

# LONG ISLAND SOUND STUDY

## HABITAT RESTORATION INITIATIVE

GUIDELINES FOR  
HABITAT RESTORATION GRANT APPLICATIONS

**February 2017**

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## CHAPTER ONE

### *Introduction and Other Background Information*

## INTRODUCTION

There are numerous grant programs that provide funds for Long Island Sound (LIS) habitat restoration projects, such as Connecticut's LIS Fund (License Plate Program), NOAA's Community-based Habitat Restoration Program, and the National Fish & Wildlife Foundation's LIS Futures Fund. Each grant program has its own specific guidelines regarding eligible activities and application processes. However, members of the Long Island Sound Study (LISS) Habitat Restoration & Stewardship Work Group (HRSWG), who regularly serve as technical reviewers for grant programs, have found that applicants often do not include sufficient technical details to allow for a thorough project review. In these cases, applications may be rated poorly by reviewers or rejected due to uncertainties regarding the plans submitted – or not submitted for that matter.

The purpose of this document is to provide guidance to potential habitat restoration grant applicants, and it should be viewed as a supplement to any grant program's Request for Proposals. This document includes information on habitat restoration priorities, details on developing the necessary habitat restoration plans, habitat-specific project guidance, information on projects discouraged by the HRSWG, and a summary of potentially-applicable state permits. \*\* Note: This document may seem long and overwhelming at first glance. Please keep in mind that it contains a wealth of information for the restoration of twelve coastal habitat types, including related permitting requirements for two states. Therefore, not all of this information is applicable to every habitat restoration proposal. A scan of the document will help you to quickly determine which sections pertain to your project. Questions about the HRI or any topics included in this document should be directed to one of the following LISS Habitat Restoration Coordinators:

Harry Yamalis  
CT Habitat Restoration Coordinator  
CT Dept. of Energy and  
Environmental Protection  
[harry.yamalis@ct.gov](mailto:harry.yamalis@ct.gov)  
860-424-3620

Victoria O'Neill  
NY Habitat Restoration Coordinator  
NYS Dept. of Environmental Conservation  
[victoria.oneill@dec.ny.gov](mailto:victoria.oneill@dec.ny.gov)  
631-444-0441

For information on LIS grant programs, please visit  
<http://www.longislandsoundstudy.net/about/grants>

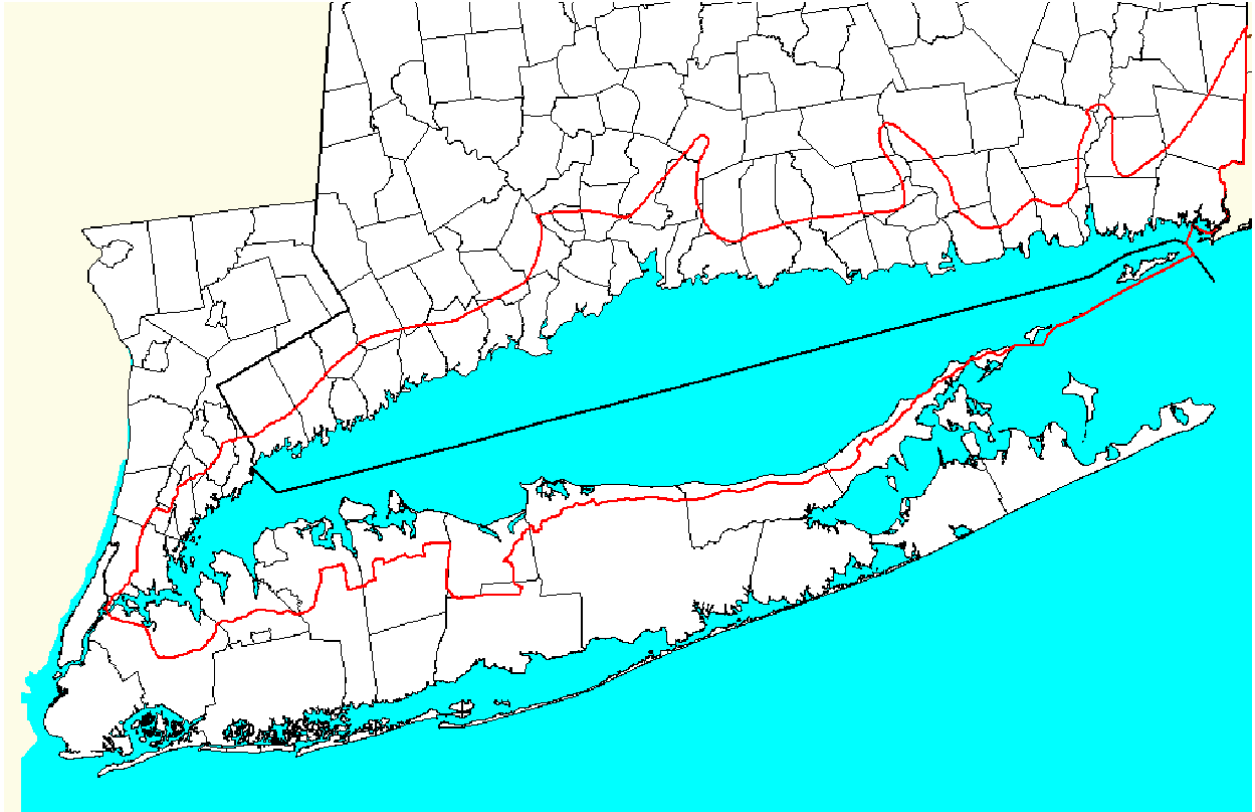
## ***HABITAT RESTORATION PRIORITIES***

Habitat restoration, as defined by the LISS HRSWG, is the intentional alteration of a site to attempt to reestablish the approximate biogeophysical conditions that existed in the predisturbance ecosystem or habitat, given necessary adaptations for climate change. A habitat restoration project should aim to reestablish the same functions and values as those which are characteristic of an undisturbed habitat of the same type. The HRI has identified the following 12 priority coastal habitat types:

Cliffs and Bluffs	Intertidal Flats
Coastal Barriers, Beaches, & Dunes	Riverine Migratory Corridors
Coastal Grasslands	Rocky Intertidal Zones
Coastal and Island Forests	Molluscan (shellfish) Reefs
Estuarine Embayments	Submerged Aquatic Vegetation
Freshwater Wetlands	Tidal Wetlands

The HRSWG recommends that restoration projects focus on at least one of these priority coastal habitat types. With the exception of diadromous fish passage projects, to be eligible for most Long Island Sound funding opportunities, all projects must be within the LISS project boundary (see Figure 1). If you have questions regarding whether your project is within the boundary, please contact your habitat restoration coordinator. The LISS project boundary is based on climatological and topographical features, and political jurisdictions. In Connecticut, the boundary is the coastal hardwoods zone ecoregion described in Dowhan and Craig (1976). The northern extent of this ecoregion represents the inland extent of coastally-influenced vegetation. In New York, the LISS project boundary follows the Harbor Hill moraine through Queens, Nassau, and Suffolk Counties. The western extent of the project boundary is the Robert F. Kennedy Bridge (formerly the Triborough Bridge) span that crosses the East River from Queens to the Bronx. The project boundary in Bronx and Westchester Counties is drawn to follow a portion of the Bronx River and the Hutchinson River Parkway. To check your project site's location in proximity to the coastal boundary, please go to <https://www.google.com/maps/d/edit?mid=1bieDdfGc5d8Nwj7xlq6Ov3AmklM&ll=41.41777617044552%2C-72.85663999999997&z=9>.

Restoration projects will be successful only if the cause of degradation can be managed. Applicants must demonstrate in their proposals that sources of degradation can be adequately controlled. If planting is necessary to achieve restoration goals, the HRI strongly recommends that only plants grown from stock native to the Long Island Sound area be used. All projects should include a 3-year (minimum) post-construction maintenance and monitoring plan.



