Comprehensive Conservation and Management Plan 2020

Supplemental Document 2

Thriving Habitats and Abundant Wildlife (HW) Theme

Implementation Actions 2020–2024

Summary Table. Thriving Habitats and Abundant Wildlife (HW) Implementation Actions

Implementation Actions (IAs) have been formulated to carry out the HW strategies. The IAs are listed in the table with highest priority actions shaded in **bold blue**. The major strategies addressed by the action are also listed in the table.

IA Number	Implementation Action Title	Strategies Addressed
HW-1	**Complete projects that result in restoration of coastal habitat.**	**2-1a1**
HW-2	Develop a list of current and new or innovative restoration techniques.	2-1a1
HW-3	**Complete projects that restore or maintain habitat connectivity (i.e., river miles reconnected and/or contiguous acres of coastal habitat protected or restored). Generate supporting GIS data to help measure extent of connectivity enhanced.**	**2-1a1, 2-1a2, 1-1b2**
HW-4	**By 2024, agree upon an applicable habitat connectivity model and apply metrics for all restoration and protection projects.**	**2-1a2, 2-1b1, 2-4a1**
HW-5	**Use remote sensing, mapping tools, modeling, and field verification to determine sites that are likely to be impacted by sea level rise, and which sites are ideal for habitat migration.**	**2-1b1, 2-1c1, 2-4a1**
HW-6	**Develop and apply standardized habitat quality metrics and assessment methodology across targeted habitat types.**	**2-1b1, 2-1a1, 2-4a2**
HW-7	**Use leading-edge design tools to prioritize future conservation investment and management plan development for Long Island Sound's most significant and imperiled terrestrial and intertidal coastal habitats.**	**2-1b1, 3-5a2**
HW-8	**Conduct an ecological assessment of lands and waters surrounding Long Island Sound Stewardship Sites and design green infrastructure/low-impact development pilot projects that minimize negative impacts and enhance beneficial ecosystem services of lands and waters within or surrounding the Sites.**	**2-1b1, 2-4a2**
HW-9	**Equitably protect high-priority coastal habitat from development through property acquisition and other means, support sustainable use of these properties, without discouraging wildlife use, and create a registry of protected areas in Connecticut and New York, which encompasses both existing protected properties and future acquisitions.**	**2-1b2, 2-1b3**
HW-10	Promote management practices that limit human disturbance and protect functional availability of coastal and marine habitats for Species of Greatest Conservation Need, including forage species and other wildlife.	2-1b2, 2-1b3, 2-3a2, 3-3a1
HW-11	**In lieu of hard armoring, develop and promote the use of living shoreline habitat protection methods (dunes, shorelines, coastal marshes) and standardized living shoreline monitoring protocols while considering the habitat needs of Species of Greatest Conservation Need, including forage species, and reducing wildlife conflicts.**	**2-1c1**

IA Number	Implementation Action Title	Strategies Addressed
HW-12	Promote the conversion of existing armored shorelines (seawalls, riprap, bulkheads, etc.) to softer, nature-based living shorelines to enhance habitat and habitat connectivity.	2-1c1
HW-13	Promote directed volunteer-driven invasive species reconnaissance and removal work.	2-2a1, 2-2a2, 2-2d1, 3-1c1, 3-2b2
HW-14	**Develop and implement invasive/non-native species management plans for priority terrestrial and aquatic sites.**	**2-2a2, 2-2d1**
HW-15	Assess adequacy of current legislation and programs that target prevention, spread, and removal of invasive/non-native species.	2-2a2, 2-2d1
HW-16	**Collect and analyze data on, and restore habitat for, Species of Greatest Conservation Need, including forage species.**	**2-2b1**
HW-17	Reduce and manage threats to populations of Species of Greatest Conservation Need, including forage species.	2-2b2, 2-4a3, 3-1a1
HW-18	Develop a shellfish management plan for aquaculture, recreation, and restoration that ensures sustainable marine populations.	2-2c1
HW-19	Update and implement Connecticut and New York State Wildlife Action Plans as they pertain to Long Island Sound, and continue to update or draft new site-specific management plans as needed.	2-2d1
HW-20	Develop and support programs to engage landowners in understanding the importance of habitat protection and management methods and in implementing them on their properties.	2-3a1, 2-3a2, 3-1a3
HW-21	Support inclusive participation of communities and stakeholders in the design and implementation of the Long Island Sound National Estuarine Research Reserve management plan and reserve education and research programs.	2-3a1, 2-3a2, 3-3a2
HW-22	Engage local communities in design, development, implementation, and promotion of habitat restoration, stewardship and monitoring projects.	2-3b1, 2-3a1, 2-3a2, 3-1a3, 3-1c1, 3-2b2
HW-23	Collect and analyze data on LISS 12 targeted coastal habitat types in order to improve habitat assessment and adaptive management.	2-4a1, 2-4a2
HW-24	Explore adding new coastal habitat types to the 12 currently targeted for restoration.	2-4a2
HW-25	**Continue Long Island Sound eelgrass abundance surveys and promote eelgrass management.**	**2-4a2**
HW-26	Determine whether monitoring of surrogate species, including those of high conservation priority, is a cost-effective way to track habitat restoration.	2-4a3

IA Number	Implementation Action Title	Strategies Addressed
HW-27	Assess causes and extent of tidal marsh change through research and monitoring and use this information to create a model to prioritize sites for restoration and conservation.	2-4a4, 4-1a1

Implementation Action: HW-1

Complete projects that result in restoration of coastal habitat.

Theme: Thriving Habitats and Abundant Wildlife
Goal: 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 resiliency and function are maintained by protecting, restoring, and enhancing habitats.
Objective: 2-1a: To restore and enhance targeted habitat types.
Strategy: 2-1a1: Develop and implement innovative and effective habitat restoration plans and projects including restoring quality and quantity of coastal habitat and fish passage.

Project Description/Background: This action will help to promote completion of projects to restore habitat within 12 targeted habitat types and the species associated with these habitats, whether for the entirety of their lives or just for short periods of time (stopover habitat to support avian species that migrate along the Atlantic Flyway, fish species that require habitat for nurseries, etc.) (LISS Habitat Restoration Initiative targeted habitats can be found here: https://longislandsoundstudy.net/our-vision-and-plan/thriving-habitats-and-abundant-wildlife/habitat-and-stewardship-initiatives/). In order to accomplish this action, partner insight and prioritization will be sought. There has been progress made on implementing restoration at the top 5 priority sites (listed in Appendix D in the CCMP), and will continue implementation at those and other sites warranted.

Cooperators and Partners: LISS Habitat Restoration & Stewardship Work Group partners, The Nature Conservancy, Connecticut Audubon Society, Audubon Connecticut, Audubon New York, NOAA, American Rivers, Save the Sound, CTDEEP, NYSDEC, NRCS, USFWS.

Funding Sources: LISS program funds, various for project design and implementation, Recovering America's Wildlife Act (if passed).

Funding Needs: $$ – $$$/project

Expected Outputs:
- Habitat restoration in the 12 targeted habitat types
- Funding for priority projects on the list and those that surface due to expert insight and need
- Enhanced biodiversity, increased biomass of Species of Greatest Conservation Need (SGCN), and improved habitat health due to restoration

Performance Metric(s):
- Number of prioritized restoration projects that have been completed
- Species health if and when tied to specific restoration projects
- Public engagement if/when tied to priority restoration project outcomes

Expected Timeframe: Ongoing; 2020-2024.

Implementation Action: HW-2

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

Theme: Thriving Habitats and Abundant Wildlife
Goal: 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 resiliency and function are maintained by protecting, restoring, and enhancing habitats.
Objective: 2-1a: To restore and enhance targeted habitat types.
Strategy: 2-1a1: Develop and implement innovative and effective habitat restoration plans and projects including restoring quality and quantity of coastal habitat and fish passage.

Project Description/Background: This action involves compiling and posting an annotated list of new or innovative restoration techniques to restore and enhance the extent and/or health of targeted habitats in the Long Island Sound Study (LISS) area. This will include methods for restoring or creating living shoreline habitat. The list will be assembled from the knowledge within the LISS Habitat Restoration & Stewardship Work Group and from reaching out to habitat restoration practitioners in the LISS area.

