Long Island Sound Program was developed to quantify local changes in the environment brought about by climate change. The SMCC workgroup, together with other elements of the Long Island Sound, will work to integrate the results of the pilot study and next steps of the SMCC into the regular monitoring program of the LISS. In addition, the LIS SMCC program will coordinate, to the extent possible, with regional observational organizations.

Cooperators and Partners SMCC Work Group, LISS STAC

Funding Sources LISS

Level of Funds Needed No cost to develop strategic integration plan; funding recommendations will be part of this plan

Expected Outputs

Performance Metric(s)

- SMCC workgroup meeting notes;
- Strategic plan describing steps to integrate sentinel monitoring into the LISS monitoring program and coordination aspects with regional entities

Implementation Status Underway

Expected Timeframe The analysis of the pilot project will not be completed until summer 2014; therefore, draft strategic plan will be ready for submission to the LISS MC fall 2014.

Implementation Action: SM-12

Assess options for establishing a secure, long-term Long Island Sound data portal that can be accessed by other regional data systems, such as the Northeast Ocean Data Portal.

Theme:	Sound Science and Inclusive Management
Goal	4: Manage Long Island Sound using sound science and cross-jurisdictional governance that is inclusive, adaptive, innovative, and accountable.
Outcome:	4-1: The scientific understanding of LIS to support management is increased through strengthened research, monitoring, assessment, mapping, and modeling
Objective:	4-1b: To maintain and enhance monitoring and assessment programs to increase understanding of Long Island Sound and assess progress toward management outcomes
Strategy:	4-1b6: Improve regional identification, storage, and sharing of spatial and temporal data

Project Description/Background Over the past few years significant support has been growing for integration of LISS monitoring data/programs with regional data collection initiatives. These initiatives include the two regional ocean partnerships/data portals: Northeast Regional Ocean Council (NROC) and Mid-Atlantic Regional Council on the Oceans (MARCO) as well as the two relevant IOOS Regional Associations: Northeastern Regional Association of Coastal Ocean Observing Systems (NERACOOS), Mid-Atlantic Coastal Ocean Observing Regional Association (MACOORA). It important for the LISS looks to better integrate its monitoring data with these regional entities.

Cooperators and Partners LISS MC and STAC, federal and state agencies

Funding Sources LISS

Level of Funds Needed $

Expected Outputs Through the analysis of the LISS associated monitoring programs and the regional entities it is expected that a strategic plan outlining steps and resources needed to fine-tune the LISS monitoring program to better integrate with regional associations.

Performance Metric(s)

- RFP development and implementation for consultant;
- Consultant selection;
- Strategic plan resulting from consultant activity in coordination with STAC;
- Submission of strategic plan to LISS MC

Implementation Status New

Expected Timeframe It is expected that the RFP development will be in the fall of 2016 with consultant selection by the end of 2016. Strategic plan development will begin in early 2017 with the final draft report due to LISS MC by summer 2017.

Implementation Action: SM-13

Improve use and utility of Long Island Sound data for GIS applications.

Theme:	Sound Science and Inclusive Management
Goal	4: Manage Long Island Sound using sound science and cross-jurisdictional governance that is inclusive, adaptive, innovative, and accountable.
Outcome:	4-1: The scientific understanding of LIS to support management is increased through strengthened research, monitoring, assessment, mapping, and modeling
Objective:	4-1b: To maintain and enhance monitoring and assessment programs to increase understanding of Long Island Sound and assess progress toward management outcomes
Strategy:	4-1b6: Improve regional identification, storage, and sharing of spatial and temporal data

Project Description/Background In 2012 the LISS secured a consultant, Corbel Analytics, to aid in the development of a comprehensive GIS needs assessment to serve the needs of all of the LISS partners. The report, completed in 2013, recommended a number of steps that could improve the use and application of LIS data through regional GIS.

Cooperators and Partners LISS

Funding Sources LISS

Level of Funds Needed In-house staff evaluation. $$ - Implementation costs/year

Expected Outputs Relevant members of the LISS community will utilize the results of the consultant analysis to develop a strategic plan for how to enhance and facilitate GIS tool use for LISS partners. The plan will include recommendations on approaches and funding needs.

Performance Metric(s) Strategic plan outlining how to implement augmented GIS tools for LISS partners

Implementation Status Underway

Expected Timeframe The Corbel Analytics report was completed in October 2013. Need to develop a strategy for implementing the recommendations and propose tasks for funding.

Implementation Action: SM-14

Enhance modeling of eutrophication in Long Island Sound to support nitrogen management and dissolved oxygen TMDL implementation.

Theme:	Sound Science and Inclusive Management
Goal	4: Manage Long Island Sound using sound science and cross-jurisdictional governance that is inclusive, adaptive, innovative, and accountable.
Outcome:	4-1: The scientific understanding of Long Island Sound to support management is increased through strengthened research, monitoring, assessment, mapping, and modeling
Objective:	4-1c: To develop and improve modeling capabilities to provide predictive assessments of resources, physical dynamics, and water quality
Strategy:	4-1c1: Transition existing and new models to a community modeling framework that provides open source access to facilitate external collaboration, assessments, and enhancements

Project Description/Background The System Wide Eutrophication Model (SWEM) is a simulation model that has been used to relate nutrient loadings to water quality impairments in Long Island Sound and the New York/New Jersey Harbor. With LISS funding, UCONN, assisted by HDR, Inc., a) recalibrated the model in 2014 after making a series of technical improvements to its formulation; and b) took steps to advance the open-source accessibility of the model.. An independent model evaluation group (MEG) reviewed the SWEM recalibration and made a number of recommendations to further improve the calibration.

Cooperators and Partners LISS, NEIWPCC, University of Connecticut, HDR

Funding Sources LISS

Level of Funds Needed $$$

Expected Outputs Assessment of final SWEM recalibration report and MEG technical comments. Development of a eutrophication modeling strategy, which can include further enhancements to SWEM or the development of alternate modeling tools.

Performance Metric(s) Improved calibration of model-predicted versus measured parameters. MEG meetings and written evaluations.

