

ENVIRONMENTAL ASSESSMENT

Federal Financial Assistance Grant Number: 43006
Coastal Resiliency via Integrated Salt Marsh Management, Suffolk County, New York
Prepared as Part of the Hurricane Sandy Coastal Resiliency Competitive Grant Program

Prepared by:



U.S. Department of the Interior

In Partnership With:

National Fish and Wildlife Foundation

And

Suffolk County Department of Public Works, Division of Vector Control

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TABLE OF CONTENTS

1.0	INTRODUCTION	1
1.1	Purpose and Need	2
2.0	ALTERNATIVES.....	3
2.1	No Action Alternative.....	3
2.2	Proposed Action Alternative.....	4
2.3	Alternatives Eliminated from Further Consideration.....	8
2.3.1	Selective Ditch Maintenance Alternative.....	8
2.3.2	Thin Layer Dredged Material Casting Alternative	9
3.0	AFFECTED ENVIRONMENT	9
3.1	Introduction – Scope of Resources Evaluated	9
3.2	Geology, Soils, and Sediment	9
3.3	Water Resources and Wetlands.....	10
3.3.1	Surface Water Quality.....	10
3.3.2	Groundwater	11
3.3.3	Floodplains.....	11
3.3.4	Wetlands	12
3.4	Biological Resources and Vegetation	14
3.4.1	Common Species.....	14
3.4.2	Threatened or Endangered Species	14
3.4.3	Essential Fish Habitat.....	17
3.4.4	Significant Coastal Fish and Wildlife Habitats.....	18
3.4.5	Vegetation	18
3.5	Human Health and Public Safety	21
3.6	Cultural Resources	21
3.7	Socioeconomics, Environmental Justice, and Protection of Children	22
3.8	Land Use, Recreation, and Coastal Zone Management.....	23
3.8.1	Land Use	23
3.8.2	Recreation	23
3.8.3	Coastal Zone Management.....	24
3.9	Air Quality and Noise	24
3.9.1	Air Quality	24
3.9.2	Noise	25

3.10	Sea Level Rise.....	25
4.0	ENVIRONMENTAL CONSEQUENCES	26
4.1	Geology, Soils, and Sediment	26
4.1.1	No Action Alternative.....	26
4.1.2	Proposed Action.....	26
4.2	Water Resources and Wetlands.....	26
4.2.1	No Action Alternative.....	26
4.2.2	Proposed Action.....	27
4.3	Biological Resources and Vegetation.....	28
4.3.1	Common Species.....	28
4.3.2	Threatened or Endangered Species	29
4.3.3	Essential Fish Habitat.....	30
4.3.4	Significant Coastal Fish and Wildlife Habitat	31
4.3.5	Vegetation	32
4.4	Human Health and Safety	33
4.4.1	No Action Alternative.....	33
4.4.2	Proposed Action.....	33
4.5	Cultural Resources	33
4.5.1	No Action Alternative.....	33
4.5.2	Proposed Action.....	33
4.6	Socioeconomics, Environmental Justice, and Protection of Children	34
4.6.1	No Action Alternative.....	34
4.6.2	Proposed Action.....	34
4.7	Land Use, Recreation, and Coastal Zone Management.....	34
4.7.1	No Action Alternative.....	34
4.7.2	Proposed Action.....	34
4.8	Air Quality and Noise	35
4.8.1	No Action Alternative.....	35
4.8.2	Proposed Action.....	35
5.0	CUMULATIVE EFFECTS.....	36
6.0	AGENCY COORDINATION AND PUBLIC INVOLVEMENT	37
6.1	Agency Coordination	37
6.2	Public Involvement	38
7.0	COMPLIANCE WITH FEDERAL, STATE, AND LOCAL LAWS.....	38

8.0	LIST OF PREPARERS	39
8.1	U.S. Department of the Interior (DOI)	39
8.2	Suffolk County Department of Public Works, Division of Vector Control	39
8.3	Suffolk County Department of Economic Development and Planning	39
8.4	Nelson, Pope & Voorhis, LLC	40
8.5	Cardno, Inc.	40
9.0	REFERENCES	40

LIST OF APPENDICES

- Appendix A: Suffolk County, NY, Proposal for the Hurricane Sandy Coastal Resiliency Competitive Grants, submitted to the National Fish and Wildlife Foundation. Federal Financial Assistance Grant Number: No. 43006
- Appendix B: Figures
- Appendix C: Suffolk County Salt Marsh Management Revised Best Management Practices (BMP) Manual
- Appendix D: NYSDOS Coastal Consistency Certification and Coastal Fish & Wildlife Habitat Assessment Forms
- Appendix E: USACE Permit, NOAA Consultation and Essential Fish Habitat Designations
- Appendix F: USFWS Consultation
- Appendix G: Natural Heritage Correspondence
- Appendix H: NYSDEC Consultation (Permits)
- Appendix I: New England Interstate Water Pollution Control Commission (NEIWPCC) Tidal Wetlands Trends Analysis
- Appendix J: Suffolk Hazard Mitigation Plan (Islip)
- Appendix K: SHPO Correspondence
- Appendix L: Federal Consistency Assessment
- Appendix M: Vehicle Emission Calculations
- Appendix N: Support Letters
- Appendix O: Regional Technical Workgroup Progress Reports

LIST OF FIGURES

(All Figures are located in Appendix B)

- Figure 1-1. South Shore Estuary Reserve Boundary and NYS Significant Coastal Fish and Wildlife Habitat & Location Map
- Figure 1-2. Gardiner County Park Marsh Equilibrium Model
- Figure 1-3. Gardiner County Park Aerial Map
- Figure 1-4. Timber Point Aerial Map
- Figure 1-5. West Sayville Aerial Map
- Figure 3-1. Gardiner County Park Flood Zones and Hurricane Sandy Surge Boundary Map
- Figure 3-2. Timber Point Flood Zones and Hurricane Sandy Surge Boundary Map
- Figure 3-3. West Sayville Flood Zones and Hurricane Sandy Surge Boundary Map
- Figure 3-4. Gardiner County Park Soil Map
- Figure 3-5. Timber Point Soil Map
- Figure 3-6. West Sayville Soil Map
- Figure 3-7. Depth to Bedrock
- Figure 3-8. GP Geologic Cross Section
- Figure 3-9. TP Geologic Cross Section
- Figure 3-10. WS Geologic Cross Section
- Figure 3-11. Water Table Map
- Figure 3-12. FEMA 2% Annual Flood Boundary
- Figure 3-13. Gardiner County Park National Wetlands Inventory Map
- Figure 3-14. Timber Point National Wetlands Inventory Map
- Figure 3-15. West Sayville National Wetlands Inventory Map
- Figure 3-16. Gardiner County Park NYSDEC Freshwater and Tidal Wetlands Map
- Figure 3-17. Timber Point NYSDEC Freshwater and Tidal Wetlands Map
- Figure 3-18. West Sayville NYSDEC Freshwater and Tidal Wetlands Map
- Figure 3-19. Potential Environmental Justice Area Map
- Figure 3-20. US 2010 Census Tract Map
- Figure 3-21. Gardiner County Park Land Use Map
- Figure 3-22. Timber Point Land Use Map
- Figure 3-23. West Sayville Land Use Map

- Figure 3-24. Gardiner County Park Areas at Risk for Static Sea Level Rise
- Figure 3-25. Areas at Risk for Static Sea Level Rise

LIST OF TABLES

Table 3-1	National Wetlands Inventory Classification	12
Table 3-2	NEWIPCC Tidal Wetlands Trends Analysis	20

1.0 INTRODUCTION

The Hurricane Sandy Coastal Resiliency Competitive Grant Program (Program) supports projects that reduce communities' vulnerability to the growing risks from coastal storms, sea level rise, flooding, erosion, and associated threats through strengthening natural ecosystems that also benefit fish and wildlife. Program funding is administered by the National Fish and Wildlife Foundation (NFWF) through the Department of the Interior (Department or DOI) Hurricane Sandy disaster relief appropriation (Disaster Relief Appropriations Act of 2013).

On June 16, 2014, the Department announced the award of 54 grants totaling \$102.75 million. In addition, the grantees committed over \$55 million in additional funding and in-kind contributions, for a total conservation investment of over \$158 million. Grants were awarded to projects that assess, restore, enhance, or create wetlands, beaches, and other natural systems to help better protect communities and to mitigate the impacts of future storms and naturally occurring events on fish and wildlife species and their habitats. Projects are located in the region affected by Hurricane Sandy: Connecticut, Delaware, the District of Columbia, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Virginia, and West Virginia. Each of these states officially declared a natural disaster as a result of the 2012 Hurricane Sandy storm event.

The Department, as lead Federal agency, and its partners, Suffolk County, New York, are proposing this Coastal Resiliency via Integrated Salt Marsh Management Project (the Project) to improve resiliency of coastal ecosystems and communities to adapt to rising sea levels and extreme storm events while restoring approximately 200 to 400 acres of tidal wetlands (marshes, wetlands) on the South Shore of Suffolk County. The Project area is within the South Shore Estuary Reserve watershed of Suffolk County. The Long Island South Estuary Reserve is a unique 326-square-mile New York State-designated estuary. The reserve was established through the Long Island South Shore Estuary Reserve Act (see Appendix B, Figure 1-1). As the Project administrator, Suffolk County is managing the Project activities.

This Project would implement sustainable salt marsh rehabilitation methodologies known as Integrated Marsh Management (IMM) with goals to improve natural local conditions for marsh accretion and native vegetation, maintenance or filling of strategic ditches, and installation of runnels¹ to connect marsh areas suffering from water logging. IMM is an approach to tidal wetlands management that seeks to maximize multiple benefits and reconcile competing management goals. The IMM approach to project design involves convening strategic stakeholders into an interagency team that will plan a project based on the site-specific considerations and stakeholder goals and mandates. Marsh management techniques are then chosen and tailored to the needs of that site.

This Environmental Assessment (EA) evaluates alternatives to address the improvement of ecological services provided by tidal wetlands (marshes), such as wave energy reduction and

¹ Runnels are shallow ditches, designed to be a maximum of 12 inches wide by 12 inches deep, that serve as connectors between a tidal channel or ditch that experiences the ebbs and flow of the tides and pannes or areas where waterlogging has occurred.

buffering against flooding and storm surges. Long Island's south shore is especially susceptible to tropical and extra-tropical storms such as Hurricane Sandy and Hurricane Irene (2011). As a result, flooding is one of the primary natural hazards in Suffolk County due to climatological and meteorological influences and characteristics, topography, latitude, and water bodies and waterways that influence the potential for flooding. The EA further analyzes the potential impacts these alternatives may have on the natural and human environment. This EA has been prepared in accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality (CEQ) regulations for implementing NEPA (40 Code of Federal Regulations [CFR] 1500-1508), and DOI regulations (43 CFR Part 46), policy, and guidance.

1.1 Purpose and Need

The purpose of the Program is to undertake a variety of actions to restore wetlands and other natural areas, better manage stormwater using green infrastructure, and assist states, tribes, and local communities in protecting themselves from major storms such as Hurricane Sandy. Overall, the Program goals relate to coastal resiliency and ecosystem enhancement. The Program provides funding for projects in five categories, including Project Planning and Design, Coastal Resiliency Assessments, Restoration and Resiliency Projects, Green Infrastructure, and Community Coastal Resiliency Planning.

The Program provides technical and financial assistance to identify, protect, conserve, manage, enhance, or restore habitat and infrastructure on both public and private lands that have been negatively impacted by Hurricane Sandy.

The purpose and need of the Project is to improve flood and storm surge risk reduction, wave energy reduction, and resiliency of coastal ecosystems and communities of the South Shore of Long Island to rising sea levels and storm events through restoration of 200-400 acres tidal wetlands. One of the main goals of the Project is to achieve this restoration through the development and implementation sustainable salt marsh rehabilitation methodologies under the conceptual umbrella of IMM (Rochlin et al. 2012b). Such ongoing stewardship of the tidal wetlands would enhance resiliency of coastal ecosystems and communities to address rising sea levels and extreme storm events (Deegan et al. 2012). IMM has been field tested by the core team of Suffolk County applicants at Wertheim National Wildlife Refuge (NWR) and recently adopted by the U.S. Fish and Wildlife Service (USFWS) as part of its approach for expanding salt marsh habitat restoration on the remainder of the National Wildlife Refuges on Long Island (funded through a Hurricane Sandy Coastal Resiliency grant).

This Project meets the purpose and need of the Restoration and Resiliency project category, which is to restore, enhance, or create naturally functioning habitats or ecological systems for the benefit of communities and fish and wildlife species (see Appendix A, Suffolk County Hurricane Sandy Coastal Resiliency Competitive Grants Program).

On October 29, 2012, Hurricane Sandy caused \$32 billion in storm damage to several areas of New York State including the south shore of Suffolk County, New York (New York State Senate Bipartisan Task Force on Hurricane Sandy Recovery 2013). The resilience of large areas of Long Island tidal marshes is threatened by tidal restrictions, waterlogging, extensive

mudflat and panne formation, and invasive plants. Moreover, many of these wetlands produce mosquitoes in large enough numbers to require regular pesticide application. IMM has been demonstrated to be effective in addressing these challenges. Rehabilitating these wetlands, reducing and reversing wetland loss will improve fish and wildlife habitat, while mitigating vulnerability by buffering adjacent coastal communities to impacts of storms and sea level rise. Rehabilitated wetlands may help to allay public health concerns with mosquito proliferation, and increase recreational opportunities, further demonstrating the socioeconomic and ecosystem values of salt marshes.