The list will include a short description of each technique, examples of where it was used, estimated cost, and contact information of the organization/project manager. The purpose of this action is to provide an easily accessible, comprehensive list of restoration techniques to habitat restoration practitioners in the Long Island Sound as a resource to draw on for new, innovative or ground tested practices that might apply to habitat restoration projects. In addition, this resource will help LISS and partners develop and implement effective habitat restoration projects and plans.

Cooperators and Partners: LISS Habitat Restoration & Stewardship Work Group.

Funding Sources: LISS program funds, Recovering America's Wildlife Act (if passed).

Funding Needs: $; list will be maintained, edited, updated as needed.

Expected Outputs:
- A regularly updated online annotated list of new and innovative restoration techniques to be shared with restoration practitioners in the LISS area

Performance Metric(s):
- The annotated list of habitat restoration techniques is developed and posted

Expected Timeframe: Ongoing; 2020-2024.

Implementation Action: HW-3

Complete projects that restore or maintain habitat connectivity (i.e., river miles reconnected and/or contiguous acres of coastal habitat protected or restored). Generate supporting GIS data to help measure extent of connectivity enhanced.

Theme: Thriving Habitats and Abundant Wildlife
Goal: 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 resiliency and function are maintained by protecting, restoring, and enhancing habitats.
Objective: 2-1a: To restore and enhance targeted habitat types.
Strategy: 2-1a1: Develop and implement innovative and effective habitat restoration plans and projects including restoring quality and quantity of coastal habitat and fish passage. 2-1a2: Restore and enhance connectivity of targeted habitat types. 1-1b2: Protect wetlands, healthy watersheds, riparian buffers, and open land to minimize land disturbance and impervious cover through land protection, sustainable development and green infrastructure.

Project Description/Background: This action will help to promote habitat restoration projects that restore or maintain habitat connectivity (either terrestrial or aquatic), including river miles reconnected or contiguous acres of coastal habitat protected in the LISS area. In order to accomplish this action, the priority lists of potential habitat restoration sites created from habitat connectivity models and metrics developed in HW-4 will be used to assist local and regional funding program administrators to prioritize and fund grant proposals in a similar manner. There has been progress made on implementing restoration at the top 5 priority sites for riverine migratory corridor reconnections (listed in Appendix D in the CCMP), and will continue implementation at those and other sites warranted.

In addition, this action will encourage the generation of GIS data for proposed and completed habitat restoration projects to document habitat connectivity and to demonstrate the need for additional restoration. These data and subsequent maps will be made available online for the use of the public, municipalities, habitat restoration practitioners, etc. to assist in grant applications for habitat restoration funding and assist in municipal resource allocation for habitat restoration, as well as to track progress. Generation of the data and maps will be completed by the Co-Chairs of the Habitat Restoration Work Group and Stewardship Work Group, with help from associated partners.

Cooperators and Partners: LISS Habitat Restoration & Stewardship Work Group, The Nature Conservancy, Connecticut Audubon Society, Audubon Connecticut, Audubon New York, NOAA, American Rivers, Save the Sound, CTDEEP, NYSDEC, NRCS, USFWS.

Funding Sources: LISS program funds, NRCS Environmental Quality Incentives Program, USFWS, Audubon Connecticut's In Lieu Fee Program, various for project design and implementation, Recovering America's Wildlife Act (if passed).

Funding Needs: $$–$$$/project

Expected Outputs:
- GIS data generated for potential and completed habitat restoration projects and made accessible to the public
- An online map displaying the habitat restoration projects (completed and proposed) that enhance habitat connectivity
- Letters to funding program administrators requesting that prioritization by habitat connectivity be added to their ranking criteria

Performance Metric(s):
- Number of prioritized restoration projects that have been completed
- Number of proposed or completed habitat restoration sites with GIS data generated and available
- Number of river miles reconnected
- Number of contiguous acres of coastal habitat protected or restored

Expected Timeframe: Ongoing; 2020-2024.

Implementation Action: HW-4

By 2024, agree upon an applicable habitat connectivity model and apply metrics for all restoration and protection projects.

Theme: Thriving Habitats and Abundant Wildlife
Goal: 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 resiliency and function are maintained by protecting, restoring, and enhancing habitats.
Objective: 2-1a: To restore and enhance targeted habitat types.
Strategy: 2-1a2: Restore and enhance connectivity of targeted habitat types. 2-1b1: Identify high-priority areas to protect using a repeatable, criteria-based process to minimize bias, supplemented by expert knowledge. 2-4a1: Support ecosystem science research such as habitat modeling and landscape design efforts to enhance protection of living terrestrial and aquatic resources.

Project Description/Background: Habitat connectivity can be as important to wildlife as habitat condition. If habitat areas are not of sufficient size or do not 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 that can be used to improve overall habitat function and value.

In order to promote habitat restoration and protection projects that restore or maintain habitat connectivity (either terrestrial or aquatic) in the LISS area, practitioners will need priority lists, models, maps and other metrics that identify potential, high-priority restoration and protection sites. Existing habitat connectivity data and models for regions in the northeast will be reviewed for use in the LISS area.

For this action, partners will agree upon an applicable habitat connectivity model and apply metrics to determine priority levels for habitat restoration and land protection (acquisition) projects. This effort will benefit the states of New York and Connecticut. From this habitat connectivity model and metrics, priority lists of potential habitat restoration and protection sites which will increase connectivity across the landscape will be created. These priority lists will be used in HW-3 to complete priority projects that result in habitat connectivity.

Cooperators and Partners: LISS Habitat Restoration & Stewardship Work Group, CTDEEP, NYSDEC.

Funding Sources: LISS program funds, USFWS grant program, Recovering America's Wildlife Act (if passed).

Funding Needs: $$

Expected Outputs:
- Potential habitat connectivity models are reviewed and discussed via the LISS HRSWG and its partners. A habitat connectivity model is chosen for use by LISS in order to track and prioritize connectivity.
- A list and map of prioritized sites for restoration and protection to increase habitat connectivity in LISS area
- GIS data layers for various coastal habitats from which connectivity can be assessed
- Recommendations for where to prioritize habitat restoration and land protection

Performance Metric(s):
- Maintained and enhanced connectivity
- Generation of lists that prioritize areas for land protection and restoration
- Restoration and acquisition of priority areas

Expected Timeframe: Discrete; 2020-2024.

Implementation Action: HW-5

Use remote sensing, mapping tools, modeling, and field verification to determine sites that are likely to be impacted by sea level rise, and which sites are ideal for habitat migration.

Theme: Thriving Habitats and Abundant Wildlife
Goal: 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 resiliency and function are maintained by protecting, restoring, and enhancing habitats.
Objective: 2-1b: To protect targeted habitat types through acquisition and other mechanisms.
Strategy: 2-1b1: Identify high-priority areas to protect using a repeatable, criteria-based process to minimize bias, supplemented by expert knowledge. 2-1c1: Identify and prioritize upland, wetland, 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 barriers to habitat migration). 2-4a1: Support ecosystem science research such as habitat modeling and landscape design efforts to enhance protection of living terrestrial and aquatic resources.

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. This action will use remote sensing, mapping tools, modeling, and field verification techniques to assist planning and implementation of restoration projects to improve resiliency. In addition, this action will enhance the effectiveness of targeted land acquisition that will allow for habitat migration. Monitoring and installation of Surface Elevation Tables will be included in this implementation action. All efforts will need to be conducted on a regular basis in order to reevaluate changes in SLR predictions and habitat changes.

Cooperators and Partners: USFWS, LISS HRSWG, TNC-Connecticut, TNC-New York, NYSERDA, NYC DPR, TNC-Connecticut, NYSDEC, University of Connecticut, Yale University, Audubon Connecticut, Audubon New York.

Funding Sources: Various funding sources connected to sources above, Recovering America's Wildlife Act (if passed).

Funding Needs: $$/project

Expected Outputs:
- Maps and list of sites impacted by SLR
- Maps and lists of sites that are ideal for habitat migration
- Monitoring strategy for SLR vulnerable habitats to detect what changes actually occur and at what rates
- Long-term monitoring sites identified (possibly using Stewardship Sites as Sentinel Monitoring Sites)
- Research directed toward the understanding of marine transgression processes and marsh response to sea level rise

Performance Metric(s):
- Number of sites assessed that are likely to be impacted by SLR
- Number of sites identified that are ideal for habitat migration
- Number of monitoring strategies, long-term monitoring sites identified
- Number of research projects initiated toward understanding processes

Expected Timeframe: Ongoing; 2020-2024.