**Figure 1.** The Long Island Sound Study Project boundary (red line) utilized by the HRSWG.

## ***ELEMENTS OF A COMPLETE HABITAT RESTORATION PROPOSAL***

Please refer to the document entitled Elements of a Complete Habitat Restoration Proposal (Chapter 3 of this document) and respond to each item as completely as possible.

Submission of this plan is one of the required components of the many available funding programs to which you may be applying for restoration funds. Even if this plan is not a requirement of the funding program, supplying the project information requested in it will enhance the breadth of your proposal and possibly improve your score during the review and ranking process.

## ***IMPORTANT INFORMATION REGARDING PROJECT DESIGN PLANS***

a) If the application is for design funds, please include evidence that the project is feasible. Acceptable items (where applicable) include elevation surveys, vegetation surveys, preliminary or conceptual design plans, tide studies, and stream surveys. Please include copies of the survey results / reports and/or contact information for each consultant that conducted these surveys. Applications for restoration design funds which do not include the necessary background information about the project site cannot be adequately reviewed. Upon project completion, final project design plans will be among the required deliverables for design-funds grant awards. Design plans must meet the specifications outlined above, as well as the requirements of the all regulatory agencies that have jurisdiction.

b) If the application requests funds for construction, please include a copy of the final, scaled project design plans, as well as a list of those who have reviewed and approved them. Final design plans submitted with construction proposals must meet the specifications outlined in part (a), above, as well as the requirements of the all regulatory agencies that have jurisdiction.

## ***GLOBAL CLIMATE CHANGE ISSUES***

A complete application will address issues related to global climate change, where applicable, including accelerated sea level rise. These issues are important to the success of a habitat restoration project, especially those that involve species already living at the southern extent of their natural range. Increasing temperature can also increase the rate of growth and reproduction for many species of invasive plants. Sea level rise will drive tidal marshes and other coastal habitats landward, but only where the landscape will allow them to. In some cases the slope will be too steep to allow a tidal marsh to migrate landward; in other cases, there may be a man-made wall blocking the marsh transgression process on an otherwise very flat or gently sloped parcel immediately landward of the proposed restoration site. All of these can impact the long-term sustainability of the habitat proposed to be restored, and will influence the decision of the proposal reviewers. An example of an ideal site for tidal marsh restoration is a site that borders a very gently sloped and undeveloped upland that will allow for natural migration of the marsh as the rising sea level begins to flood the upland.

## **HABITAT-SPECIFIC PROJECT GUIDANCE**

This section provides habitat-specific project guidance for some of the HRSWG's priority coastal habitats. The following sections, which are not all-inclusive, provide examples of restoration projects and information on additional factors that should be addressed in a restoration grant proposal.

### **Coastal Barriers, Beaches and Dunes**

The most common restoration project on a coastal barrier is the restoration of dunes that have been altered or trampled by people. Ideally, planting is conducted by thinning and transplanting American beachgrass (*Ammophila breviligulata*) from the protected back slopes of dunes, which ensures that genetic stock native to LIS is used. Applicants must demonstrate that sources of degradation, such as uncontrolled pedestrian access, can be adequately managed. This can be accomplished through the use of sand fences and/or the construction of an elevated boardwalk over the dune. Additional information on coastal barrier restoration is provided in the HRSWG's Technical Support for Coastal Habitat Restoration manual, which is available online at: <http://www.longislandsoundstudy.net/wp-content/uploads/2004/12/Coastal-barriers-and-beaches.pdf>.

### **Coastal Grasslands**

The most prevalent causes of degradation in grassland communities are development, loss of agrarian activities such as grazing and plowing, fire suppression, and invasive species encroachment. Grasslands are disturbance-dependent ecosystems that historically have been created and maintained by such anthropogenic activities as grazing, intentional burning, and mowing, as well as naturally through wildfire. Due to the increase of the urban interface and development on and around grasslands, suppression of intentional burning, grazing, and wildfire has significantly reduced grassland habitats.

Under natural conditions, fire suppresses natural succession through controlling tree and shrub encroachment, thereby maintaining a grassland habitat. With the increase of fire suppression, grasslands are succeeding or being dominated by invasive shrubs that effectively outcompete native grassland species. Fire suppression can allow low-diversity shrub cover to invade, making the area unsuitable for grassland specialized species.

Grassland restoration projects often involve mowing, cutting, or controlled burning (where feasible) of native and invasive species and may include seeding of warm season grasses, such as Little Bluestem (*Schizachyrium scoparium*), Switchgrass (*Panicum virgatum*), Broomsedge (*Andropogon virginicus*), False Indigo (*Baptisia tinctoria*), and native Asters (*Symphyotrichum spp*). Consultation with plant ecologists and botanists and review of technical reports on vegetation inventories can be used to identify the appropriate plant community for restoration of coastal grassland communities, or to help reconstruct the historic vegetation types.

Soil surveys also are useful tools in looking at past historical structure. Invasive species control is critical to grassland restoration success; control, however, can be difficult, depending on the target species and current plant densities. In some cases, an incorrect



application of control methods can unintentionally increase invasive species densities. The most important components of grassland restoration projects, therefore, include determination of the feasibility of invasive species control, site preparation, and preparation of long-term management plan. All applications must include a restoration and management plan, detailing the invasive species present at the site, their densities, the projected control measures and continuing management activities after the grant funds are expended to maintain the grassland habitat.

Applications for the removal of non-native vegetation should detail the target species for control, the infestation density, methods of control, the disposal location and containment methods of harvested vegetation, as well as a plan for preventing the re-introduction of invasive species in the disturbed area. Applicants are strongly encouraged to demonstrate use of An Invasive Plant Management Decision Analysis Tool (See example: <http://www.imapinvasives.org/decision-analysis-tool>). In addition, if herbicides will be used as a control measure, applicants should include the formulation, dosage, efficacy, timing, and application methods for each target species. Additional information is provided in the HRI's Technical Support for Coastal Habitat Restoration manual, which is available at: <http://www.longislandsoundstudy.net/wp-content/uploads/2004/12/grasslands.pdf>.

### **Coastal and Island Forests**

The most prevalent problem in coastal and island forests is the presence of invasive species that outcompete native species. This results in reduced biodiversity, changing soil chemistry and possible increased erosion. Invaders of coastal forests include Tree of heaven (*Ailanthus altissima*), Black locust (*Robinia pseudoacacia*), and Asiatic bittersweet (*Celastrus orbiculatus*). On many coastal islands, the original forests were modified and non-native vegetation was planted for landscaping and agronomic practices. Consultation with plant ecologists and botanists, as well as review of technical reports on vegetation inventories, can be used to identify the appropriate plant species for restoration of a coastal forest community, or to help reconstruct the historic vegetation types. In some cases, there may need to be field surveys of similar soils in order for ecologists to develop their best recommendations for what the historic vegetation community consisted of. Conditions that encourage long-term succession of native forest communities are key to successful projects. Evaluation of the existing soil conditions on the site prior to installations of new plant material or seeding may be critical to restoration success. Applicants are strongly encouraged to consult with soil scientists and/or forest ecologists to determine whether current soil conditions can support new plant installations and what soil amendment(s) may be required. Current light and wind penetration also need to be assessed to determine whether typical forest- interior, shade-tolerant plants can be supported in near- or long-term restoration plans. Planting plans must be clearly outlined in proposal.

