

PUBLIC NOTICE

US Army Corps
of Engineers
New York District
Jacob K. Javits Federal Building
New York, N.Y. 10278-0090
ATTN: Regulatory Branch

In replying refer to:
Public Notice Number: **NAN-2020-01304-EMI**
Issue Date: **June 2, 2021**
Expiration Date: **July 1, 2021**

To Whom It May Concern:

The New York District, Corps of Engineers has received an application for a Department of the Army permit pursuant to Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403) and Section 404 of the Clean Water Act (33 U.S.C. 1344).

APPLICANT: Cornell Cooperative Extension of Suffolk County
423 Griffing Avenue, Suite 100
Riverhead, New York 11901

ACTIVITY: Marsh Island, Oyster Reef and Submerged Aquatic Vegetation Restoration and Enhancement and Dredging

WATERWAY: Cedar Beach Creek

LOCATION: 3690 Cedar Beach Road, Town of Southold, Suffolk County, New York

A detailed description and plans of the applicant's activity are enclosed to assist in your review.

The decision whether to issue a permit will be based on an evaluation of the probable impact including cumulative impacts of the proposed activity on the public interest. That decision will reflect the national concern for both protection and utilization of important resources. The benefit which reasonably may be expected to accrue from the proposal must be balanced against its reasonably foreseeable detriments. All factors which may be relevant to the proposal will be considered including the cumulative effects thereof; among those are conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shoreline erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, considerations of property ownership and, in general, the needs and welfare of the people.

The Corps of Engineers is soliciting comments from the public; Federal, state, and local agencies and officials; Indian Tribes; and other interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received will be considered by the Corps of Engineers to determine whether to issue, modify, condition or deny a permit for this proposal. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and the other public interest factors listed above. Comments are used in preparation of an Environmental Assessment and/or an Environmental Impact Statement pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity.

ALL COMMENTS REGARDING THE PERMIT APPLICATION MUST BE PREPARED IN WRITING AND EMAILED TO REACH THIS OFFICE BEFORE THE EXPIRATION DATE OF THIS NOTICE,

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PUBLIC NOTICE NO. NAN-2020-01304-EMI

otherwise, it will be presumed that there are no objections to the activity.

Comments submitted in response to this notice will be fully considered during the public interest review for this permit application. Comments provided will become part of the public record for this permit application. All written comments, including contact information, will be made a part of the administrative record, available to the public under the Freedom of Information Act. The Administrative Record, or portions thereof, may also be posted on a Corps of Engineers internet web site. Due to resource limitations, this office will normally not acknowledge the receipt of comments or respond to individual letters of comment.

Any person may request, in writing, before this public notice expires, that a public hearing be held to collect information necessary to consider this application. Requests for public hearings shall state, with particularity, the reasons why a public hearing should be held. It should be noted that information submitted by email is considered just as carefully in the permit decision process and bears the same weight as that furnished at a public hearing.

Our preliminary determination is that the activity for which authorization is sought herein is not likely to affect any Federally endangered or threatened species or their critical habitat. However, pursuant to Section 7 of the Endangered Species Act (16 U.S.C. 1531), the District Engineer is consulting with the appropriate Federal agency to determine the presence of and potential impacts to listed species in the project area or their critical habitat.

The Magnuson-Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act (Public Law 104-267), requires all Federal agencies to consult with the National Oceanic and Atmospheric Administration Fisheries Service (NOAA/FS) on all actions, or proposed actions, permitted, funded, or undertaken by the agency, that may adversely affect Essential Fish Habitat (EFH). The proposed work, fully described in the attached work description, could cause the disruption of habitat for various lifestages of some EFH-designated species as a result of a temporary increase in turbidity during construction. However, the New York District has made the preliminary determination that the site-specific adverse effects are not likely to be substantial because it is expected that fish populations would avoid the area of disturbance. Further consultation with NOAA/FS regarding EFH impacts and conservation recommendations is being conducted and will be concluded prior to the final decision.

Based upon a review of the latest published version of the National Register of Historic Places, there are no known sites eligible for, or included in, the Register within the permit area. Presently unknown archeological, scientific, prehistorical, or historical data may be lost by work accomplished under the required permit.

Reviews of activities pursuant to Section 404 of the Clean Water Act will include application of the guidelines promulgated by the Administrator, U.S. Environmental Protection Agency, under authority of Section 404 (b) of the Clean Water Act and the applicant will obtain a water quality certificate or waiver from the appropriate state agency in accordance with Section 401 of the Clean Water Act prior to a permit decision.

Pursuant to Section 307 (c) of the Coastal Zone Management Act of 1972 as amended [16 U.S.C. 1456 (c)], for activities under consideration that are located within the coastal zone of a state which has a federally approved coastal zone management program, the applicant has certified in the permit application that the activity complies with, and will be conducted in a manner that is consistent with, the approved state coastal zone management program. By this public notice, we are requesting the state's concurrence with, objection to, or waiver of the applicant's certification. No

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permit decision will be made until one of these actions occur. For activities within the coastal zone of New York State, the applicant's certification and accompanying information is available from the Consistency Coordinator, New York State Department of State, Division of Coastal Resources and Waterfront Revitalization, Coastal Zone Management Program, One Commerce Plaza, 99 Washington Avenue, Albany, New York 12231, Telephone (518) 474-6000. Comments regarding the applicant's certification, and copies of any letters to this office commenting upon this proposal, should be so addressed.

In addition to any required water quality certificate and coastal zone management program concurrence, the applicant has obtained or requested the following governmental authorization for the activity under consideration:

- New York State Department of Environmental Conservation

It is requested that you communicate the foregoing information concerning the activity to any persons known by you to be interested and who did not receive a copy of this notice. Please send all comments and questions concerning this application to Christopher.W.Minck@usace.army.mil.

In order for us to better serve you, please complete our Customer Service Survey located at <http://www.nan.usace.army.mil/Missions/Regulatory/CustomerSurvey.aspx>.

For more information on New York District Corps of Engineers programs, visit our website at <http://www.nan.usace.army.mil>.

FOR AND IN BEHALF OF
Stephan A. Ryba
Chief, Regulatory Branch

Enclosures

WORK DESCRIPTION

The permit applicant, Cornell Cooperative Extension (CCE) of Suffolk County, has requested Department of the Army (DA) authorization for marsh island, oyster reef, and submerged aquatic vegetation (SAV) restoration. The project is located at Cedar Beach Creek, at 3690 Cedar Beach Road in the Town of Southold, Suffolk County, New York.

The proposed work would involve the following:

Marsh Islands:

Construction of two (2) marsh islands totaling approximately 4.8 acres, of which approximately 4.3 acres (188,800 square feet) will be low marsh and approximately 0.5 acres (21,800 square feet) will be high marsh.

Marsh Island A will be approximately 1.9 acres, consisting of low marsh with elevations ranging from 1.6 to 2.23 feet above Mean Low Water (MLW), to be planted with *Spartina alterniflora*. Marsh Island A will incorporate two (2) existing adjacent marsh islands and connect with the existing western marsh to create a larger continuous marsh.

Marsh Island B will be approximately 2.9 acres consisting of 2.4 acres of low marsh with elevations ranging from 1.6 to 2.23 feet above MLW, a narrow transition zone with elevations ranging from 2.23 to 2.38 feet above MLW, and 0.5 acres of high marsh at the center of the island with elevations ranging from 2.38 to 2.7 feet above MLW. The low marsh and transition area will be planted with *Spartina alterniflora* and the high marsh will be planted with *Spartina patens* and *Distichlis spicata*. Secondary plantings following establishment in the high marsh may include *Salicornia* species, *Limonium carolinianum*, and *Iva frutescens*. Marsh Island B will incorporate a thin band of existing marsh along the northern side of the proposed marsh island.

Both marsh islands will include swales to feed sediment-laden water into interior sections of the marsh islands.

To construct the marsh islands, approximately 15,000 cubic yards of material will be discharged below the plane of Spring High Water. Approximately 14,900 cubic yards of material will come from the dredging of four (4) shoaled areas (Dredge Areas 1-4) over approximately 3.7 acres (161,202 square feet), using a bucket dredge or a small pump-powered suction dredge (six-inch diameter) to a maximum depth of 30-inches below the existing grade, ranging from approximately 2.21 to 3.26 feet below MLW. The remaining material needed (approximately 100 cubic yards) will come from one of two options: a fifth dredge area (Dredge Area 5), which is approximately 0.3 acres (12,929 square feet) and could allow for up to 1,197 cubic yards to be dredged or clean sand from an upland location.

An approximately 10 to 15-foot-wide by 450-foot-long temporary sand causeway will be temporarily constructed for access to the marsh islands to allow for transport of the dredged material.

Submerged Aquatic Vegetation (SAV) Planting:

Within two areas on the east and west sides of Marsh Island A, totaling approximately 2.0 acres, plant approximately 0.5 to 1.0 acres of *Ruppia maritima* to re-establish SAV. Planting will occur in areas that are at -2.0 feet at MLW.