Implementation Status Underway

Expected Timeframe Initiate modeling enhancements in 2015, completing them in 2016.

Implementation Action: SM-15

Make publicly available the System wide Eutrophication Model code and products to enhance transparency and collaboration.

Theme:	Sound Science and Inclusive Management
Goal:	4: Manage Long Island Sound using sound science and cross-jurisdictional governance that is inclusive, adaptive, innovative, and accountable.
Outcome:	4-1: The scientific understanding of Long Island Sound to support management is increased through strengthened research, monitoring, assessment, mapping, and modeling
Objective:	4-1c: To develop and improve modeling capabilities to provide predictive assessments of resources, physical dynamics, and water quality
Strategy:	4-1c1: Transition existing and new models to a community modeling framework that provides open source access to facilitate external collaboration, assessments, and enhancements

Project Description/Background The SWEM has undergone significant revisions, including the availability of the source code underling the model. Upon further revisions recommended by the model evaluation team, SWEM will made available to the broader research community to foster collaborations, applications, and continuous improvements. This will require a workshop whose aim is to train new users and facilitate the SWEM's future use.

Cooperators and Partners LISS STAC, SWEM MEG

Funding Sources LISS

Level of Funds Needed $

Expected Outputs Website with posted guidance and model information. A more informed modeling community and an increased capacity to apply advanced modeling tools to improve scientific and management decision making.

Performance Metric(s) Completed SWEM outputs, posted on a website

Implementation Status Underway

Expected Timeframe To be completed by the end of 2014.

Implementation Action: SM-16

Link water quality models of Long Island Sound to watershed and groundwater models to better elucidate nutrient and water budgets.

Theme:	Sound Science and Inclusive Management
Goal	4: Manage Long Island Sound using sound science and cross-jurisdictional governance that is inclusive, adaptive, innovative, and accountable.
Outcome:	4-1: The scientific understanding of Long Island Sound to support management is increased through strengthened research, monitoring, assessment, mapping, and modeling
Objective:	4-1c: To develop and improve modeling capabilities to provide predictive assessments of resources, physical dynamics, and water quality
Strategy:	4-1c1: Transition existing and new models to a community modeling framework that provides open source access to facilitate external collaboration, assessments, and enhancements

Project Description/Background Coastal nitrogen source loading from surface and groundwater runoff are estimated using a variety of approaches. Eutrophication modeling would benefit from more refined models to estimate coastal runoff loading of nitrogen. This effort would seek to develop such a model enhancement for eutrophication modeling.

Cooperators and Partners LISS STAC/NEIWPCC

Funding Sources LISS enhancement program

Level of Funds Needed $$$ over 3 years

Expected Outputs A eutrophication model that includes as either integral or as separate modules surface and groundwater loading models.

Performance Metric(s)

- Convened temporary workgroup to develop RFP;
- Fully developed RFP and contractor selection process;
- Contractor selected;
- Contractor completed surface and groundwater modules linked to eutrophication model.

Implementation Status New

Expected Timeframe Not to begin before 2018 as adequate time is needed to assess SWEM performance and application.

Implementation Action: SM-17

Continue program administrative, financial, and technical assistance support to Management Conference.

Theme:	Sound Science and Inclusive Management
Goal	4: Manage Long Island Sound using sound science and cross-jurisdictional governance that is inclusive, adaptive, innovative, and accountable.
Outcome:	4-2: Actions are implemented through coordinated strategies by all levels of government and diverse stakeholders.
Objective:	4-2a: To increase communication, coordination, and reduce institutional barriers to cooperation on an ecosystem level among all levels of government, stakeholder groups, and the general public.
Strategy:	4-2a1: Maintain and enhance the Long Island Sound Management Conference as the coordinating entity to implement the CCMP.

Project Description/Background EPA should continue to provide lead agency support to the Management Conference consistent with the policies and requirements of Clean Water Act sections 119 and 320. This support has been centrally coordinated by an EPA Long Island Sound Office located in Stamford, CT since 1992.

Cooperators and Partners EPA lead, with support from CTDEEP and NYSDEC

Funding Sources EPA

Level of Funds Needed $$$/year for core program staff and functions

Expected Outputs Core LISS products and functions defined in annual work plans

Implementation Status Ongoing

Performance Metric(s) Completion of annual work plan products and activities.

Expected Timeframe Annually

Implementation Action: SM-18

Continue state program coordination and involvement in the Management Conference.

Theme:	Sound Science and Inclusive Management
Goal	4: Manage Long Island Sound using sound science and cross-jurisdictional governance that is inclusive, adaptive, innovative, and accountable.
Outcome:	4-2: Actions are implemented through coordinated strategies by all levels of government and diverse stakeholders.
Objective:	4-2a: To increase communication, coordination, and reduce institutional barriers to cooperation on an ecosystem level among all levels of government, stakeholder groups, and the general public.
Strategy:	4-2a1: Maintain and enhance the Long Island Sound Management Conference as the coordinating entity to implement the CCMP.

Project Description/Background The involvement of Connecticut and New York is critical to the successful management of Long Island Sound. State coordinators have worked to involve and integrate diverse state programs into LIS-focused management.

Cooperators and Partners CTDEEP and NYSDEC lead with financial support from EPA

Funding Sources EPA through LIS funding

Level of Funds Needed $$/year for core program staff and functions

Expected Outputs Core LISS products and functions defined in annual work plans

Performance Metric(s)

Implementation Status New

Expected Timeframe Annually

Implementation Action: SM-19

Optimize structure and function of the Management Conference with a focus on implementation of the revised CCMP. (e.g., evaluate inclusion of additional partners and possible reorganization of workgroup structure)

Theme:	Sound Science and Inclusive Management
Goal	4: Manage Long Island Sound using sound science and cross-jurisdictional governance that is inclusive, adaptive, innovative, and accountable.
Outcome:	4-2: Actions are implemented through coordinated strategies by all levels of government and diverse stakeholders.
Objective:	4-2a: To increase communication, coordination, and reduce institutional barriers to cooperation on an ecosystem level among all levels of government, stakeholder groups, and the general public.
Strategy:	4-2a1: Maintain and enhance the Long Island Sound Management Conference as the coordinating entity to implement the CCMP.