Implementation Action: HW-6

Develop and apply standardized habitat quality metrics and assessment methodology across targeted habitat types.

Theme: Thriving Habitats and Abundant Wildlife
Goal: 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 resiliency and function are maintained by protecting, restoring, and enhancing habitats.
Objective: 2-1b: To protect targeted habitat types through acquisition and other mechanisms.
Strategy: 2-1b1: Identify high-priority areas to protect using a repeatable, criteria-based process to minimize bias, supplemented by expert knowledge. 2-1a1: Develop and implement innovative and effective habitat restoration plans and projects including restoring quality and quantity of coastal habitat and fish passage. 2-4a2: Inventory status and trends in quality, quantity, and distribution of priority habitats and species.

Project Description/Background: Ecologists working in the Long Island Sound coastal boundary must balance the 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 standardized habitat quality metrics and a repeatable criteria-based assessment methodology will allow managers and practitioners to better understand the condition of habitats and how they have changed over time. The LISS Habitat Restoration Initiative has targeted 12 coastal habitat types for restoration and each habitat type can have its own criteria for assessment. 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 and restoration activities. Partners across the Sound have been working on developing these standardized metrics and methodologies and they can be shared through the LISS HRSWG.

This IA will directly impact development of HW-7 and HW-23.

Cooperators and Partners: USFWS, LISS HRSWG, TNC-New York, NYSERDA, NYC DPR, CTDEEP, NYSDEC, other state, federal, and non-profit partners as expertise is needed.

Funding Sources: Various funding sources connected to organizations above, Recovering America's Wildlife Act (if passed).

Funding Needs: $$-$$$; Development of habitat quality metrics and assessment methodologies based on project size, application of metrics and methodology.

Expected Outputs:
- Consistent methods for evaluating habitat quality of targeted coastal habitats

Performance Metric(s):
- Number of adopted protocols for metrics and methodology across each targeted coastal habitat

Expected Timeframe: Ongoing; 2020-2024.

Implementation Action: HW-7

Use leading-edge design tools 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: 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 resiliency and function are maintained by protecting, restoring, and enhancing habitats.
Objective: 2-1b: To protect targeted habitat types through acquisition and other mechanisms.
Strategy: 2-1b1: Identify high-priority areas to protect using a repeatable, criteria-based process to minimize bias, supplemented by expert knowledge. 3-5a2: Improve access to Long Island Sound and its embayments, maintain and enhance view corridors and blueways, and enhance water-dependent uses.

Project Description/Background: Decision support tools, aiding in the identification and prioritization of candidate sites for stewardship purposes are essential to protecting ecologically important areas around Long Island Sound. This action will use existing tools, and new tools in development to help identify new priority coastal habitats in the LISS Area for possible designation as Stewardship Areas or Stewardship Sites.

These tools will 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 Areas or Sites most worthy of additional investment of LISS conservation resources. This action also involves using tools to help identify and prioritize Stewardship Sites for management plan development, which is essential for maintaining targeted habitat and targeted (listed) species, as well as for allowing long term planning and accountability to landowners.

Cooperators and Partners: LISS Habitat & Stewardship Work Group in collaboration with NYOPRHP, NYSDEC, USFWS.

Funding Sources: LISS program funds and additional funds through partner collaborators, Recovering America's Wildlife Act (if passed).

Funding Needs: $$

Expected Outputs:
- Prioritized list of sites or areas for possible nomination as Stewardship Areas or Stewardship Sites that can help best direct limited conservation resources
- Management plans created for identified and prioritized sites

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 Stewardship Site or Area landowners participating in the development of management plans for their properties

Expected Timeframe: Ongoing; 2020-2024.

Implementation Action: HW-8

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

Theme: Thriving Habitats and Abundant Wildlife
Goal: 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 resiliency and function are maintained by protecting, restoring, and enhancing habitats.
Objective: 2-1b: To protect targeted habitat types through acquisition and other mechanisms.
Strategy: 2-1b1: Identify high-priority areas to protect using a repeatable, criteria-based process to minimize bias, supplemented by expert knowledge. 2-4a2: Inventory status and trends in quality, quantity, and distribution of priority habitats and species.

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. This action will conduct an ecological assessment of land and water surrounding Long Island Sound Stewardship Sites and design green infrastructure/low impact development (GI/LID) pilot projects that minimize negative impacts from nitrogen and other pollutants and enhance beneficial ecosystem services of lands and waters within or surrounding the Sites and to ensure site preservation.

This action 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.

Designs for two GI/LID pilot projects have been completed at two Stewardship Sites. If future funding becomes available, there will be potential to choose other Stewardship Sites, based on the assessment, for design. Funding will also be needed for implementation of the two completed design projects.

Cooperators and Partners: LISS Habitat & Stewardship Work Group, Connecticut Audubon Society, NEIWPCC, state agencies and local municipalities.

Funding Sources: LISS program funds through NEIWPCC, LISFF, Recovering America's Wildlife Act (if passed).

Funding Needs: $–$$

Expected Outputs:
- Funding secured and designs for two Stewardship pilot Site(s) (one in New York and one in Connecticut) are implemented
- Conceptual designs for two more Stewardship Sites that include GI/LID conceptual designs and 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 LISS HRSWG 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 and number of people that attend the community meetings
- Number of GI/LID designs produced at Stewardship Sites
- Number of GI/LID projects implemented at Stewardship Sites

Expected Timeframe: Discrete; 2020-2024.

Implementation Action: HW-9

Equitably protect high-priority coastal habitat from development through property acquisition and other means, support sustainable use of these properties, without discouraging wildlife use, and create a registry of protected areas in Connecticut and New York, which encompasses both existing protected properties and future acquisitions.

Theme: Thriving Habitats and Abundant Wildlife
Goal: 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 resiliency and function are maintained by protecting, restoring, and enhancing habitats.
Objective: 2-1b: To protect targeted habitat types through acquisition and other mechanisms.
Strategy: 2-1b2: Conserve and enhance natural areas and open space to benefit ecosystem function and wildlife. 2-1b3: Conserve and enhance natural areas and open space to benefit public access, recreation, and shoreline and community protection.

Project Description/Background: Undeveloped coastal properties are becoming scarce and must be protected from development for wildlife and recreational use. Targeting and acquiring high-priority conservation properties (ex: Plum Island, NY; former Seaside Sanatorium in Waterford, CT) will minimize negative coastal development in the future. Additional high-priority sites would include properties abutting important natural resources and existing conservation areas (Nissequogue River Corridor, Wading River Assemblage, Shu Swamp Preserve, and Sunken Meadow State Park in New York; Lower Connecticut River, Niantic River and Bay, Barn Island Wildlife Management Area, and Hammonasset Beach State Park in Connecticut).

Connecticut state law sets a goal of conserving 21 percent of the state's land area (673,210 acres), with Connecticut's official land conservation plan establishing 2023 as the target date. That goal includes conservation land owned by towns and cities, land trusts and other nonprofit organizations, water utilities, and the State. New York State is currently working on the latest version of their New York Open Space Conservation Plan. The Plan serves as the blueprint for the State's land conservation efforts and is required by law to be revised every three years. The most recent version was released in 2016 (https://www.dec.ny.gov/lands/98720.html). In the Plan, open space is considered an area of land that is either publicly or privately owned that will remain in its natural state or is used for agriculture, free from intensive development for residential, commercial, industrial or institutional use. The Plan identifies conservation projects and objectives for all counties found within the Long Island Sound watershed. These projects and objectives were determined by Regional Advisory Committees composed of County, State, land conservation organizations, and community interest group representatives, along with public comments received through the Plan review process. This Plan will help guide land acquisition in New York State for the coming years.

The LISS has set goals for the protection of coastal lands. This action will work to equitably protect high-priority conservation land from development through property acquisition or other means, support sustainable uses of these properties in order to accommodate climate change and SLR, and create a registry of protected conservation land in Connecticut and New York, which encompasses both existing protected properties and future acquisitions. This action will also encourage and support research opportunities to assess opportunities for managed shoreline restoration and public access. There is a need for an accurate, complete inventory of protected land statewide in Connecticut and in the coastal area of Connecticut and New York to assess progress toward these goals.

Cooperators and Partners: Various—CTDEEP, NYSDEC, municipalities within LISS coastal area, USFWS, NRCS, water utilities, power utilities, Connecticut Audubon Society, TNC, and various other land trusts and nonprofit organizations.

