Hashamomuck Cove
Southold, New York
Coastal Storm Risk Management
Integrated Feasibility Study/EA

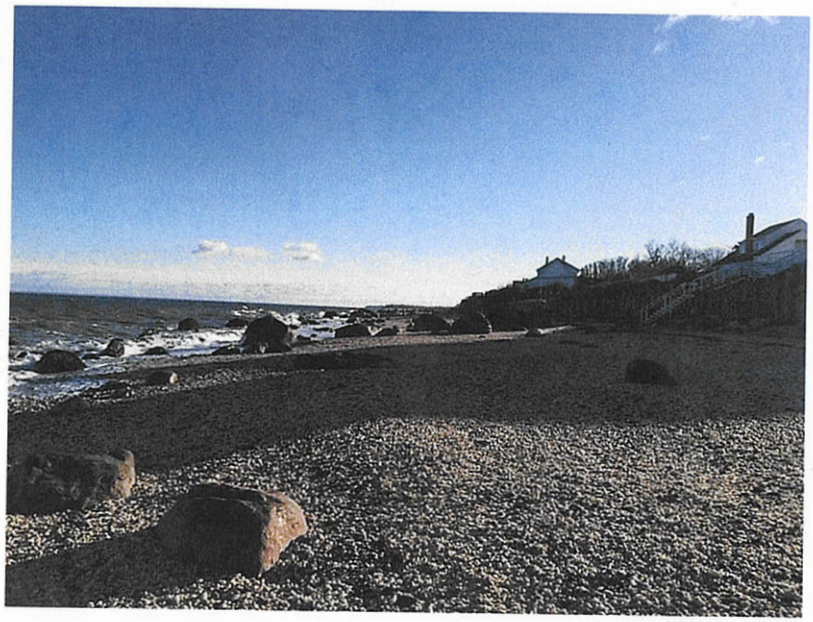
Appendix A4 Environmental Documentation United States Fish and Wildlife Service (USFWS)

1. USFWS-Final Federal Coordination Act Report

2. USFWS-Federal Planning Aid Letter

Final Fish and Wildlife Coordination Act Section 2(b) Report

Hashamomuck Cove Storm Risk Management Study
Town of Southold, Suffolk County, New York



Prepared for:
U.S. Army Corps of Engineers
New York District
26 Federal Plaza - 21st Floor
New York, New York

Prepared by:
Department of the Interior
U.S. Fish and Wildlife Service
Long Island Field Office
Ecological Services, Region 5
Shirley, New York

Preparers: Terra Willi, Kerri Dikun
New York Field Office Supervisor: David A. Stilwell

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Executive Summary

This is the U.S. Fish and Wildlife Service's (Service) Final Fish and Wildlife Coordination Act Report (Report) for the U.S. Army Corps of Engineers' (Corps; USACE) project entitled, "Hashamomuck Cove Southold, New York Coastal Storm Risk Management Feasibility Study Draft Integrated Feasibility Report & Environmental Assessment" within the Town of Southold, Suffolk County, NY.

This Report has been prepared at the request of the Corps in fulfillment of Section 2(b) of the Fish and Wildlife Coordination Act (FWCA; 48 Stat. 401, as amended; 16 U.S.C. 661 et seq.). This final document incorporates the Corps' comments dated October 2, 2018. The Service has recognized receipt of these comments and has responded as appropriate herein. The purpose of the FWCA is to ensure equal consideration and coordination of fish and wildlife conservation.

This Report provides the Service's comments on the direct, indirect, and cumulative impacts of the proposed projects on fish and wildlife resources and provides specific recommendations that should be taken to conserve those resources. In the short- and long-term, the Corps' recommended plan will have direct and indirect impacts on fish and wildlife resources and their supporting habitats. Initial beach fill will directly impact 11.2 acres (ac) of intertidal habitat and 10.3 ac of subtidal habitat along 1.5 miles of shoreline. These impacts include habitat modification, burial of benthic organisms, and turbidity.

The proposed project would involve the construction of berm width of 25 feet. A total of 215,600 cubic yards will be used during initial construction to build the sand berm in the three coves. Sand will be trucked to the site and would be delivered to staging points with direct access to the beach. Trucks would deposit sand at appropriate locations, for subsequent spreading and regrading by bulldozers or front end loaders. The work is estimated to take 7 to 10 months to complete. Sand will be placed on the beach and graded seaward on a slope of 1 vertical to 10 horizontal (USACE 2016). The beach renourishment cycle is estimated to be conducted approximately every 5 to 10 years over the 50-year life of the project depending on the actual storm events that occur. Only areas of significant erosion would be renourished. The total volume of sand needed to renourish the beach to the design profile over the 50-year project life is estimated to be 577,800 cubic yards.