Applications for the removal of non-native vegetation should detail the target species for control, the infestation density, methods of control, the disposal location and containment methods of harvested vegetation, as well as a plan for preventing the re-introduction of invasive species in the disturbed area. Applicants are strongly encouraged to demonstrate use of An Invasive Plant Management Decision Analysis Tool (See example:

<http://www.imapinvasives.org/decision-analysis-tool>). In addition, if herbicides will be used as a control measure, applicants should include the formulation, dosage, efficacy, timing, and application methods for each target species. The forest restoration proposal should include an evaluation of the current impacts of deer pressure at the projected restoration site and the methods to be employed to reduce deer browse in order to ensure a successful restoration and native plant persistence on the site.

### **Freshwater Wetlands**

The major cause of wetland degradation is the alteration of the wetland system's hydrology. This alteration may result from draining, filling, or impounding. Filling of wetlands increases their elevation and causes the plant community to disappear due to burial. If this is the case, restoration may be accomplished through fill removal. Once the correct elevations are restored, the hydrology should reach equilibrium and the existing seed bank should re-vegetate the wetland naturally. The HRSWG recommends that the restoration of buffer areas and corridors between freshwater wetlands and complementary upland habitats be included as part of any freshwater wetland restoration. Projects must be engineered so that they do not cause flooding or other damage to adjacent properties, infrastructure, or other habitat types. Sample projects include adjusting the hydrology to a pre-disturbance condition and planting native wetland vegetation.

Applications for the removal of non-native vegetation should detail the target species for control, the infestation density, methods of control, the disposal location and containment methods of harvested vegetation, as well as a plan for preventing the re-introduction of invasive species in the disturbed area. Applicants are strongly encouraged to demonstrate use of An Invasive Plant Management Decision Analysis Tool (See example: <http://www.imapinvasives.org/decision-analysis-tool>). In addition, if herbicides will be used as a control measure, applicants should include the formulation, dosage, efficacy, timing, and application methods for each target species. Additional information is provided in the HRSWG's Technical Support for Coastal Habitat Restoration manual, which is available online at: <http://www.longislandsoundstudy.net/wp-content/uploads/2004/12/FWwetlands.pdf>.

### **Molluscan Reefs**

Consistent with the classification used for the National Wetland Inventory, the HRSWG uses the term "molluscan reef" to describe the habitat in Long Island Sound that is created by several molluscan species – typically American oysters and blue mussels. Projects to restore molluscan reefs focus on creating habitat for all species, not for aquaculture-related purposes. Applicants must clearly demonstrate that the site selected for a reef restoration project was once home to natural beds or reefs, not populations of oysters or mussels that were seeded or otherwise introduced at the site for harvest. Applicants need to evaluate the nature of the affected bottom communities and describe existing functions to demonstrate that the proposed restoration would not have unacceptable impacts on the environment. Critical to the success of a molluscan reef restoration proposal is the demonstration that measures will be taken to prevent future harvest of the mussels or oysters from the restored areas. Funding will not be provided for the restoration of these

species so that they simply can be harvested for commercial gain. Work with your natural resource agencies and shellfish pathologists to determine whether your potential project and location would be suitable and would receive necessary permits. Due to disease prevalence in some areas of Long Island Sound, oyster restoration is not recommended in many areas because of a limited chance of long-term habitat survival.

### **Riverine Migratory Corridors**

Projects to restore riverine migratory corridors often involve removing or modifying dams (i.e., adding a fish ladder) or other man-made obstructions in rivers to allow the passage of diadromous fish species. Applicants must demonstrate that the waterway once provided passage to spawning habitat upstream of the barrier for at least one species of diadromous fish. Native diadromous fish in LIS include alewife, American eel, American shad, Atlantic salmon, blueback herring, gizzard shad, hickory shad, rainbow smelt, sea lamprey, sea-run brook trout, and white perch. The presence of any of these species at the base of a dam during the spring migration period is evidence of an historic fish run. If fish are not currently present, the applicant should perform an historical survey, prior to submitting the application for funding, to determine whether or not an historical fish run existed at the site. Clearly identify downstream and upstream barriers that exist and describe efforts that have been undertaken or in the planning stages to promote fish passage. When available please include fish counts from downstream fish ladders to demonstrate downstream efficacy. Be sure to include how many miles of fish passage will be made accessible by the proposed project, and include map(s) to demonstrate this. Maps drawn in GIS are preferred as the electronic files are easily transferrable, and be sure to count miles in the main stem as well as in tributaries that also lead to spawning habitat. The lowest barrier without a passage mechanism in a system will receive preference for structural solutions (i.e. fish ladders) over barriers located upstream of barriers with no provisions for fish passage. Upstream barriers, with no provisions for fish passage at barriers below them could receive preference for removal of the obstruction (i.e. dam removal or culvert modification), but please check with your state's habitat restoration coordinator before applying. Finally, please be aware that some funding programs, including the LIS Futures Fund program, will not cover the costs of making a fishway aesthetically pleasing, but will only pay for costs of installing an operable fishway. As part of the monitoring plan, please identify monitoring that will be performed upon project completion. Daylighting of buried (culverted) stream reaches is also encouraged under this category. Additional information on riverine migratory corridor restoration is provided in the HRSWG's Technical Support for Coastal Habitat Restoration manual, which is available online at:

[http://longislandsoundstudy.net/wp-content/uploads/2004/12/RMC\\_Chapter\\_Finalformatted.pdf](http://longislandsoundstudy.net/wp-content/uploads/2004/12/RMC_Chapter_Finalformatted.pdf)

### **Submerged Aquatic Vegetation**

The dominant Submerged Aquatic Vegetation (SAV) of interest in LIS is eelgrass (*Zostera marina*), the abundance and distribution of which has decreased as a result of nitrogen enrichment. Given the current decline of eelgrass in many of the Sound's bays and harbors, the HRSWG recommends that projects focus on small-scale test plots and monitoring

activities rather than on large-scale plantings. Applicants must demonstrate that SAV beds exist or had once existed at the site to be restored. The suitability of the proposed reference site should be discussed in the proposal and, wherever possible, should be supported by reference to LIS eelgrass restoration site suitability studies and models that have been conducted to-date (See <http://spatial.usc.edu/wp-content/uploads/2014/04/EddingsJustinThesis.pdf> and the work of Cornell Cooperative Extension - <http://www.seagrassli.org/>). Additional information, including water quality guidelines for eelgrass, is provided in the HRSWG's Technical Support for Coastal Habitat Restoration manual, which is available at: <http://www.longislandsoundstudy.net/wp-content/uploads/2004/12/sav-with-cover1.pdf>.

## **Tidal Wetlands**

As with freshwater wetlands, the major cause of tidal wetland degradation is the alteration of the wetland system's hydrology. Hydrological changes to tidal marshes have been caused by grid ditching, filling, draining, and impounding. Grid ditching has affected more acreage of tidal marshes than any other type of degradation; however, the HRSWG is studying the effects of ditch-plugging and currently recommends allowing the ditches to fill naturally. As with freshwater wetlands, filled tidal wetlands may be restored by excavating the fill materials. Depending on the scope of the project and the location of the fill, a fill removal project may require the use of low-ground pressure equipment that is designed to operate on the organic and compressible soils of tidal wetlands.