Funding Sources: Various federal and state funding sources, NRCS Farm and Ranchlands Protection Program, USFWS, Audubon Connecticut's In Lieu Fee Program, Audubon IBA Small Matching Grants Program, Great American Outdoors Act, and possibly through private donations.

Funding Needs: $$$–$$$$

Expected Outputs:
- More land protected from development
- More land set aside strictly for wildlife use
- More land for shared wildlife and recreational use
- Larger contiguous parcels of protected lands

- Easily accessible database of protected lands

Performance Metric(s):
- Degree of completion of inventory database (registry) of protected conservation land
- Number of parcels and acres and acquired
- Number of acquired acres/parcels that increase connectivity with other protected parcels and targeted habitats
- Number or acquired acres/parcels that directly and significantly benefit priority/protected species

Expected Timeframe: Ongoing; 2020-2024.

Implementation Action: HW-10

Promote management practices that limit human disturbance and protect functional availability of coastal and marine habitats for Species of Greatest Conservation Need, including forage species and other wildlife.

Theme: Thriving Habitats and Abundant Wildlife
Goal: 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 resiliency and function are maintained by protecting, restoring, and enhancing habitats.
Objective: 2-1b: To protect targeted habitat types through acquisition and other mechanisms.
Strategy: 2-1b2: Conserve and enhance natural areas and open space to benefit ecosystem function and wildlife. 2-1b3: Conserve and enhance natural areas and open space to benefit public access, recreation, and shoreline and community protection. 2-3a2: Communicate the importance of ecosystem services to the public and municipal leaders. 3-3a1: Support the dissemination of the best practices to reduce contaminants, improve water quality, and protect habitats through professional development training and workshops.

Project Description/Background: The 12 targeted coastal habitat types found within the Long Island Sound provide resting, feeding, and breeding habitat for a variety of Species of Greatest Conservation Need (SGCN), forage species, and other wildlife. Restoration and protection of these habitat types are two steps to ensuring that these natural areas provide those ecosystem services. However, it is critical to promote and implement proper land management of these habitat types so that they provide the greatest benefits to SGCN, forage species, and other wildlife. These species can be negatively impacted by human disturbance. The implementation of best management practices on these lands can protect and enhance the population numbers of these essential species.

This Action relates to HW-9, HW-16, and HW-17.

Cooperators and Partners: Various—based on lead partner for projects, and/or property owner, Connecticut Audubon Society, Audubon Connecticut, Audubon New York, NYC DPR, New York and Connecticut State Parks, USFWS, New York and Connecticut municipalities, Connecticut Invasive Plant Working Group (CIPWG), New York Partnership for Regional Invasive Species Management (PRISMs), The Nature Conservancy, USFWS, NYSDEC, CTDEEP.

Funding Sources: Various federal and state (primarily) funding sources, local municipalities, LISS Program Funding—LISFF, Recovering America's Wildlife Act (if passed).

Funding Needs: $$–$$$

Expected Outputs:
- Targeted coastal habitats are managed to reduce human disturbance and support and enhance SGCN, forage species, and other wildlife

Performance Metric(s):
- Number of management plans that include management practices that protect and enhance populations of SGCN, forage species, and other wildlife
- Number of projects in targeted habitat types that limit human disturbance to benefit populations of SGCN, forage species, and other wildlife

Expected Timeframe: Ongoing; 2020-2024.

Implementation Action: HW-11

In lieu of hard armoring, develop and promote the use of living shoreline habitat protection methods (dunes, shorelines, coastal marshes) and standardized living shoreline monitoring protocols while considering the habitat needs of Species of Greatest Conservation Need, including forage species, and reducing wildlife conflicts.

Theme: Thriving Habitats and Abundant Wildlife
Goal: 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 resiliency and function 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: 2-1c1: Identify and prioritize upland, wetland, 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 barriers to habitat migration).

Project Description/Background: Living shorelines projects can include such activities as constructed/restored tidal wetlands and dunes, installation of reef balls or other small, low-height and low-impact stone walls, or any other combination softer (natural fiber logs/blankets) and harder materials (stones, wood), and may also include planting of native vegetation. These kinds of projects provide the storm protection and erosion control benefits without the permanent negative impacts associated with larger shoreline armoring alternatives such as seawalls and bulkheads. Hardened shorelines typically cause erosion on the waterward side, and oftentimes exacerbate storm damage to neighboring properties. Prior to 2012, the Connecticut statutes governing the coastal permitting process did not allow for a simplified permitting process to authorize living shorelines. As erosion-control structures, permit applications for lower-impact living shorelines projects were treated in the same manner as applications for seawalls, bulkheads, revetments, and other forms of high-impact, hard shoreline armoring. This classification made it difficult to authorize living shorelines without the applicant demonstrating a severe erosion problem or an imminent loss to dwellings on the property. The passage of Public Act 12-101 made it possible for coastal property owners to get authorization for living shorelines projects under a faster permitting track, and demonstration of project urgency is also no longer required. The result is a shorter delay before implementation when a living shoreline is recommended by conservation experts to protect coastal habitats from erosion, to the benefit of the wildlife supported by these habitats. In New York, as per the Community Risk and Resiliency Act (CRRA) legislation, the state has developed guidance on the use of resiliency measures that utilize natural resources and natural processes to reduce risk. It is essential that partners work together to determine monitoring protocols (biological and otherwise) for all types of living shoreline projects in order to evaluate project success and failure. This action will promote permitting strategies and regulations in New York that encourage the use of living shoreline habitat protection methods (dunes, coastal marshes), in lieu of hard armoring. This action will also work to develop standardized living shoreline monitoring protocols, while considering the habitat needs of Species of Greatest Conservation Need, including forage species, for both Connecticut and New York.

Cooperators and Partners: CTDEEP, NYSDEC, NYSDOS, USFWS, NYCDPR, Connecticut Audubon Society, municipalities within LISS coastal area, various other private waterfront property owners.

Funding Sources: Various federal (primarily) funding sources; state, municipal, and private funds to a more limited extent.

Funding Needs: $$–$$$$

Expected Outputs:
- Coastal habitats are protected from erosion and buffered against storm damage
- Permitting strategies that require/encourage the use of living shorelines for habitat protection and enhancement (NY)
- Changes in the regulations that allow for the installation of innovative living shoreline techniques (NY)
- Monitoring protocols developed

Performance Metric(s):
- Decrease in the rate of loss/erosion of coastal habitats
- Increase in aerial extent of coastal habitats that are protected by living shorelines
- Number and variety of living shorelines implemented
- Number of living shoreline monitoring protocols developed

Expected Timeframe: Ongoing; 2020-2024.

Implementation Action: HW-12

Promote the conversion of existing armored shorelines (seawalls, riprap, bulkheads, etc.) to softer, nature-based living shorelines to enhance habitat and habitat connectivity.

Theme: Thriving Habitats and Abundant Wildlife
Goal: 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 resiliency and function 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: 2-1c1: Identify and prioritize upland, wetland, 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 barriers to habitat migration).

Project Description/Background: Similar to HW-11, this action will encourage the use of living shorelines, but this action will succeed by promoting the conversion of existing armored shorelines (seawalls, riprap, bulkheads, etc.) to softer, nature-based living shorelines to enhance habitat and habitat connectivity. The passage of Public Act 12-101 made it possible for coastal property owners to get authorization for living shorelines projects under a faster permitting track and it stipulates "off-site removal of existing shoreline flood and erosion control structures" as a "reasonable mitigation" measure for the construction of any new flood and erosion control structure. Such a regulatory framework provides the opportunity to establish living shorelines at sites where armored shorelines currently exist. In New York, as per the Community Risk and Resiliency Act (CRRA) legislation, the state has developed guidance on the use of resiliency measures that utilize natural resources and natural processes to reduce risk. A shoreline assessment in both CT and NY would support this effort, along with a prioritization tool that assists landowners in identifying the appropriate nature-based shoreline technique for their properties.

Cooperators and Partners: CTDEEP, NYSDEC, NYSDOS, Connecticut Audubon Society, municipalities within LISS coastal area, various other private waterfront property owners.

Funding Sources: Various federal (primarily) funding sources; state, municipal, and private funds to a more limited extent.