2.0 ALTERNATIVES

An alternatives analysis was performed to determine the most feasible and prudent means of achieving the defined Project purpose and need.

Four alternatives were evaluated based upon engineering constraints and environmental impacts, while meeting the purpose and need of the Project. Expected costs were also considered for the feasibility of alternatives but were not the controlling factor in the selection of the Preferred Alternative.

Guidance provided in 40 CFR 1502.14 regarding the NEPA provision of an alternatives analysis states that an agency must rigorously explore and objectively evaluate all reasonable alternatives and for those that were eliminated from detailed study, briefly discuss the reasons for their elimination. Additionally, a No Action Alternative must be included in the analysis. This section discusses the No Action Alternative, the feasible alternatives that would meet the purpose and need, and any alternatives eliminated from further analysis.

2.1 No Action Alternative

Under this alternative, no action would be taken to improve coastal resiliency and reduce risks related to storm and flood surges to coastal habitats and surrounding areas through restoring tidal marsh services. Historical grid ditches would remain, and no efforts would be taken to prevent further loss of vegetation. The tidal marshes and surrounding communities would continue to be at risk from flooding due to storm surge and potential future sea level rise. Additionally, existing areas of stagnant water within the tidally isolated internal pools and ditches provide habitat for salt marsh mosquitoes, which can be vectors for serious human pathogens including Eastern equine encephalitis virus (EEEV) and West Nile virus (WNV). Both EEEV and WNV can pose serious risk to human health ranging from acute illness to death and have been found in Suffolk County (Howard et al. 1996; Rochlin et al. 2011).

During colonial times, grid ditches were created for the purpose of salt hay farming. In the late 1920s and 1930s, the ditches were constructed in marshes throughout the Great South Bay to increase tidal flushing and prevent mosquito breeding. When originally constructed, the linear ditches were arbitrarily placed and did not take into account the typical scour and sediment deposition that occurs along a naturally flowing channel. The linear ditches run perpendicular or parallel to each other and create small panels between the grid-like ditches. During site development, spoil material was usually cast immediately alongside the ditches, with no consideration given to marsh surface or effects on hydrology. Marsh plants along the ditches grew larger and more densely. Due in part to the layout of the ditch system, the size of the

plants along the sides of the ditches, and the addition of spoil materials during site development, sediments have naturally deposited along the topside of the ditches. This has contributed to the creation of small berms that prevent the draining of flooded inter-grid panels. Increased salinity along with the long period of standing water has led to the loss of marsh vegetation within the inter-grid marsh panels. Thus, the marsh systems feature high marsh vegetation along the berms and large unvegetated pannes in the center of inter-grid panels.

Under the No Action Alternative, no action would be taken to prevent marsh degradation and continued deposition of sediments. The No Action Alternative does not meet the Project purpose and need.

2.2 Proposed Action Alternative

The Proposed Action includes: 1) creating small micropools irregularly shaped up to 10 × 10 × 2 feet (length × width × depth) that closely resemble natural salt marsh ponds to create habitat for fish and wildlife; 2) creating shallow connecting channels to prevent waterlogging of the marsh, allow access to micropools by estuarine fish, and allow access to the marsh surface for native killifish that control mosquito larvae; 3) filling select obsolete grid ditches using coir² logs and excavated material; and, 4) spreading excavated material on the marsh surface to provide the proper elevation for desirable vegetation and eliminate habitats for mosquito larvae.

Modeling simulations using the Marsh Equilibrium Model (MEM) (Morris et al. 2002) applied to one of the sites included in this analysis (Suffolk County Gardiner Park) suggested an ever-increasing rate of mean sea level (MSL) rise will significantly reduce mean marsh elevation above sea level in the future (Appendix B, Figure 1-2). Eventually, the marsh will drown, or migrate inland, unless tidal exchange is improved and sediments captured by more robust native vegetation. Although the MEM model has been applied to just one site considered in this analysis, the presence of comparable conditions elsewhere in the Great South Bay indicates that the techniques can be extrapolated and applied to the other proposed sites. In line with this assertion, preliminary analysis by The Nature Conservancy (TNC) identified other marshes with significant (20-60 percent) loss of vegetated areas, which are included herein.

The Project area is within the South Shore Estuary Reserve watershed of Suffolk County. The sites and locations proposed for restoration are indicated below and provided in Appendix B:

Suffolk County Gardiner Park East: Approximately 28 acres. The marsh system is heavily impacted by the creation of historical grid-ditching and is showing signs of waterlogging and the loss of marsh vegetation. In addition, the upper portions are also subject to serious infiltration by the invasive reed *Phragmites australis*. The area is heavily used by the public and features hiking trails and beach access. Restoring this site would preserve an important community asset with high visibility that would help generate continuing public support for these efforts. This site is actively monitored and managed by Suffolk County

² COIR logs are biodegradable logs, composed of primarily coconut fibers that can be secured within existing ditches.

Department of Public Works, Division of Vector Control as it presents an important public health issue in the form of WNV. See aerial photographs of the restoration area in Appendix B, Figure 1-3.

Suffolk County Gardiner Park West: Approximately 69 acres. The marsh system is heavily impacted by the creation of historical grid-ditching and is showing signs of waterlogging and the loss of marsh vegetation. In addition, the upper portions are also subject to serious infiltration by the invasive reed *Phragmites australis*. The area is heavily used by the public and features hiking trails and beach access. Restoring this site would preserve an important community asset with high visibility that would help generate continuing public support for these efforts. This site is actively monitored and managed by Suffolk County Department of Public Works, Division of Vector Control as it presents an important public health issue in the form of WNV. See aerial photographs of the restoration area in Appendix B, Figure 1-3.

Timber Point: Approximately 30 acres. This New York State Department of Environmental Conservation (NYSDEC) marsh system is heavily impacted by the creation of historical grid-ditching and is showing extensive waterlogging and the loss of marsh vegetation. Furthermore, the marsh system cannot migrate inland due to the adjacent County Park, which includes a country club, golf course, and marina facilities. This site has high “demonstration value” and has been identified by NYSDEC as a high-priority marsh due to its location adjacent to a highly utilized park. This site is actively managed by Suffolk County Department of Public Works, Division of Vector Control as it presents an important public health issue in the form of WNV. See aerial photographs of the restoration area in Appendix B, Figure 1-4.

West Sayville: Approximately 73 acres. This Suffolk County marsh system is heavily impacted by the creation of historical grid-ditching and is showing waterlogging and the loss of marsh vegetation. Furthermore, the marsh system cannot migrate inland due to the adjacent County Park, which includes a country club, golf course, and marina facilities. This site is actively managed by Suffolk County Department of Public Works, Division of Vector Control as it presents an important public health issue in the form of WNV. See aerial photographs of the restoration area in Appendix B, Figure 1-5.

The Proposed Action Alternative would restore approximately 200 to 400 acres of tidal salt marsh using the ecosystem-based IMM approach (Rochlin et al. 2012b). The IMM approach to project design involves convening strategic stakeholders into an interagency team that plans a project based on the site-specific considerations and stakeholder goals and mandates. Marsh management techniques are then chosen and tailored to the needs of that site. IMM has been field tested by the core team of Suffolk County applicants at Wertheim NWR and adopted by the USFWS as part of its approach for expanding salt marsh habitat restoration on the remainder of the National Wildlife Refuges on Long Island. Results published by the core team on the pilot project at Wertheim NWR demonstrate that the techniques deployed promoted growth of desirable vegetation while improving fish and wildlife habitat (Suffolk County Vector Control 2009). In addition, production of mosquito larvae was reduced to levels where the need for pesticide application was greatly reduced and could be eliminated with some minor additional work (Rochlin et al. 2012a, b). The IMM framework can also

include additional marsh management techniques, such as vegetation control or planting where indicated.

Marsh restoration techniques include the strategic filling of existing ditches using coir logs and sediments (from removal of material along the existing berms on the sides of the ditches), and creation of micropools, and runnels or shallow connectors. The goal is to decrease the amount of waterlogged area (also known as open water areas) and increase habitat for native salt marsh vegetation.

The degraded network of existing linear mosquito ditches would be replaced through selective filling of existing grid ditches and the creation of runnels. Select ditches would remain in place allowing runnels to transport tidal water in and out from waterlogged areas and potentially to newly created $10 \times 10 \times 2$ -foot, irregularly shaped micropools (approximately less than 2,000 square feet each).

Select existing ditches would be filled with a combination of coir logs and sediment taken from along the banks of the existing ditches to provide a stable substrate to allow vegetation to establish within ditch areas and decrease the loss of substrate while the plants become established. With the combination filled ditches and creation of runnels, the tidal flow would be restored, allowing for tidal exchange in the marsh interior and improved tidal flux between the marsh and Great South Bay or estuary.

Micropools are designed to improve biological flux³ between the Great South Bay or estuary and the marsh and create fish habitat within the marsh. Placement of micropools would be targeted to areas where Suffolk County Department of Public Works, Division of Vector Control has detected mosquito larvae, areas supporting intensive mosquito larval habitat, monocultures of invasive *Phragmites australis*, and unvegetated pannes. At a maximum, micropools would be $10 \times 10 \times 2$ feet (100 square feet), and would be connected to tidal flow through runnels. Runnels are designed to allow pannes to drain and prevent further loss of vegetation in these areas. Any original marsh soil remaining after hydrologic modifications would be used to strategically fill mosquito ditches and would be dispersed over the marsh surface by back-blading and/or side casting material into depressions, thus increasing marsh elevation and reducing mosquito larval habitat. Back-blading involves using the rear of the blade of a grader or excavator to move sediment in order to create a level grade. Side casting refers to the deposition of dredged material alongside the dredge location. Examples of side-casting would include use of berm material to close nearby ditches. This alternative is expected to improve conditions for proper marsh accretion and resilience to sea level rise, while allowing local marsh vegetation to thrive, and would improve marsh functions such as wave energy attenuation and buffering against storm and flood surges. The combination of activities under the Proposed Action Alternative can also provide high-quality habitat for salt marsh vegetation and animal life while allowing for biological control of both larval and adult salt marsh mosquitoes.

³ Biological flux refers to the renewal of water within the marsh as a result of natural tidal exchange.

Creating micropools and runnels and filling ditches can be accomplished by using Suffolk County–owned equipment and their trained personnel. The types of equipment used would include low ground pressure equipment such as ditchers, excavators, dump trucks, graders, and equipment that can handle a combination of these activities (i.e., excavator/grader, dumper/grader/ditcher, and dumper/ditcher). Restoration activities on each marsh system would take approximately 6 weeks. Work within wetlands with heavy equipment is restricted to between December 1 and April 30 of any given year to minimize impacts to marsh vegetation per the NYSDEC permits (Appendix H).

No hazardous materials would be used during restoration activities under the Proposed Action. All waste materials generated during restoration activities (i.e., packaging materials for shipment and temporary staging of coir logs, general solid waste, etc.) would be disposed of offsite in an appropriately licensed landfill.

The Proposed Action Alternative is supported by the Suffolk County Vector Control and Wetlands Management Long Term Plan (Long-Term Plan) under Suffolk County Resolution 285-2007. As a result of the Long-Term Plan, Suffolk County developed the *Suffolk County Salt Marsh Management Revised Best Management Practices Manual* (Manual; Appendix C), which aims to improve tidal exchange between estuary and marsh; allow improved tidal exchange in the marshes' interior; enhance conditions for proper marsh accretion and resilience to sea-level rise; provide high-quality habitat for salt marsh native biota; and enable biological control of larval salt marsh mosquitoes. Best management practices (BMPs) listed in the Manual include naturalizing existing ditches, installing shallow spur ditches, back-blading and/or side-casting material into depressions, breaking internal berms, installing tidal channels, and filling existing ditches. In addition, the Proposed Action Alternative is also supported by the Suffolk County Wetlands Stewardship Strategy (WSS), which has been developed pursuant to County Resolution No. 285-2007 (*Adopting the Suffolk County Vector Control and Wetlands Management Long-Term Plan and a State Environmental Quality Review Act Findings Statement for the Final Generic Environmental Impact Statement*). Resolution 285-2007 Long-Term Plan and the WSS was reviewed, approved, and adopted by the Suffolk County Council on Environmental Quality. Thus, the Proposed Action Alternative for the Project is a result of a wetlands management strategy and BMPs that have been extensively reviewed.

Student interns are expected to be employed for the Project from Suffolk Community College and Stony Brook University, as are veterans in The Corps Network's (TCN's) Conservation Corps, to assist with monitoring efforts. Student and veteran participants would be provided with safety training, equipment, and appropriate gear to ensure safety during Project implementation and would also be closely supervised by experienced technical staff.

Under the Proposed Action Alternative, multiple monitoring techniques would be used to track changes in the marsh complex both before and after Project implementation. Monitoring would include vegetation monitoring (photography and quadrant sampling), nekton⁴ sampling, and

⁴ Nekton are actively swimming aquatic organisms that move through the water independent of water currents. Fish species are considered nekton. Plankton species and other organisms that are carried by the current are not considered nekton.

sampling of pore water chemistries and sediment chemistries. Pre-Project monitoring began in 2016 and has continued during the 2017 and 2018 field season. Post-Project monitoring would occur annually and across transect lines that would be marked in the field and by global positioning system (GPS) to ensure consistency, with the exception of mosquito larvae sampling, which may occur weekly.

It is anticipated that the Proposed Action Alternative would: improve tidal regime and hydraulic exchange between the bay, estuary, and marsh; improve tidal exchange in the marsh interior; result in higher quality habitat for salt marsh biota including harvestable resource species such as crabs, clams, and fish; reduce production of larval salt marsh mosquitoes while simultaneously reducing the need for chemical control; enhance marsh accretion and resilience to sea level rise; increase protection against storm surges and flooding; improve nutrient fluxes into the estuary; and, engage students and the general public through participatory instructive marsh field work and stewardship activities.