Marsh draining occurs when tidal flow into a marsh is restricted by undersized culverts or tide gates, the two most common types of structures. Reintroduction of tidal flow is the principal technique used to restore salt marshes degraded by tide gates and undersized culverts. Planting is not recommended for this type of restoration, as the natural stock of wetland vegetation will reestablish itself (this method also helps to minimize costs). However, each site is unique and under certain site conditions (e.g., limited seed source), planting may be an appropriate restoration technique. Projects must be engineered so that they do not cause flooding or other damage to adjacent properties, infrastructure, or other habitat types. Where tide gates (or other adjustable flood-control devices) are involved, the proposal should state who has jurisdiction over the position of the gate. Large-scale projects may require the deployment of tide gates and modeling, while for less-complex projects, tidal obstruction can be demonstrated by simple tidal observations. At minimum, the following information should be included in a typical proposal:

- Elevation of high tide line (in Connecticut, also include the Coastal Jurisdiction Line), mean high water, and mean low water, downstream and upstream of any existing tidal restrictions or other structures (tide gates, culverts, dikes, etc);
- Additional tide data – a tide study analysis should be included with the application, which would present such findings as: when the high tide peaks then starts to recede; is water still flowing upstream through a culvert or tide gate opening? Is the peak high tide on both sides of a tidal restriction at the same elevation?
- Marsh elevations, including a combination of transects and spot elevations at areas that are clearly higher or lower than the surrounding marsh. These should be

- recorded both downstream and upstream of any tidal restrictions;
- Baseline vegetation map (high marsh, low marsh, *Phragmites australis* density, etc.);
- soil and water salinity (downstream and upstream of any existing tidal restrictions) during spring high tide and, ideally, during the May to July growing season);
- Elevations of the lowest lying adjacent properties, such as homes, businesses, infrastructure, etc.
- Planting plan if applicable, including plant type, source material, methodology and monitoring

It was stated earlier that an ideal site for tidal marsh restoration is a site that borders a very gently sloped and undeveloped upland to allow the natural migration of the marsh as tidal flooding becomes more frequent. This should not be viewed as contradictory to the requirement of protecting adjacent properties from flooding as a result of habitat restoration. These low-lying uplands will inevitably become subject to tidal inundation as a result of sea level rise, but their flooding should not be a direct consequence of the habitat restoration project.

Applications for the removal of non-native vegetation should detail the target species for control, the infestation density, methods of control, the disposal location and containment methods of harvested vegetation, as well as a plan for preventing the re-introduction of invasive species in the disturbed area. Applicants are strongly encouraged to demonstrate use of An Invasive Plant Management Decision Analysis Tool (See example: <http://www.imapinvasives.org/decision-analysis-tool>). In addition, if herbicides will be used as a control measure, applicants should include the formulation, dosage, efficacy, timing, and application methods for each target species. Please see Activities Not Recommended for Funding below for more information related to the removal of *Phragmites australis*.

Additional information on LIS tidal wetland restoration is provided in the HRSWG's Technical Support for Coastal Habitat Restoration manual, available at: <http://www.longislandsoundstudy.net/wp-content/uploads/2004/12/tidal-wetlands.pdf>.

### **ACTIVITIES NOT RECOMMENDED FOR FUNDING**

There are four main categories of projects that are not recommended by the HRSWG for habitat restoration funding: habitat creation; modification of healthy habitat; alteration of natural processes; and *Phragmites australis* control in tidally influenced habitats.

1. Habitat Creation – Habitat creation is defined by the HRSWG as bringing into existence a habitat that was not historically supported at the site in question. Creation requires the destruction or conversion of the existing habitat in favor of a new habitat, which the HRSWG does not promote. For example, wetlands should not be filled to create a coastal grassland, and freshwater wetlands should not be connected to the tides simply to convert them to tidal wetlands. ***\*\*Please Note: While habitat creation is not supported by the HRSWG for habitat restoration projects, it IS supported in regards to projects that address sea level rise and climate change.***

***Some habitat creation may be necessary to support living shoreline projects or other projects that account for land migration due to a rise in sea level.***

2. Modification of Healthy Habitat – The HRSWG does not recommend restoration funding for projects to modify healthy habitats. An example of this type of project is the creation of tidal ponds or creeks in an otherwise healthy marsh. While creating creeks and ponds can enhance species diversity by increasing fish abundance and attracting birds, creation of these aquatic features comes at the expense of productive tidal marsh habitat. Another example is a project to convert a healthy freshwater wetland to its historical condition as a tidal wetland.

3. Alteration of Natural Processes – Ecological restoration focuses on restoring habitats degraded by man. If natural processes are causing the degradation or destruction of the habitat, the HRSWG does not recommend that attempts be made to restore the habitat. For example, coastal barrier beaches may ‘migrate’ landward during storms when sand overwashes a dune and buries the tidal wetland behind the dune. This migration and the tidal wetland burial is part of a natural process. Proposals to restore the buried tidal wetland may not be reviewed favorably and are unlikely to receive permits or funding. Projects to restore habitat (terrestrial or aquatic) lost by natural channel migration and erosion also are not recommended by the HRSWG.

4. *Phragmites australis* Control – Proposals to remove dense stands of *Phragmites*, either by mechanical or chemical means in tidally influenced systems, are not recommended for habitat restoration funding by the HRSWG. Mowing or chemically treating *Phragmites* provides only a temporary solution; preventing recolonization requires long-term maintenance and continued control. Given the high level of maintenance required and the unlikelihood of complete, long-term eradication, projects to remove dense *Phragmites* stands are not recommended for habitat restoration funding.

## ***LITERATURE CITED***

Dowhan, J.J. and R.J. Craig. 1976. Rare and endangered species of Connecticut and their habitats. State Geol. Natur. Hist. Surv., CT Dept. Environmental Protection, Rep. Invest. No. 6, 137 pp.



## ***LISS COMPREHENSIVE CONSERVATION & MANAGEMENT PLAN (CCMP) & HABITAT RESTORATION MANUAL***

The LISS has completed an update to the LISS Comprehensive Conservation & Management Plan (CCMP). This document is free to download here:

[http://longislandsoundstudy.net/wp-content/uploads/2015/09/CCMP\\_LowRes\\_Hyperlink\\_singles.pdf](http://longislandsoundstudy.net/wp-content/uploads/2015/09/CCMP_LowRes_Hyperlink_singles.pdf).

Information on Ecosystem Targets and Implementation Actions for the *Thriving Habitats & Abundant Wildlife* theme identify priorities for the LISS. This document will help guide habitat restoration project applicants when developing proposals. This Ecosystem Targets can be downloaded from <http://longislandsoundstudy.net/wp-content/uploads/2015/07/ThemeSheets2.pdf>.

The Implementation Actions can be downloaded from

<http://longislandsoundstudy.net/wp-content/uploads/2015/09/HW-CCMP-Supp-Doc-2.pdf>.

The LISS has also prepared a document to assist with the planning and implementation of habitat restoration projects. This document is a free download from

<http://www.longislandsoundstudy.net/wp-content/uploads/2010/03/LIS.Manual.pdf>.

## CHAPTER TWO

### *Permit Requirements for Coastal Habitat Restoration*



## PERMIT REQUIREMENTS FOR HABITAT RESTORATION PROJECTS IN NEW YORK

Potentially Applicable Permits in New York			
Issuing Agency	Permit Type	Process Time*	Contact Info
DEC- Division of Fish, Wildlife and Marine Resources	Tidal Wetlands	** see below	<a href="http://www.dec.ny.gov/permits/6039.html">http://www.dec.ny.gov/permits/6039.html</a>
DEC- Division of Fish, Wildlife and Marine Resources	Freshwater Wetlands	** see below	<a href="http://www.dec.ny.gov/permits/6058.html">http://www.dec.ny.gov/permits/6058.html</a>
DEC- Division of Fish, Wildlife and Marine Resources	Wild, Scenic, and Recreational Rivers		For Nissequogue River only <a href="http://www.dec.ny.gov/permits/6033.html">http://www.dec.ny.gov/permits/6033.html</a>
DEC- Division of Fish, Wildlife and Marine Resources	Water Quality Certification	** see below	<a href="http://www.dec.ny.gov/permits/6546.html">http://www.dec.ny.gov/permits/6546.html</a>
DEC- Division of Fish, Wildlife and Marine Resources	Protection of Waters	** see below	<a href="http://www.dec.ny.gov/permits/6042.html">http://www.dec.ny.gov/permits/6042.html</a>
DEC- Division of Water	Dam Safety	** see below	<a href="http://www.dec.ny.gov/lands/4991.html">http://www.dec.ny.gov/lands/4991.html</a>
DEC- Division of Water	Coastal Erosion Hazard Areas		<a href="http://www.dec.ny.gov/permits/6064.html">http://www.dec.ny.gov/permits/6064.html</a>
DEC- Division of Water Solid and Hazardous Wastes	Aquatic Pesticides		<a href="http://www.dec.ny.gov/chemical/8530.html">http://www.dec.ny.gov/chemical/8530.html</a>
DEC, DOS, OGS, ACOE	Joint Application		<a href="http://www.dec.ny.gov/permits/6222.html">http://www.dec.ny.gov/permits/6222.html</a>
Army Corp of Engineers- New York Region	Regulatory Branch, New York District		<a href="http://www.nan.usace.army.mil/Missions/Regulatory.aspx">http://www.nan.usace.army.mil/Missions/Regulatory.aspx</a> 917-790-8511