Funding Needs: $$–$$$$

Expected Outputs:
- Developed coastal properties are protected from erosion and buffered against storm damage
- Permitting strategies that require/encourage the use of living shorelines for habitat protection and enhancement (NY)
- Changes in the regulations that allow for the installation of innovative living shoreline techniques (NY)
- Shoreline assessment(s) in NY and CT that identifies current shoreline armoring and natural structures
- Prioritization tool that assists landowners in identifying the correct options for nature-based features in Long Island Sound

Performance Metric(s):
- Decrease in overall length of armored shoreline
- Decrease in the number of developed coastal properties with an armored shoreline
- Decrease in the rate of loss erosion of the shoreline along developed coastal properties
- Increase in the use of living shorelines to protect developed coastal properties

Expected Timeframe: Ongoing; 2020-2024.

Implementation Action: HW-13

Promote directed volunteer-driven invasive species reconnaissance and removal work.

Theme: Thriving Habitats and Abundant Wildlife
Goal: 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 other wildlife.
Objective: 2-2a: To manage invasive species.
Strategy: 2-2a1: Develop volunteer stewardship programs to manage invasive species to ensure habitats are healthy and include representative plant and animal species. 2-2a2: Teach and promote measures that will help to prevent the introduction and spread of invasive biota in Long Island Sound and connected upland areas. . 2-2d1: Promote projects that protect and restore biological and ecological diversity. 3-1c1: Involve the public in the cleanup and restoration of Long Island Sound through volunteerism and community action. 3-2b2: Engage youth in stewardship opportunities

Project Description/Background: Invasive species are detrimental to targeted habitat in Long Island Sound. These species can disrupt ecosystem balance, reduce native diversity, and form monocultures within habitats. In order to manage invasive species, it is essential to determine the distribution and magnitude of invasion of these species (reconnaissance work), remove them from these locations, and create a network of volunteers, under the direction of land managers and restoration practitioners, to involve in species removal and long term management at these sites. Some of these volunteers may be from traditionally underrepresented groups as an element of Environmental Justice. Through this action volunteers will be trained by the various groups responsible for property management around Long Island Sound to identify and remove invasive biota. It is essential, for this work, to prioritize the focus on early invaders through early detection in order to prevent the spread of these species through rapid response.

Cooperators and Partners: Various—based on lead partner for projects, and/or property owner; water quality monitoring groups, Connecticut Audubon Society, Audubon Connecticut, Audubon New York, NYC DPR, New York and Connecticut State Parks, USFWS, New York and Connecticut municipalities, Connecticut Invasive Plant Working Group (CIPWG), New York Partnership for Regional Invasive Species Management (PRISMs), Long Island-Metro Aquatic Invasive Species Task Force.

Funding Sources: Audubon Connecticut's In Lieu Fee Program, Audubon IBA Small Matching Grants Program, various federal and state (primarily) funding sources, Recovering America's Wildlife Act (if passed).

Funding Needs: $$/year to pay for various programs.

Expected Outputs:
- A list and/or map of locations and distribution of invasive species in priority sites
- Active removal of invasive species
- Creation of a network of volunteers to manage these locations

Performance Metric(s):
- Number of funding sources identified for invasive species reconnaissance work, removal, and volunteer coordination in priority sites
- Completed lists and/or maps indicating invasive species distribution
- Acres under invasive species management in priority site
- Number of invasive species removal projects in targeted habitats
- Number of volunteers involved in the management of invasive species in targeted habitats

Expected Timeframe: Ongoing; 2020-2024.

Implementation Action: HW-14

Develop and implement invasive/non-native species management plans for priority terrestrial and aquatic sites.

Theme: Thriving Habitats and Abundant Wildlife
Goal: 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 other wildlife.
Objective: 2-2a: To manage invasive species.
Strategy: 2-2a2: Teach and promote measures that will help to prevent the introduction and spread of invasive biota in Long Island Sound and connected upland areas. 2-2d1: Promote projects that protect and restore biological and ecological diversity.

Project Description/Background: Invasive species can be detrimental to the ecological integrity of priority terrestrial and aquatic habitats. It is essential to develop and promote widespread use plans and practices that will assist various groups (landowners, site managers) around Long Island Sound in preventing the inadvertent movement or introduction of invasive species. A primary focus of this action will be creation and implementation of invasive species management plans for targeted terrestrial and aquatic habitats across Long Island Sound. Invasive species management plans should include regular assessments of whether the management efforts are having an impact on the species and re-evaluate whether to continue the designated practice. Plans should state clear goals and provide information on potential ecosystem services of target species.

This action will also include training on how to apply Hazard Analysis and Critical Control Point (HACCP) to field work and how to develop BMPs, along with information on how to promote the widespread use of BMPs or HACCP plans.

Cooperators and Partners: LISS-Habitat & Stewardship Work Group, Connecticut Audubon Society, New York Sea Grant, Connecticut Sea Grant, USFWS, NRCS.

Funding Sources: Various federal and state (primarily) funding sources, local municipalities, LISS Communications and Outreach team, LISS Program Funding—LISFF, Recovering America's Wildlife Act (if passed).

Funding Needs: $$—total for five years. $$—seasonal staff costs for two years to promote work.

Expected Outputs:
- Development and implementation of invasive species management plans for targeted habitats across Long Island Sound
- A list of BMPs and HACCP plans distributed in an informational pamphlet and available on LISS website
- Outreach Plan to provide this information to target audiences
- Training in how to apply HACCP to field work and develop plans or BMPs to minimize risk of introducing or spreading invasive species between sites

Performance Metric(s):
- Number of invasive species management plans developed for targeted habitats or priority sites
- Number of invasive species management plans implemented for targeted habitats or priority sites
- Number of training sessions held
- Number of individuals or entities trained
- Number of BMPS included in management plans

Expected Timeframe: Ongoing; 2020-2024.

Implementation Action: HW-15

Assess adequacy of current legislation and programs that target prevention, spread, and removal of invasive/non-native species.

Theme: Thriving Habitats and Abundant Wildlife
Goal: 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 other wildlife.
Objective: 2-2a: To manage invasive species.
Strategy: 2-2a2: Teach and promote measures that will help to prevent the introduction and spread of invasive biota in Long Island Sound and connected upland areas. 2-2d1: Promote projects that protect and restore biological and ecological diversity.

Project Description/Background: Invasive species are detrimental to targeted 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 Long Island Sound this action will establish new, effective legislation and regulations that target preventing the introduction, spread, and removal of invasive species within and across Long Island Sound. This action will also include educating target audiences about new legislation and regulations through new programs must follow their establishment. Although legislation and regulations do currently exist (i.e., NYS 6 NYCRR Part 575 Prohibited and Regulated Invasive Species), it is essential to review the existing legislation, regulations, and policies to ascertain whether there are revisions needed and determine how well they are being enforced. It is also necessary to review what legislation and regulations exist in other neighboring states through the Northeast Aquatic Nuisance Species Panels (and Mid-Atlantic Panels) to see about compatibility.

Cooperators and Partners: CTDEEP, NYSDEC, Save the Sound, CAC, LISS Communications Team, New York Sea Grant, Connecticut Sea Grant, Connecticut Audubon Society, Connecticut Invasive Plant Working Group (CIPWG), New York Partnership for Regional Invasive Species Management (PRISMs), Long Island-Metro Aquatic Invasive Species Task Force.

Funding Sources: Various federal and state (primarily) funding sources.

Funding Needs: $$; various partner operating budgets and staff salaries.

Expected Outputs:
- New legislation is passed, resulting in new regulations that target the prevention of introduction and minimization of the spread of invasive species
- Existing and new regulations are effectively enforced in stopping the introduction and spread of invasive species
- The public is educated regarding the new and existing legislation and regulation

Performance Metric(s):
- Number of legislations passed resulting in regulations that are enforced
- Number of species targeted under new legislation and regulations
- Number of enforcement actions
- Number of programs educating the public regarding the new legislation and regulations

Expected Timeframe: Discrete; 2020-2024.

Implementation Action: HW-16

Collect and analyze data on, and restore habitat for, Species of Greatest Conservation Need, including forage species.

Theme: Thriving Habitats and Abundant Wildlife
Goal: 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 other wildlife.
Objective: 2-2b: To manage state and federal listed species and species whose Long Island Sound population is regionally or globally important.
Strategy: 2-2b1: Prioritize habitat restoration projects for targeted and Trust species.

Project Description/Background: Data is needed to help manage Species of Greatest Conservation Need (SGCN) and forage species (species that key to the survival and abundance of SGCN rely). This action will collect this data and work to restore habitat for SGCN and forage species. All of these 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 as well as provide a better understanding of true threats to these species. Often, the reason that SGCN and forage 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 SGCN and forage species rely on for survival. Habitat restoration projects that target priority SGCN will receive higher priority when applying for funding.