Sustained benefits of the Project include heightened ecosystem resiliency and coastal security, reduction of local nutrient pulses and nonpoint source pollution, invigorating native vegetation, and increased cover for enhanced estuarine fish, crabs, and shrimp habitat. Restored tidal flow would enable marshes to drain more quickly during storm events. Restored native vegetation would contribute to marsh elevation and increase sediment capture, mitigating sea level rise impacts by providing storm buffering. As a result, mosquito-borne threats would also be reduced.

The Proposed Action Alternative would most effectively meet the purpose and need of the Project and is identified as the Preferred Alternative in this EA.

2.3 Alternatives Eliminated from Further Consideration

The Manual (Appendix C) lists two alternatives as management actions, as described below.

2.3.1 Selective Ditch Maintenance Alternative

The Selective Ditch Maintenance Alternative would alter a selection of existing ditches through the use of handheld tools and/or the removal of vegetation, to allow some tidal circulation to return. Some ditch maintenance can be done by hand; nearly all, however, is best addressed by heavy machinery, such as self-propelled, low ground pressure, rotary ditching machines. The ditch would not, however, be cut and returned to its original configuration. This alternative may have to be repeated after storms. The Manual (Appendix C) identifies this alternative as BMP 4, a management action with minor impacts. This alternative has been identified as a BMP in the Manual as it offers the opportunity to address targeted hydrological issues of a tidal marsh as well as mosquito problems through source reduction, with the least disturbance to the existing environment.

The Selective Ditch Maintenance Alternative would not provide a self-sustaining marsh in the long term and is unlikely to improve protection against floods and storm surge damages and other marsh conditions resulting from increased weather intensity and sea level rise. As such, this alternative would not meet the purpose and need for the Project and is not considered further.

2.3.2 Thin Layer Dredged Material Casting Alternative

The Thin Layer Dredged Material Casting Alternative would involve applying a thin layer of dredge material to the marsh surface concentrating on depressions and areas of mosquito breeding. The casted dredge material would fill mosquito breeding areas and return the marsh to a uniform elevation. To make this alternative economically and logistically feasible would require dredge material from an adjacent waterbody to be pumped on to the marsh surface. To transport this material by truck would add transportation costs and would be cost prohibitive. Also, there would be additional costs of sampling the material for contaminants prior to placement. The Manual (Appendix C) identifies this alternative as BMP 8.

While the Thin Layer Dredged Material Casting Alternative would generally meet the purpose and need for the Project, it was eliminated from further consideration because no suitable dredge candidate sites adjacent to the marshes in the Project area have been identified. As such, the Thin Layer Dredged Material Casting Alternative is not considered further.

3.0 AFFECTED ENVIRONMENT

3.1 Introduction – Scope of Resources Evaluated

The coastal communities along the south shore of Long Island were substantially impacted by Hurricane Sandy in late October 2012. Storm surge surpassed the Federal Emergency Management Agency (FEMA) 100-year flood level mark (see Appendix B, Figures 3-1, 3-2, and 3-3). The impacts of this event included sediment over-wash, beach, dune, and marsh erosion, breach openings, deposition of diverse debris over salt marshes, significant infrastructure damage, and loss of human lives. Modeling simulations using the MEM (Morris et al. 2002) applied to one of the proposed sites, Gardiner County Park, suggested an ever-increasing rate of MSL rise would significantly reduce mean marsh elevation above sea level.

The Project evaluates approximately 264 acres of degraded and/or threatened salt marsh habitat on the south shore of Suffolk County for coastal resiliency enhancement. The Proposed Action would benefit the Long Island South Shore Estuary Reserve, a unique 326-square-mile New York State-designated estuary, as well as the adjacent coastal communities of Babylon, Brookhaven, and Islip, which were heavily impacted by Hurricane Sandy. The Proposed Action would complement other restoration and resiliency enhancement efforts that have been completed, are underway, or are proposed within the South Shore Estuary Reserve (see Section 5 for more information on cumulative effects of these projects).

Environmental resources identified and analyzed in this document are listed below along with reasons for their inclusion in this EA and applicable regulations. The evaluation of effects to these resources for each alternative is described in Section 4.0. A brief description of the existing resource conditions is provided below.

3.2 Geology, Soils, and Sediment

Long Island's surficial features began when the Wisconsin Glacial Episode terminated over current-day north/central Long Island approximately 22,000 years ago. Large amounts of unconsolidated sediments were deposited when the glacier melted, resulting in the formation of two prominent terminal moraines. The Harbor Hills Moraine parallels the north shore of Long

Island while the southernmost moraine, known as the Ronkonkoma Moraine, parallels the center of Long Island.

The Project area is located south of the Ronkonkoma Moraine in a geologic region known as the outwash plane. The outwash plane is composed primarily of sand sediments that were deposited by waterflow off the terminal moraine. These sandy sediments have since been reworked by the ocean and bay currents and have also been influenced by the organic materials that accumulated in the surrounding estuaries. The Soil Survey of Suffolk County (Warner et al. 1975), prepared by the U.S. Department of Agriculture, identifies soil types resulting from natural deposition and modification, as well as human-induced alterations associated with land use. The soil survey indicates that the following Tidal Marsh (Tm) soil type underlies the subject properties (see Appendix B, Figure 3-4, 3-5 and 3-6, pages 25-27). The characteristics of this soil type are identified below.

Tidal Marsh (Tm) is made up of wet areas around the border of calmer embayments and tidal creeks. These level areas are not inundated by daily tide flow, but they are subject to flooding during abnormally high moon and storm tides. Tidal marsh has an organic mat on the surface that ranges from a few inches to several feet in thickness. The organic mat overlies pale-grey or white sand. In many places the profile of the marsh is made up of alternating layers of sand and organic material as a result of sand deposited on the organic mat during abnormally high storm tides.

Tidal marsh is not a soil that is classified as Farmland of Statewide Importance. Therefore, the Farmland Protection Policy Act, which requires Federal agencies to take into account potential adverse effects of their actions on the preservation of farmland, does not apply.

The topography of the Project area is generally level, with elevations ranging between 0 and 5 feet above MSL. The topography has been influenced by a series of human-made grid ditches through each site proposed for restoration (see Section 2.2). The grid ditches were constructed in the marshes throughout the Great South Bay in the 1930s by the Works Progress Administration to increase tidal flushing and prevent mosquito breeding.

Bedrock in the Project area is approximately 1,800 feet below the surface under the Lloyd aquifer (see Appendix B, Figure 3-7, page 28). See Section 3.3 for additional information on aquifers and groundwater.

3.3 Water Resources and Wetlands

3.3.1 Surface Water Quality

New York State uses a letter-based classification system to denote the best use for each waterbody located within the state. Freshwater systems are classified as A, B, C, and D, while tidal waters are classified SA, SB, SC, I, and SD. All Project sites in the Project area are located within “The Great South Bay, Middle” area, which is classified as an SA waterbody with best usage including “shellfishing for market purposes, primary and secondary contact recreation and fishing” and “suitable for fish, shellfish, and wildlife propagation and survival” (6 New York Codes, Rules, and Regulations Parts 700-705, Water Quality Regulations for Surface Waters and Groundwaters, effective September 1, 1991). Examples of primary contact

recreation include swimming, diving, and surfing. Examples of secondary contact recreation include fishing and boating.

The New York State Section 303(d) List of Impaired/TMDL Waters is generated by NYSDEC and identifies those waters that do not support appropriate uses. Waters identified in this list may require development of a Total Maximum Daily Load (TMDL). The Section 303(d) List is updated every 2 years and the Project area is located within the waters identified as “Great South Bay (Middle).” Per the list, updated October 2016, Great South Bay (Middle) is an impaired waterbody due to nitrogen, low dissolved oxygen, and the presence of high levels of algal/weed growth. The list indicates the sources of pollutants to be on-site septic systems and urban runoff.

3.3.2 Groundwater

Authorized by Section 1424(e) of the Safe Drinking Water Act of 1974, the Federal government has given sole source aquifer designation to the entirety of Suffolk County, which includes the Project area. Beneath the immediate subsurface lie three major groundwater bearing aquifers. The aquifer closest to the surface is known as the Upper Glacial aquifer, followed by the Magothy aquifer, and then the Lloyd aquifer. Appendix B, Figures 3-8 (page 29), 3-9 (page 30) and 3-10 (page 7), show the geologic cross sections and the locations of the aquifers. These aquifers are generally composed of fine to coarse sands interspersed with thin clay layers. The depth to groundwater beneath the Project area is between 0 and 2 feet. Regional groundwater flow in this area is to the south toward Great South Bay. Local groundwater mainly flows south toward the Great South Bay, as shown in Appendix B, Figure 3-11 (page 8) with some variability due to the human-made ditches that cross the Project area.

The Suffolk County Comprehensive Water Resources Management Plan issued in 2015 (Suffolk County Department of Health Services et al. 2015) found that the groundwater within the Project area has a medium-high to very high susceptibility to nitrate contamination. Nitrate concentrations are greater than 10 parts per million in nearby wells in the Upper Glacial aquifer and are between non-detect and 1 part per million in the Magothy aquifer. The Suffolk County Comprehensive Groundwater Management Plan also found that the Project area has a medium-high to very high susceptibility to volatile organic compound contaminants. The residential areas in the vicinity of the Proposed Action do not have sewers; therefore, due to the low depth to groundwater, floodwater could inundate and damage residential on-site wastewater systems and degrade water quality in the event that wastewater escaped containment.

3.3.3 Floodplains

To improve the nation’s resilience to flooding, Executive Order (EO) 11988, May 24, 1977, was established to:

“...avoid to the extent possible the long and short term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative....”

As the Proposed Action is designed to restore healthy wetland function, it is aligned with the goal of restoring and preserving the beneficial values served by floodplains.

3.3.4 Wetlands

Wetlands are defined by the Clean Water Act (40 CFR 230.3) as “Those areas that are inundated or saturated by surface or groundwater at a frequency of duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.” EO 11990, Wetlands Management, requires Federal agencies to avoid funding activities that directly or indirectly support occupancy, modification, or development of wetlands, whenever there are practicable alternatives.

The USFWS classifies wetlands into five distinct categories: marine, estuarine, riverine, lacustrine, and palustrine wetlands (Cowardin et al. 1979). Categories and subsequent subcategories are described in *Classification of Wetlands and Deepwater Habitat of the United States* (Cowardin et al. 1979). As shown in Appendix B, Figures 3-13, 3-14 and 3-15 (pages 10-12), USFWS’s National Wetlands Inventory indicates wetlands of diverse types are located within the Project area. Table 3-1 describes the wetlands located within the Project area.

Table 3-1 National Wetlands Inventory Classification

Wetland Category	Marsh Complex	Description
E1UBL	Gardiner East Timber Point West Sayville	Estuarine, subtidal, unconsolidated bottom, subtidal
E2EM1Pd	Gardiner East Gardiner West Timber Point West Sayville	Estuarine, intertidal, emergent, persistent, irregularly flooded, partially drained/ditched
E2EM5Pd	Gardiner East Gardiner West	Estuarine, intertidal, emergent, <i>Phragmites australis</i> , irregularly flooded, partially drained/ditched
PFO1/SS1R	Gardiner East Gardiner West	Palustrine, forested, broad-leaved deciduous, scrub-shrub, broad-leaved deciduous, seasonally flooded-tidal
PFO1Rd	Gardiner West	Palustrine, forested, broad-leaved deciduous, seasonally flooded, partially drained/ditched
PFO1Ad	Timber Point	Palustrine, forested, broad-leaved deciduous, temporary flooded, partially drained/ditched
E1UB4L	West Sayville	Estuarine, subtidal, unconsolidated bottom, organic, subtidal

Wetland Category	Marsh Complex	Description
E1UBLx	West Sayville	Estuarine, subtidal, unconsolidated bottom. subtidal, excavated
E2EM5P	West Sayville	Estuarine, intertidal, emergent, <i>Phragmites australis</i> , irregularly flooded
E2US2N	West Sayville	Emergent, intertidal, unconsolidated shore, sand, regularly flooded

In addition to USFWS categorization, all tidal wetlands are categorized by NYSDEC to identify wetlands and aid in administering programs for tidal wetland protection. NYSDEC administers and regulates wetlands in New York State under the Freshwater Wetlands Act (Article 24 of Environmental Conservation Law) and the Tidal Wetlands Act (Article 25 of Environmental Conservation Law). The NYSDEC Tidal Wetlands Map is provided as Appendix B, Figures 3-16, 3-17 and 3-18 (pages 13-15). NYSDEC categorizes the tidal wetlands within the Project area as adjacent area, dredge spoil, high marsh, intertidal marsh, littoral zone and coastal shoals, bars, and mudflats. Characteristics of these wetland types are as follows (NYSDEC, 1974):

Coastal Shoals, Bars, and Mudflats: *The tidal wetland zone that at high tide is covered by saline or fresh tidal waters, at low tide is exposed or is covered by water to a maximum depth of approximately one foot, and is not vegetated.*

High Marsh: *The normal upper most tidal wetland zone usually dominated by salt meadow grass, *Spartina patens*; and spike grass, *Distichlis spicata*. This zone is periodically flooded by spring and storm tides and is often vegetated by low vigor, *Spartina alterniflora* and Seaside lavender, *Limonium carolinianum*. Upper limits of this zone often include black grass, *Juncus Gerardi*; chairmaker's rush, *Scirpus sp*; marsh elder, *Iva frutescens*; and groundsel bush, *Baccharis halimifolia*.*

Intertidal Marsh: *The vegetated tidal wetland zone lying generally between average high and low tidal elevation in saline waters. The predominant vegetation in this zone is low marsh cordgrass, *Spartina alterniflora*.*

Littoral Zone: *The tidal wetland zone that includes all lands under tidal waters which are not included in any other category. There shall be no LZ under waters deeper than six feet at mean low water.*

Dredge Spoil: *All areas of fill material.*

Adjacent Area: *Those land areas not included in the any of the above categories that are generally not inundated by tidal waters and that extend 300 feet landward of the most landward tidal wetlands boundary or to an elevation of ten feet.*

3.4 Biological Resources and Vegetation

3.4.1 Common Species

Relatively few wildlife species were observed on-site, although it is expected that the property should support at least 90 different species of wildlife common to tidal marsh habitat, including birds, fish, herpetiles, and clams (Andrle and Carroll 1988; Bent 1961, 1962a, 1962b, 1962c, 1963a, 1963b, 1964a, 1964b, 1965; Bull 1974; Leviton 1970; Obst 1988; Stone 1965a, 1965b). Avian species that might be expected within the Project area include a variety of ducks and geese, gulls, waders, and songbirds. It is also expected that the Project area would support a number of mammal species. Mammals expected on-site include white-tailed deer (*Odocoileus virginianus*), red fox (*Vulpes vulpes*), and Virginia opossum (*Didelphis virginiana*). A number of aquatic species would be expected to inhabit the aquatic areas within the Project area. Expected aquatic species include banded killifish (*Fundulus diaphanus*), mummichog (*Fundulus heteroclitus*), spotfin killifish (*Fundulus luciae*), American eel (*Angiulla rostrata*), and Chesapeake blue crab (*Callinectes sapidus*). Note that killifish are a natural predator of salt marsh mosquito (Abraham 1985).