The Service finds that implementation of the proposed project may result in both adverse and beneficial impacts to the ecological communities of the marine subtidal, maritime intertidal and beach communities. The proposed project will impact marine and intertidal communities, resulting in the elimination and disturbance of invertebrate species of the maritime beach and intertidal communities. In its current condition, the Study Area lacks suitable maritime beach habitat for nesting shorebirds. The construction of the berm and subsequent renourishments will increase the beach width, which will provide breeding habitat for shorebirds including piping plover and least terns.

Impacts from the proposed project will vary in duration, and recurring impacts will occur throughout the 50-year project life. Periodic renourishments will affect the benthic invertebrates

of the intertidal and upper beach. With periodic nourishment scheduled over the 50-year project life this may have some serious implications for the species using the proposed Study Area. However, the implementation of the Shorebird Management Plan, benthic resource (invertebrates and horseshoe crab) monitoring program, and mitigation measures provided herein, will assist the Corps in offsetting the potential adverse impacts presented in this report, by using the monitoring information to guide appropriate design and construction approaches.

In a draft version of this report, the Service provided the following recommendations to mitigate for project impacts to fish and wildlife resources:

- Consideration of alternatives and methods;
- Time-of-year restrictions and monitoring;
- Development of a shorebird management plan;
- Recommendations for sediment grain size and color, as well as plantings; and
- Best management practices (BMPs).

Additionally, the Service recommended specific pre- and post-construction surveys/studies which should be conducted in order to determine the current conditions and better assess post construction recovery of species. Survey results may also lead to the development of additional recommendations in order to avoid or minimize project related impacts over the course of the project.

The Service recommended a number of measures the Corps should consider incorporating into the project design, local cost-sharing agreement, plans, and specifications, as well as the operations and maintenance agreements to avoid, minimize, or compensate for impacts to the nation's trust resources including migratory birds and wetland habitats.

The Corps has accepted the majority of the Service's recommendations which will avoid, reduce or minimize project related impacts. The Service appreciates the Corps' comments and the opportunity to respond to them and requests that the Corps continue to coordinate with us as they move into the pre-construction engineering and design phase of the project.

Finally, this report does not constitute a Biological Opinion under section 7 of the Endangered Species Act (ESA) (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*). The Service has not received correspondence initiating consultation under section 7, however, the Corps has engaged the Service in early coordination regarding determinations for the federally-listed species: piping plover (*Charadrius melodus*; threatened), roseate tern (*Sterna dougallii dougallii*; endangered), red knot (*Calidris canutus rufa*; threatened), seabeach amaranth (*Amaranthus pumilus*; threatened), sandplain gerardia (*Agalinis acuta*; endangered), and northern long-eared bat (*Myotis septentrionalis*; threatened).

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Project Purpose and Authority

The Study Area is located within the Town of Southold (Town), in Suffolk County, New York. The easternmost boundary of the Study Area is situated near Soundview Road and extends westerly for approximately 1.5 miles (mi).

The purpose of the study, as identified by the U.S. Army Corps of Engineers (Corps or USACE), is to determine if there is an economically justified and environmentally compliant recommendation for federal participation in coastal storm risk management within the Study Area (USACE 2016). The Corps states that the Study Area is affected by both nor'easters and tropical storms. Storm driven surge and waves cause beach and bluff erosion and flooding. Erosion during storms results in the loss of land, damage to homes, businesses, and roads. The properties, utilities, and County Road 48 are most susceptible to damage within the concave portions of the coves (USACE 2016). In 2012, Hurricane Sandy impacted the Town with a storm surge of about 6 feet (ft) and flooded low-lying areas (USACE 2016).

The Feasibility Study is authorized by the House of Representatives, Committee on Transportation and Infrastructure, Resolution, Docket Number 2773 (May 2007) which states:

> *"Resolved by the Committee on Transportation and Infrastructure of the United States House of Representatives, that the Secretary of the Army is requested to review the reports of the Chief of Engineers on the North Shore of Long Island, Suffolk County, New York, published as House Document 198, 92nd Congress, 2nd Session, as well as other related reports with a view to determine whether the modifications of the recommendations therein are advisable at the present time in the interest of navigation, streambank stabilization, flood damage reduction, floodplain management, water quality, sediment control, environmental preservation and restoration, and other related purposes in Hashamomuck Cove and tributaries."*

Relevant Prior and Ongoing Studies/Reports/Projects

U.S. Army Corps of Engineers. December 2015. Sediment Sampling, Benthic Community Analysis, and Eelgrass Survey in Support of Feasibility Investigation Hashamomuck Cove Southold, New York. New England District. Concord, Massachusetts.