**Table 1: List of potentially applicable permits for habitat restoration activities in New York.** Please contact the appropriate regulatory agency to help you determine which permit application(s) you may need for your project and approximately how long the agency will need to process your application.

Many projects in NY will also require permits from local municipalities.

\*An estimate of how long the regulatory agency will need to process your permit application from the day they receive it.

\*\*Times are from time application is complete; 45 days for minor projects and 90 days for major projects

NYS DEC Department of Environmental Permits Phone Numbers		
Region 1	(631) 444-0365	Nassau and Suffolk Counties
Region 2	(718) 482-4997	Boroughs of Bronx and Queens
Region 3	(845) 256-3054	Westchester County

## PERMIT REQUIREMENTS FOR HABITAT RESTORATION PROJECTS IN CONNECTICUT

Many habitat restoration projects will need state or local authorization of some kind. Projects in tidal wetlands may also need federal authorization from the Army Corps of Engineers. In general, projects whose activities are entirely above the [Coastal Jurisdiction Line \(CJL\)](#) as defined in the Connecticut General Statutes will not need authorization from the CT DEEP's Land & Water Resources Division (LWRD)\*, while any project that may impact areas below the CJL will need written authorization from LWRD. Below is a checklist of authorizations that may potentially be required for projects in Connecticut, followed by a detailed description of the permitting requirements for habitat restoration projects done within the State of Connecticut. Requirements are listed by habitat type. In some cases, your habitat restoration project may be authorized under the [General Permit](#) for Minor Coastal Structures or Coastal Maintenance. **In all cases, if the grant applicant is not the owner of the property where the proposed habitat restoration project is located, a letter from the property owner expressing written support for the project will be required for both the grant application and any necessary permit applications.**

**\*Note: Staff from CT DEEP's Land & Water Resources Division recommend that potential applicants call to set up a pre-application meeting as early as possible. We will help you determine which application(s) you will need to authorize your proposed work.**

Permit Required?	Issuing Agency	Permit Type	Pro- cess Time	Contact Info
Y N Y N	<b>Are you the property owner of the project site? Do you have property owner permission?</b>		N/A	N/A
Y N	DEEP – Land & Water Resources Division	Certificate of Permission (COP)	up to 3 months	<a href="http://www.ct.gov/deep/cwp/view.asp?a=2709&amp;q=324222&amp;deepNav_GID=1643#LongIslandSound">http://www.ct.gov/deep/cwp/view.asp?a=2709&amp;q=324222&amp;deepNav_GID=1643#LongIslandSound</a> or 860-424-3034
Y N	DEEP – Land & Water Resources Division	Structures, Dredging, Fill, & Tidal Wetlands Permit	1 year	<a href="http://www.ct.gov/deep/cwp/view.asp?a=2709&amp;q=324222&amp;deepNav_GID=1643#LongIslandSound">http://www.ct.gov/deep/cwp/view.asp?a=2709&amp;q=324222&amp;deepNav_GID=1643#LongIslandSound</a> or 860-424-3034
Y N	DEEP – Land & Water Resources Division	Water Quality Certificate		<a href="http://www.ct.gov/deep/cwp/view.asp?a=2709&amp;q=324222&amp;deepNav_GID=1643#InlandWaterResources">http://www.ct.gov/deep/cwp/view.asp?a=2709&amp;q=324222&amp;deepNav_GID=1643#InlandWaterResources</a> or 860-424-3019
Y N	DEEP – Land & Water Resources Division	Flood Management Certificate		<a href="http://www.ct.gov/deep/cwp/view.asp?a=2709&amp;q=324222&amp;deepNav_GID=1643#InlandWaterResources">http://www.ct.gov/deep/cwp/view.asp?a=2709&amp;q=324222&amp;deepNav_GID=1643#InlandWaterResources</a> or 860-424-3019
Y N	DEEP – Water Planning & Management Division	Dam Safety Permit		<a href="http://www.ct.gov/deep/cwp/view.asp?a=2709&amp;q=324222&amp;deepNav_GID=1643#InlandWaterResources">http://www.ct.gov/deep/cwp/view.asp?a=2709&amp;q=324222&amp;deepNav_GID=1643#InlandWaterResources</a> or 860-424-3706 or <a href="mailto:DEEP.DamSafety@ct.gov">DEEP.DamSafety@ct.gov</a> ; see also: <a href="http://www.ct.gov/deep/dams">www.ct.gov/deep/dams</a>

Permit Required?	Issuing Agency	Permit Type	Pro- cess Time	Contact Info
Y N	DEEP – Land & Water Resources Division	Water Diversion Permit		<a href="http://www.ct.gov/deep/cwp/view.asp?a=2709&amp;q=324222&amp;deepNav_GID=1643#InlandWaterResources">http://www.ct.gov/deep/cwp/view.asp?a=2709&amp;q=324222&amp;deepNav_GID=1643#InlandWaterResources</a> or 860-424-3019
Y N	DEEP – Land & Water Resources Division	State Inland Wetlands Permit (only when a state agency is the applicant)		<a href="http://www.ct.gov/deep/cwp/view.asp?a=2709&amp;q=324222&amp;deepNav_GID=1643#InlandWaterResources">http://www.ct.gov/deep/cwp/view.asp?a=2709&amp;q=324222&amp;deepNav_GID=1643#InlandWaterResources</a> or 860-424-3019
Y N	DEEP – Land & Water Resources Division	Natural Diversity Database Review	up to 2 months	<a href="http://www.ct.gov/deep/cwp/view.asp?a=2702&amp;q=323466&amp;deepNav_GID=1628%20">http://www.ct.gov/deep/cwp/view.asp?a=2702&amp;q=323466&amp;deepNav_GID=1628%20</a> or <a href="mailto:deep.nddbrequest@ct.gov">deep.nddbrequest@ct.gov</a>
Y N	US Army Corps of Engineers- Programmatic General Permit	Regulatory Branch, New England District		<a href="http://www.nae.usace.army.mil/Missions/Regulatory.aspx">http://www.nae.usace.army.mil/Missions/Regulatory.aspx</a>

**Table 2.** List of permits that may be required for some habitat restoration projects. Please review the list and circle Y or N, depending on whether or not that specific permit type will be necessary for your project. The Connecticut Habitat Restoration Coordinator can help you determine which, if any, permits will be required. In some cases, a pre-application meeting with a permit analyst will be necessary to make this determination. Most habitat restoration projects will not require more than 2 or 3 of these permit types.