Project Description/Background The Management Conference structure and function (committees, work groups, and advisory committees) must support the attainment of the CCMP goals and outcomes.

Cooperators and Partners LISS Management Committee lead, with support from advisory committees

Funding Sources Core LISS funding

Level of Funds Needed Staff time only

Expected Outputs LISS Management Conference restructured as appropriate.

Performance Metric(s) New structure communicated and implemented among program partners.

Implementation Status Underway

Expected Timeframe FY 2015.

Implementation Action: SM-20

Reauthorize Clean Water Act sections 119 and 320, and other relevant statutes, to support Long Island Sound.

Theme:	Sound Science and Inclusive Management
Goal	4: Manage Long Island Sound using sound science and cross-jurisdictional governance that is inclusive, adaptive, innovative, and accountable.
Outcome:	4-2: Actions are implemented through coordinated strategies by all levels of government and diverse stakeholders.
Objective:	4-2a: To increase communication, coordination, and reduce institutional barriers to cooperation on an ecosystem level among all levels of government, stakeholder groups, and the general public.
Strategy:	4-2a1: Maintain and enhance the Long Island Sound Management Conference as the coordinating entity to implement the CCMP.

Project Description/Background Clean Water Act Sections 320 and 119 set the purpose and authority of the Long Island Sound Management Conference.

Cooperators and Partners Congress lead with support from stakeholders

Funding Sources N/A

Level of Funds Needed N/A

Expected Outputs Reauthorized Clean Water Act sections 119 and 320

Performance Metric(s) Sponsored legislation introduced and passed by Congress.

Implementation Status Underway

Expected Timeframe FY 2015

Implementation Action: SM-21

Support involvement of and communication with the bi-state Long Island Sound Congressional Caucus and bi-state Connecticut and New York legislative caucus on issues of common concern.

Theme:	Sound Science and Inclusive Management
Goal	4: Manage Long Island Sound using sound science and cross-jurisdictional governance that is inclusive, adaptive, innovative, and accountable.
Outcome:	4-2: Actions are implemented through coordinated strategies by all levels of government and diverse stakeholders.
Objective:	4-2a: To increase communication, coordination, and reduce institutional barriers to cooperation on an ecosystem level among all levels of government, stakeholder groups, and the general public.
Strategy:	4-2a1: Maintain and enhance the Long Island Sound Management Conference as the coordinating entity to implement the CCMP.

Project Description/Background Legislators have a vital role in policy and funding and require both technical information and hearing from constituents to make informed decisions.

Cooperators and Partners Legislators and staff, Management Conference partners, NGOs

Funding Sources N/A

Level of Funds Needed N/A

Expected Outputs Legislators that are informed and engaged on issues related to LIS.

Performance Metric(s) Briefings and events involving the Long Island Sound Congressional Caucus and Bi-State legislative caucus.

Implementation Status New

Expected Timeframe Annually starting in FY 2015.

Implementation Action: SM-22

Support involvement of and communication with local governments, which have front line authority for implementing many of the CCMP strategies.

Theme:	Sound Science and Inclusive Management
Goal	4: Manage Long Island Sound using sound science and cross-jurisdictional governance that is inclusive, adaptive, innovative, and accountable.
Outcome:	4-2: Actions are implemented through coordinated strategies by all levels of government and diverse stakeholders.
Objective:	4-2a: To increase communication, coordination, and reduce institutional barriers to cooperation on an ecosystem level among all levels of government, stakeholder groups, and the general public.
Strategy:	4-2a1: Maintain and enhance the Long Island Sound Management Conference as the coordinating entity to implement the CCMP.

Project Description/Background Local governments have front line authority for implementing many of the CCMP strategies. The need is particularly important in meeting sustainability and adaptation objectives. The primary line of communication is through the states, but federal agencies and NGOs also have a support role.

Cooperators and Partners NYSDEC/NYSDOS, CTDEEP, with support from Management Conference partners

Funding Sources LISS and agency existing funding

Level of Funds Needed In-kind services of existing staff

Expected Outputs Communications with local elected officials and local government staff to increase effectiveness of local programs and projects.

Performance Metric(s) Briefings and events involving the Long Island Sound.

Implementation Status Underway

Expected Timeframe Ongoing

Implementation Action: SM-23

Reach out to traditionally underrepresented stakeholders and encourage them to participate in the Management Conference.

Theme:	Sound Science and Inclusive Management
Goal	4: Manage Long Island Sound using sound science and cross-jurisdictional governance that is inclusive, adaptive, innovative, and accountable.
Outcome:	4-2: Actions are implemented through coordinated strategies by all levels of government and diverse stakeholders.
Objective:	4-2a: To increase communication, coordination, and reduce institutional barriers to cooperation on an ecosystem level among all levels of government, stakeholder groups, and the general public.
Strategy:	4-2a1: Maintain and enhance the Long Island Sound Management Conference as the coordinating entity to implement the CCMP.

Project Description/Background There is a need to broaden the conversation on environmental protection. The involvement and support of traditionally underrepresented groups can strengthen efforts to protect and restore Long Island Sound.

Cooperators and Partners The LISS and participating organizations.

Funding Sources LISS and agencies existing funding

Level of Funds Needed In-kind services of existing staff

Expected Outputs Members of organizations traditionally underrepresented in environmental policy development are involved in the LISS.

Performance Metric(s)

- Number of organizations traditionally underrepresented in environmental policy development are involved in the LISS Management Conference (MC, CAC, work groups);
- Number of briefings and events involving organizations traditionally underrepresented.

Implementation Status New

Expected Timeframe Ongoing

Implementation Action: SM-24

Incorporate relevant updated elements of the CCMP into state regulatory and planning programs such as coastal zone management program consistency reviews and state environmental quality reviews (SEQRA in New York).