3.4.2 Threatened or Endangered Species

The Endangered Species Act (ESA; 16 U.S. Code [U.S.C.] § 1531 et seq.) directs all Federal agencies to work to conserve endangered and threatened species and to use their authorities to further the purposes of the act. The ESA is administered by two federal agencies, the USFWS and the National Oceanic and Atmospheric Administration (NOAA).

The USFWS Information for Planning and Conservation (IPaC) system was accessed on August 19, 2016, November 30, 2016, and April 19, 2017, to obtain USFWS environmental review for all areas included in the Proposed Action. Appendix F contains the IPaC queries results for all of these areas. Threatened or endangered species that could potentially occur within, or in close proximity to each of the four restoration sites in the Project area include piping plover (*Charadrius melodus*), red knot (*Calidris canutus rufa*), roseate tern (*Sterna dougallii*), sandplain gerardia (*Agalina acuta*), seabeach amaranth (*Amaranthus pumilus*), and northern long-eared bat (*Myotis septentrionalis*).

The piping plover can be found breeding from April through July (Levine 1998) and typically utilize open beach area between the primary dune and high tide line (Elliot-Smith and Haig 2009; McIntyre et al. 2010; New York Natural Heritage Program [NYNHP] 2015c). The red knot typically breeds in drier tundra areas but may be found in intertidal marine habitats during migration or wintering periods (Cornell Lab of Ornithology 2017). The roseate tern arrives to its breeding grounds between April and July and remains until fall migration, which typically occurs from August through September (Gochfeld et al. 1998; Nisbet 1989; New York Natural Heritage Program [NYNHP] 2015d). The vast majority (>90 percent) of the breeding population of roseate tern in New York breeds within the colony located on Great Gull Island (NYNHP 2015d) located approximately 60 miles northeast of the easternmost portion of the Project area. The northern long-eared bat occurs in forest habitats. During the winter, these bats hibernate in caves and mines and in the summer, they roost in trees under bark or in tree cavity and crevices (USFWS 2015).

Sandplain gerardia is most commonly associated with maritime grasslands and needs periodic disturbance to maintain viable population (NatureServe 2009). Natural succession of open areas poses a significant threat to sandplain gerardia populations (NatureServe 2009). Seabeach amaranth is generally found along the dunes associated with ocean beaches (Buchanan and Finnegan 2010). The decline of the species is most notably attributed to habitat destruction and alteration, incompatible beach grooming practices, and recreational activities (New Jersey Department of Environmental Protection nd).

The complete results of the USFWS IPaC reviews can be found in Appendix F. There are no critical habitats documented within the Project area.

The USFWS Long Island Field Office was contacted on June 22, 2017, to conduct a consultation in order to ensure that the Proposed Action is not likely to jeopardize the continued existence of any listed species or result in the adverse modification of critical habitat (see Section 4.3.2.2).

Of the approximately 2,270 species listed as endangered or threatened under the ESA, NOAA, through the National Marine Fisheries Service (NMFS), retains jurisdiction over approximately 157 endangered or threatened marine species (NOAA 2017a). Based on scientific information, NOAA is responsible for designating “critical habitats” for threatened and endangered species under its jurisdiction. “Under Section 7 of the ESA, all Federal agencies must ensure that any actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of a listed species, or destroy or adversely modify its designated critical habitat” (NOAA 2017b). As stated above, there are no critical habitats within the Project area.

Per the consultation requirements of §7(a)(2) of the Endangered Species Act, federal agencies must consult with the NMFS Secretary on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect listed threatened or endangered species. As the federal permitting agency tasked with authorizing the Proposed Action, the United States Army Corps of Engineers (USACE) submits the Proposed Action for NMFS consultation and reviews the determination as part of the permitting process. The Proposed Action was submitted to the USACE on March 7, 2017 and July 7, 2017. On May 31, 2018, USACE issued a Nationwide General Permit 27 for the Proposed Action. As part of the permit issuance process, consultation was conducted with NMFS regarding listed species (Appendix E). NMFS submitted its findings to USACE on November 15, 2017, concluding that threatened or endangered species under the jurisdiction of NMFS may be present in the project area. Recommendations and best management practices resulting from consultation with NMFS are included in the USACE issued permits (Appendix E) and discussed further in Section 4.3.2.

In addition to federal threatened and endangered species, certain migratory birds of conservation concern have the potential to be present in the Project area for breeding, overwintering, during migration, or year-round. The Migratory Bird Treaty Act (MBTA) (40 Stat. 755 as amended; 16 U.S.C. 703-712) is a Federal law implemented to protect migratory birds. The MBTA makes it unlawful to pursue, hunt, take, capture, kill, or sell birds listed therein. All migratory birds are protected under the MBTA. In addition to the MBTA, bald eagles are protected under the Bald and Golden Eagle Protection Act, which prohibits anyone

without a permit issued by the Secretary of the Interior from “taking” bald eagles, including their parts, nests, or eggs, or molesting or disturbing the birds.

According to the IPaC query (Appendix F), 27 species of migratory birds could potentially use the Project area during migration along the flyway, or during wintering and/or breeding season. Generally, the main migratory paths used by avian species are referred to as “flyways.” Within North America, the four major flyways are the Atlantic, Central, Mississippi, and Pacific. The Project area is located within the Atlantic flyway, which encompasses the offshore waters of the Atlantic coast westward roughly to the Allegheny Mountains and extends northwest across portions of Canada (USFWS 2016).

The NYNHP was contacted to determine whether any records of New York State (NYS) species of special concern, threatened or endangered species, or significant natural communities are known to exist within, or in close proximity to, the Project area. For correspondence from the NYNHP see Appendix G.

NYNHP reported seven species of plants and animals and one wetland/aquatic community within or adjacent to Suffolk County Gardiner Park. Reports from NYNHP indicate that breeding seaside sparrow (*Ammodramus maritimus*), a NYS species of special concern, and the unlisted seaside dragonlet (*Erthrodiplosis berenice*) have been found within Suffolk County Gardiner Park. The seaside sparrow is a migratory species that typically arrives on the marsh during late April and migrates south from the end of August through October. This sparrow typically nests within tall grasses on the wet marsh surface (NYNHP 2016). A marine eelgrass meadow community is located within the Great South Bay near the Project area. Three endangered plant species and two threatened plant species are reported as being in the vicinity of Suffolk County Gardiner Park: slender marsh-pink (*Sabatia campanulata*), coastal goldenrod (*Solidago latissimifolia*), slender spikerush (*Eleocharis tenuis* var. *pseudoptera*), swamp sunflower (*Helianthus angustifolius*), and marsh straw sedge (*Carex hormathodes*). Records of these occurrences are associated with Appletree Neck, a TNC preserve, located approximately 0.4 mile east of Suffolk County Gardiner Park.

NYNHP reported three species of plants and animals and three significant natural communities within or adjacent to Timber Point. Reports from NYNHP indicate that a breeding record of common tern (*Sterna hirundo*), a NYS threatened species, and a breeding record of least tern (*Sternula antillarum*), a NYS threatened species, have occurred within Timber Point. The least tern is a migratory bird that breeds between May and August most commonly in open sand of ocean beaches, dunes, and sand flats (NYNHP 2015a). The common tern is also a migratory bird that commonly breeds between May and mid-September, nesting within areas of sand, gravel, or shell with scattered vegetation (Nisbet 2002; NYNHP 2015b). A coastal oak-hickory forest and a red maple-blackgum swamp, both considered significant natural communities, are in the vicinity of Timber Point. These two communities are associated with Heckscher State Park, located approximately 0.56 mile southwest of Timber Point. A marine eelgrass meadow community is located within the Great South Bay adjacent to Timber Point. NYNHP also reports that the endangered plant angled spikerush (*Eleocharis quadrangulata*) is found in nearby Heckscher State Park.

NYNHP reported one species of plant and one species of animal as well as one significant natural community within or adjacent to West Sayville. Reports from NYNHP indicate that a breeding record of seaside sparrow, a NYS species of special concern, has occurred within West Sayville. The endangered plant small-flowered pearlwort (*Sagina decumbens* spp. *decumbens*) is reported in the vicinity of West Sayville. More specifically, the plant is found approximately 0.25 mile from West Sayville within an area of dredge spoil. A marine eelgrass meadow community, considered a significant natural community, is located within the Great South Bay adjacent to West Sayville.

New York State regulates the taking of endangered species under Article 11, Environmental Conservation Law Implementing Regulations – 6 New York Codes, Rules, and Regulations Part 182. As part of the NYSDEC review associated with the Article 25 Tidal Wetland permit, NYSDEC reviews potential impacts of the Proposed Action on state listed endangered species. Applications are forwarded to NYSDEC’s regional Division of Fish and Wildlife for review if a project has the potential for impact on a state listed endangered species. If based on this review, there is a potential for impact to a state listed endangered species, the applicant would be notified that an Article 11 permit would be required.

3.4.3 Essential Fish Habitat

The National Marine Fisheries Service (NMFS) lists essential fish habitat (EFH) and fisheries resources in the Project area as follows: eggs, larvae, juveniles, and adults for seven species: winter flounder (*Pseudopleuronectes americanus*), windowpane flounder (*Scophthalmus aquosus*), Atlantic butterfish (*Peprilus triancanthus*), Atlantic mackerel (*Scomber sombrus*), king mackerel (*Scomberomorus cavalla*), Spanish mackerel (*Scomberomorus maculatus*), and cobia (*Rachycentron canadum*). As part of the 1996 amendments to the Magnuson-Stevens Fishery Conservation Management Act, NMFS designates EFH to protect and conserve the habitat of marine, estuarine, and anadromous finfish, mollusks, and crustaceans. EFH is broadly defined to include “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity” (16 U.S.C. 1802(10)).

Portions of the Project area occur within two designated EFH regions:

1. Atlantic Ocean waters within the square within Great South Bay, south of East Islip, NY, Islip, NY, Bay Shore, NY, Great Cove, and Babylon, NY, from west of Nicoll Pt. to Bergen Pt.
2. Atlantic Ocean waters within the square and within Great South Bay, north of Ocean Beach, and south of Sayville, NY, and Bohemia, NY, from Patchogue, NY and western Patchogue Bay to just west of Nicoll Pt. on Nicoll Bay, southeast of Great River, NY, and the Connetquot River.

The Project area is designated EFH in one or more category for 13 additional species including: Atlantic salmon (*Salmo salar*), pollock (*Pollachius virens*), Atlantic salmon (*Salmo salar*), monkfish (*Lophius americanus*), bluefish (*Pomatomus saltatrix*), Summer flounder (*Paralichthys dentatus*), Scup (*Stenotomus chrysops*), black sea bass (*Centropristis striata*), sand tiger shark (*Carcharias taurus*), Blue shark (*Prionace glauca*), dusky shark (*Carcharhinus obscurus*), sandbar shark (*Carcharhinus plumbeus*), and skipjack

tuna (*Katsuwonus pelamis*). The *Summary of EFH Designation* reports are included as Appendix E. Per the consultation requirements of §305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA; 16 U.S.C. 1855(b)) federal agencies must consult with the NMFS Secretary on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect essential fish habitat (EFH). NOAA NMFS EFH Consultation has occurred as part of the USACE Nationwide Permit application. The Proposed Action was submitted to the USACE on March 7, 2017, for Gardiners County Park East and West and Timber Point County Park, and on July 7, 2017, for West Sayville (Appendix E).