U.S. Fish and Wildlife Service. May 2012. Final Fish and Wildlife Coordination Act Report for the Corps' Combined Section 111 and Operations and Maintenance Project at the Federal Navigation Project at Mattituck Harbor, Southold, New York. Long Island Field Office, Brookhaven, New York.

Description of the Study Area

The Study Area extends from Soundview Road, near the Southold Town Beach, west approximately 1.5 mi (USACE 2016) and includes three coves separated by headlands:

Hashamomuck Cove (West Cove), Southold Cove (Central Cove), and Pebble Beach Cove (East Cove). The Study Area is bounded by the Long Island Sound to the north and County Road 48 to the south.

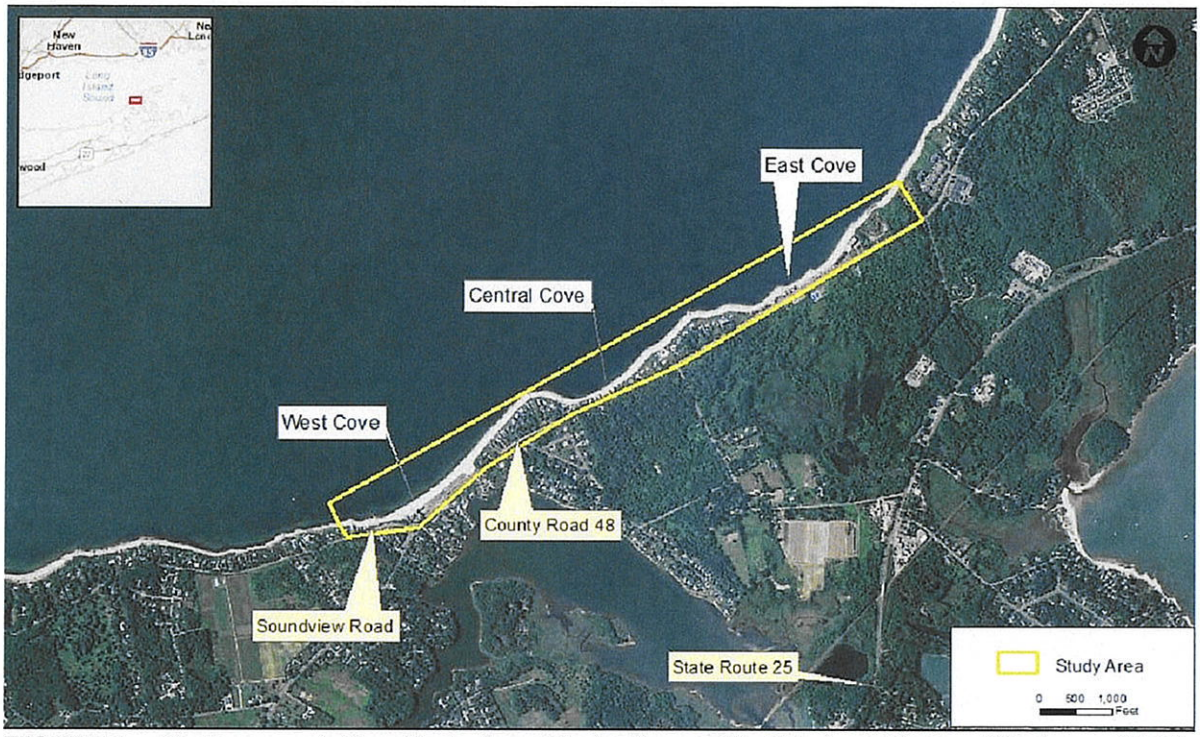

FIGURE 1.—Hashamomuck Cove Study Area. Illustration credit: U.S. Army Corps of Engineers (2016).