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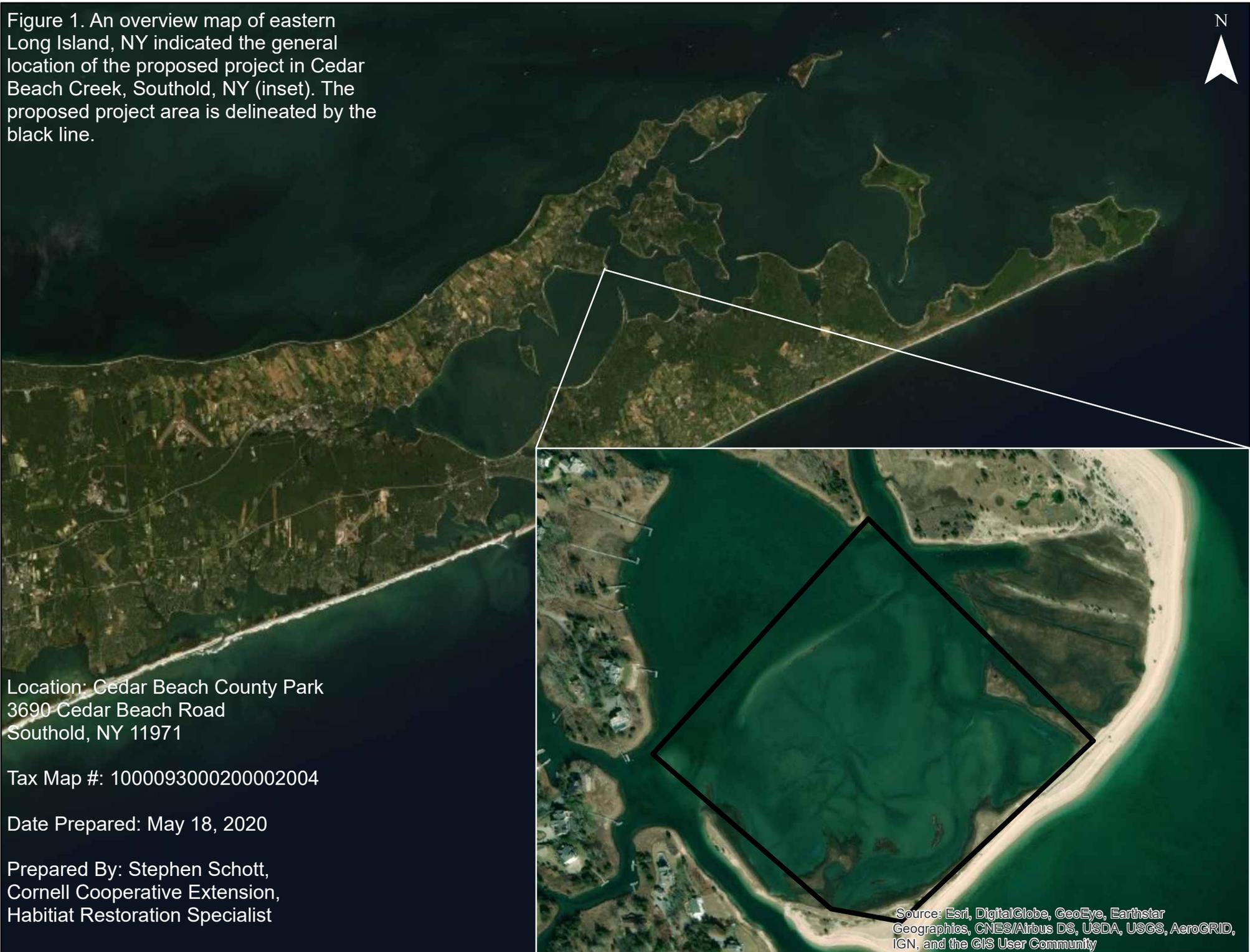
Oyster Reef:

Construct an approximately 75-foot-wide by 145-foot-long (0.25 acre) oyster reef consisting of approximately 60,000 eastern oyster (*Crassostrea virginica*) spat-on-shell (approximately 100 cubic yards). The reef would consist of a perimeter of shell bags (approximately one-foot in diameter by three-foot-long) filled with oyster and surf clam shells stacked two bags high with the spat-on shell placed within the perimeter.

The applicant has stated that they have avoided, minimized, and mitigated for potential impacts proposed to the maximum extent practicable by containing dredged material within the footprint of the marsh islands with haybales staked around the perimeter of the island and when constructing the temporary causeway, any existing vegetation will be removed, transplanted into pots, and maintained at the CCE Habitat Restoration Nursery until construction completion when they will be replanted. Most impacts are anticipated to be temporary and those permanent impacts to the waterway are anticipated to provide an ecological benefit. Both temporary and permanent impacts would be offset by implementing best management practices and the applicant would implement adaptive management and monitoring in accordance with the enclosed plans, which would be required in special conditions of any Department of the Army permit authorization.

The purpose of the project is to restore and enhance habitat within the estuary which has experienced long-term, steady decline in marsh habitat.

Figure 1. An overview map of eastern Long Island, NY indicated the general location of the proposed project in Cedar Beach Creek, Southold, NY (inset). The proposed project area is delineated by the black line.



Location: Cedar Beach County Park
3690 Cedar Beach Road
Southold, NY 11971

Tax Map #: 1000093000200002004

Date Prepared: May 18, 2020

Prepared By: Stephen Schott,
Cornell Cooperative Extension,
Habitat Restoration Specialist

Source: Esri, DigitalGlobe, GeoEye, Earthstar
Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID,
IGN, and the GIS User Community

Figure 2. A map of Cedar Beach Creek delineating the existing salt marsh within, and adjacent to, the proposed project area. The star identifies the location a SET station maintained by the Peconic Estuary Partnership and The Nature Conservancy.

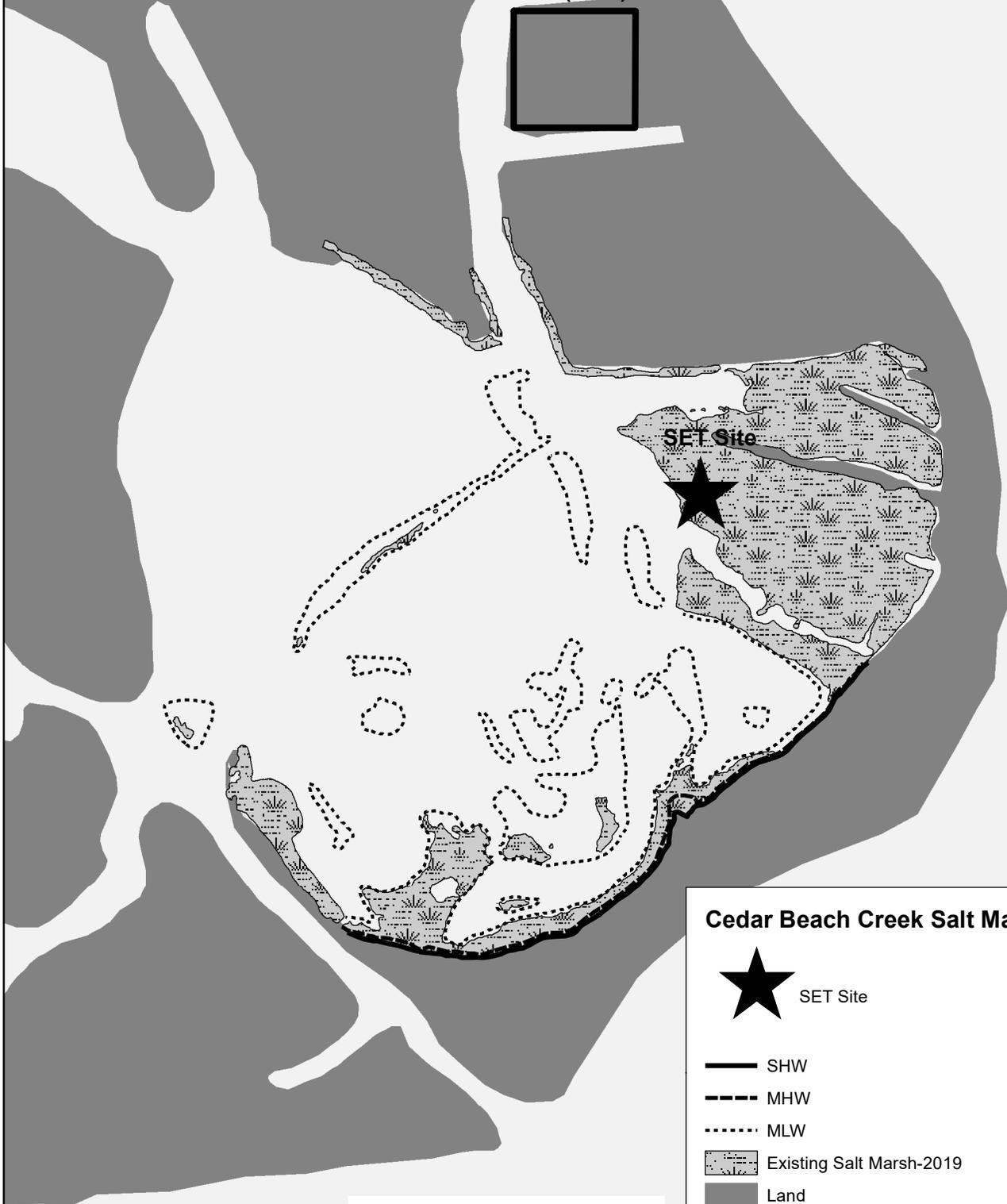
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**Suffolk County
Marine Environ-
mental Learning
Center (CCE)**