3.4.4 Significant Coastal Fish and Wildlife Habitats

Coastal areas provide important habitat for aquatic and terrestrial species. The salt marsh ecosystem functions as a primary producer and nursery ground for numerous marine organisms that provide the food base for other marine resources. The New York State Office of Planning and Development (NYSOPD), in coordination with NYSDEC, designates Significant Coastal Fish and Wildlife Habitats (SCFWH) across the state. All SCFWH have been identified as being critical to the maintenance or re-establishment of species of fish and wildlife in the coastal zone. Multiple SCFWH are present within the Great South Bay, and the Project area includes three separately designated SCFWH. Gardiner County Park East and Gardiner County Park West are located within Great South Bay-West SCFWH, and Timber Point are located in Connetquot River SCFWH, and West Sayville Marsh is located in Great South Bay-East SCFWH. See Appendix D for the Coastal Fish & Wildlife Habitat Assessment Forms and figures for the SCFWH areas.

As required by U.S. Department of Commerce regulations (15 CFR 930.57) for the Coastal Zone Management Act, the Proposed Action was submitted to New York State Department of State to obtain a Coastal Consistency Determination. A Coastal Consistency Determination certifies that the Proposed Action is consistent with all policies included as part of the State Coastal Management Program including Policy 7 which states “*Significant coastal fish and wildlife habitats will be protected, preserved, and, where practical, restored so as to maintain their viability as habitats*”. General Concurrence for the Proposed Action was obtained and is included in Appendix D. The General Concurrence letter ensures that the Proposed Action is consistent with New York State’s Coastal Management Program (CMP).

3.4.5 Vegetation

The Project area is generally located within multiple marsh complexes along the Great South Bay in areas with a high degree of historical disturbance related to the creation of linear grid ditches. The habitat types for each site were defined according to a classification system developed by the NYSDEC (Edinger et al. 2014). Habitat types are defined by the predominant vegetation occurring within an area. Habitat types present within the Project area include high salt marsh, salt panne, and low salt marsh. These habitat types are defined by Edinger et al. (2014) as:

High salt marsh is “*a coastal marsh community that occurs in sheltered areas of the seacoast, in a zone extending from mean high tide up to the limit of spring tides. It is periodically flooded by spring tides and flood tides. High salt marsh typically consists of a mosaic of patches that are mostly dominated by a single graminoid species. The dominant*

species in many large areas are either salt-meadow grass (Spartina patens) or a dwarf form (15 to 30 cm tall) of cordgrass (Spartina alterniflora); also common are large areas dominated by spikegrass (Distichlis spicata), black-grass (Juncus gerardii), and glassworts (Salicornia spp.), or a mixture of salt-meadow grass and cordgrass.”

Salt pannes are “shallow depression in a salt marsh where the marsh is poorly drained. Pannes occur in both low and high salt marshes. Pannes in low salt marshes usually lack vegetation, and the substrate is a soft, silty mud. Pannes in a high salt marsh are irregularly flooded by spring tides or flood tides, but the water does not drain into tidal creeks. After a panne has been flooded the standing water evaporates and salinity of the soil water is raised well above the salinity of sea- water. Soil water salinities fluctuate in response to tidal flooding and rainfall. Small pond holes occur in some pannes; the pond holes are usually deeper than the thickness of the living salt marsh turf, and the banks or “walls” of the pond holes are either vertical or they undercut the peat. Salt pannes can be formed by ponding of water on the marsh surface, scouring of wrack or coverage by storm wrack, and possibly by ice scour. Salt panne formation appears to be favored by a mean tidal range of about 20-80 cm and are poorly developed in settings with a mean tidal range greater than 1.6 m. Characteristic plants of a salt panne include the dwarf form (15 to 30 cm tall) of cordgrass (*Spartina alterniflora*), glassworts (*Salicornia depressa* and *Sarcocornia pacifica*), marsh fleabane (*Pluchea odorata*), salt marsh plantain (*Plantago maritima* ssp. *juncoides*), arrow- grass (*Triglochin maritimum*), spikegrass (*Distichlis spicata*), sea-blites (*Suaeda* spp.), and salt marsh sand spurry (*Spergularia marina*).”

Low salt marsh is “a coastal marsh community that occurs in sheltered areas of the seacoast, in a zone extending from mean high tide down to mean sea level or to about 2 m (6 ft) below mean high tide. It is regularly flooded by semidiurnal tides. The mean tidal range of low salt marshes on Long Island is about 80 cm, and they often form in basins with a depth of 1.6 m or greater. The vegetation of the low salt marsh is a nearly monospecific stand of cordgrass (*Spartina alterniflora*), a coarse grass that grows up to about 3 m (10 ft) tall.”

Historical grid ditching has occurred throughout the Project area, as shown in Appendix B, Figures 1-3, 1-4, and 1-5, which has contributed to the long-term degradation of the marsh system and resulted in the growth of high marsh vegetation, such as saltmeadow cordgrass (*Spartina patens*), along the berms and large unvegetated pannes⁵ in the center of inter-grid panels.

As depicted in the aerial imagery in Appendix B, large pannes have formed in the grid panels throughout the Project area, resulting in the loss of marsh vegetation. The most substantial pannes are found at the Timber Point site, where every “grid panel” has a large unvegetated panne in the center. Panne formation is most apparent in the western reaches of the Gardiner East site and along the western edge and eastern portions of the Gardiner West site. Significant panning is occurring within the southern portion of the West Sayville site marsh, with some panning and waterlogging occurring in the northern portion of the marsh to a lesser extent. Remnant vegetation remains in select pannes at this site. However, the majority of pannes at

⁵ Shallow unvegetated depressions.

the West Sayville site are unvegetated. It is assumed that the waterlogged areas across the Project area are in the process of converting to pannes.

New England Interstate Water Pollution Control Commission (NEWIPCC), in coordination with NYSDEC, developed the *Long Island Tidal Wetlands Trends Analysis* (Cameron Engineering & Associates, LLP 2015). The analysis compared marsh composition in 1975 to marsh composition in 2005/2008 within the Long Island Sound Estuary, Peconic Bay Estuary, and South Shore Estuary.⁶ The analysis found 11.6 percent marsh loss across the South Shore Estuary. Specific marsh loss for the marsh sites within the Project area is included in Table 3-2 (adapted from Cameron Engineering & Associates, LLP 2015). The complete tables and associated mapping are included as Appendix I.

From 1974 to 2005/2008, Timber Point experienced the greatest marsh loss at 18.58 percent while West Sayville experienced a 2.28 percent loss of marsh area. The Suffolk County Gardiner Park site increased by 1.71 percent, which may be attributed to the natural inland migration of the tidal wetland and the conversion of forested upland area to *Phragmites australis*, commonly called common reed or Phragmites, and high marsh in select areas. Unlike Timber Point, and West Sayville, which are bounded by residential and recreational facilities that prevent the natural inland migration of the marsh, Suffolk County Gardiner Park is bounded to the north by a small patch (<100 acres) of forested upland habitat. The conversion of this upland habitat into predominately Phragmites has led to the net increase in marsh area seen in the *Long Island Wetlands Trends Analysis*. It is important to note that the continued conversion of upland area to tidal wetland area would be confined due to development north of the forested upland area. Furthermore, the conversion of upland areas reduced the overall ecological value of the forested areas by reducing patch size. This conversion of upland habitat to Phragmites is evident in trend analysis mapping provided in Appendix I.

Table 3-2 NEWIPCC Tidal Wetlands Trends Analysis

Change in Wetland Complex	Gardiner County Park (ID# 418)	Timber Point (ID# 431)	West Sayville (ID# 435)*
Vegetated Complex 1974-2005/2008 Area (ac)	1.24	-11.86	-2.69
Vegetated Complex 1974-2005/2008 Area (%)	1.71	-18.58	-2.28
Intertidal Marsh + High Marsh + Fresh Marsh Area 1974- 2005/2008 (ac)	4.09	-13.72	-17.03
Intertidal Marsh + High Marsh + Fresh Marsh Area 1974- 2005/2008 (%)	7.61	-22.37	-17.63

* Wetland Complex identified as West Sayville County Tidal Wetland Marsh is listed by NEWIPCC as Indian Creek.

⁶ Tidal Wetlands Trends Analysis can be found here: <http://www.dec.ny.gov/lands/5113.html>.

3.5 Human Health and Public Safety

The estimated inundation in Suffolk County from Hurricane Sandy along the south shore of Long Island in the vicinity of the Project was 3.9 feet with an estimated 5.68 feet of storm tide (Blake et al. 2013) (see Appendix B, Figures 3-1, page 6, 3-2, page 17, and 3-3, page 24). The impacts of this event included sediment over-wash, beach, dune, and marsh erosion, breach openings, deposition of diverse debris over salt marshes, significant infrastructure damage, and loss of human lives. After Hurricane Sandy, hundreds of homes in Suffolk County were deemed either unlivable or condemned from structural damage. Hurricane Sandy floodwaters inundated and damaged on-site wastewater systems, which became inoperable. Inoperable sanitary systems can cause health and safety issues from human exposure to bacteria and viruses carried in sanitary wastewater. Post Hurricane Sandy, New York created the New York Rising Community Reconstruction (NYRCR) Program to focus on implementing reconstruction plans to build “physically, socially, and economically resilient and sustainable communities” (NYRCR Plans 2014a). The NYRCR conducted a risk assessment that characterized the West Sayville marsh as being at extreme risk of frequent inundation, vulnerable to erosion in the next 40 years, and likely to be inundated in the future due to sea level rise (NYRCR Program 2014b). Gardiner County Park is located within the area identified as the Greater Bay Shore NY Rising Community, and is at extreme risk of frequent inundation, vulnerable to erosion in the next 40 years, and likely to be inundated in the future due to sea level rise (NYRCR 2014c).

The susceptibility of Long Island’s south shore to coastal storms and flooding is one of the primary natural hazards in Suffolk County. The frequency of high-intensity storms has been projected to increase by 8 percent by mid-century, and 12 to 13 percent by the end of the century. The Suffolk County Hazard Mitigation Plan Update (Appendix J) provides a list of historical events that have impacted the vicinity of the Proposed Action.

The existing areas of stagnant water within the tidally isolated internal pools and ditches provide habitat for salt marsh mosquitoes, which can be vectors for serious human pathogens including EEEV and WNV (Rochlin et al. 2012b). Both EEEV and WNV can pose a serious risk to human health ranging from illness to death (New York State Department of Health 2016).

3.6 Cultural Resources

Cultural resources are defined as prehistoric and historic sites, structures, districts, buildings, objects, artifacts, or any other physical evidence of human activity considered important to a culture, subculture, or community for scientific, traditional, religious, or other reasons. Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended (36 CFR 800) outlines the process in which Federal agencies are required to determine the effects of their undertakings on historic properties. The NHPA defines a historic property as “any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion on the National Register.” Eligibility criteria for listing a property on the National Register of Historic Places (NRHP) are found at 36 CFR Part 60.

Effects to cultural resources could occur if there is an alteration to the characteristics of a cultural resource that qualify it for inclusion in the NRHP, or properties of traditional cultural

or religious importance to tribes. Effects are considered to be adverse if they alter, directly or indirectly, any of the characteristics of a cultural resource that qualify that resource for the NRHP so that the integrity of the resource's location, design, setting, materials, workmanship, feeling, or association is diminished. Cultural resources that have not been evaluated at the time of the undertaking may be considered potentially eligible for inclusion in the NRHP and, as such, are afforded the same regulatory consideration as historic properties. Pursuant to 36 CFR 800.4(a)(1), the Area of Potential Effects (APE) is defined as the geographic area(s) within which the undertaking may directly or indirectly affect cultural resources. Within the APE, impacts to cultural resources are evaluated prior to the undertaking for both standing structures and archaeology.

The New York State Historic Preservation Office (NYSHPO) maintains a database of New York's historic properties, which is regularly updated, in part on the basis of reports prepared by cultural resources professionals in advance of ground-disturbing projects that are subject to NYSHPO and Federal agency review. There are no structures or evidence of historic structures located within the APE for the Proposed Action, although the Gardiner County Park, and West Sayville marshes are located within a designated Archeological Sensitive Zone. No designated tribal lands are located within or adjoining the Project Area (see NYS Native American Lands mapping, Appendix K). Suffolk County has consulted with the NYSHPO on the Proposed Action with regard to historic properties and archeological sensitive areas. The Proposed Action was submitted for determination to the State Historic Preservation Office (SHPO) and was found to have no effect. The Findings Letter dated April 13, 2017, issued by NYSHPO is included as Appendix K.

3.7 Socioeconomics, Environmental Justice, and Protection of Children

EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, requires Federal agencies to examine proposed actions to determine whether they would have disproportionately high and adverse human health or environmental effects on minority or low-income populations.

As established in NYSDEC Commissioner Policy 29 on Environmental Justice and Permitting (CP-29), Potential New York Environmental Justice Areas are U.S. Census block groups of 250 to 500 households that in the 2000 census had populations that met or exceeded at least one of the following statistical thresholds: At least 51.1% of the population in an urban area reported themselves to be members of minority groups; or, at least 33.8% of the population in a rural area reported themselves to be members of minority groups; or, at least 23.59% of the population in an urban or rural area had household incomes below the federal poverty level.

The NYSDEC Office of Environmental Justice maintains state-wide county maps of Potential Environmental Justice Areas (PEJAs).⁷ According to the NYSDEC Western Suffolk County Map of Potential Environmental Justice Areas, there are no PEJAs within 3.0 miles of the Timber Point, and West Sayville wetland restoration sites. The Gardiner Park wetland restoration site is approximately ± 1.7 miles from the PEJA, which is located ± 1.7 miles to the

⁷ See: <http://www.dec.ny.gov/public/899.html>.

east in the hamlet of Bay Shore in the Town of Islip. Appendix B, Figure 3-19 (page 16) shows all NYSDEC PEJAs.

EO 13045, Protection of Children from Environmental Health Risks and Safety Risks, seeks to protect children from disproportionately incurring environmental health risks or safety risks that might arise as a result of Federal policies, programs, activities, and standards.