## **Requirements for plans submitted with CTDEEP – LWRD permit applications**

The requirements for project plans for CTDEEP coastal permits are many. Project design plans require a high level of detail and usually must be completed by certified engineers. Plans that may meet the requirements for a grant application may not be suitable for the permit application that will be necessary for a habitat restoration project located below the Coastal Jurisdiction Line. For example, a CTDEEP permit application for tidal wetland restoration will require professionally engineered and properly scaled plan-views and elevation-views. A vicinity map and photographs of the site are also necessary. As permitting requirements change from time to time, specific plan requirements are not listed here. Please contact the CT Habitat Restoration Coordinator for questions regarding LWRD coastal permits and to schedule a pre-application meeting with the permit review staff if necessary. It makes more sense for applicants to draft only one set of plans for the entire project, as opposed to two or more with varying levels of detail. [Please go to [http://www.ct.gov/deep/cwp/view.asp?a=2705&pm=1&Q=511544&deepNAV\\_GID=1622](http://www.ct.gov/deep/cwp/view.asp?a=2705&pm=1&Q=511544&deepNAV_GID=1622) for information on Connecticut's new regulatory Coastal Jurisdiction Line].

**Cliffs and Bluffs** – Restoration of cliffs and bluffs will not need authorization from LWRD unless some of the work that is done falls below, or impacts areas below the Coastal Jurisdiction Line. To find out if a potential project falls within LWRD jurisdiction, please contact the CT Habitat Restoration Coordinator to discuss project details. Applicants must have permission from the property owner, and should check with municipal governments to see if the proposed activities might need local permits. For example, local Planning & Zoning or Building Departments may need to approve the plans for any proposed structures, and a local Conservation Commission may want to review the proposed restoration.

**Coastal Barriers** – In most cases, the restoration of coastal barriers involves a combination of invasive weed removal, transplanting of American beachgrass (*Ammophila breviligulata*), building structures to keep pedestrian & vehicular traffic off the dunes, and the relocation of small boats (i.e., dinghies) being stored on the dunes and other vegetated areas. Structures would include elevated wooded walkways or boardwalks to convey pedestrians over a dune, or the installation of sand fence to keep people out of certain areas. All of these activities would take place above the Coastal Jurisdiction Line and are exempt from LWRD jurisdiction. Applicants must have permission from the property owner, and should check with municipal governments to see if these activities might need local permits. For example, local Planning & Zoning or Building Departments may regulate the construction of boardwalks and fences, and a local Conservation Commission may want to review the proposed restoration. LWRD will, however, take jurisdiction over projects where sand or gravel modification is proposed - beach nourishment, regrading of existing or imported sand, removal of rocks, boulders, etc, are all examples of activities under LWRD jurisdiction. It is recommended that grant applicants call the CT Habitat Restoration Coordinator to discuss project details prior to submitting a permit application.

**Coastal Grasslands** – Coastal grassland restoration activities are done well above the Coastal Jurisdiction Line and well outside of LWRD jurisdiction. As with any habitat restoration project, property owner permission is required. The installation of any structures, such as fences to keep pedestrians and potential predators away from the project site, may fall under the jurisdiction of local building codes. The local Conservation Commission may want to review the proposed restoration.

**Coastal and Island Forests** – Coastal and island forest restoration activities are also done well above the Coastal Jurisdiction Line and well outside of LWRD jurisdiction. As with any habitat restoration project, property owner permission is required. The installation of any structures, such as fences to keep pedestrians and potential predators away from the project site, may fall under the jurisdiction of local building codes. The local Conservation Commission may want to review the proposed restoration.

**Estuarine Embayments** – The restoration of estuarine embayments will need authorization from LWRD in all cases where structures, dredging, fill, or changes to the flow of tidal waters are involved. Please contact the CT Habitat Restoration Coordinator to discuss project details.

**Freshwater Wetlands** – These include only non-tidal inland wetlands; tidally-influenced freshwater wetlands are covered in the Tidal Wetlands section below. All inland wetlands are out of LWRD jurisdiction, but are subject to regulation by municipal Inland Wetlands Commissions, in addition to local building codes if structures are involved. There are potentially several authorizations necessary from CT DEEP's former Inland Water Resources Division (IWRD), now also part of the Land & Water Resources Division for projects in inland wetlands. Please see Table 1 (above) and contact the CT Habitat Restoration Coordinator to determine if any of these permits are necessary for your project. Property owner permission will be necessary if the applicant does not own the subject property. A local Inland Wetlands and/or Conservation Commission may have regulatory jurisdiction and may want to review the proposed restoration.

**Intertidal Flats** – The restoration of intertidal flats will need authorization from LWRD in all cases where structures, dredging, fill, or changes to the flow of tidal waters are involved. Please contact the CT Habitat Restoration Coordinator to discuss project details.

**Molluscan (shellfish) Reefs** – Restoration of oyster reefs will require authorization from the CT Dept. of Agriculture, Bureau of Aquaculture, and the restoration of mussel beds may also require a similar permit. Grant applicants are advised to call the Aquaculture Laboratory in Milford at 203-874-0696 before submitting their applications for funding. Depending on what, if any, structures will be necessary for the restoration project, LWRD authorization may also be required. Grant applicants are urged to contact the CT Habitat Restoration Coordinator regarding all molluscan reef habitat restoration projects. A review will be performed to determine whether the location of the restoration project may interfere with other coastal activities. The local shellfish commission should also be contacted.

**Riverine Migratory Corridors** – Permitting for the removal or modification of a dam to accommodate fish passage structures can get quite complicated. After contacting CT DEEP's Diadromous Fish Program (860-434-6043 or [deep.inland.fisheries@ct.gov](mailto:deep.inland.fisheries@ct.gov)) for project feasibility, grant applicants for fish passage projects are strongly encouraged to contact DEEP's Water Planning and Management Division (WPMD - see Table 1) for potential permitting requirements before submitting any grant applications. If the dam (or other structure) that is hindering the passage of fish happens to be in tidal waters (for example, the first dam on a tidal creek or river; tide gate; or culvert in the tidal area) applicants are also urged to contact the CT Habitat Restoration Coordinator to determine if a coastal permit might also be necessary. Once again, property owner permission will be necessary if the applicant does not own the dam, or the property and other structures at the project site. A local Inland Wetlands and/or Conservation Commission may have regulatory jurisdiction and may want to review the proposed restoration.

**Rocky Intertidal Zones** – The restoration of rocky intertidal habitat will need authorization from LWRD in all cases where structures, dredging, fill, or changes to the flow of tidal waters are involved. This includes the addition, removal, or rearrangement of rocks, boulders, etc. Please contact the CT Habitat Restoration Coordinator to discuss project details.

**Submerged Aquatic Vegetation** – Due to water quality limitations, restoration of eelgrass beds on a large scale are discouraged in favor of multiple smaller scale test plots. Even these test plots, however, fall under LWRD jurisdiction and may need written authorization before in-water work can begin, especially if any permanent or temporary structures are involved with the project. Grant applicants are urged to contact the CT Habitat Restoration Coordinator regarding all submerged aquatic vegetation habitat restoration projects. A review will be performed to determine whether the location of the restoration project may interfere with other coastal activities. The local shellfish commission should also be contacted.

**Tidal Wetlands** – In all instances, the restoration of tidal wetlands will require LWRD authorization and grant applicants are urged to contact the CT Habitat Restoration Coordinator regarding all tidal wetland restoration projects. No matter their size, individual tidal marsh systems may have multiple property owners. Each owner's parcel of a tidal marsh proposed for restoration will likely be impacted to some degree. For this reason, advanced written permission from all property owners (and in some cases, adjacent property owners) is required and must be submitted with your grant proposal as well as with your permit application.