Cedar Beach Creek Salt Marsh Restoration



SET Site

— SHW

- - - MHW

· · · · · MLW

 Existing Salt Marsh-2019

 Land

 Open Water

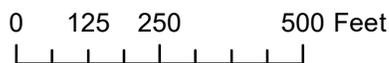


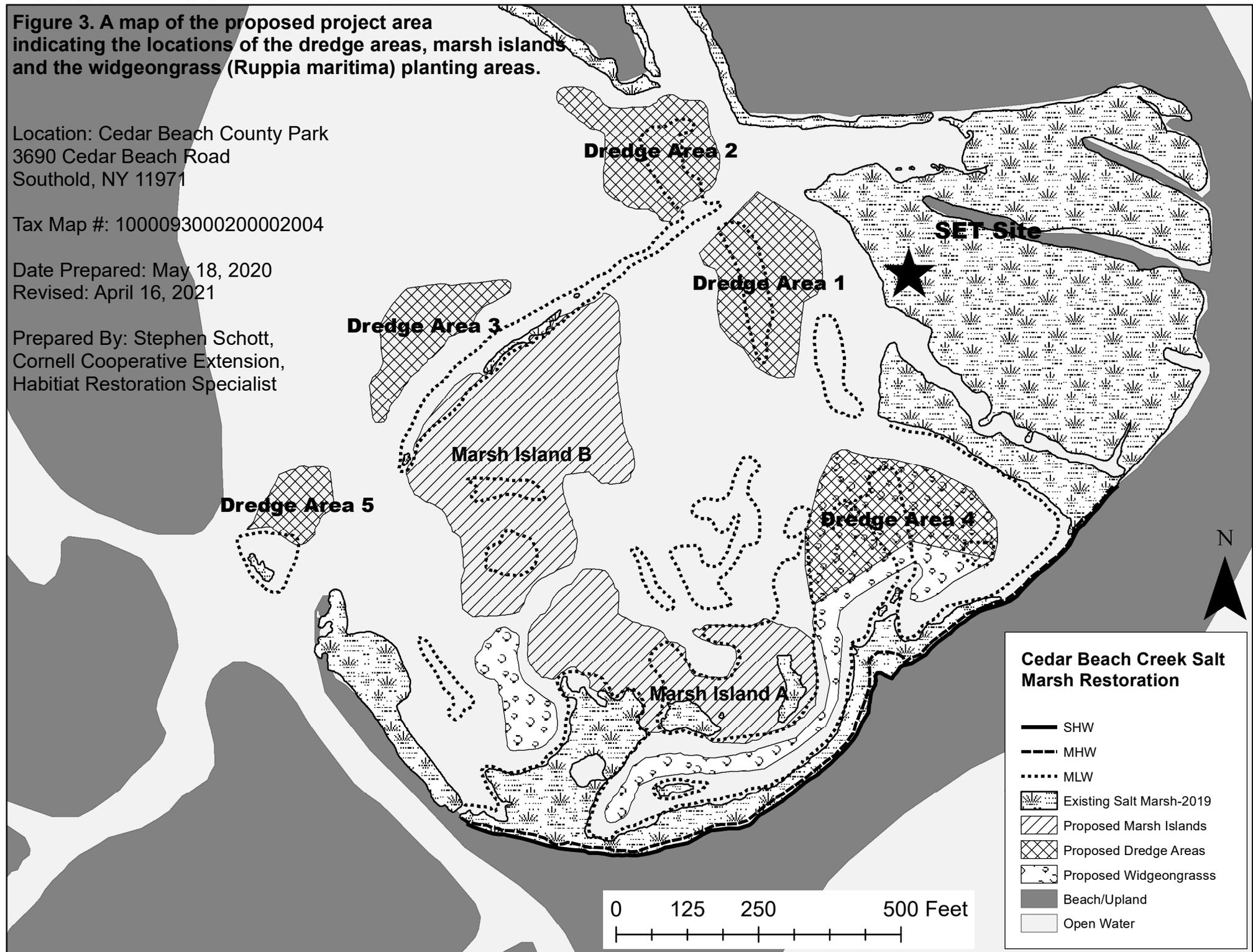
Figure 3. A map of the proposed project area indicating the locations of the dredge areas, marsh islands and the widgeongrass (*Ruppia maritima*) planting areas.

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Habitat Restoration Specialist



Cedar Beach Creek Salt Marsh Restoration

- SHW
- - - MHW
- MLW
- Existing Salt Marsh-2019
- Proposed Marsh Islands
- Proposed Dredge Areas
- Proposed Widgeongrass
- Beach/Upland
- Open Water

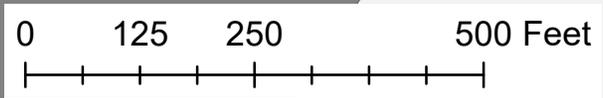


Figure 4. A map of the proposed marsh islands to be constructed in Cedar Beach Creek. Marsh Island A will consist entirely of low marsh while Marsh Island B will be composed of a 75' wide band of low marsh surrounding 0.5 acres of high marsh.

Total Area: 210,600 sq. feet (21,800 sq. feet-High Marsh; 188,800 sq. feet-Low Marsh)

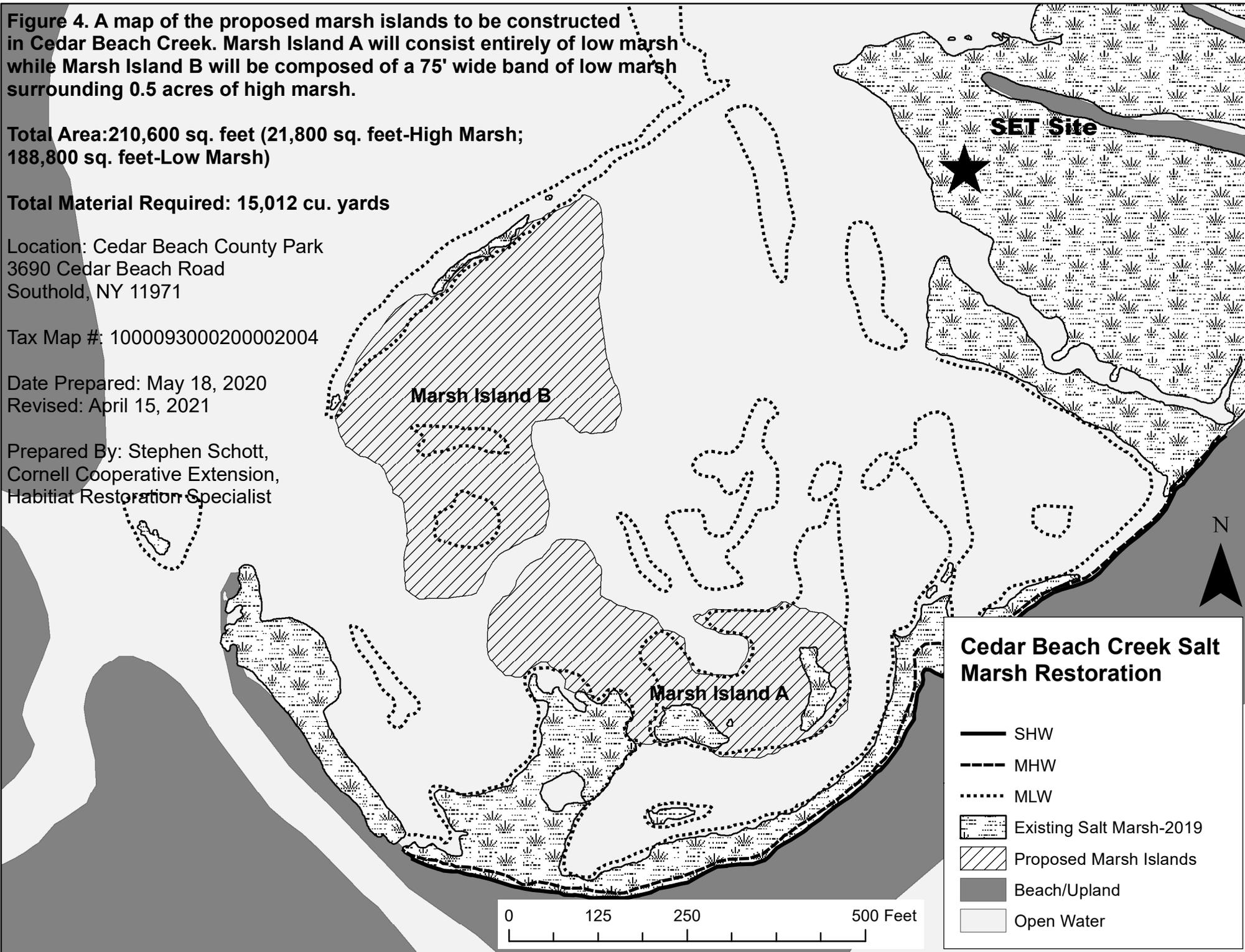
Total Material Required: 15,012 cu. yards

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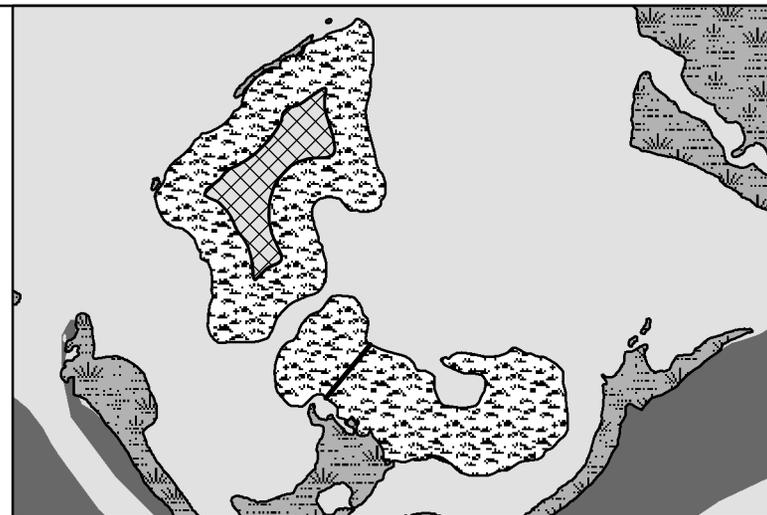
Cedar Beach Creek Salt Marsh Restoration

- SHW
- - - MHW
- MLW
- [Pattern] Existing Salt Marsh-2019
- [Hatched] Proposed Marsh Islands
- [Dark Grey] Beach/Upland
- [Light Grey] Open Water

Figure 5. Cross-sectional diagram of proposed Marsh Island A within Cedar Beach Creek, Southold, NY. The area profiled is indicated by the line in the inset map.