Environmental health risks and safety risks include risks to health and safety attributable to products or substances that a child is likely to come in contact with or ingest. The 2010 U.S. Census reported 2,179 children under the age of 18 in the census tracts containing Gardiner Park, 358 children under 18 in the census tract containing Timber Point, and 1,174 children under 18 in the census tract containing West Sayville. Appendix B, Figure 3-20 (page 18) depicts each of the census tracts analyzed.

3.8 Land Use, Recreation, and Coastal Zone Management

3.8.1 Land Use

As shown in Appendix B, Figure 3-21 (page 19), Gardiner County Park East and West are bordered to the north and east by Gardiner County Park, which includes a system of walking trails throughout the park area. Gardiner County Park permits dogs and is frequented by people walking dogs throughout the park and trail system. Gardiner County Park is bordered to the west by True's Creek and a medium-density residential neighborhood on the west side of True's Creek. The Project would occur within the existing wetlands, which are located on the south side of Gardiner County Park, adjacent to the Great South Bay (which borders the south side of Gardiner County Park East and West). The existing land use designated for the Gardiner County Park East and West Project area is recreational park. The health of the marsh is essential in protecting an important community asset and is adjacent to residential neighborhoods.

The Timber Point portion of the Project is NYSDEC-managed tidal wetlands, located adjacent to Suffolk County's Timber Point Country Club (adjacent to the south). The country club includes an 18-hole golf course (south of the Project area) and a marina that is located southeast of the Project area. The Connetquot River is directly to the north and east of the Project. Open space associated with the county's park/country club is located to the west (see Appendix B, Figure 3-22, page 20).

The West Sayville portion is bounded to the south by the Great South Bay, and Suffolk County Parks Departments owns and operates the West Sayville Country Club at Charles R. Dominy County Park, which bounds the northern boundary of the Project. As depicted in Appendix B, Figure 3-23 (page 24), open space marsh is found to the west of the area of the Proposed Action. Health of the existing marsh is important due to its location adjacent to the County's West Sayville Country Club and the low-lying residential neighborhoods and West Sayville marina located to the east.

3.8.2 Recreation

Suffolk County salt marshes provide critical habitat for a wide variety of commercially and recreationally important fish and wildlife. The public enjoys fishing and recreational boating

within the area of the Proposed Action. As discussed in Section 3.4, Suffolk County salt marshes also support migratory birds and over-wintering waterfowl. Incidental bird watching, wildlife observation, educational activities, hiking, and walking may occur throughout the year, as well as waterfowl hunting as permitted in season.

The three sites included in the Project (Suffolk County Gardiner Park East and West, Timber Point and West Sayville) each offer recreational value and are located adjacent to the Great South Bay. The Great South Bay is used by boaters during the recreational boating season, which runs from approximately mid-April to mid-November.

As described in the Land Use Section above, Gardiner Park East and West are part of the 231 acre Suffolk County Gardiner Park, which has a network of heavily utilized trails and access to the beach on the Great South Bay. Hunting is not a permitted activity.

The Timber Point site is owned by New York State and is open to waterfowl hunting, hiking, canoeing and fishing. In addition to the requisite hunting licenses, waterfowl hunters are required to obtain an access permit in order to hunt on the NYSDEC tidal wetland. The Connetquot River is utilized for recreational activities including boating and fishing and the adjacent to Suffolk County's Timber Point Country Club (adjacent to the south), an active golf course.

Suffolk County Parks Departments owns and operates the West Sayville site. Incidental bird watching, wildlife observation, educational activities, hiking, and walking occur at this site throughout the year. Hunting is not a permitted activity.

The health of the marsh at the four locations is essential in protecting these important community recreational assets.

3.8.3 Coastal Zone Management

The Coastal Zone Management Act (CZMA) of 1972 provides assistance to states, in cooperation with federal agencies, for developing land and water use programs in coastal zones. Section 307 of the CZMA stipulates that where a federal project initiates reasonably foreseeable effects on any coastal use or resource, the action must be consistent to the maximum extent practicable with enforceable policies of the affected State's federally approved coastal management plan. As noted in section 3.4.4, the proposed Project was submitted for determination of Coastal Consistency Conformance to New York State Department of State. The Federal Consistency Form and Conformance with New York State Management Policy submission is included as Appendix L.

3.9 Air Quality and Noise

3.9.1 Air Quality

The Clean Air Act of 1970 (CAA; 42 USC 7401–7661, 2009) is a comprehensive federal law that regulates air emissions from area, stationary, and mobile sources. The CAA authorized the U.S. Environmental Protection Agency (EPA) to establish National Ambient Air Quality Standards (NAAQS) to protect public health and the environment. The NAAQS include standards for six criteria air pollutants: lead, nitrogen dioxide, ozone, carbon monoxide, sulfur

dioxide, and particulate matter (including both particulate matter less than 10 micrometers in diameter [PM₁₀], and fine particulate matter less than 2.5 micrometers in diameter [PM_{2.5}]) (EPA 2015). Areas where the monitored concentration of a criteria pollutant exceeds the applicable NAAQS are designated as being in “non-attainment” of the standards; while areas where the monitored concentration of a criteria pollutant is below the standard are classified as in “attainment”. Non-attainment areas can be re-designated as a maintenance area if subsequent monitoring data demonstrate that a non-attainment area meets the NAAQS and a 10-year plan for continuing to meet and maintain such standards is implemented.

As of June 2018, Suffolk County is in attainment for carbon monoxide, PM₁₀, nitrogen dioxide, lead, and sulfur dioxide. The county is currently in maintenance for PM_{2.5} and is marginal nonattainment for 8-hour ozone (EPA 2018). Since the site is comprised of natural marsh it does not currently produce NAAQS emissions.

Federally funded actions in nonattainment and maintenance areas are subject to EPA conformity regulations (40 CFR Parts 51 and 93), which ensure that emissions of air pollutants from planned federally funded activities would not affect the state’s ability to meet the NAAQS. Section 176(c) of the CAA requires that federally funded projects conform to the purpose of the State Implementation Plan (SIP), meaning that federally funded activities would not cause any violations of the NAAQS, increase the frequency or severity of NAAQS violations, or delay timely attainment of the NAAQS or any interim milestone.

3.9.2 Noise

The Noise Control Act of 1972 required the EPA to create a set of noise criteria. In response, the EPA published *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety* (EPA 1974), which explains the impact of noise on humans.

Each of the four sites is existing marshland, which is located adjacent to the Great South Bay, parkland or recreational uses and single family residential neighborhoods. These existing land uses produce relatively low sound volumes. Both the residential neighborhoods and residential streets produce relatively low sound volumes. Temporary noise from motor boats in the Great South Bay may occur during the recreational boating season, which runs from approximately mid-April to mid-November. Similarly, temporary noise from maintenance and mowing equipment occurs at the public golf courses located adjacent to Timber Point and West Sayville sites. Both of these noise sources reflect periodic/short duration noise. The nearest railroad line is 4-5 miles to the north of the Project sites and does not contribute significant noise to the Project areas. In addition, the nearest airport is five or more miles to the north of the Project sites, which generates little to no sound due to its distance.

3.10 Sea Level Rise

It is estimated that global sea levels have risen by approximately 1.7 millimeters per year—the equivalent of 6.7 inches—over the last century. According to a recent publication of the EPA, the US Geological Survey (USGS) and the NOAA, the sea level rise along Mid-Atlantic coasts—including those within New York State—was substantially higher than this global average. Specifically, the rate of sea level rise in Montauk, the sampling location nearest to the

Project area, is estimated at a rate between 2.39 and 2.77 millimeters per year—on average, the equivalent of roughly 10.2 inches over the last century (Zervas 2001).

Estimates suggest that the average sea level will rise by an additional 0.6 to 2 feet by the year 2100 (over a period of more than 90 years), with higher sea level rise projected to continue throughout the Mid-Atlantic coasts. This will result in loss of wetlands and increased flood risk, erosion, salinity of rivers, bays, tidal estuaries and groundwater, along with other land impacts throughout the world. Over the next 20 years, at the current estimated rate of sea level rise, an increase of 5.16 centimeters (or approximately 2-1/16 inches) may be experienced (Zervas 2001).

The NYS Sea Level Rise Task Force was created in 2007 to assess impacts to New York State's coastlines from rising sea levels and recommend protective and adaptive measures. Appendix B, Figure 3-24 (page 21) and Appendix B, Figure 3-25 (page 23) present the Task Force's map showing areas in New York State that would be at risk for flooding due to sea level rise. The Proposed Action is within the areas identified on this map.

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 Geology, Soils, and Sediment

4.1.1 No Action Alternative

The No Action Alternative is expected to have a long-term minor negative effect on marsh topography and soils as berms along the banks of the ditches would continue to form as a result of sediment deposition. The depressions associated with panne areas would continue to expand, resulting in variable elevations throughout the marshes. While the elevation differences are minor (between 0 to less than 5 feet), they impact tidal connectivity. The No Action Alternative would have no effect on geology, as bedrock in the area is approximately 1,800 feet below the surface under the Lloyd aquifer.

4.1.2 Proposed Action

The Proposed Action would alter the existing topography and bathymetry within the Project area. Under the Proposed Action, the sediments deposited along the edges of grid ditches would be removed, select ditches would strategically be filled using coir logs and sediments from removal of material along the existing berms on the sides of the ditches, and waterlogged and panne areas would drain through the creation of runnels, and micropools. Vegetation would naturally return to unvegetated areas which would effectively level small depressions that exist within the marsh. The Proposed Action would result in positive long-term moderate effects to soils and sediments in the Project area. The Proposed Action would have no effect on geology, as bedrock in the area is approximately 1,800 feet below the surface under the Lloyd aquifer.

4.2 Water Resources and Wetlands

4.2.1 No Action Alternative

Under the No Action alternative ecosystem functions would continue to degrade due to continued erosion and deposition of sediment along the banks of mosquito ditches. Tidally

isolated internal pools would continue to expand and new pannes would form, resulting in the continued loss of marsh vegetation diminishing the tidal marsh ability to reduce flood and wave energy from potential storm events; continued extensive loss of high marsh (periodically inundated); an increase in low marsh areas (inundated daily at high tide); and disrupted hydrology with the bay (Cameron Engineering & Associates 2015). The degradation of vegetation would continue throughout the marsh thus reducing the ability of the marsh to filter nutrients, sediments and contaminants from surface waters and runoff and reduced flood control and wave protection during coastal storms, resulting in long-term moderate adverse impacts to water resources and wetlands.

4.2.2 Proposed Action

4.2.2.1 *Surface Water Quality*

Vegetated salt marshes provide valuable ecosystem services; most notably, improving coastal resiliency and filtering nutrients, sediments and contaminants from waters (Koch and Gobler 2009; Nelson and Zavaleta 2012). A poorly vegetated salt marsh does not perform as well in nutrient and pollutant removal as healthy, vegetated salt marsh. The lack of plant biomass reduces the ability of the marsh to assimilate these materials and reduces resilience to sea level rise (Koch and Gobler 2009). The Proposed Action is intended to stop vegetation degradation within the marsh complexes, resulting in a positive long-term effect on the ability of the marsh complexes to perform valuable ecosystem services including nutrient and pollutant removal.

The Project is anticipated to result in an improvement of the tidal wetland ability to provide water quality services in each of the sites. However, there would be some unavoidable but temporary and minor adverse impacts resulting from the implementation of the Project relating to the movement and placement of sediment to selectively fill existing grid ditches and create micropools. The movement of sediment is anticipated to result in some short-term turbidity. However, this increase in turbidity would be temporary and localized to the specific work area and would be contained to the extent possible using coir logs and sediment barriers as shown on the Conceptual Plan Details (see Attachment 1). The Proposed Action would result in long-term moderate benefits to water quality by maintaining and enhancing the marsh areas.

4.2.2.2 *Groundwater*

As noted above, healthy vegetated salt marshes provide valuable ecosystem services, including filtering nutrients and pollutant which eventually reach groundwater. Therefore, the Project would improve the overall health and ability of the marsh areas to perform beneficial services that improve groundwater quality, resulting in long-term minor positive impacts to groundwater resources.

4.2.2.3 *Floodplains*

The Proposed Action would improve tidal regime and flux between estuary and marshes, enhance tidal exchange with the areas of Proposed Action, and improve conditions for proper marsh accretion and resilience to sea level rise. The restored marshes would properly provide the environmental services of flood and storm surge buffer to the vicinity. The restored marshes would also be able to potentially reduce the amount the runoff flowing toward the marshes from the adjacent land areas, resulting in long-term moderate positive impacts to

floodplains. In the event of storm impact over the Project area, the restored marsh would help to diminish flooding effects to the residential vicinities.

4.2.2.4 Wetlands

Temporary, unavoidable, adverse impacts to wetlands are expected during restoration work. Adverse impacts would derive from the movement of personnel and equipment across the marshes during the implementation of the Proposed Action, including the removal of berms, creation of micropools and runnels. To reduce the impacts to vegetated wetlands, work crews would utilize BMPs as included in the approved NYSDEC Article 25 permits (Appendix H). BMPs include the appointment of an Environmental Supervisor responsible for identifying the best routes for machinery and personnel based on daily field conditions, utilization of marsh mats/plywood at repetitive use locations, and the utilization of “low-impact” machinery that operate with ground pressure of 2.0 pounds per square inch or less.