Cooperators and Partners: The Nature Conservancy, USFWS, NYSOPRHP, NYC Parks, Connecticut Audubon Society, Audubon Connecticut, Audubon New York, New York City Audubon, Cornell Cooperative Extension, NYC DPR, CTDEEP, NYSDEC, USFWS.

Funding Sources: Various federal and state (primarily) funding sources, Recovering America's Wildlife Act (if passed).

Funding Needs: $$$—total for five years. $$—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 SGCN and forage species
- Habitat restoration projects are completed to support SGCN and forage species
- SGCN and forage species make use of the newly restored habitat
- Development management strategies (including climate adaptation strategies) for key species

Performance Metric(s):
- Number of SGCN and forage species within Long Island Sound watershed
- Number of individuals found within a population for SGCN and forage species found in Long Island Sound watershed
- List of locations (distribution) of SGCN and forage species within Long Island Sound watershed
- Number of habitat restoration projects completed to support SGCN and forage species
- Number and variety of SGCN and forage species recorded using these restored habitats

Expected Timeframe: Ongoing; 2020-2024.

Implementation Action: HW-17

Reduce and manage threats to populations of Species of Greatest Conservation Need, including forage species.

Theme: Thriving Habitats and Abundant Wildlife
Goal: 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 other wildlife.
Objective: 2-2b: To manage state and federal listed species and species whose Long Island Sound population is regionally or globally important.
Strategy: 2-2b2: Manage habitat threats (e.g., climate-change driven threats and predator-prey relationships) to targeted and Trust species. 2-4a3: Identify surrogate/representative species for long-term monitoring to evaluate ecosystem health. 3-1a1: Encourage opportunities to enjoy Long Island Sound through activities such as fishing, swimming, and bird watching.

Project Description/Background: Habitat restoration is an important tool to reduce and manage threats to populations of Species of Greatest Conservation Need (SGCN), but there are other needs such as decreasing human disturbance and conducting effective predator management that must be met. Long Island Sound supports a considerable number of SGCN, including Piping Plovers, a species that in recent years has shown significant declines on Long Island. Every effort must be put forth to counter these trends in piping plovers, seabeach sandwort, marsh pink, yellow thistle, black skimmers, Roseate terns, least terns, saltmarsh sparrow, American oystercatcher, and other species, and to reach recovery goals. This action will support research and management of climate change driven threats (SLR, ocean acidification, etc.) to SGCN, as well as predator-prey relationships. For fish species, the Ecosystem Based Fisheries Management Plan should be taken into consideration for the next five years.

Cooperators and Partners: Audubon Connecticut, Audubon New York, NYC Audubon, Connecticut Audubon Society, NYSDEC, CTDEEP, USFWS.

Funding Sources: Audubon, LISS Program Budget-LISFF/Research Grant, USFWS, NOAA Species Recovery Grants to States, Recovering America's Wildlife Act (if passed).

Funding Needs: $$—total for five years to support research, management, and monitoring in New York and Connecticut.

Expected Outputs:
- Creation of 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 management plans and research projects 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 management efforts initiated
- Population trends for targeted SGCN species

Expected Timeframe: Ongoing; 2020-2024.

Implementation Action: HW-18

Develop a shellfish management plan for aquaculture, recreation, and restoration that ensures sustainable marine populations.

Theme: Thriving Habitats and Abundant Wildlife
Goal: 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 other wildlife.
Objective: 2-2c: To manage and restore populations of harvested species.
Strategy: 2-2c1: Create or update species management plans for commercially and recreationally important species.

Project Description/Background: This action will work to develop a statewide plan (one for NY and one for CT) 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 help protect and enhance Long Island Sound's natural shellfish habitat and ecosystem services, as well as promote recreational shellfishing, aquaculture viability and sustainable harvests. The development of the statewide plans will be a public process that will require several public meetings to obtain the concerns and interests of the public. This effort will be led by State Sea Grant programs along with state regulatory agencies.

Cooperators and Partners: Connecticut Sea Grant, New York Sea Grant, aquaculturists, UCONN, TNC, NOAA, USDA, USACE, USFWS, CTDOA Bureau of Aquaculture, CTDEEP, NYSDEC.

Funding Sources: Various federal and state (primarily) funding sources.

Funding Needs: $$–$$$; dependent upon scope of the plans.

Expected Outputs:
- Completion of a CT statewide plan and a NY statewide plan
- Section of plans devoted to restoration of shellfish reefs as habitat, including benefits to aquaculture industry from the restoration of such reefs. The recently completed Natural Shellfish Beds chapter of the LISS Habitat Restoration Manual may qualify as the habitat restoration section of the plans.

Performance Metric(s): N/A

Expected Timeframe: Discrete; 2020-2024.

Implementation Action: HW-19

Update and implement Connecticut and New York State Wildlife Action Plans as they pertain to Long Island Sound, and continue to update or draft new site-specific management plans as needed.

Theme: Thriving Habitats and Abundant Wildlife
Goal: 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 other wildlife.
Objective: 2-2d: To maintain or improve diverse/resilient communities of native fish, birds, and other wildlife.
Strategy: 2-2d1: Promote projects that protect and restore biological and ecological diversity.

Project Description/Background: This action will work to update the state-wide Wildlife Action Plan for both New York and Connecticut, and implement portions as they pertain to LIS. Secondarily, update and draft new site-specific wildlife management plans for both public and private lands that are held for conservation purposes. These plans will assist in conservation efforts for, among other topics, state and federally listed species such as saltmarsh sharp-tailed sparrow, piping plover, least tern, roseate tern, and many more. The plans will include species-specific goals and targets for (as applicable) population sizes, species range, nesting areas, number of nests, number of fledglings, and other statistics.

Cooperators and Partners: NYSDEC, CTDEEP, USFWS, municipalities, local land trusts and other private conservation groups including Audubon Connecticut, Connecticut Audubon Society, and The Nature Conservancy.

Funding Sources: Various federal and state (primarily) funding sources, Recovering America's Wildlife Act (if passed).

Funding Needs: $–$$ for site-specific Wildlife Management Plans; $$–$$$ for statewide Wildlife Action Plans.

Expected Outputs:
- Updated New York State Wildlife Action Plan
- Updated Connecticut Wildlife Action Plan
- New and/or updated Management Plans for site-specific areas (state forests, state parks, nature preserves, wildlife management areas, etc.)

Performance Metric(s):
- Number of management plans completed and in-progress
- Implementation of one or more elements of some of these new and updated plans

Expected Timeframe: Discrete; 2020-2024.

Implementation Action: HW-20

Develop and support programs to engage landowners in understanding the importance of habitat protection and management methods and in implementing them on their properties.

Theme:	Thriving Habitats and Abundant Wildlife
Goal:	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 educate and engage the public, particularly in urban areas, in both large and small-scale habitat restoration projects, research, monitoring, management, and stewardship associated with targeted habitat types and living resources.
Strategy:	2-3a1: Promote the creation of educational and outreach programs tailored for multiple user groups. 2-3a2: Communicate the importance of ecosystem services to the public and municipal leaders. 3-1a3: Connect/reconnect urban populations, including underserved and non-English language communities, to the Sound.

Project Description/Background: This action will work to develop and support programs to engage landowners in understanding the importance of habitat protection and management methods and in implementing them on their properties. Programs will highlight native plant species, discouragement of invasive/non-native plant species, erosion, and proper disposal of pollutants (pesticides, paint, cleaners, pharmaceuticals, etc.). Educational material will be developed and distributed to the public both online and in print. Examples of these types of programs are already in place in some locations (i.e., Audubon Connecticut's Urban Oases Program) but there is need to expand these programs and add more/variety of programs for landowners within the Long Island Sound area.

Cooperators and Partners: Various—based on lead partner for projects, and/or property owner; municipalities, water quality monitoring groups (state and local), LISS Communications, Connecticut Audubon Society, Audubon Connecticut, Connecticut Sea Grant, New York Sea Grant, Citizens Campaign for the Environment, USFWS.

Funding Sources: LISS program funds—LISFF, USFWS—partial through the Urban Wildlife Refuge Initiative and other Coastal Program projects, various federal and state (primarily) funding sources.