Total Area: 82,500 sq. feet (All Low Marsh)

Total Material Required: 5,640 cu. yards



Low Marsh (1.6 - 2.3' above MLW)

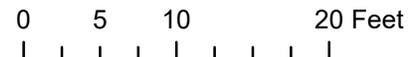


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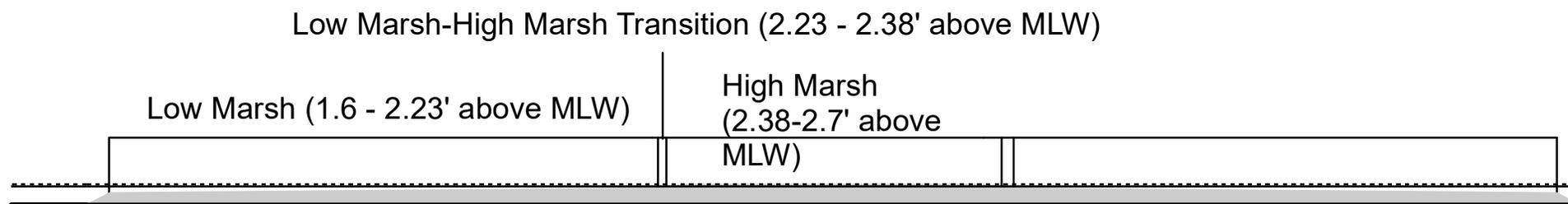
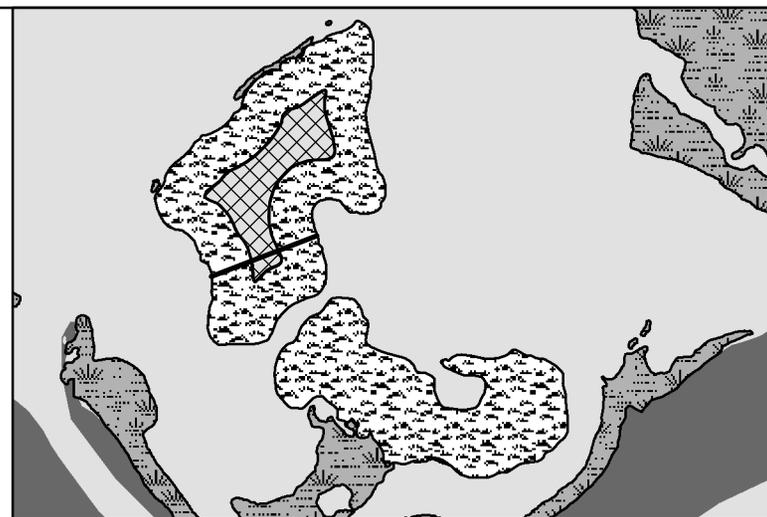


----- SHW
——— MHW
——— MLW

Figure 6. Cross-sectional diagram of proposed Marsh Island B within Cedar Beach Creek, Southold, NY. The area profiled is indicated by the line in the inset map.

Total Area: 128,100 sq. feet (21,800 sq. feet-High Marsh; 106,300 sq. feet-Low Marsh)

Total Material Required: 9,370 cu. yards



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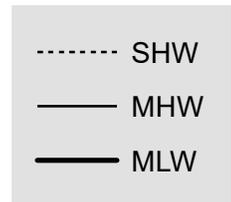
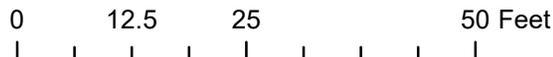


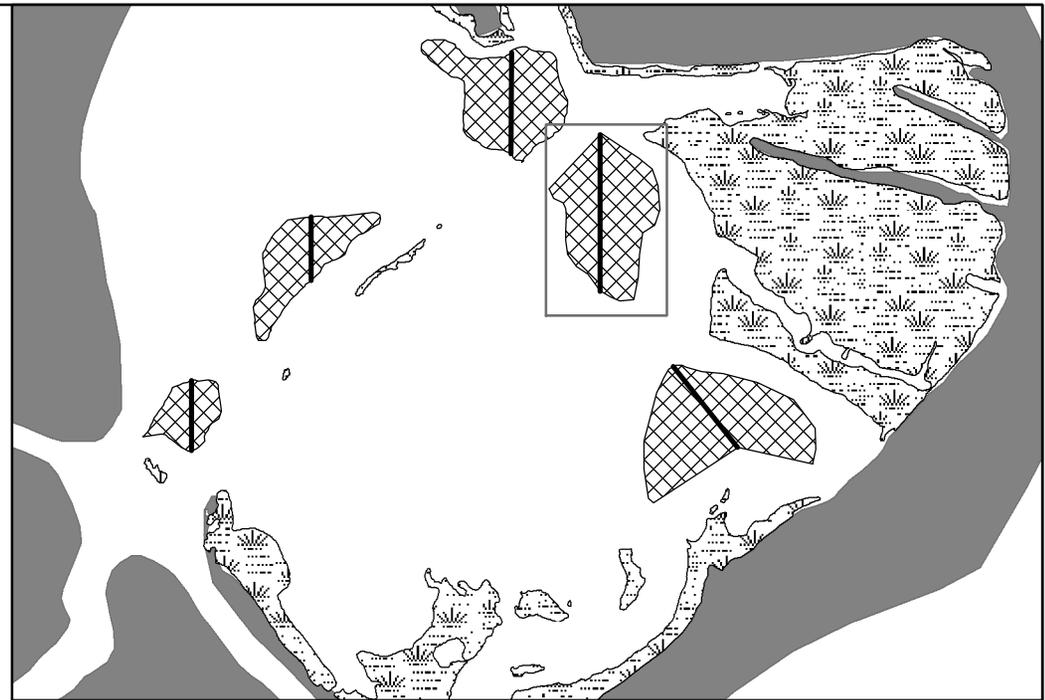
Figure 7. Cross-sectional diagram of proposed Dredge Area 1 (highlighted by the box) within Cedar Beach Creek, Southold, NY.

Total Area: 43,915 sq. feet

Dredge Depth: 2.5 feet

Total Depth below MLW: 2.0 feet

Total Dredge Material: 4,066 cu. yards



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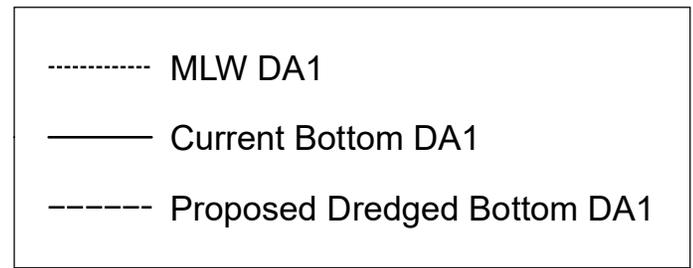
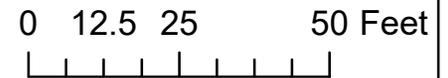


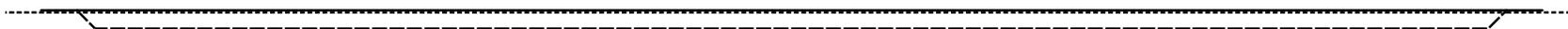
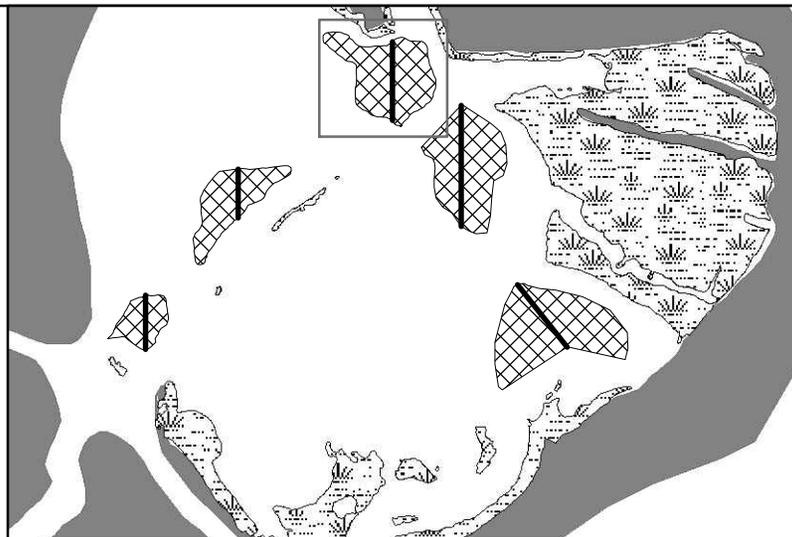
Figure 8. Cross-sectional diagram of proposed Dredge Area 2 (highlighted by the box) within Cedar Beach Creek, Southold, NY.

Total Area: 38,711 sq. feet

Dredge Depth: 2.5 feet

Total Depth below MLW: 2.21 feet

Total Dredge Material: 3,584 cu. yards



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Habitat Restoration Specialist



- MLW DA2
- Current Bottom DA2
- Proposed Dredged Bottom DA2

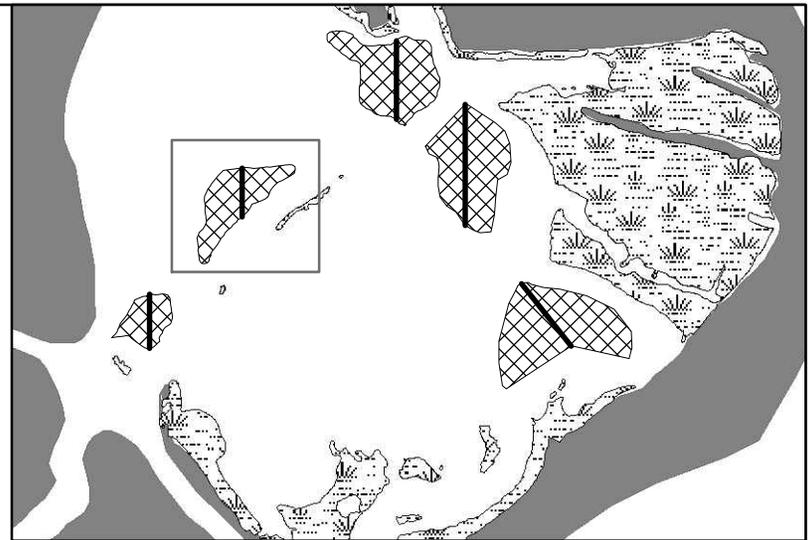
Figure 9. Cross-sectional diagram of proposed Dredge Area 3 within Cedar Beach Creek, Southold, NY.