## CHAPTER THREE

### *Elements of a Complete Habitat Restoration Proposal*



## Am I ready to apply for habitat restoration funding?

To determine if you are ready to apply for on-the-ground habitat restoration funding, you should be able to fully respond to the items in the recently developed 'Elements of a Complete Habitat Restoration Proposal' list which follows. If you are requesting funds for engineering / design services only, please answer each item as completely as possible. Including these elements in your grant application will make for a more comprehensive proposal. The following information was adapted from the Society for Ecological Restoration International's Guidelines for Developing and Managing Ecological Restoration Projects, available online at:

[http://www.ser.org/resource/resmgr/custompages/publications/ser\\_publications/Dev\\_and\\_Mng\\_Eco\\_Rest\\_Proj.pdf](http://www.ser.org/resource/resmgr/custompages/publications/ser_publications/Dev_and_Mng_Eco_Rest_Proj.pdf).

### Elements of a Complete Habitat Restoration Proposal:

- 1. Identify the project site location and its boundaries.** Project boundaries must be clearly delineated on a map or aerial photograph, as they would be presented in a site plan or a vicinity map. A USGS quadrangle or topographic map centered over the project site at a scale of 1:24,000 generally makes for a good site plan. Be sure to highlight the project site or project boundary, as well as its relationship to other features such as the shoreline or park boundary, if applicable. For fish passage projects, include maps highlighting the stream miles (including tributaries) that will be reconnected, along with the location of the next upstream barrier (s). Applicants must also provide photographs of the site in its current and historic (if possible) conditions. Both current, on-the-ground photos as well as recent aerial photographs (if available) should be included. Restoration boundaries can also be transferred onto a GIS base map from GPS points acquired in the field. Historical maps and aerial photos of Connecticut can be viewed on the web at <http://clear.uconn.edu> and <http://magic.lib.uconn.edu>. Please contact your state's habitat restoration coordinator for help in finding or viewing historical maps and photos.
- 2. Estimate extent of area to be restored.** This information should be presented in acres (or square feet for small-scale projects), or in linear miles (including tributaries) for fish passage projects. Briefly describe how this estimate was determined (e.g., using aerial photos, GIS, on-site measurements, etc.).
- 3. Identify ownership and permission granted.** Applicants must demonstrate ownership or other legal interest in the affected property (i.e., copies of applicable property deeds or conservation easements), or a written demonstration of permission and support from the property owner, if the applicant is not the property owner. If there are multiple property owners, a letter of support for the project signed by each property owner must be submitted with the application. Also, describe how the restoration site will be protected from future development or other potential modifications (e.g., easements, ownership).

**4. Address current site uses and identify impacts the proposed project might impose on existing uses.** The habitat at the proposed project site may be subject to various uses including but not limited to salt hay farming, cultivation, or forestry practices. Please describe how the habitat is currently used and identify any changes that would result from restoration.

**5. Demonstrate that the habitat to be restored exists or existed at the site historically.** This information may come in the form of historic maps or photographs, charts, aerial photographs, articles, surveys, technical reports, or other documents that verify the existence of the habitat type at that location. Historic charts and aerial photographs can be used to demonstrate that a healthy habitat (tidal wetlands, for example) had once existed at a location and were subsequently altered by human impacts. Soil surveys (available on the Natural Resources Conservation Service's website: [websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx](http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx)) can demonstrate that tidal wetland soils exist or have been converted to another habitat type (e.g., mapped as fill or udorthents). Soil series are also instructive about the soil moisture regime, nutrient status, and drainage which can help to identify the potential historic vegetation type.

**6. Demonstrate that the site is currently degraded, and describe the anthropogenic cause(s) and nature of the degradation.** Proof that a habitat truly is degraded is essential in a habitat restoration grant proposal. Habitat restoration is about restoring habitats degraded by anthropogenic activities. Habitats degraded by nature are usually an indication that the site can no longer sustain the historic habitat, and that the habitat is in transition. As an example, coastal barrier beaches migrate landward in response to sea level rise – such migration tends to occur during storms. Sand may overwash a dune and bury tidal wetlands behind it. This landward migration of the beach and burial of tidal wetlands is a natural process and will not be favorably reviewed.

There are various man-made causes of habitat degradation including but not limited to modifications of the tidal hydrology (ditching, draining, impounding), placement of fill, clear-cutting, fish passage obstruction, nutrient enrichment, etc. To help determine whether or not the project truly qualifies as restoration, refer back to the sections above or contact the habitat restoration coordinators. Describe whether the cause(s) of degradation is historic or on-going. If it is on-going, explain how you will eliminate or manage the source of degradation. Absent a clear understanding as to the basis for the degradation or loss of the habitat, restoration may be doomed to failure. For example, stormwater outfalls cause changes in hydrology, reduce salinity and can deliver sediment that buries aquatic habitat. Removal of stormwater sediment can temporarily restore the pre-disturbance habitat, but if the sediment source is not eliminated, the degradation will occur again. Restoration funds generally are only available for the restoration action and not to correct the source of degradation (e.g., stormwater retrofits).

**7. Describe the existing habitat and describe the adverse impacts of the proposed habitat restoration.** There are various classifications that should be used to describe the existing habitat, such as the National Wetlands Inventory for wetlands and shallow waters.

Plant community classifications should be used to characterize vegetation.

Example - Diked and drained tidal wetlands have reduced tidal flooding which can limit or even eliminate marsh invertebrates, and prevents access to the marsh by killifish.

Oxidation of the soils in diked and drained tidal marshes causes pyrite to release sulfuric acid, and creates acid sulfate soils. The resulting low soil pH promotes the release of aluminum from soil minerals, which can be toxic at low concentrations to aquatic organisms. The degraded habitat is itself acting as a source of pollution, and restoration would eliminate water quality degradation and result in a positive impact upon the environment.

In describing the adverse impacts to the existing habitat, to merely state that there are no impacts absent an explanation as to how that conclusion is derived is not acceptable statement. All restoration projects result in the destruction of the current ecological matrix, and all habitats provide some level of ecological services - the impacts of losing these services must be outlined. Overall, the positive benefits from restoration must outweigh the impacts from restoration. In numerous situations, the former habitat type has been lost but converted to one that is otherwise healthy, for example, freshwater ponds created by damming former tidal wetlands. The present day ecological system, if healthy and functioning, may not be a good candidate for restoration making permit approval unlikely. There are numerous wetlands that have been destroyed through the placement of fill and converted to a different wetland type or even a terrestrial habitat.

**8. Identify the restoration goals.** Written goals define the specific state or condition that the restoration endeavors to attain. The goals will provide a basis for evaluating the restoration success at a later date. There are certain goals that are common to all restoration projects, such as restoring ecosystem integrity, health, and the potential for long-term sustainability. A project may have additional ecological goals, such as to provide habitat for particular species or to reassemble particular biotic communities.

A recently adopted goal of the Long Island Sound Study is to maximize high marsh habitat to provide longer marsh longevity, given recent predictions for accelerated sea level rise. Goal statements must address the degree to which recovery can be expected to reach a former state or trajectory. Restoration, *sensu stricto*, endeavors to return the degraded ecosystem to its precise pre-disturbance condition. In most, if not all cases, that is not attainable since detailed information about site elevations, soil properties, distribution of individual plants or clones, exact location of such features including tidal creeks, ponds, or natural oyster beds does not exist. From this emerge the goals of (a) “resetting the wetland on a long-term trajectory to becoming a self-maintaining ecosystem that is in dynamic equilibrium with sea level” and (b) reaching a target restoration that delivers an ecosystem dominated by salt (polyhaline) marsh or brackish (mesohaline/oligohaline), yet without a specific, pre-determined amount of low marsh or high marsh habitat.

**9. Discuss feasibility studies.** Provide information obtained from preliminary feasibility studies, or explain why a study is not needed. For example, a proposal to increase tidal flow

to a degraded marsh would need to document that flow restoration can occur without flooding adjacent low-lying properties and structures. A feasibility study in this example may include tide studies, elevation surveys, and modeling of tidal flow to demonstrate that tidal flow restoration is feasible without creating new, or exacerbating existing flooding problems. It may be that the vertical separation distance between the water and structures is so great, that no feasibility study is required. In some cases, existing flooding problems may even be eliminated through a properly engineered habitat restoration project. In addition to tide and elevation data, a typical feasibility study should include such items as vegetation surveys, preliminary design plans, stream surveys, etc (as applicable to the habitat type to be restored).