Funding Needs: $$$; over five 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 informational sessions held on this topic sponsored by watershed groups, municipalities, etc.
- Number of homeowners and municipalities utilizing this information on private property
- Number of states/towns utilizing this info on public land

Expected Timeframe: Ongoing; 2020-2024.

Implementation Action: HW-21

Support inclusive participation of communities and stakeholders in the design and implementation of the Long Island Sound National Estuarine Research Reserve management plan and reserve education and research programs.

Theme:	Thriving Habitats and Abundant Wildlife
Goal:	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 educate and engage the public, particularly in urban areas, in both large and small-scale habitat restoration projects, research, monitoring, management, and stewardship associated with targeted habitat types and living resources.
Strategy:	2-3a1: Promote the creation of educational and outreach programs tailored for multiple user groups. 2-3a2: Communicate the importance of ecosystem services to the public and municipal leaders. 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: The State of Connecticut and NOAA are instituting an effort to designate a National Estuarine Research Reserve (NERR). The designation effort is being led by Connecticut's Department of Energy and Environmental Protection's (CTDEEP) Land and Water Resources Division (LWRD) in partnership with the UConn Department of Marine Science, Connecticut Sea Grant, and Connecticut Audubon Society. LWRD convened a team of experts to complete an assessment of coastal area lands and waters to select areas to include in the proposed Reserve. Public information meetings were held to present information and solicit input. NOAA has concurred with the proposed selection, and now the State, with assistance from NOAA, is moving through the next steps in the process, which include developing a Draft and Final Environmental Impact Statements (EIS), which will also include a Reserve Management Plan. Once the Final EIS process is complete and approved by NOAA, the Reserve designation will be finalized. UConn will transition to be the state lead, in partnership with NOAA and various state-level organization such as CTDEEP and others as needed. A critical component to this process is the Management Plan, which is designed to guide the operational aspect of the Reserve. This will require input and guidance from the public and key stakeholders to help develop the goals and strategies the Reserve will address, as well as the research, education, and training program needs and outcomes. Similar to the selection effort, this will require an inclusive and transparent process to ensure the needs of the state and coastal communities are best addressed in both the design and implementation of Reserve functions.

Cooperators and Partners: CTDEEP's Land and Water Resources Division, University of Connecticut's Marine Sciences Department, Connecticut Audubon Society, Connecticut Sea Grant; other sources.

Funding Sources: NOAA, CT DEEP, University of Connecticut, LISS program funds.

Funding Needs: $$

Expected Outputs:

- Pre-Designation: Workshops/meetings hosted by the State leads to solicit input from stakeholders to inform the Reserve goals, strategies, and areas of focus required to develop the Reserve management plan
- Post-Designation: Public outreach events that will educate the public regarding the importance of the Research Reserve and its estuarine ecology and attract volunteers and/or attendance for Reserve research, monitoring, or education/training programs
- Post-Designation: Programming (workshops, meetings, curriculum, etc.) to support the education of K-12 science teachers in estuarine science, monitoring, and stewardship
- Post-Designation: Creation of signage, displays, or other similar items within the Reserve to help promote estuarine science and education
- Development of a Reserve Management Plan

Performance Metric(s):

- Number of workshops held to support management planning efforts
- Number of outreach events that educate public on the Research Reserve and estuarine ecology
- Number of volunteers/attendees in the Reserve education/training programs
- Number of programming events that support teacher-based education in estuarine science
- Number of attendees for teacher-based programming events

- Number of signs, displays, or similar items deployed within the Reserve to help promote estuarine science and education

Expected Timeframe: Ongoing; 2020-2024.

Implementation Action: HW-22

Engage local communities in design, development, implementation, and promotion of habitat restoration, stewardship and monitoring projects.

Theme: Thriving Habitats and Abundant Wildlife
Goal: 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: 2-3b: To instill a sense of stewardship by increasing people's awareness of and visitation to targeted habitats and LISS Stewardship Sites.
Strategy: 2-3b1: Enhance and promote innovative and relevant ways of connecting people to Stewardship Sites. 2-3a1: Promote the creation of educational and outreach programs tailored for multiple user groups. 2-3a2: Communicate the importance of ecosystem services to the public and municipal leaders. 3-1a3: Connect/reconnect urban populations, including underserved and non-English language communities, to the Sound. 3-1c1: Involve the public in the cleanup and restoration of Long Island Sound through volunteerism and community action. 3-2b2: Engage youth in stewardship opportunities.

Project Description/Background: Community scientists can assist researchers and practitioners with biological monitoring and habitat restoration projects. With proper training, community 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. Additionally, to get the public to feel engaged and develop a sense of stewardship regarding the environment and their local natural area, it is important to involve communities in hands-on activities at habitat restoration sites. This action will work to engage local communities in design, development, implementation, and promotion of habitat restoration, stewardship, and monitoring projects. Communities can be involved in several project components, such as implementation (planting), maintenance (invasive species removal, watering), and 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 urban area communities, it is essential to conduct outreach within the neighborhood, with assistance from established local organizations (i.e., environmental justice, religious group, non-profits, etc.). Existing programs include the New Haven Harbor Watershed Urban Refuge Partnership and Audubon Connecticut Coastal Bird Program.

Cooperators and Partners: New York Sea Grant, Connecticut Sea Grant, NYS Parks, LISS Habitat & Stewardship Work Group and Communications Team, NRCS, TNC, NYCDPR, Connecticut Audubon Society, Audubon Connecticut, Audubon New York, NYC Audubon, USFWS, NGOs.

Funding Sources: Various funding sources; NRCS Environmental Quality Incentives Program with development and implementation of Forest Management Plans, USFWS—partial through the Urban Wildlife Refuge Initiative, Audubon IBA Small Matching Grants Program.

Funding Needs: $$$ over five years

Expected Outputs:
- Using appropriate monitoring protocols, trained community scientists that are capable of collecting scientifically based data during monitoring efforts (i.e., water quality, invasive species removal, alewife surveys, avian studies, etc.)
- Events/workshops hosted by researchers and/or practitioners for community scientists to collect scientifically based 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 community scientists trained to collect scientifically based data during monitoring efforts
- Number of events/workshops that promote and educate the public on community science-based data collection
- Number of sites around the Long Island Sound monitored by community scientists
- Number of volunteer projects developed that are linked to habitat restoration projects
- Number of volunteers participating in habitat restoration project activities

Expected Timeframe: Ongoing; 2020-2024.

Implementation Action: HW-23

Collect and analyze data on LISS 12 targeted coastal habitat types in order to improve habitat assessment and adaptive management.

Theme: Thriving Habitats and Abundant Wildlife
Goal: 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: 2-4a1: Support ecosystem science research such as habitat modeling and landscape design efforts to enhance protection of living terrestrial and aquatic resources. 2-4a2: Inventory status and trends in quality, quantity, and distribution of priority habitats and species.

Project Description/Background: This action involves the collection and analysis of sound biological data that will improve habitat assessment and adaptive management throughout Long Island Sound. Once the work outlined in HW-6 is complete, LISS and partners will promote, fund, and assist with data collection that will allow us to improve habitat assessment, including vulnerabilities to climate change. As part of this action, cooperators will also promote data collection to understand and address habitat changes and overall ecosystem health. Partners will agree upon appropriate monitoring protocols for each habitat type. This information is vital to site managers to help guide adaptive management plans. LISS will also work with local and regional funding program administrators to prioritize grant proposals that include biological data collection that will address these issues. Aside from this partnership effort, LISS will also support other efforts that assess critical habitat. An example of targeted habitat assessment is a focus on updated tidal wetland trends now and into the Suffolk, Nassau, Queens, Bronx, and Westchester County areas. All of these efforts will support an increase in knowledge of habitat quality around LIS.

Cooperators and Partners: USFWS, TNC-NY, NYSERDA, NYC DPR, CTDEEP, NYSDEC, Audubon Connecticut, Connecticut Audubon Society, other state, federal, and non-profit partners as expertise is needed.

Funding Sources: Various funding sources connected to organizations above, Recovering America's Wildlife Act (if passed).

Funding Needs: $$; new tool development; total costs depend on how many tools are developed.

Expected Outputs:
- Consistent way to evaluate 12 targeted coastal habitats using an agreed upon monitoring protocol
- Document to teach others how to apply this method going forward

Performance Metric(s):
- Successful evaluation of 12 targeted coastal habitat quality

Expected Timeframe: Ongoing; 2020-2024.