Total Area: 25,135 sq. feet

Dredge Depth: 2.5 feet

Total Depth below MLW: 2.39 feet

Total Dredge Material: 2,327 cu. yards



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- MLW DA3
- Current Bottom DA3
- Proposed Dredged Bottom DA3

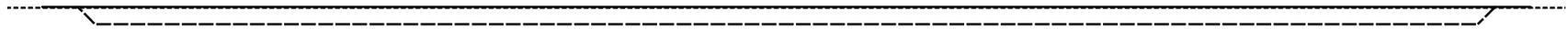
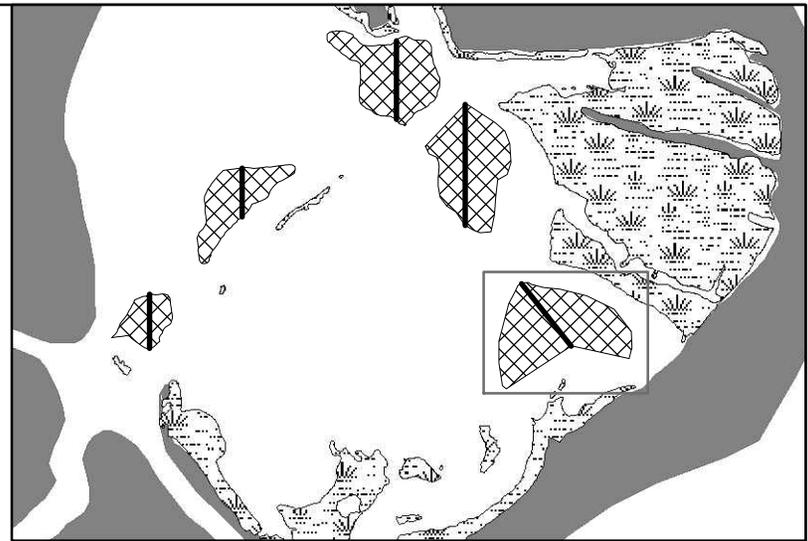
Figure 10. Cross-sectional diagram of proposed Dredge Area 4 (highlighted by the box) within Cedar Beach Creek, Southold, NY.

Total Area: 53,441 sq. feet

Dredge Depth: 2.5 feet

Total Depth below MLW: 2.36 feet

Total Dredge Material: 4,948 cu. yards

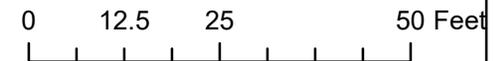


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- MLW DA4
- Current Bottom DA4
- Proposed Dredged Bottom DA4

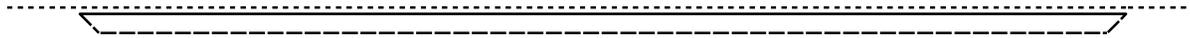
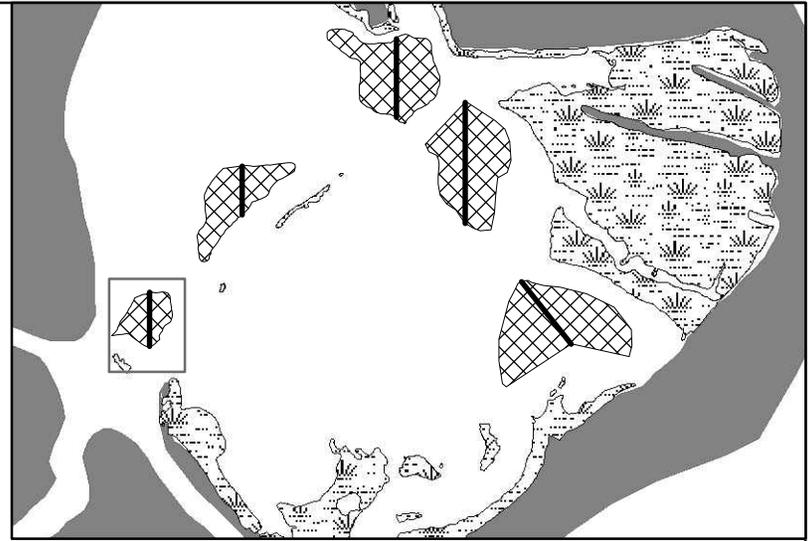
Figure 11. Cross-sectional diagram of proposed Dredge Area 5 (highlighted by the box) within Cedar Beach Creek, Southold, NY.

Total Area: 12,929 sq. feet

Dredge Depth: 2.5 feet

Total Depth below MLW: 3.36 feet

Total Dredge Material: 1,197 cu. yards



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Date Prepared: May 18, 2020

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- MLW DA5
- Current Bottom DA5
- Proposed Dredged Bottom DA5

Figure 12. Map indicating the proposed location of a temporary sand causeway to provide access for machinery to work on marsh islands.

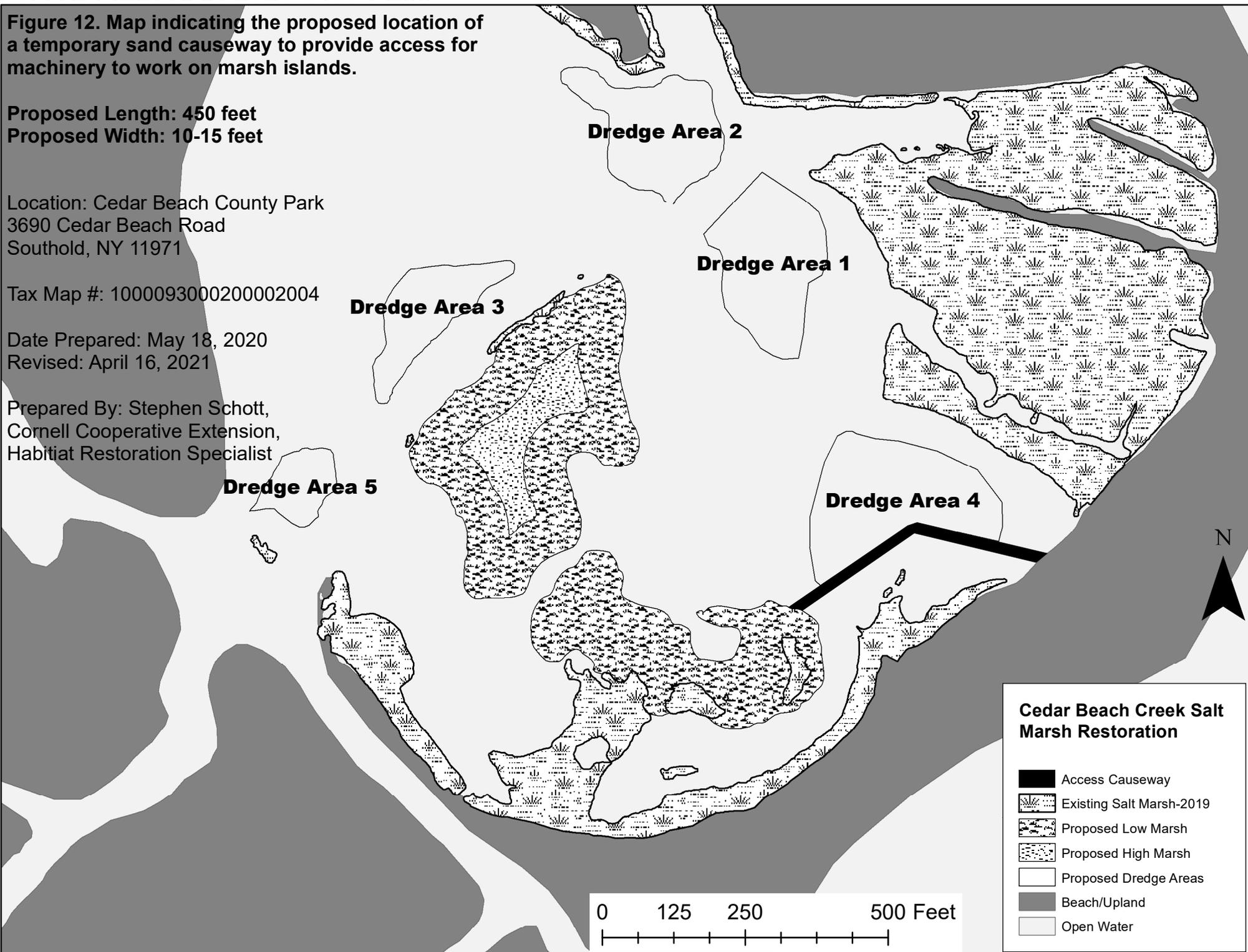
Proposed Length: 450 feet
Proposed Width: 10-15 feet

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Date Prepared: May 18, 2020
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Habitat Restoration Specialist



Cedar Beach Creek Salt Marsh Restoration

- Access Causeway
- Existing Salt Marsh-2019
- Proposed Low Marsh
- Proposed High Marsh
- Proposed Dredge Areas
- Beach/Upland
- Open Water

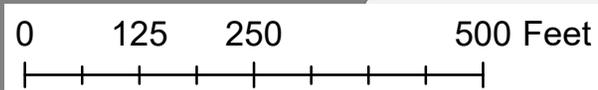


Figure 13. The location of the proposed Oyster Reef in the Cedar Beach Creek project area.