Theme:	Sound Science and Inclusive Management
Goal	4: Manage Long Island Sound using sound science and cross-jurisdictional governance that is inclusive, adaptive, innovative, and accountable.
Outcome:	4-2: Actions are implemented through coordinated strategies by all levels of government and diverse stakeholders.
Objective:	4-2a: To increase communication, coordination, and reduce institutional barriers to cooperation on an ecosystem level among all levels of government, stakeholder groups, and the general public.
Strategy:	4-2a2: Ensure that the CCMP is incorporated into and carried out through existing state policies and regulatory programs.

Project Description/Background Incorporating relevant parts of the CCMP into the state coastal zone management plan consistency reviews will help ensure that federal actions are consistent with the CCMP.

Cooperators and Partners CTDEEP, NYSDEC, NYSDOS

Funding Sources N/A

Level of Funds Needed N/A

Expected Outputs State reviews of federal actions for consistency with coastal policies incorporate key elements of the CCMP.

Performance Metric(s) N/A

Implementation Status Underway

Expected Timeframe Ongoing.

Implementation Action: SM-25

Convene senior EPA and State management to help direct, inform, and coordinate policy relevant to Long Island Sound.

Theme:	Sound Science and Inclusive Management
Goal	4: Manage Long Island Sound using sound science and cross-jurisdictional governance that is inclusive, adaptive, innovative, and accountable.
Outcome:	4-2: Actions are implemented through coordinated strategies by all levels of government and diverse stakeholders.
Objective:	4-2a: To increase communication, coordination, and reduce institutional barriers to cooperation on an ecosystem level among all levels of government, stakeholder groups, and the general public.
Strategy:	4-2a3: Maintain USEPA, NYSDEC, and CTDEEP sponsorship of the Management Conference to provide leadership and accountability.

Project Description/Background The Long Island Sound Management Conference is led by a Policy Committee comprised of the Regional Administrators of EPA Regions 1 and 2, and the Commissioners of the CTDEEP, and NYSDEC. An Executive Steering Committee of division directors provides more frequent policy level input on LIS management.

Cooperators and Partners EPA, CTDEEP, NYSDEC

Funding Sources LISS and agency existing funding

Level of Funds Needed In kind work from existing staff

Expected Outputs Improved integration of federal and state programs priorities into LIS program activities.

Performance Metric(s) Number of Policy Committee (1/year) and Executive Steering Committee meetings (3/year).

Implementation Status Underway

Expected Timeframe Ongoing.

Implementation Action: SM-26

Foster involvement of the tributary states in Management Conference activities by maintaining the Five State/EPA TMDL Work Group.

Theme:	Sound Science and Inclusive Management
Goal	4: Manage Long Island Sound using sound science and cross-jurisdictional governance that is inclusive, adaptive, innovative, and accountable.
Outcome:	4-2: Actions are implemented through coordinated strategies by all levels of government and diverse stakeholders.
Objective:	4-2a: To increase communication, coordination, and reduce institutional barriers to cooperation on an ecosystem level among all levels of government, stakeholder groups, and the general public.
Strategy:	4-2a4: Enhance opportunities for cooperation and involvement of the tributary states of Massachusetts, New Hampshire, and Vermont to address stressors that contribute to downstream effects on Long Island Sound.

Project Description/Background Massachusetts Department of Environmental Protection now has a seat on the Management Committee. While distance and travel limitations may preclude regular, in-person attendance of staff from all the tributary states in LIS planning, there are opportunities to use technology to foster remote involvement. The Five State/EPA TMDL work group was specifically formed after adoption of the nitrogen TMDL as a forum for discussion on TMDL related issues. It has fostered improved monitoring and modeling of nitrogen loads, while also increasing dialogue on enhancing implementation of the TMDL.

Cooperators and Partners EPA, CTDEEP, NYSDEC, MADEP, NHDES, VTDEP

Funding Sources LISS and agency existing resources

Level of Funds Needed $$/year

Expected Outputs Improved integration of federal and state programs priorities into LIS TMDL activities.

Performance Metric(s) Nitrogen reductions from all watershed states.

Implementation Status Underway

Expected Timeframe Ongoing.

Implementation Action: SM-27

Develop a bi-state framework (or guidance) for Marine Spatial Planning for Long Island Sound to more comprehensively manage Long Island Sound resources.

Theme:	Sound Science and Inclusive Management
Goal	4: Manage Long Island Sound using sound science and cross-jurisdictional governance that is inclusive, adaptive, innovative, and accountable.
Outcome:	4-2: Actions are implemented through coordinated strategies by all levels of government and diverse stakeholders.
Objective:	4-2a: To increase communication, coordination, and reduce institutional barriers to cooperation on an ecosystem level among all levels of government, stakeholder groups, and the general public.
Strategy:	4-2a5: Through Marine Spatial Planning facilitate the management of multiple human uses of the Sound compatible with the conservation of natural resources and habitats.

Project Description/Background Coastal and Marine spatial planning (CMSP) is a process that brings together multiple users of the ocean – including energy, industry, commercial fishing, government, conservation, and recreation – to make informed and coordinated decisions about how to use marine resources sustainably. CMSP generally uses maps to create a more comprehensive picture of a marine area – identifying where and how an ocean area is being used and what natural resources and habitat exist. It is similar to land-use planning, but for marine waters.

Cooperators and Partners Sound Spatial Planning Work Group, led by Connecticut Sea Grant and The Nature Conservancy.

Funding Sources In-kind services

Level of Funds Needed In-house staff support is being provided by CTSG and TNC.

Expected Outputs The SSPWG will recommend a bi-state framework from marine spatial planning.

Performance Metric(s) Meetings of work group; draft and final reports.