Implementation Action: HW-24

Explore adding new coastal habitat types to the 12 currently targeted for restoration.

Theme: Thriving Habitats and Abundant Wildlife
Goal: 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, collaboration, and distribution of useful habitat and living resource data.
Strategy: 2-4a2: Inventory status and trends in quality, quantity, and distribution of priority habitats and species.

Project Description/Background: Currently, the LISS Habitat Restoration Initiative targets 12 coastal habitat types (LISS Habitat Restoration Initiative target habitats can be found here: https://longislandsoundstudy.net/our-vision-and-plan/thriving-habitats-and-abundant-wildlife/habitat-and-stewardship-initiatives/). This action will explore adding new coastal habitat types for possible inclusion on this list. A habitat type is targeted for restoration and protection if it particularly important in sustaining living resources and it can be restored through active management. As part of this action, the Habitat Restoration & Stewardship Work Group will also revisit and update the 12 coastal habitat types.

Cooperators and Partners: Various: Cornell Cooperative Extension, NOAA, LDEO, SUNY SB, UCONN, URI, UNH, USGS, CTDEEP, NYSDEC; LISS HRSWG, and Connecticut Audubon Society.

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

Funding Needs: $$$$—existing/ongoing research through Long Island Sound Cable Fund; Project (Phase One); $$$$—for additional Long Island Sound Cable Fund Phases and for more in-depth research around Long Island Sound by other projects.

Expected Outputs:
- Data collected on the various coastal habitat in Long Island Sound
- Additional chapter(s) in LISS Habitat Restoration Manual created as needed
- Updated report on the targeted coastal habitat types of LIS

Performance Metric(s):
- Number of new habitats assessed
- Number of new habitats included into the LISS targeted coastal habitat list
- LISS HRSWG report on targeted coastal habitat types

Expected Timeframe: Ongoing; 2020-2024.

Implementation Action: HW-25

Continue Long Island Sound eelgrass abundance surveys and promote eelgrass management.

Theme: Thriving Habitats and Abundant Wildlife
Goal: 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, collaboration, and distribution of useful habitat and living resource data.
Strategy: 2-4a2: Inventory status and trends in quality, quantity, and distribution of priority habitats and species.

Project Description/Background: Eelgrass habitat provides food and nesting grounds for fish, and food for many migratory birds. Eelgrass beds abundance indicates good water quality and good habitat for aquatic life, and acceptable levels of nutrients. Excessive levels of nutrients such as nitrogen and phosphorous can stimulate the overgrowth of phytoplankton (algal) blooms that could block the energy from the sunlight that eelgrass needs to grow. The LISS has several years of eelgrass data from aerial surveys that date back to 2002. These surveys were undertaken about every 3 years, in which the last survey was conducted in 2017, and gave LISS reliable eelgrass abundance and distribution data. Eelgrass surveys should be continued into the future so that the baseline dataset can be expanded upon and so that trends in eelgrass populations can be more reliably evaluated. Field verification should be combined with the aerial surveys. All data collected to date and in the future should be subjected to a trends analysis to review declines and increases in embayments vs open water areas. With support from 2020 funds, we funded an interagency agreement with NEIWPCC to conduct a 2021 Long Island Sound Eelgrass Mapping and Change Analysis project, with the ultimate goal to achieve the Eelgrass Extent Ecosystem Target, which is to restore and maintain an additional 2,000 acres of eelgrass by 2034 from a 2012 baseline of 1,893.

Cooperators and Partners: LISS Habitat Restoration& Stewardship Work Group, USFWS, NYSDEC, ASMFC, CTDEEP, Cornell Cooperative Extension, University of Connecticut, USGS, NOAA, NEIWPCC.

Funding Sources: Various federal (primarily) funding sources.

Funding Needs: $$/survey; $$ salary per year for seagrass manager.

Expected Outputs:
- Eelgrass survey report, along with field verification, that highlights the locations and extent of eelgrass beds in Long Island Sound
- Management plans for LISS New York partners
- Research needs, monitoring recommendations, and projects identified
- Trend analysis for eelgrass highlighting areas of recovery, declines, the success of funded restoration projects

Performance Metric(s):
- Number of maps and aerial photos indicating the location and extent of eelgrass beds in Long Island Sound
- Number of management plans for New York partners
- Number of research projects identified
- Number of restoration projects implemented

Expected Timeframe: Ongoing; 2020-2024.

Implementation Action: HW-26

Determine whether monitoring of surrogate species, including those of high conservation priority, is a cost-effective way to track habitat restoration

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Theme: Thriving Habitats and Abundant Wildlife
Goal: 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, collaboration, and distribution of useful habitat and living resource data.
Strategy: 2-4a3: Identify surrogate/representative species for long-term monitoring to evaluate ecosystem health.

Project Description/Background: This action will determine whether monitoring of surrogate species, including species of high conservation priority, is a cost-effective way to track habitat restoration. More can be done by placing a specific emphasis on surrogate species identification and health in the LISS Area. This action also supports species-based targets set by the States or Federal government and implemented by these and other partners like Audubon and The Nature Conservancy (TNC). When merited rather than using a solely habitats focused approach to restoration this action promotes the use of a species-based approach, such as using surrogate species or numbers of nesting pairs to determine the health of species, representative species, or associated habitat.

Cooperators and Partners: USFWS, TNC, NYSDEC, CTDEEP, Save the Sound, Audubon Connecticut, Audubon New York, Cornell University, University of Connecticut, other state, federal, and non-profit partners as expertise is needed.

Funding Sources: Various funding sources connected to organizations above.

Funding Needs: $$; species monitoring, tracking.

Expected Outputs:
- Consistent way to understand and use surrogate species in the LISS Area
- Support and tracking of population numbers for species like the yellow thistle, alewife, piping plover, Roseate tern, etc.

Performance Metric(s):
- Successful meeting of surrogate species and other species-based targets

Expected Timeframe: Discrete; 2020-2024.

Implementation Action: HW-27

Assess causes and extent of tidal marsh change through research and monitoring and use this information to create a model to prioritize sites for restoration and conservation.

Theme: Thriving Habitats and Abundant Wildlife
Goal: 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, collaboration, and distribution of useful habitat and living resource data.
Strategy: 2-4a4: Identify water quality conditions necessary to support priority habitats and use suitability models to evaluate appropriate restoration priorities through pollution controls. 4-1a1: Identify and support science activities needed to transparently link outcomes and objectives to strategies and actions, setting priorities based on management relevance and scientific merits.

Project Description/Background: The 2014 Long Island Sound Tidal Wetlands Loss Workshop was a meeting of Long Island Sound and regional tidal wetland researchers, managers, practitioners, and regulators to discuss the issues causing tidal wetland loss. Attendees identified the current factors impacting tidal wetlands and recommended further research and monitoring to better understand tidal wetland loss. The effect of water quality parameters on the health of tidal wetlands and tidal marsh loss is an area needing further study. Specifically, research and monitoring should study the impacts of nitrogen, sediment input, hydroperiod (due to SLR), and climate change aspects on susceptible targeted habitat, such as tidal marshes. Additionally, it is important to investigate these effects on tidal marsh ecosystem services, including, but not limited to, sedimentation, carbon storage, and nutrient cycling. Every tidal marsh complex along Long Island Sound may be impacted by one or all of these factors in different ways (synergistic effect) and/or may be impacted by other factors. As a result, this action promotes that the entirety of Long Island Sound tidal marshes should be studied to assess causes and extent of change. The location of these areas of loss should be documented in trends analyses on a routine basis to study changes or shifts in habitat. Also, creating a suitability model that uses this information to evaluate marshes will aid in determining priority sites for restoration and remediation through pollution controls.

Cooperators and Partners: NYSDEC, CTDEEP, USFWS, TNC, NOAA, University of Connecticut, The Nature Conservancy, Yale University, EPA, other state, federal, and non-profit partners as expertise is needed.

Funding Sources: Various funding sources connected to organizations above.

Funding Needs: $$

Expected Outputs:
- A better understanding of the impact of water quality factors on tidal marsh health
- A better understanding of which tidal marshes losing acreage and need to be restored and/or protected
- Tidal marshes will be restored and protected based on additional research

Performance Metric(s):
- Number of research and monitoring projects that study the causes for marsh loss and change
- Number of marsh complexes studied
- Number of trend analyses complete
- Number of suitability models that evaluate sites for restoration

Expected Timeframe: Ongoing; 2020-2024.