Total Area: 10,875 sq. feet
Volume of Spat on Shell: 100 cubic yards

Location: Cedar Beach County Park
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Southold, NY 11971

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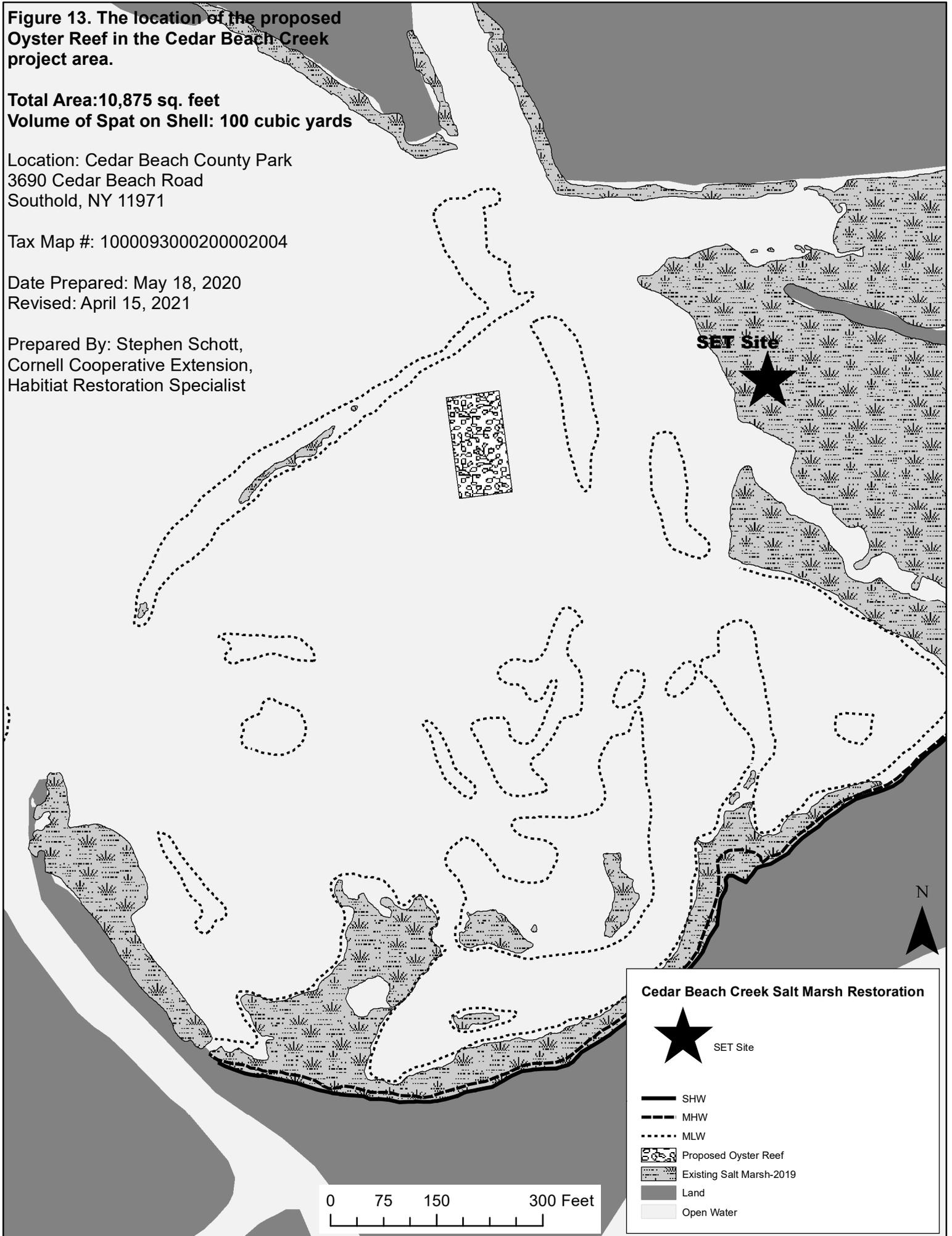


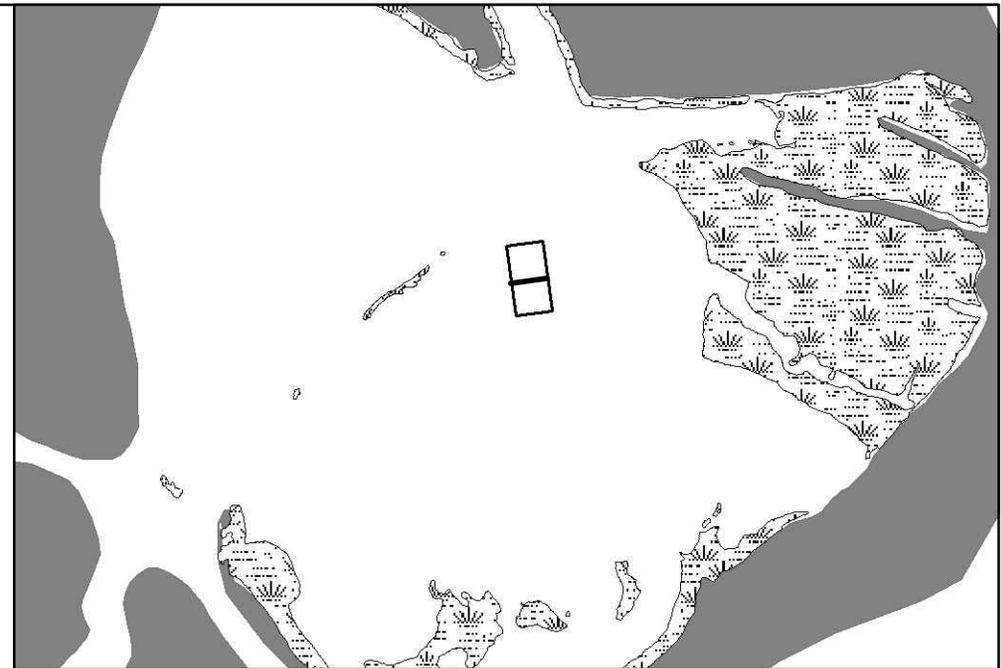
Figure 14. Cross-sectional diagram (profile direction indicated in the inset map by the line) of the proposed oyster reef within Cedar Beach Creek, Southold, NY.

The reef will be composed of a single row of shellbags lining the perimeter, with a shell base of no more than 6 inches, and topped with 6 inches of oyster spat on shell and loose oysters.

Total Area: 10,875 sq. feet

Height Above Sediment Surface: 1.0 foot

Height Above MLW (top of reef): 1.72 feet

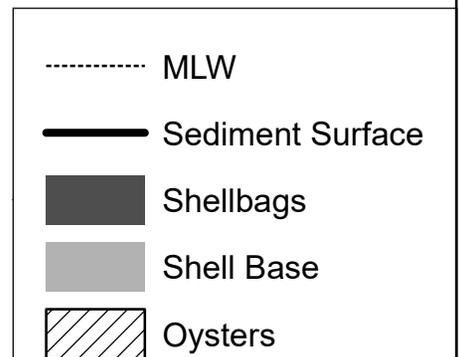


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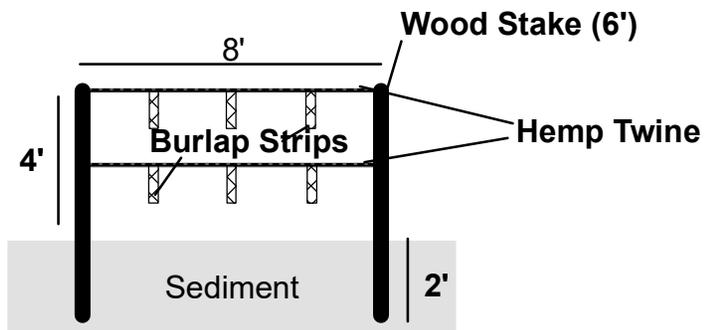


Figure 15. A map and inset diagram of the proposed bird exclusion fencing to be installed over the marsh islands as vegetation is planted. Wooden stakes will be placed at 8' intervals (the line intersections) with hemp twine run between each stake. Untreated burlap strips will be tied at 2' intervals along each line to act as a deterrent for geese and swans. Twine with burlap strips will be run along the perimeter of the marsh islands as illustrated in the inset.

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Date Prepared: August 19, 2020
 Revised: April 15, 2021

Prepared By: Stephen Schott,
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 Habitat Restoration Specialist