Implementation Status New

Expected Timeframe 2015

Implementation Action: SM-28

Conduct primary valuations of the critical ecosystem goods and services supported by Long Island Sound and its coastal habitats

Theme:	Sound Science and Inclusive Management
Goal	Manage Long Island Sound using sound science and cross-jurisdictional governance that is inclusive, adaptive, innovative, and accountable.
Outcome:	4-2: Actions are implemented through coordinated strategies by all levels of government and diverse stakeholders.
Objective:	4-2b: To maintain and enhance efficient public investments in restoration and management.
Strategy:	4-2b1: Apply concepts of economic valuations of the natural capital of LIS and its watershed (i.e., the value of the goods and services supported by natural ecosystems) to inform and sustain investment in protecting and restoring those assets

Project Description/Background Kocian et al. 2014 recently estimated the economic value of the goods and services provided by the natural ecosystem of the Sound and its basin. A recommendation for future research of primary ecosystem service valuations is first and foremost to fill in key gaps. The greatest limitation to this analysis is the gaps of primary valuation studies representing all of the ecosystem services provided in the Long Island Sound Basin. Granularity on valuation is lacking for more specific land covers, such as some of LISS's priority habitats: intertidal flats, cliffs and bluffs, and rocky intertidal zones.

Cooperators and Partners Multiple research funders and economists

Funding Sources Research funds

Level of Funds Needed $$

Expected Outputs Studies that identify LIS-specific valuations

Performance Metric(s) Key data gaps identified, research conducted, products published resulting in increased confidence in ecosystem service valuations.

Implementation Status New

Expected Timeframe 2015

*Kocian, M., Fletcher, A., Schundler, G., Batker, D., Schwartz, A., Briceno, T., 2014. The Trillion Dollar Asset: The Economic Value of the Long Island Sound Basin. Earth Economics, Tacoma, WA, 76 pp.

Implementation Action: SM-29

Conduct return-on investment analysis for Long Island Sound restoration and preservation strategies to inform priority-setting for implementation of the CCMP

Theme:	Sound Science and Inclusive Management
Goal	Manage Long Island Sound using sound science and cross-jurisdictional governance that is inclusive, adaptive, innovative, and accountable.
Outcome:	4-2: Actions are implemented through coordinated strategies by all levels of government and diverse stakeholders.
Objective:	4-2b: To maintain and enhance efficient public investments in restoration and management.
Strategy:	4-2b1: Apply concepts of economic valuations of the natural capital of LIS and its watershed (i.e., the value of the goods and services supported by natural ecosystems) to inform and sustain investment in protecting and restoring those assets.

Project Description/Background Kocian et al. 2014 recently estimated the economic value of the goods and services provided by the natural ecosystem of the Sound and its basin. Private or public understanding of the rate of return on investments is essential to allocating capital efficiently to generate significant and real returns. Understanding the size of assets and the relative returns on investments in those assets provides robust information for deciding the scale of and potential returns from investment. By utilizing metrics that incorporate ecosystem services, the true value of investments can be understood. The measurement of Return-on-Investment (ROI) has been proven to be superior to other decision-making tools for ensuring cost-efficiency and the maximization of benefits.

Cooperators and Partners LISS and contractor

Funding Sources In-kind services

Level of Funds Needed In-house staff support, through a workgroup to develop a scope of work to be done by a contractor, contractor cost $

Expected Outputs A return on investment calculator that can be scaled from small to large protection and, or restoration activities throughout the Sound.

Performance Metric(s) Meetings of work group; SOW for contract; contractor selection and oversight

Implementation Status New

Expected Timeframe 2015

*Kocian, M., Fletcher, A., Schundler, G., Batker, D., Schwartz, A., Briceno, T., 2014. The Trillion Dollar Asset: The Economic Value of the Long Island Sound Basin. Earth Economics, Tacoma, WA, 76 pp.

Implementation Action: SM-30

Capitalize Connecticut Clean Water Fund and New York State Revolving Fund adequately to finance Clean Water infrastructure needs.

Theme:	Sound Science and Inclusive Management
Goal	4: Manage Long Island Sound using sound science and cross-jurisdictional governance that is inclusive, adaptive, innovative, and accountable.
Outcome:	4-2: Actions are implemented through coordinated strategies by all levels of government and diverse stakeholders.
Objective:	4-2b: To maintain and enhance efficient public investments in restoration and management.
Strategy:	4-2b2: Identify critical funding needs for protection and restoration projects, science, and education and involvement, and relate these needs to available or new funding sources.

Project Description/Background The EPA provides capitalization grants to the states that are matched by state monies to create loan funds to finance clean water infrastructure projects. The 20-year need for capital upgrades to water infrastructure that considers climate change adaptation must be identified and met.

Cooperators and Partners EPA, CTDEEP, NYSDEC, NYS Environmental Facilities Corporation (NYEFC)

Funding Sources EPA, CTDEEP, NYEFC

Level of Funds Needed $$$/year needed in bonding to support infrastructure work

Expected Outputs Clean Water implementation projects.

Performance Metric(s) Federal appropriations for the State Revolving Fund and leveraged state matching funds.

Implementation Status Underway

Expected Timeframe Annually.

Implementation Action: SM-31

Research and develop innovative, locally appropriate funding mechanisms to provide sustained, reliable sources of investment capital to restore and protect ecosystem services.

Theme:	Sound Science and Inclusive Management
Goal	4: Manage Long Island Sound using sound science and cross-jurisdictional governance that is inclusive, adaptive, innovative, and accountable.
Outcome:	4-2: Actions are implemented through coordinated strategies by all levels of government and diverse stakeholders.
Objective:	4-2b: To maintain and enhance efficient public investments in restoration and management.
Strategy:	4-2b2: Identify critical funding needs for protection and restoration projects, science, and education and involvement, and relate these needs to available or new funding sources.

Project Description/Background Funding mechanisms refer to creative ways to meet financial needs for protecting and managing community assets (including natural capital). They include market mechanisms designed to obtain a desired value from community assets by providing incentives and disincentives for practices that protect or degrade them while also creating a revenue base to invest in their management. The utility and efficiency of funding mechanisms will become more apparent in coming years as new market opportunities develop for habitat, climate control, temperature, and water quality. Current funding mechanisms are limited. The people who benefit from many aspects of the Long Island Sound Basin (property values, storm protection, drinking water) do not have a means to pay for investment in asset improvements that directly benefit them. In addition, those who may harm these assets (pollution, blight, impermeable surfaces) do not have a system for paying to mitigate for these damages or repair the natural assets. Researching the full range of locally appropriate funding mechanisms could provide a sustained, reliable source of investment capital to restore and protect ecosystem services

Cooperators and Partners LISS, NFWF, LISS Citizens Advisory Committee

Funding Sources Varied government and private funding sources.