**10. Describe the restoration project and attach plans and drawings.** Provide a detailed description of all aspects of the restoration project. The level of detail required for plans and drawings is habitat and project-specific. Plans for the hand removal of invasive plants may only require a plan view showing the areas where hand pulling will occur. Aquatic restoration projects (i.e., tidal wetland restoration, fish passage projects, etc) will require detailed, scaled plan views and elevations. These engineered Project Design Plans are also required for obtaining coastal permits for work in regulated areas in New York and below the Coastal Jurisdiction Line in Connecticut. Please create Project Design Plans to meet the minimum specifications required by the appropriate regulatory agencies. If the application is for design funds, please include evidence that the project is feasible. If one is not required please provide an explanation (see item number 9). Upon project completion, final design plans that meet the specifications of applicable permitting programs will be among the required deliverables for design-fund grant awards.

**11. Identify all required permits.** Identify all required permits, and give their status (i.e., in preparation, submitted or approved), if applicable. In addition, contact the appropriate agency (ies) and obtain an estimate of the time anticipated for a permit to issue from the receipt of a complete permit application. A description of the permit status is important for the application reviewers to determine if the restoration proposal could be reasonably accomplished within the time constraints of the grant program (usually 1-2 years). Ideally, the most favorable review for an application seeking funding for construction is one where the permits have already been issued. The most common permit types necessary for habitat restoration projects in Connecticut and New York State are outlined in Chapter 2 of this document. **Please answer the following questions when submitting your**

**Elements of a Complete Habitat Restoration Proposal:**

- Have you applied for permit(s)? (yes/no); if yes, please list all.
- If yes, what is the anticipated issuance date?
- If no, have the applications been drafted? Do you need to hire a consulting engineer to help draft the application or prepare plans and conduct various studies to support the proposal?

**12. Have reviews been conducted to determine if rare species are present at the project site?** Provide information on whether a determination has been made regarding the presence of rare or endangered species or communities at the site. In Connecticut, applicants should consult the natural diversity database maps

([http://www.ct.gov/deep/cwp/view.asp?a=2702&q=323464&deepNav\\_GID=1628](http://www.ct.gov/deep/cwp/view.asp?a=2702&q=323464&deepNav_GID=1628)) and locate the project site. If the project area lies within a species circle, then further review must be conducted by the Connecticut Department of Energy and Environmental Protection. For instructions on initiating this review, refer to [http://www.ct.gov/deep/cwp/view.asp?a=2702&q=323466&deepNav\\_GID=1628&deepNav\\_av=1](http://www.ct.gov/deep/cwp/view.asp?a=2702&q=323466&deepNav_GID=1628&deepNav_av=1).

In New York, please refer to the NYS Department of Environmental Conservation's Endangered Species page (<http://www.dec.ny.gov/animals/7181.html>) and the Natural Heritage Program for additional information, <http://www.dec.ny.gov/animals/29338.html>.

**13. Identify strategies for long-term protection and management.** Describe the anticipated long-term maintenance requirements, using studies or sources to support claims of low or no maintenance. The ideal restoration site is one that will be self-maintaining and will not require maintenance, such as restoration of tidal flow to a degraded tidal marsh. Projects that require a high level of maintenance may not be eligible for restoration funds (refer to the individual grant program guidelines). Restoration projects that are dependent upon successful invasive species control will have varying levels of long-term management to control invasive or prevent reinvasion. Applicants for habitat restoration projects that will be accomplished via invasive species control need to demonstrate how the long term monitoring and maintenance will be accomplished. All projects must include a 3-year (minimum) post-construction monitoring plan that includes maintenance if necessary.

If the issue causing degradation covers an area greater than that proposed for restoration, include any relevant information about plans to continue the effort on adjacent parcels or throughout the affected area to address the entire issue. For example, if your project proposes removing Japanese Knotweed on one parcel, but that parcel is surrounded on three sides by properties covered in Japanese Knotweed, please indicate how you (or others) plan to prevent re-encroachment or continue the effort on the adjoining properties.

**14. Provide information related to global climate change specific to your site, including accelerated sea level rise. Include details about properties immediately landward of your site.** Address climate change issues in your application. For example, how will temperature increases affect the potential success of a shellfish or eelgrass project, or the spread and control efforts necessary for invasive plants (aquatic or terrestrial). For sites that are affected by tidal action, such as tidal marshes, provide an assessment of the likely impacts of sea level rise upon the success and longevity of the project. In the case of a tidal marsh restoration, what is the relationship between the wetland and the adjacent uplands (i.e., is there opportunity for marine transgression; are the elevational gradients in the adjacent upland areas appropriate to accommodate salt marsh formation under conditions of marine transgression; is there a barrier such as a bulkhead between the wetlands and the uplands)? For reference, please refer to the 2007 Union of Concerned Scientists report for the U.S. Northeast at [http://www.ucsusa.org/global\\_warming/regional\\_information/northeastern-](http://www.ucsusa.org/global_warming/regional_information/northeastern-)

[states.html#.VNTGvaMo6JA](#).

**15. Detail the restoration schedule.** Provide a schedule of the steps required to implement the restoration (e.g., apply for permits, secure additional funding) and a schedule for construction, including details on contractor availability (if applicable). Identify any seasonal restrictions that limit the time when the restoration can occur (i.e., nesting of shorebirds, or the spring migration of diadromous fish, etc.).

**16. Identify archaeological impacts.** State and federal grant programs may require an assessment of the potential archaeological impacts of a restoration project. Applicants are advised to contact the granting agency with respect to this evaluation.

Please direct any questions regarding these requirements to the habitat restoration coordinators.

## CHAPTER FOUR

### *Habitat Restoration Goals and Parameters*

## Background

The following goals and parameters were created by the LISS Habitat Restoration & Stewardship Work Group in response to a 2015 LISS Management Committee directive. The intention was to create a list of priorities that could be used to optimize the allocation of LIS-related resources to projects that best meet the objectives referenced under the LISS CCMP theme *Thriving Habitats and Abundance*. As project managers prepare LIS habitat restoration project proposals it is essential that they refer to these goals and parameters.

## Restoration Goals

1. Restore or enhance habitats capable of providing healthy and resilient ecosystem functions and habitat creation that facilitates climate change adaptation.
2. Convert shorelines with structural erosion controls using, where appropriate, non-structural 'living shorelines' to restore or create targeted ecological functions.
3. Remove man-made obstacles (e.g., dams, culverts, bulkheads) to ecosystem adaptation (e.g. marsh migration)
4. Restore coastal habitats capable of supporting species of greatest conservation need or federal trust species.
5. Restore terrestrial and aquatic habitats to create or improve habitat connectivity (e.g., to promote habitat migration or expansion, and species dispersal).

## Habitat Restoration Project Selection Parameters

1. Has high likelihood of sustainability and adaptability under changing (climatic) conditions without significant maintenance
2. Addresses threats (e.g., water quality, invasive species, etc.) to habitat's long-term viability and provision of ecosystem services
3. Is consistent with/complements conservation objectives for adjacent habitats
4. The site and purpose of the habitat restoration is appropriate within the context of the landscape and ecological communities in which it is proposed and supported by scientifically-sound principles of ecological restoration
5. Include, where appropriate, engineered design plans needed to complete the project
6. Employs adaptive management by identifying and addressing project uncertainties including alternative actions which may be needed to address alternative outcomes
7. Ability of property owner or project lead to provide for long-term monitoring