0 75 150 300 Feet

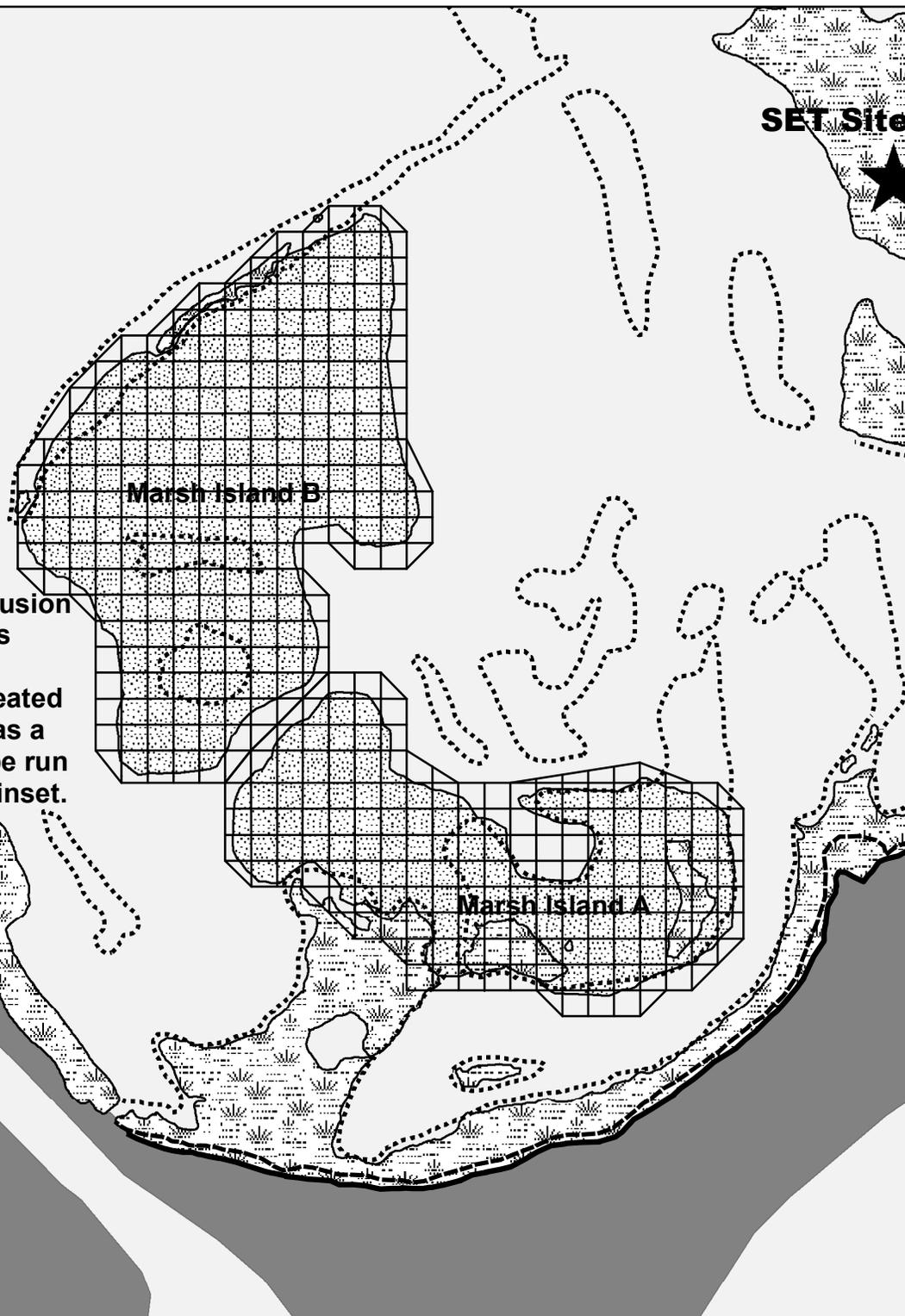


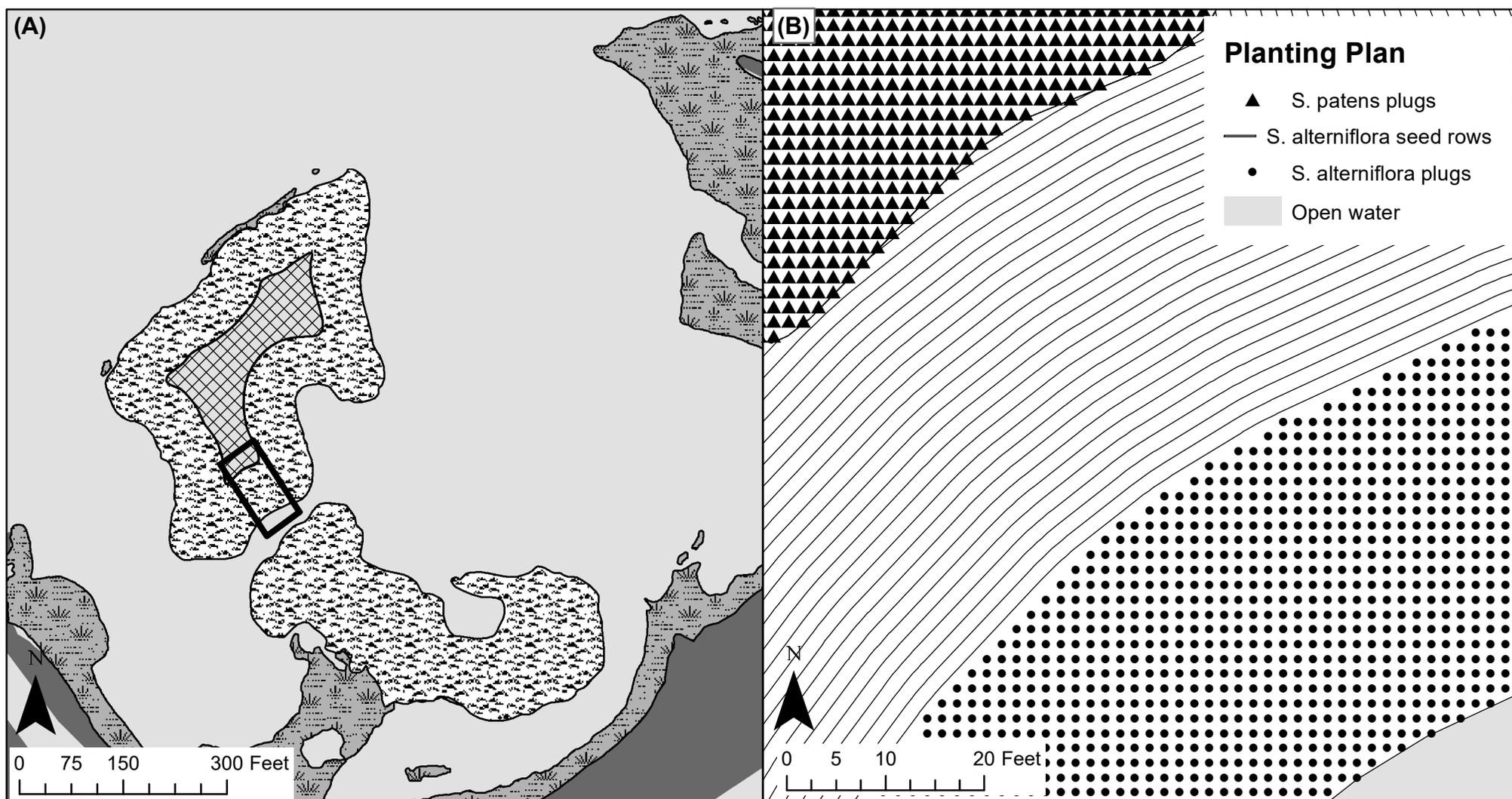
Figure 16. Planting diagram for the marsh islands proposed for Cedar Beach Creek, Southold, NY. The black rectangle in (A) below indicates the area of focus presented in the second diagram. *Spartina alterniflora* plugs will be planted along the offshore edge of the marsh islands in a 35 ft wide band and at an 18in-OC spacing. A drop seeder will be used to seed rows of *S. alterniflora* at 18 inch spacing between rows from the upland edge of the plug planting to the edge of the high marsh. The high marsh will be planted with *Spartina patens* plugs spaced 18 inches OC.

Location: Cedar Beach County Park
 3690 Cedar Beach Road
 Southold, NY 11971

Tax Map #: 1000093000200002004

Date Prepared: April 18, 2021

Prepared By: Stephen Schott,
 Habitat Restoration Specialist,
 Cornell Cooperative Extension



USACE FILE: NAN-2020-01304-EMI

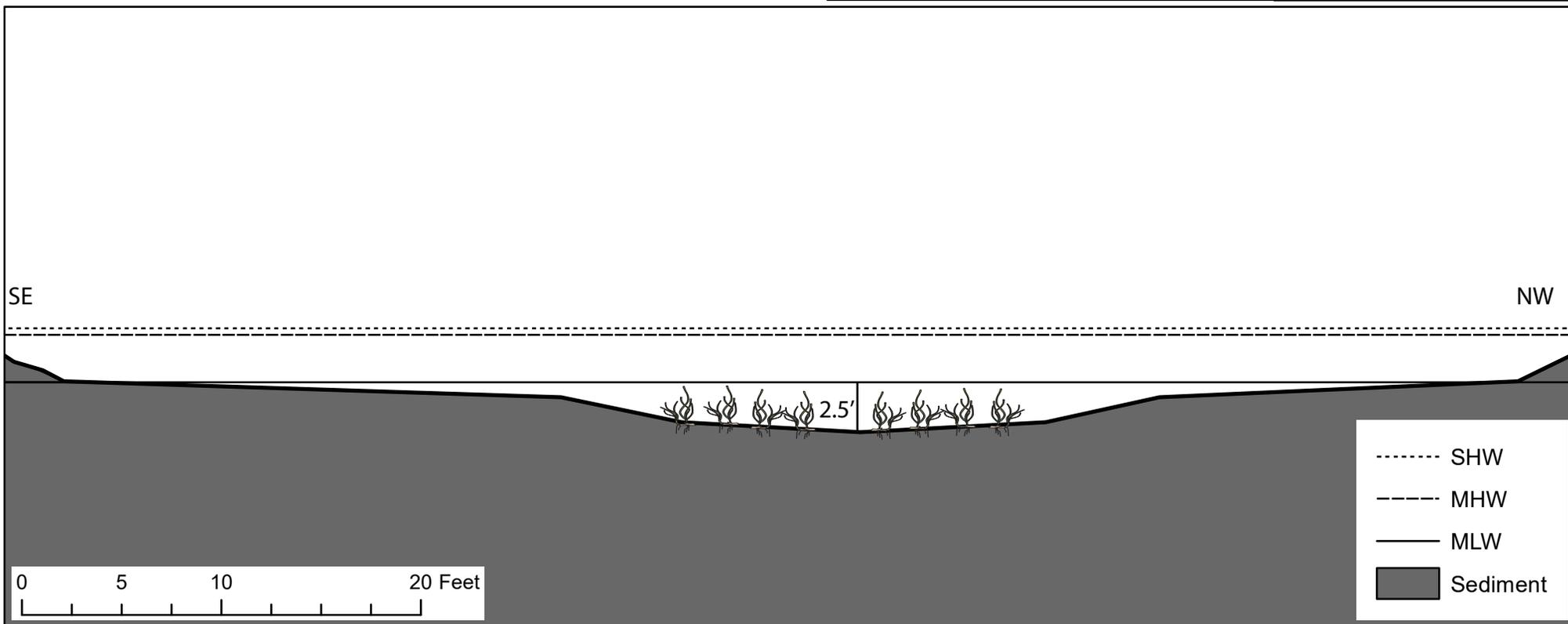
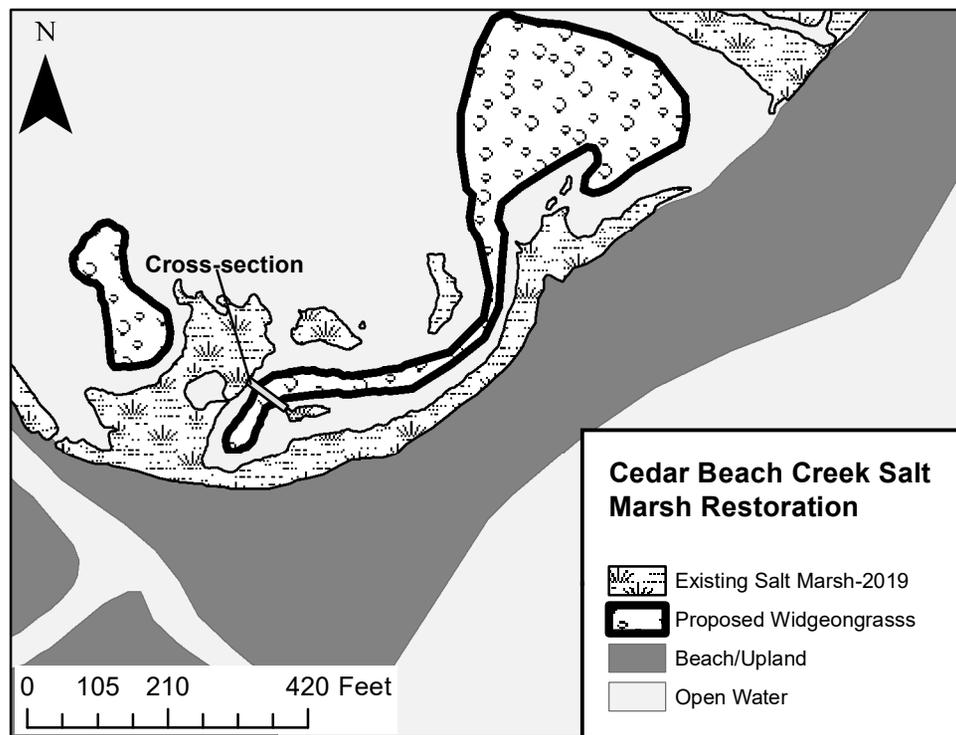
Figure 17. Cross-section of the *Ruppia maritima* (widgeongrass) proposed for Cedar Beach Creek, Southold, NY. The target area for planting *Ruppia* is shown in the inset map and covers approximately 2 acres. The planting depth (MLW) for *Ruppia* is 2ft, and not all of the 2 acre target area can meet that target. As a result, 0.5-1 acre of *Ruppia* plantings is proposed for this project.