Level of Funds Needed $$

Expected Outputs

- a strategic planning document elucidating potential mechanisms for funding
- a prospectus for private/public sector parties to inform investment

Performance Metric(s)

- a plan with funding mechanisms
- a fund, administered by the appropriate agency, to apply investment funds to restore as well as track progress

Implementation Status new

Expected Timeframe five years

Implementation Action: SM-32

Coordinate and target funding for implementation of protection and restoration, science, and education and involvement projects.

Theme:	Sound Science and Inclusive Management
Goal	Manage Long Island Sound using sound science and cross-jurisdictional governance that is inclusive, adaptive, innovative, and accountable.
Outcome:	4-2: Actions are implemented through coordinated strategies by all levels of government and diverse stakeholders.
Objective:	4-2b: To maintain and enhance efficient public investments in restoration and management.
Strategy:	4-2b2: Identify critical funding needs for protection and restoration projects, science, and education and involvement, and relate these needs to available or new funding sources.

Project Description/Background Multiple sources of funding exist on the federal, state, local, and non-governmental levels.

Cooperators and Partners EPA and other federal agencies, CTDEEP, NYSDEC, CTSG, NYSG, foundations, etc.

Funding Sources EPA and other federal agencies, CTDEEP, NYSDEC, CTSG, NYSG, foundations, etc.

Level of Funds Needed Coordination through existing staff and organizations to better direct available resources

Expected Outputs Projects that implement the CCMP.

Performance Metric(s)

- Number of projects.
- Quantitative progress toward implementation metrics.
- Funding levels.

Implementation Status Underway

Expected Timeframe Annually.

Implementation Action: SM-33

Develop an annual budget of the United States Government regarding each Federal department and agency involved in the protection and restoration of the Long Island Sound watershed

Theme:	Sound Science and Inclusive Management
Goal	Manage Long Island Sound using sound science and cross-jurisdictional governance that is inclusive, adaptive, innovative, and accountable.
Outcome:	4-2: Actions are implemented through coordinated strategies by all levels of government and diverse stakeholders.
Objective:	4-2b: To maintain and enhance efficient public investments in restoration and management.
Strategy:	4-2b3: Evaluate cross-agency expenditures on Long Island Sound to identify how funding levels match with priority needs, assess whether resources are being optimally applied, and identify leveraging opportunities.

Project Description/Background This action is included in previous house and senate versions of bills to reauthorize CWA Section 119. It would evaluate current federal spending on Long Island Sound programs against established priorities and needs. Federal spending allocations can be better coordinated to promote specific regional outcomes if the distribution and level of investments are for each outcome are understood. This would help to better coordinate activities and implementation responsibilities among federal agencies with jurisdiction over Long Island Sound. This will include an interagency crosscut budget that displays for each department and agency: (A) The amount obligated during the preceding fiscal year for protection and restoration projects and studies relating to the watershed; (B) the estimated budget for the current fiscal year for protection and restoration projects and studies relating to the watershed; and (C) the proposed budget for succeeding fiscal years for protection and restoration projects and studies relating to the watershed.

Cooperators and Partners EPA lead with other federal agencies in support roles

Funding Sources N/A

Level of Funds Needed N/A

Expected Outputs Published evaluations of federal expenditures by program elements.

Performance Metric(s) Reauthorized legislation with cross-budget analysis requirement.

Implementation Status New

Expected Timeframe Annually starting in FY 2016.

Implementation Action: SM-34

Incorporate climate change-driven factors such as temperature and sea level rise in model applications to assess factors that can influence future attainment of water quality standards and habitat protection and restoration goals.

Theme:	Sound Science and Inclusive Management
Goal	Manage Long Island Sound using sound science and cross-jurisdictional governance that is inclusive, adaptive, innovative, and accountable.
Outcome:	4-3: Implementation is adapted and improved through the application of new information and knowledge.
Objective:	4-3a: To frame sustainability, adaptation, and resilience in relation to the drivers of ecosystem change.
Strategy:	4-3a1: Include important environmental drivers (e.g., climate change) in all relevant management planning initiatives.

Project Description/Background Physical factors can affect the susceptibility of Long Island Sound to impairments in water and habitat quality. Scenarios for future attainment of dissolved oxygen water quality standards or habitat protection and restoration goals must evaluate plausible alterations to the physical environment due to climate change.

Cooperators and Partners LISS work groups responsible for modeling oversight

Funding Sources LISS

Level of Funds Needed $$

Expected Outputs Model scenarios for water quality attainment that incorporate future physical conditions driven by climate change.

Performance Metric(s)
Modeling scenarios identified by work group.

Implementation Status New

Expected Timeframe FY 2019.

Implementation Action: SM-35

Incorporate desired ecosystem outcomes for planning and implementation of Hurricane Sandy Relief funds (e.g. North Atlantic Coast Comprehensive Study, Public Law 113-2, the Disaster Relief Appropriation Act of 2013).

Theme:	Sound Science and Inclusive Management
Goal	Manage Long Island Sound using sound science and cross-jurisdictional governance that is inclusive, adaptive, innovative, and accountable.
Outcome:	4-3: Implementation is adapted and improved through the application of new information and knowledge.
Objective:	4-3a: To frame sustainability, adaptation, and resilience in relation to the drivers of ecosystem change.
Strategy:	4-3a2: Consider the spectrum of desired ecosystem outcomes when planning and implementing resiliency of both built and natural systems.