The Proposed Action is designed to have a positive effect on existent marshes. The Proposed Action is expected to improve the current degraded grid ditching features of the marshes by strategically filling them with local material and coir logs. The final design for each area included in the Proposed Action may include the creation of micropools connected to tidal channels by shallow connector ditches to enhance natural conditions by allowing biological flow between the bay and the marsh to control marsh mosquito species, which can be vectors for serious human pathogens including Eastern equine encephalitis virus and WNV. Overall, implementation of the Proposed Action would have long-term moderate to major beneficial impacts to wetlands.

4.3 Biological Resources and Vegetation

4.3.1 Common Species

4.3.1.1 No Action Alternative

Under this alternative, continued degradation and loss of vegetation would occur in the Project area, resulting in the loss of wildlife and their habitats, including potential impacts to common and listed species. The No Action alternative would likely result in long-term minor to moderate adverse impacts to biological resources and vegetation.

4.3.1.2 Proposed Action

The Proposed Action targets restoration of degraded marsh habitat, thereby improving habitat for fish, invertebrates, and other wildlife. Temporary adverse impacts would occur from implementation activities including use of site development equipment (ditchers, excavators, dump trucks, and graders) which could cause injury or mortality to less mobile wildlife species. The placement of sediment and coir logs to fill ditches may bury or displace epifaunal macroinvertebrates in the Project area, resulting in temporary minor impacts to macroinvertebrates.

The alteration or elimination of the linear mosquito grid ditches from the proposed placement of sediment and coir logs may have a temporary moderate impact on the utilization of the Proposed Action by nekton (aquatic animals that are able to swim and move independently of

water currents). However, post-restoration, the Project area would include improved habitat for aquatic species.

Increased human activity and site development equipment noise caused by implementation activities may cause wildlife species to temporarily relocate, resulting in negative impacts to wildlife in the Project area. Restoration activities on each marsh system would be relatively short-term (approximately six weeks) and the use of heavy equipment within wetlands is restricted to between December 1 and April 30 of any given year per the NYSDEC permits (Appendix H), which would minimize impacts to common species during important breeding and rearing times. Further, under the Proposed Action multiple monitoring techniques would be utilized to track changes in the marsh complex both pre- and post-site development. Monitoring would include vegetation monitoring (photography and quadrant sampling), nekton sampling, and sampling of pore water chemistries and sediment chemistries.

Once the restoration activities are complete, it is anticipated that wildlife species will return to the Project area. As successive growing seasons pass, the Project area is expected to revegetate naturally and result in higher quality marsh habitat that is better able to support wildlife species utilizing the area than under current conditions. The Proposed Action is anticipated to result in long-term moderate beneficial impacts to common wildlife species.

4.3.2 Threatened or Endangered Species

4.3.2.1 *No Action Alternative*

The No Action Alternative would have minor adverse long-term impacts on threatened and endangered species. Specifically, the continued degradation of the Project area would impact habitats potentially used by these species for foraging along the migratory flyway.

4.3.2.2 *Proposed Action*

The Proposed Action may have temporary minor adverse impacts on threatened or endangered species. The threatened and endangered avian species and migratory birds and seaside dragonlet that could occur in the Project area would likely temporarily relocate during restoration activities and would be expected to return after Project completion. Implementation of the Proposed Action would occur between November and April which is outside of the breeding season of the identified avian species, so some birds would not be present in the area and would thus be unaffected by implementation of the Proposed Action. This includes the seaside sparrow, common tern, and least tern that were identified by NYNHP as being within or nearby the project site (Appendix G). After restoration activities are complete, the restored marsh habitat would provide refuge and sheltering habitat for avian species, resulting in positive impacts to listed and migratory birds.

Temporary minor impacts to slender marsh-pink, coastal goldenrod, slender spikerush, swamp sunflower, marsh straw sedge, angled spikerush, sandplain gerardia and seabeach amaranth could result from the movement of personnel and equipment across the marshes, removal of berms, and the creation of micropools and runnels. Implementation of BMPs described in Appendix C and Appendix H would minimize adverse impacts to vegetation which may also minimize impacts to these listed plant species. No impacts to the small-flowered pearlwort are

anticipated as this species is isolated approximately 0.25 miles from the nearest project location.

The Proposed Action would have no adverse impacts to the marine eelgrass meadow within the Great South Bay because the Project area encompasses only tidal marsh and would not impact submerged aquatic vegetation within the bay. The Proposed Action would have no adverse impacts to the coastal oak-hickory forest and red maple-black gum swamp identified within the nearby Heckscher State Park as these areas are outside of the Project area.

NOAA NMFS determined that threatened or endangered species under the jurisdiction of NMFS may be present within the Project area (Appendix E). However, NOAA NMFS indicated that the “federal action agency will be responsible for determining whether the proposed action may affect listed species. If they determine that the proposed action may affect a listed species, they should submit their determination of effects, along with justification and a request for concurrence to the attention of the Section 7 Coordinator.” The USACE as the federal action agency granted Nationwide Permit 27 on May 31, 2018, with conditions for development of a 5 year monitoring plan for the restored wetland and the use of best management practices to minimize the release of suspended sediment into waterways (see Appendix E).

The USFWS Long Island Field Office was contacted on June 22, 2017, to conduct a consultation in order to ensure that the Proposed Action is not likely to jeopardize the continued existence of any listed species or result in the adverse modification of critical habitat. On October 11, 2017, USFWS concurred with the “no effect” determination and found no further ESA coordination or consultation was required. For consultation correspondence with the USFWS see Appendix F.

Consultation regarding possible impacts to state-listed threatened and endangered species was conducted with NYSDEC as part of the permitting process for the Proposed Action. On April 13, 2018, the NYSDEC granted permits for the Project with special conditions to minimize potential effects. Special conditions include no cutting of woody vegetation upslope of the tidal wetland boundary; any debris or excess material from implementation of the Project shall be completely removed from the site; all ground and heavy equipment shall be low ground pressure equipment only; fueling is prohibited within 100 feet of the tidal wetland boundary; use of heavy equipment shall occur between December 1 and April 30 of any given year to minimize impacts to marsh vegetation; and a written report of annual monitoring shall be submitted to the agency each year (Appendix H).

Overall, the Proposed Action is anticipated to create higher quality habitat for salt marsh species, thereby resulting in long-term moderate beneficial impacts to threatened and endangered wildlife and plants.

4.3.3 Essential Fish Habitat

4.3.3.1 *No Action Alternative*

The No Action Alternative is not expected to result in impacts to EFH as no action would be taken in the Project area.

4.3.3.2 Proposed Action

The Proposed Action would have adverse short-term minor impacts to EFH derived from increased turbidity. Turbidity would temporarily increase within the Project area as sediments are deposited in to the existing ditches. Increased turbidity may decrease the quality of the habitat to both the marine resource and its food/prey items as less light would be able to penetrate deeper depths. Reduced light can inhibit growth of aquatic vegetation, which would impact species dependent upon the vegetation. Impacts to EFH are expected to be temporary and localized to the immediate Project area. Furthermore, as select aquatic species are highly mobile they may temporarily leave areas that experience high turbidity during site development and return when surface water turbidity returns to pre-implementation conditions. Slow moving or immobile marine resources may be unable to re-locate from ditches selected for closure and therefore may be subject to smothering.

EFH review was conducted as part of the USACE permit review. The USACE Nationwide General Permit 27 was issued on May 31, 2018, and included permit conditions including the use of best management practices to minimize the release of suspended sediment into waterways which would minimize effects to EFH (Appendix E). Overall, the Proposed Action would increase the quality of the marsh habitat and provide long-term moderate benefits to EFH.

4.3.4 Significant Coastal Fish and Wildlife Habitat

4.3.4.1 No Action Alternative

The No Action Alternative would result in continued degradation of SCFWH resources. Continuing sea level rise and the loss of the salt marsh to open water would reduce the ability of the salt marsh ecosystem to function as a primary producer and nursery ground for numerous marine organisms that provide the food base for other marine resources. The No Action Alternative would result in the expansion of open water and the reduction of salt marsh at an accelerated rate, thereby eliminating this ecosystem function. Overall, the No Action Alternative would result in long-term moderate negative impacts to SCFWH.

4.3.4.2 Proposed Action

The Proposed Action would result in temporary adverse impacts to SCFWH in the immediate Project area. Increased turbidity resulting from the deposition of sediments within ditches and dredging of berms may decrease the quality of the habitat to both the marine resource and its food/prey item as stated in Section 4.3.3. Impacts to SCFWH are expected to be temporary and localized to the immediate Project area. Furthermore, as select aquatic species are highly mobile, they may temporarily leave areas that experience high turbidity during restoration activities and return when surface water turbidity returns to pre-restoration conditions. Slow moving or immobile marine resources may not be unable to re-locate from ditches selected for closure and therefore may be subject to smothering. Implementation of the Proposed Action would occur only between November and April to avoid impacts to breeding population of aquatic and terrestrial species as these species are not expected to breed during winter months.

The Proposed Action would prevent further habitat degradation associated with marsh loss, and would ultimately increase the quality of the habitat by allowing for natural marsh vegetation to

return. Due to the generally highly motile nature of terrestrial wildlife, it is expected that wildlife present in the Project area at the time of site development would temporarily vacate the site once implementation of the Proposed Action commences. Over the long-term, the Proposed Action would increase the quality of marsh habitat and would have a long-term moderate positive impact on SCFWH.

The Proposed Action was submitted to New York State Department of State to obtain a Coastal Consistency Determination. The General Concurrence letter in Appendix D ensures that the Proposed Action is consistent with the policies outlined in New York State's Coastal Management Program (CMP). New York State Department of State noted that Gardiner County Park and Timber Point are located within the Significant Coastal Fish and Wildlife Habitat for Great South Bay-West and Great South Bay- East. As such, human disturbance should be minimized between March 15 and August 15 to prevent disturbance to nesting birds within the marsh. All marsh restoration work would be completed between November 1 and March 15 to limit potential disturbance to nesting birds within the Project area. With implementation of these restrictions, the proposal meets the departments' general consistency concurrence criteria and an individual consistency certification is not required (Appendix D). For West Sayville, the New York State Department of State determined that with the proposed modification to the Project (to include a time-of-year restriction such that work within the marsh would not be conducted from March 15 through August 15 to avoid potential impacts to nesting birds), the proposal meets the department's general consistency concurrence criteria and that an individual consistency certification is not required (Appendix D).

4.3.5 Vegetation

4.3.5.1 No Action Alternative

The No Action Alternative would result in the expansion of unvegetated pannes, extensive waterlogging of pannes and increased sedimentation along the berms of the ditches causing die-back of vegetation to continue throughout the marsh. Overall, the No Action Alternative would result in long-term moderate negative impacts to marsh vegetation.

4.3.5.2 Proposed Action

The Proposed Action would result in temporary minor adverse impacts to wetlands vegetation from the movement of personnel and equipment across the marshes, removal of berms, and the creation of micropools and runnels, all of which would result in trampling and loss of vegetation. To reduce these impacts, BMPs identified in Appendix C and Appendix H would be followed, including include the appointment of an Environmental Supervisor that would be responsible for identifying the best routes for machinery and personnel based on daily field conditions; use of marsh mats/plywood at repetitive use locations; and the use of "low-impact" machinery that operate with ground pressure of 2.0 pounds per square inch or less.

The Proposed Action would have a long-term moderate positive effect on marsh vegetation. Natural revegetation is expected to occur in the areas of berm removal as well as within currently unvegetated pannes and waterlogged areas. Similar IMM techniques such as filling existing ditches and creating runnels were applied for a pilot project at Wertheim NWR and when compared to control areas that did not receive IMM treatment, the areas in which IMM

techniques were applied saw significantly higher total live vegetative biomass (Suffolk County Vector Control 2009).

4.4 Human Health and Safety

4.4.1 No Action Alternative

Under the No Action Alternative, salt marshes would continue to degrade, and coastal communities would continue to be flooded during intense storm events. The No Action Alternative would result in the expansion of pannes, extensive waterlogging of pannes and increased sedimentation along the berms of the ditches, allowing for increased areas of stagnant water and mosquito breeding, which could result in long-term negative impacts to the local community from potential mosquito-borne viruses. Suffolk County would likely continue application of mosquito larval control products to the salt marshes to prevent adult mosquitoes from emerging which would reduce this impact.

4.4.2 Proposed Action

The Proposed Action would have beneficial impacts to human health and safety. Salt marshes have value for coastal hazard mitigation by protecting communities from the impacts caused by coastal storms including flooding, sea level rise and increased weather intensity. Salt marsh restoration is expected to improve conditions for proper marsh accretion and resilience to sea level rise, while allowing local marsh vegetation to thrive, and improving marsh services such as wave energy attenuation, and buffering against storm and flood surges.

With regard to human health hazards from mosquitos, a pilot project conducted at Wertheim NWR saw reduced mosquito breeding in areas where the IMM approach was utilized, effectively reducing the frequency of pesticide use within the marsh (Suffolk County Vector Control 2009). A reduction in mosquito breeding areas and adult populations under the Proposed Action would represent a positive long-term impact on human health.

4.5 Cultural Resources

4.5.1 No Action Alternative

The No Action Alternative would have no effect on historic properties as no historic properties are located within the APE for the Project.

4.5.2 Proposed Action

Suffolk County has consulted with the NYSHPO on the Proposed Action with regard to cultural resources. Since there are no structures or evidence of historic structures located within the APE for the Project, there would be no effect on historic properties under the Proposed Action. While the APE associated with the Proposed Action at Gardiner County Park, and West Sayville marsh are located within a designated Archeological Sensitive Zone, a review by NYSHPO found that no historic properties would be impacted by the Proposed Action. The Proposed Action was submitted for determination to the State Historic Preservation Office (SHPO) and was found to have no effect. The Findings Letter dated April 13, 2017, issued by NYSHPO is included as Appendix K. No designated tribal lands are located within or adjoining the Project Area.