Location: Cedar Beach County Park
3690 Cedar Beach Road
Southold, NY 11971

Tax Map #: 1000093000200002004

Date Prepared: April 20, 2021

Prepared By: Stephen Schott,
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The Cedar Beach Creek Habitat Restoration Demonstration Project - Monitoring and Adaptive Management Plans

1. Project Monitoring Plan

The following project monitoring plan details how the success of this project will be followed after the project construction phase has been completed. Project monitoring will include quantitative measurements of growth (e.g. density, size, etc) and survival, as well as visual assessments via video transects and drone flights to potentially identify maintenance issues (removal of jetsam/flotsam, repairs of animal exclusion fencing, and emergence of *Phragmites australis*) and generally document changes in the project area (erosion/accretion, wildlife usage, recruitment of ribbed mussels) over time. The monitoring plan for this project addresses each of the NOAA requirements listed below for each component of the habitat restoration project.

- A monitoring protocol that measures both structural and functional parameters
- Methods for evaluating results
- Baseline/pre-construction monitoring
- Establishment of a reference site (or historical data comparison)
- An appropriate monitoring schedule (that would allow for adaptive management)

1.1. Sampling Layout and Standardization Procedures:

1.1.1. *Salt Marsh:*

- **Permanent sampling transects** will be established across the two proposed marsh island areas. Pre-construction sampling will take place before marsh island creation (Summer 2020). The same transects and sample points will be used following construction.
- Each transect will contain 5 equally spaced, **fixed sampling points** that will be sampled using a **1m² quadrat**.
- Each plot will be evaluated for **elevation relative to a fixed benchmark** before, during and after construction.

1.1.2. *Oyster Reef:*

- **Ten random 0.25m²** live/dead counts and **shell height** measurements.
- **Predator identification/removal** at each monitoring event.
- **Water quality monitoring** at the site will include water temperature (continuous), with periodic measurements including, but not limited to, DO, salinity, and pH.

- Year two **disease testing** (Dermo and MSX) by Stony Brook University Marine Animal Disease Lab.

1.1.3. *Widgeon Grass:*

- Establishment of three **transects** extending across the creek bed through the proposed restoration area(s) where widgeon grass either currently exists or will be restored.
- Transects will consist of at least 5 equally spaced, **fixed sampling points** that will be sampled using a measuring **0.1m²** quadrat.
- Each plot will be evaluated for **water depth relative to a fixed benchmark** before, during and after construction.

1.2. Additional Structural and Functional Parameters to be Measured During Monitoring:

1.2.1. *Salt Marsh:*

- Plots will be sampled quantitatively for **stem densities, plant heights, species composition and percent cover** of all naturally recruited algal and plant species, **sediment composition (organic and percent grain size)** and plant **biomass analysis** (above vs. below ground). **Salinity** and **temperature** will be recorded at all sites.
- Qualitative sampling will include **faunal observations** and **fixed station photography**.
- Bird counts/nest surveying will be added to the monitoring plan, with a focus on **seaside and saltmarsh sparrows**, *Ammodramus maritimus* and *Ammodramus caudacutus* respectively, due to their strong dependency on salt marsh habitat for nesting and current population concerns.

1.2.2. *Oyster Reef:*

- Measurement of **average height of reef** (subsidence measurement).
- Monitoring of area around the reef for **shell/oysters displaced** from the reef by predators (e.g. birds and crabs) and storm events.

1.2.3. *Widgeon Grass:*

- Plots will be sampled quantitatively for **shoot densities, shoot heights, algal species composition and percent cover, sediment composition (organic and percent grain size)** and **biomass** (above vs. below ground). **Salinity** and **temperature** will be recorded at all sites.
- Qualitative sampling will include **faunal observations** and **fixed station photography**.

1.3. When Monitoring Will Take Place:

1.3.1. Visual Assessment of the project area will occur spring and fall, annually. The spring assessment will identify issues that occurred over the winter, such as ice damage, accumulation of jetsam/flotsam, or damage to wildlife exclusion fencing, so that these issues can be addressed. Fall visual assessment will provide documentation of changes in plant/oyster densities and biomass at the end of the growing season.

1.3.2. *Salt Marsh and Widgeon Grass:*

- **Pre-construction/baseline** monitoring within the fixed sampling plots (preferably 1 year prior to annual monitoring) as well as “**as-built**” (immediately after restoration/construction is completed). This monitoring will be completed during the summer of 2020.
- Pre-construction monitoring will include the establishment of a **baseline habitat map** of the project area (completed May 2020).
- Post-construction monitoring will take place during the month of September, annually, until the success criteria for the project are met, but for no less than a period of 5 years, post-construction.

1.3.3. *Oyster Reef:*

- Initial and monthly monitoring including all the sampling procedures listed above for the first year, then semiannually or annually thereafter for 5 years.

1.4. Contingency Monitoring and Maintenance:

1.4.1. *Contingency Monitoring (Salt Marsh):*

- The restoration area and reference site(s) will be inspected for damage or the accumulation of debris after significant storm events (e.g., hurricanes and winter storms). Damage/debris accumulation will be photo-documented.
- A spring inspection (late March/early April) of the restoration and reference sites will be made to photo-document overwinter damage and plan for repairs and debris removal.

1.4.2. *Maintenance (Salt Marsh):*

- Debris accumulated in restoration and reference areas will be photo-documented then removed from restoration and reference sites.
- Damage resulting in loss of planted vegetation in the restoration areas will be repaired as needed by replacement of plants (at construction specifications), within the affected area(s).
- The restoration area will be monitored over the growing area for invasive species (e.g. *Phragmites australis*) and identified invasive plants will be removed by hand-pulling as needed.

1.5. Evaluation of Results (for all habitats):

- The resulting data will be **statistically analyzed** for comparison to baseline monitoring results as well as **reference site/historic data**.
- Because the existence of a creek in the region with all three habitat types does not exist, each of the habitats to be restored will have its own reference site (or historical reference).
- Reference sites will be located for all three habitat types if possible. If appropriate reference sites (similar size, hydrology, physical conditions etc.) cannot be located, the most relevant historical data will be used as a reference for restored habitat goals.
- Reference sites will be monitored using the same protocol, timing and frequency as conducted at the restoration sites (transects, sampling plots).

1.6. Success Criteria:

4.6.1 *Salt Marsh:*

- Planted vegetation and naturally recruited tidal wetland plants have progressed to 75% coverage over the construction area(s). If vegetation is not naturally progressing toward 75% cover after two years post-construction, an ecologist will investigate the cause of the failure of plants to establish and recommend additional plantings or modifications to the plant species, as appropriate.
- Planted vegetation have maintained or exceeded 75% survival for three consecutive years. If vegetation has not maintained at least 75% survival for three consecutive years post-construction, additional native plants will be installed and/or an ecologist will be consulted to determine the cause of the failure of plants to establish and recommend modifications to the plant species or planting methods, as appropriate.
- Invasive plant species (e.g. *Phragmites australis*) are limited to less than 10% in area coverage. Invasive species increase to 20% cover would trigger the removal of the invasive species from the project area via manual pulling of plants. Subsequent replanting of native plants will be conducted if necessary.
- Soil characteristics (e.g. organic content, soil salinity, etc.) are comparable to reference site(s).
- Establishment of fauna populations within the constructed wetland areas that are representative of those identified in the reference site(s).

2. Adaptive Management Plan

As this project is proposed as a demonstration for restoring salt marsh vegetation, several different methods for plant establishment will be utilized to reach the final goal of successfully restoring a functional salt marsh community. Some of the methods that will be used for installing plants are accepted methods (e.g. plugs, potted plants) which have been found to produce reliable success. Other methods that will be evaluated in this demonstration project will focus on directly seeding *Spartina* seeds into planting plots. Direct seeding has produced mixed success in published reports, and with the overall goal of the project being to produce a fully vegetated salt marsh, the planting plan may need to be adapted to ensure proper vegetative cover over the entire project area. If a specific method is found falling short of the project's goals for revegetation, the deficient planting area will be evaluated to determine the best course of action to reach the desired density of vegetative cover. If a seeding method is not producing the desired results, then the use of adult propagules (i.e. plugs or pots) would be introduced into the planting area to increase density in the planting area in question. Similarly, areas planted with adult propagules could be overseeded to ensure more rapid filling of the target area.