Project Description/Background Multiple efforts are underway to recover from Hurricane Sandy and build resiliency from future storms. For example, the goals of the North Atlantic Coast Comprehensive Study are to (1) provide risk reduction strategies to reduce risk to which vulnerable coastal populations are subject, and (2) promote coastal resilient communities to ensure a sustainable and robust coastal landscape system, considering future sea level rise and climate change scenarios, to reduce risk to vulnerable population, property, ecosystems, and infrastructure. Management Conference partners need to ensure the best science informs recovery and resiliency efforts for Long Island Sound.

Cooperators and Partners Multiple agencies involved in Sandy recovery and resiliency efforts

Funding Sources Public Law 113-2, the Disaster Relief Appropriation Act of 2013

Level of Funds Needed Generally these activities will be supported with the Sandy Relief supplemental appropriation.

Expected Outputs Plans and activities for coastal recovery and resiliency.

Performance Metric(s) A coastal framework (submitted to Congress within 24 months) as well as storm suite modeling, coastal GIS analysis, and related evaluations, for the affected coastlines.

Implementation Status New

Expected Timeframe January 2015.

Implementation Action: SM-36

Collaborate with the Connecticut Institute for Resiliency and Climate Adaptation (CIRCA).

Theme:	Sound Science and Inclusive Management
Goal	Manage Long Island Sound using sound science and cross-jurisdictional governance that is inclusive, adaptive, innovative, and accountable.
Outcome:	4-3: Implementation is adapted and improved through the application of new information and knowledge.
Objective:	4-3a: To frame sustainability, adaptation, and resilience in relation to the drivers of ecosystem change.
Strategy:	4-3a2: Consider the spectrum of desired ecosystem outcomes when planning and implementing resiliency of both built and natural systems.

Project Description/Background The Institute is designed to increase the resilience and sustainability of vulnerable communities and individuals along Connecticut's coast and inland waterways as they are affected by the growing impact of climate change on the environment. By bringing together experts in a wide range of academic disciplines, by developing cutting-edge research to solve practical problems, and collaborating with local, regional, and national partners, the institute will facilitate development of strategic plans for protecting the state's coastal region.

Cooperators and Partners UConn, CTDEEP, NOAA

Funding Sources Initial funding for the Institute, in the amount of $2.5 million, comes from a plea agreement approved by the U.S. Attorney's Office in a suit the State brought against Conopco Inc., for clean water violations related to wastewater treatment. Additional funding includes $610,000 from the Connecticut Sea Grant Coastal Storm Awareness program and federal funding of $425,000 from a grant to enhance coastal resilience in Connecticut.

Level of Funds Needed $$$ to $$$$ See above

Expected Outputs

- Improved scientific understanding of the changing climate and its local impacts communities;
- Developed and deployed best practices for climate resilience;
- Pilot projects to improve coastal resilience and sustainability;
- Resilient and sustainable communities;
- Enhanced resilience of critical infrastructure (e.g. power, water, communications); and
- Reduced loss of life and property, ecological damage, and social disruption from storms.

Performance Metric(s) A more climate-literate public

Implementation Status New

Expected Timeframe January 2015

Implementation Action: SM-37

Refine the ecosystem metrics and targets based on the underlying science of the Long Island Sound ecosystem to clearly identify the characteristics of a "restored" Long Island Sound.

Theme:	Sound Science and Inclusive Management
Goal	Manage Long Island Sound using sound science and cross-jurisdictional governance that is inclusive, adaptive, innovative, and accountable.
Outcome:	4-3: Implementation is adapted and improved through the application of new information and knowledge.
Objective:	4-3b: To apply an adaptive management framework, when warranted by the level of uncertainty to the underlying science, to implementation
Strategy:	4-3b1: Establish baselines of historical or prehistorical conditions of ecosystem attributes and magnitudes of change to help provide a basis for setting restoration goals.

Project Description/Background The CCMP includes ecosystem targets for restoration to be tracked through measurable indicators. Progress toward attaining the ecosystem target conditions will be evaluated on an annual basis. The ecosystem targets will also be assessed for refinement and the inclusion of new targets.

Cooperators and Partners LISS

Funding Sources LISS

Level of Funds Needed Part of the base LISS staff program activities

Expected Outputs Assessments of progress toward ecosystem characteristics.

Performance Metric(s) Annual updates of environmental indicators. Published reports on progress toward attainment of targets.

Implementation Status New

Expected Timeframe Annually starting January 2015.

Implementation Action: SM-38

Incorporate bioextraction analyses in TMDL assessments on the assimilative capacity of Long Island Sound to process nutrients without loss of designated uses.

Theme:	Sound Science and Inclusive Management
Goal	Manage Long Island Sound using sound science and cross-jurisdictional governance that is inclusive, adaptive, innovative, and accountable.
Outcome:	4-3: Implementation is adapted and improved through the application of new information and knowledge.
Objective:	4-3b: To apply an adaptive management framework, when warranted by the level of uncertainty to the underlying science, to implementation
Strategy:	4-3b2: Utilize and learn from cutting edge approaches and methods to improve management options for pollution mitigation and ecosystem protection (e.g., marine spatial planning, innovative source reduction technologies, in situ extractive technologies).

Project Description/Background Bioextraction of nutrients through shellfish and seaweed aquaculture harvests can increase the nutrient assimilative capacity of Long Island Sound, thereby increasing dissolved oxygen levels and improving water quality.

Cooperators and Partners LISS, TMDL Work Group

Funding Sources LISS

Level of Funds Needed $$

Expected Outputs Implementation Plan for nutrient bioextraction

Performance Metric(s)

Implementation Status New

Expected Timeframe January 2017.

Implementation Action: SM-39

Prepare and make available to the public annually the LISS Implementation Tracking Report using E-Sound.

Theme:	Sound Science and Inclusive Management
Goal	Manage Long Island Sound using sound science and cross-jurisdictional governance that is inclusive, adaptive, innovative, and accountable.
Outcome:	4-3: Implementation is adapted and improved through the application of new information and knowledge.
Objective:	4-3b: To apply an adaptive management framework, when warranted by the level of uncertainty to the underlying science, to implementation
Strategy:	4-3b3: Prepare periodic progress reports on the health of the Sound and on implementation progress.