4.6 Socioeconomics, Environmental Justice, and Protection of Children

4.6.1 No Action Alternative

The No Action Alternative would result in continued degradation of salt marsh and the ability of the marsh to protect communities against storm events and tidal variations would decline. The surrounding community would continue to be at risk for flooding and from illness related to mosquito bites under the No Action Alternative. As there are no Potential Environmental Justice Areas (PEJAs) within 3.0 miles of the Timber Point and Sayville wetland restoration sites or within 1.5 miles of the Gardiners Park wetland restoration site, no adverse impacts to PEJAs would occur.

4.6.2 Proposed Action

The Proposed Action would have a positive long-term impact on nearby communities. The healthier marsh areas created by the Proposed Action would serve to deflect the impacts imposed by severe coastal storms and sea level rise on coastal communities, improve the vegetated tidal marsh conditions, and decrease the numbers of disease-carrying mosquitoes. Increasing coastal resiliency would help protect the surrounding community from flood events that could have detrimental effects on the economy of the surrounding area, nearby PEJAs and the safety of all peoples, including children, residing in the community. Student and veteran involvement in monitoring efforts would likely include gaining experience in field work, scientific instrument operations, data collection, and data analysis, which would result in positive benefits to participants.

4.7 Land Use, Recreation, and Coastal Zone Management

4.7.1 No Action Alternative

The No Action Alternative would result in long-term indirect adverse impacts from the continued expansion of pannes, extensive waterlogging of pannes and increased sedimentation along the berms of the ditches causing smothering of vegetation to continue throughout the marsh. The continued degradation of marsh habitat is expected to occur under the No Action Alternative, which would, over time, result in continued salt marsh degradation, a net loss of wetland habitat and have a long-term adverse impact on waterfowl and other coastal wildlife. Surrounding land uses, including recreational assets and single family residential neighborhoods would not receive the benefits the coastal protections of healthy marsh, increasing susceptibility of storm related flood damage to the surrounding park assets and residential neighborhoods. The No Action alternative would result in continued degradation of coastal zones.

4.7.2 Proposed Action

4.7.2.1 Land Use

Implementation of the Proposed Action would not alter the existing land uses designated for all sites proposed for restoration. The Project would, however, restore existing marsh lands, which would protect land uses further inland from extreme storm events and the effects of rising sea levels, resulting in long-term positive impacts to land use in proximity to restored sites.

4.7.2.2 Recreation

The Proposed Action would have a long-term positive impact on recreation resources by improving the resiliency and health of the salt marsh, which would provide for higher quality habitat for fisheries, waterfowl, migratory birds, and other wildlife. In the short-term, minor temporary disruption to recreational activities, such as waterfowl hunting and birding may occur during restoration activities, which are anticipated to be completed within a five (5) month period between November and March. Implementation of the Proposed Action may disrupt recreational activities close to the proposed restoration sites such as noise and access restrictions. However, restoration activities would be conducted during winter and early spring, which would reduce impacts to golfing and other outdoor recreational activities occurring in areas adjacent to the Project because less recreation occurs during the winter months. The sites managed by NYSDEC (Timber Point) would be temporarily closed to hunting during Project implementation activities, which would have a temporary negative impact to hunters during the winter months. The County owned sites (Gardiner Park and West Sayville) are not open to hunting under existing conditions. Implementation of the Proposed Action would in result long-term positive benefits associated to recreation by improving wildlife habitat and supporting habitat for fisheries, waterfowl, migratory birds, and other wildlife.

4.7.2.3 Coastal Zone Management

The Proposed Action was submitted for determination of Coastal Consistency Conformance to New York State Department of State (NYSDOS). The consistency assessment addresses potential effects to environment resources including fisheries resources, hazardous materials, erosion hazard areas, and other factors. Generally, since the Proposed Action is restorative in nature, the Proposed Action would have a positive impact on coastal zone management. The Federal Consistency Form and Conformance with New York State Management Policy submission is included as Appendix L. On June 12, 2017, and October 30, 2017, NYSDOS determined that the Proposed Action meets the general consistency concurrence criteria (Appendix D).

4.8 Air Quality and Noise

4.8.1 No Action Alternative

The No Action Alternative would not require use of any vehicles or machinery. Therefore, there would be no impacts to air quality or noise from the No Action Alternative.

4.8.2 Proposed Action

The implementation of the Project would be accomplished by using Suffolk County owned low ground pressure equipment and their personnel. The types of equipment used include low ground pressure ditcher, excavator, dump truck, grader, and equipment that can handle a combination of these activities; e.g., excavator/grader, dumper/grader/ditcher and dumper/ditcher/personnel. Restoration activities are anticipated to take approximately 6 weeks per site. Wetland work with heavy equipment is restricted to December 1 and April 30 of any given year per NYSDEC permits regulations (Appendix H).

Some temporary impacts are expected during restoration activities as the Proposed Action would involve the use of emission-producing vehicles and machinery as described above. Appendix M includes calculations for anticipated machinery activity per site based on conservatively assuming 15 days of work per machine (150 total hours based on a maximum of 10 hours of use per day). The emission factors were taken from the EPA AP-42 (EPA 1995) and are presented in Appendix M, Tables 1 and 2. All units would be powered with ultra-low-sulfur diesel (ULSD) fuel, as required by EPA regulations. The air emissions from restoration implementation are all below the de minimis levels and would not require a general conformity analysis. There would likely be no emissions of fugitive dust during restoration activities because of the wetness of the marsh. Vehicles and non-road equipment would comply with applicable standards and EPA regulations. Overall, there would be a temporary negligible impact to air quality from equipment used for the Project.

Short-term noise would occur at each site for approximately 6 weeks of restoration activities at each site from vehicles and machinery. The restoration activities would require the use of the low ground pressure equipment as described above. It is anticipated that a maximum of five machines would be operating for a maximum of 10 hours per day and a total of 15 days per site. The equipment would be operating at relatively large distances (approximately 200 to 1,200) feet from the closest residential homes resulting in a large attenuation of the noise produced by the equipment. The operations would be limited to daytime hours and would comply with the applicable town noise control ordinances. Therefore, the Project would result in negligible temporary impacts to noise levels during implementation of the Proposed Action.

5.0 CUMULATIVE EFFECTS

CEQ regulations stipulate that a cumulative effects analysis consider the potential impacts to the environment potentially resulting from the incremental impact of the Proposed Action when added to other past, present, and reasonably foreseeable future actions (40 CFR 1508.7).

The resilience of large areas of Long Island tidal marshes is threatened by tidal restrictions, waterlogging, extensive mudflat and panne formation and invasive plants, and many of these wetlands produce mosquitoes in large enough numbers to require regular pesticide application. Restoring these wetlands would provide buffering adjacent coastal communities to impacts of storms and sea level rise; would improve fish and wildlife habitat, and reduce mosquito proliferation.

This Project is part of a string of proposed coastal marsh restoration projects within the Long Island South Shore Estuary Reserve (Appendix B, Figure 1-1, page 1) that aim to restore wetland functions and provide protection from storms and sea level rise. Gardiner County Park and West Sayville marsh are located within the NY Rising Community Planning Area and this Project has the support of the community leaders who have been developing resiliency plans for those communities (NYCRR Program 2014b; NYCRR Program 2014c; see Appendix N, Support Letters). Specifically, the Project would build on the restoration carried out during a pilot project at Wertheim NWR (Rochlin et al. 2012a, b), and would complement currently funded projects through the Department of the Interior's Hurricane Sandy Coastal Resiliency Grant Program. In addition, the Project's Regional Technical Workgroup (RTW) would make interconnections with similar wetland restoration projects underway across the region affected

by Hurricane Sandy, including USFWS plans to use IMM for salt marsh habitat restoration modeled after Wertheim NWR pilot project on the remainder of their refuges on Long Island.

Expectations of positive long-term outcomes are supported by the data collected during the Wertheim NWR demonstration project, where the core team applied comparable techniques (Rochlin et al. 2009, 2012a, b). The results of these IMM modifications indicated minimal maintenance and sustained performance, requiring no further intervention. The Coastal Resiliency via Integrated Salt Marsh Management Project would be closely monitored by participating agencies beyond the allocated two-year time frame for the Project. Long term benefits would be assessed and measured using established methodology, and outcomes evaluated on an on-going basis. This and other completed projects would serve as a growing body of tried and tested techniques, and provide additional means to measure the success of the IMM techniques.

With respect to other planned projects in the specific locations of the four sites, Suffolk County is not aware of any significant construction projects, proposed dredging or restoration related projects proposed in the vicinity of the four sites planned for implementation during the October 2018 to April 2019 timeframe. Therefore no adverse cumulative impacts anticipated as a result of the Project.

6.0 AGENCY COORDINATION AND PUBLIC INVOLVEMENT

6.1 Agency Coordination

Representatives of the following Federal, State, and local agencies, Tribes, and Project team members were consulted during Project planning and the development of this Environmental Assessment: New York State Department of Environmental Conservation, Region 1; New York State Department of State; U.S. Fish and Wildlife Service, Region 5; U.S. Army Corps of Engineers; U.S. Geological Survey; U.S. Environmental Protection Agency; National Marine Fisheries Service; Town of Islip; Town of Babylon; State University (SUNY) at Stony Brook; and New York State Office of Parks, Recreation and Historic Preservation.

This Project is a partnership of numerous agencies and organizations. It would be administered by Suffolk County's Divisions of Water Quality and Community Development (Department of Economic Development and Planning, SCDEDP) and Vector Control (SCVC) the (Department of Public Works, DPW). Suffolk County would administer contracts and oversee the full implementation of the Project. The New York State Department of Environmental Conservation (NYSDEC) would provide assistance with processing Project permits. The Nature Conservancy (TNC) would play a lead role in the Regional Technical Workgroup. The USGS, USFWS, TNC, Town of Babylon, Town of Islip, TCN, and the School of Marine and Atmospheric Sciences (SOMAS), at the State University (SUNY) at Stony Brook would provide expertise and experience in salt marsh restoration and monitoring.

An important aspect of coastal resiliency is the application of cost-effective techniques that can contribute to long lasting, self-sustaining systems and management efforts well beyond an infusion of DOI funding. To that end, a key component of this proposal is the Regional Technical Workgroup (RTW) led by TNC. It would be composed of restoration practitioners from across the region (DE, NJ, CT, NY, and RI) and would use best available restoration

methods for individual Projects. The RTW would also provide a forum for creation and application of new methods, thereby advancing restoration science to future circumstances. The RTW would evaluate and compare the results of Projects conducted throughout the multi-state region in order to determine the most effective restoration techniques. The RTW December 2016 and March 2017 Progress Report summaries are provided as Appendix O.

6.2 Public Involvement

The Proposed Action has support from a number of agencies and organizations including the U.S. Congress, Federal and State agencies, and conservation groups in New York and surrounding states. In addition, support letters have also been received from all of the New York Rising Communities and from a veterans/volunteers group (see Appendix N).

The Project would engage the general public, college interns and school age children, as well as veterans. This Project would provide opportunities for youth involvement including providing undergraduate student internships, working closely with technical staff, acquiring hands-on experience in field work, scientific instrument operations, data collection, and data analysis.

Youth involvement would be drawn largely from undergraduate student internships, working closely with technical staff, acquiring hands-on experience in field work, scientific instrument operations, data collection, and data analysis. Such experience would contribute both to educational pursuits and future professional opportunities in wetlands management. Student interns are expected to be employed through the Project. Suffolk Community College would participate in the monitoring studies. Between 8 and 10 student interns are expected to be employed through the Project. The School for Marine and Atmospheric Sciences at SUNY Stony Brook University would be participating in the monitoring studies. TCN has also offered assistance. TCN's Conservation Corps programs mobilize young people (typically aged 8-25) and veterans (up to age 35) with trained crew leaders, as self-contained units to complete ecological and restoration work, enhancing natural systems and restoring wildlife habitat along Sandy-impacted coastal landscape. Student interns would also be retained by the towns (Babylon and Islip), and Suffolk County. The Project has the potential to educate and provide meaningful training for veterans in TCN's Conservation Corps. The knowledge and skills gained can drive future employment opportunities in related fields. Student and veteran participants would be provided with safety training, equipment, and appropriate gear to ensure safety throughout the Project, and would be closely supervised by experienced technical staff.

7.0 COMPLIANCE WITH FEDERAL, STATE, AND LOCAL LAWS

The proposed Project has been evaluated for consistency with applicable Federal, state, and local laws, regulations, and programs. In addition to this EA, the following permits and/or consultations are also required by local, state and federal agencies:

- Clean Water Act, Section 404 and Section 404 Permits (New York State Department of Environmental Conservation, USACE) (Appendix E; Appendix H).
- Coastal Zone Management Act Federal Consistency Determination (New York State Department of State Coastal Management Program) (Appendix D)

- Endangered Species Act, Section 7 (87 Stat.884, as amended 16 U.S.C. 1531 *et seq.*) Consultation (USFWS and NOAA Fisheries Habitat Conservation Division) (Appendix E; Appendix F)
- National Historic Preservation Act Section 106 Consultation (New York State Historic Preservation Office (NYSHPO) (Appendix K)
- New York State Department of Environmental Conservation Article 25 Tidal Wetland Permit (Appendix H)

Consultations with regulatory agencies, including NYSDEC, USACE, and USFWS have been held to confirm the soundness of the Project and the ability to receive permits. Approvals have been obtained from NYSDEC, NYSDOS, and the USACE. There are no outstanding permits for the Proposed Action.

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