Project Description/Background Full and transparent knowledge of the progress in implementation can be used to identify shortfalls and design solutions to enhance program implementation. This is one of the elements required under legislation for reporting to Congress.

Cooperators and Partners LISS, Federal and state implementer agencies

Funding Sources LISS

Level of Funds Needed $$/year

Expected Outputs Implementation tracking report

Performance Metric(s) Number of agencies reporting on implementation progress.

Implementation Status New

Expected Timeframe Annually starting in January 2015.

Implementation Action: SM-40

Develop, complete, and evaluate a "report card" on water quality conditions in Long Island Sound.

Theme:	Sound Science and Inclusive Management
Goal	Manage Long Island Sound using sound science and cross-jurisdictional governance that is inclusive, adaptive, innovative, and accountable.
Outcome:	4-3: Implementation is adapted and improved through the application of new information and knowledge.
Objective:	4-3b: To apply an adaptive management framework, when warranted by the level of uncertainty to the underlying science, to implementation
Strategy:	4-3b3: Prepare periodic progress reports on the health of the Sound and on implementation progress.

Project Description/Background Report cards can integrate diverse data into an easily understandable form to communicate to the public and build support for actions for improve assessments. Critical to the report card success is the scientific credibility of its underlying assumptions. This action will develop a report card on water quality based on the science-based approaches developed elsewhere, but applied specifically to Long Island Sound.

Cooperators and Partners LISS, Science and Technical Advisory Committee, University of Maryland.

Funding Sources LISS, Long Island Sound Funders Cooperative

Level of Funds Needed $160,000 allocated in 2013. $$/year to maintain and publish report cards.

Expected Outputs Annual published report card

Performance Metric(s)

- Science-based matrices for translating water quality conditions into grades;
- Review by the Science and Technical Advisory Committee

Implementation Status New

Expected Timeframe January 2015.

Implementation Action: SM-41

Refine and communicate information on the Long Island Sound ecosystem and watershed using environmental indicators (drivers, pressures, conditions, and response indicators).

Theme:	Sound Science and Inclusive Management
Goal	Manage Long Island Sound using sound science and cross-jurisdictional governance that is inclusive, adaptive, innovative, and accountable.
Outcome:	4-3: Implementation is adapted and improved through the application of new information and knowledge.
Objective:	4-3b: To apply an adaptive management framework, when warranted by the level of uncertainty to the underlying science, to implementation
Strategy:	4-3b3: Prepare periodic progress reports on the health of the Sound and on implementation progress.

Project Description/Background Indicators are quantitative or qualitative measures that provide information about the status of or changes in natural, cultural, and economic aspects of an ecosystem. The LISS has been developing and reporting on the environmental pressures, conditions, and responses of the Long Island Sound ecosystem since the late 1990s. There is a need to maintain a robust environmental indicators program on the status and trends of Long Island Sound's water quality, habitats, and marine and coastal animal populations, and develop new climate change and socioeconomic indicators. Reporting on the health of LIS is one of the elements required under legislation for reporting to Congress.

Cooperators and Partners LISS

Funding Sources LISS Budget

Level of Funds Needed $

Expected Outputs Web page of environmental indicators and publication of a Sound Health report

Performance Metric(s)

- Environmental indicators updated annually on www.longislandsoundstudy.net
- Biennial publication of Sound Health.

Implementation Status Underway

Expected Timeframe Every two years with September 2015 for next website update.

Implementation Action: SM-42

Develop annual LISS work plans that consider progress made and recommendations for improving implementation of the implementation actions.

Theme:	Sound Science and Inclusive Management
Goal	Manage Long Island Sound using sound science and cross-jurisdictional governance that is inclusive, adaptive, innovative, and accountable.
Outcome:	4-3: Implementation is adapted and improved through the application of new information and knowledge.
Objective:	4-3b: To apply an adaptive management framework, when warranted by the level of uncertainty to the underlying science, to implementation
Strategy:	4-3b4: At 5-year intervals refine implementation actions and priorities by incorporating and integrating new information (including emerging issues) relating to Sound Science and Inclusive Management.

Project Description/Background LISS develops annual work plans that document the desired outputs and outcomes from each funded task, while also providing an update from the activities funded in the prior year. The outputs and outcomes of the annual work plan should reflect the goals and objectives of the CCMP.

Cooperators and Partners LISS Management Committee

Funding Sources LISS

Level of Funds Needed Work conducted by core LISS staff with no additional costs.

Expected Outputs An annual work plan that clearly documents who will produce what, by when, to support a specified outcome.

Performance Metric(s) Proposed annual work tasks that are reviewed for how they support attainment of desired outcomes. Management Committee meetings to review and approve the work plans.

Implementation Status Underway

Expected Timeframe Annually in April

Implementation Action: SM-43

Every five years develop a comprehensive, specific, target-oriented implementation plan engaging all Long Island Sound partners.

Theme:	Sound Science and Inclusive Management
Goal	Manage Long Island Sound using sound science and cross-jurisdictional governance that is inclusive, adaptive, innovative, and accountable.
Outcome:	4-3: Implementation is adapted and improved through the application of new information and knowledge.
Objective:	4-3b: To apply an adaptive management framework, when warranted by the level of uncertainty to the underlying science, to implementation
Strategy:	4-3b4: At 5-year intervals refine implementation actions and priorities by incorporating and integrating new information (including emerging issues) relating to science and management.

Project Description/Background The implementation actions included in this revision of the CCMP cover a period of five years. Every five years a new set of implementation actions will be developed considering success and challenges in implementation, changes in the health of Long Island Sound, and new science on the Sound.

Cooperators and Partners LISS and partner agencies.

Funding Sources LISS

Level of Funds Needed Developed by LISS core staff

Expected Outputs A five-year implementation plan

Performance Metric(s) Evaluation of the implementation tracking report and assessment of innovations and new information. Assessments of environmental indicators, and review of research and monitoring data to consider science gains.

Implementation Status New

Expected Timeframe Every five years. Next Implementation Action Plan due five years after the completion of the Implementation Action Plan (January 2020).