Ecological Significance of the Study Area

USFWS Significant Habitat and Habitat Complex

Within the Town, two regionally significant ecological complexes are located: the North Fork Beach Complex and the Orient Points – Islands Complex (USFWS 1991). The North Fork Beach Complex includes the narrow, linear complex of beaches, saltmarshes, tidal creeks, and nearshore baywaters along the Peconic Bay shoreline from Jamesport Town Beach to Conkling Point in the Village of Greenport and includes Mattituck Inlet, Cutchogue Harbor, and Hashamomuck Pond. Beach habitat, saltmarshes, and creeks are present throughout the complex. Dominant vegetation found within the complex includes: cordgrasses (*Spartina alterniflora* and *S. patens*), spikegrass (*Distichlis spicata*), and blackgrass (*Juncus gerardii*). Common reed (*Phragmites australis*) is found throughout the North Fork. The beach habitat and dredge spoil sites provide nesting habitat for nesting shorebirds and colonial waterbirds including piping plover (*Charadrius melodus*) and tern species. Diamondback terrapins (*Malaclemys terrapin*) use the wetland habitats and adjacent upland habitats for overwintering, foraging and nesting. The wetlands also provide valuable feeding areas for other species of special regional emphasis including the osprey (*Pandion haliaetus*), green-backed heron (*Butorides striatus*), yellow-crowned night heron (*Nyctanassa violacea*), Canada goose (*Branta canadensis*), American black duck (*Anas rubripes*), and clapper rail (*Rallus longirostris*). Productive habitats for finfish, shellfish, and crustaceans are found in the creeks and bay waters.

The Orient Point – Islands Complex extends approximately 18.5 mi from Gull Pond West northeast to the western edge of Fishers Island and includes Orient Harbor, Plum Gut, Plum Island, Great and Little Gull Islands, and The Race. The dominant species found within the dunes and vegetated portions of the beach include beach sandwort (*Arenaria peploides*), beach pea (*Lathyrus japonicas*), beachgrass (*Ammophila breviligulata*), and beach plum (*Prunus maritima*). Within the Orient Point area, three regionally-rare plant species, Scotch lovage (*Ligusticum scothicum*), slender knotweed (*Polygonum tenue*), and seabeach knotweed (*Polygonum glaucum*), are located on the beaches and sand ridges. Post oak (*Quercus stellata*), black oak (*Q. velutina*), and pitch pine (*Pinus rigida*) dominate the ridges while saltmarshes and salt ponds are dominated by saltmarsh cordgrass and glasswort (*Salicornia* spp.) are found in the depressions. These habitats provide breeding feeding areas for piping plover and least tern (*Sternula antillarum*). Great Gull Island provides nesting habitat for common tern (*S. hirundo)* and roseate tern (*S. dougallii dougallii*). Orient Harbor provides important habitat for fish and wildlife species and is considered a significant wintering waterfowl concentration area. Substantial winter populations of scoter (*Melanitta* spp.), greater and lesser scaup (*Aythya marila* and *A. affinis*), American black duck, common goldeneye (*Bucephala clangula*), bufflehead (*B. albeola*), red-breasted merganser (*Mergus serrator*), long-tailed duck (*Clangula hyemalis*), canvasback (*Aythya valisineria*), mallard (*Anas platyrhynchos*) and Canada goose have been documented using this area.

New York State Department of State Significant Coastal Fish and Wildlife Habitats

Hashamomuck Pond lies south of the Study Area (near the west cove) and is designated as a New York State Department of State (NYSDOS) Significant Coastal Fish and Wildlife Habitat (NYSDOS 2002). The shallow, brackish pond is approximately 220 acres (ac) in size and empties into Shelter Island Sound through Mill Creek. Hashamomuck Pond is a valuable pond/wetland on the north fork of Long Island but its value is reduced by human disturbance and water pollution. In spite of this, the pond provides a valuable habitat for a variety of fish and wildlife. Several osprey nest on platforms around the pond and utilize the pond and marshes for feeding. The pond is also an important feeding area for waterfowl including merganser, scoter, Canada goose, and long-tailed duck. Diamondback terrapin nest at the head of Mill Creek. The pond also serves as a habitat for finfish and shellfish including bay scallops (*Argopecten irradians*) and hard clams (*Mercenaria mercenaria*).

Threats to Ecologically Significant Habitats

The Town's Local Waterfront Revitalization Plan (Town of Southold 2014) recognized that while these complexes support large and healthy assemblages of plants and animals, these habitats have been destroyed, fragmented, or otherwise impaired by human activities. The physical characteristics of shoreline and upland areas have been modified, food sources and cover have been removed, non-native species have been introduced, and the waters of the Town have been degraded.

Fish and Wildlife Resource Concerns and Planning Objective

Service Mitigation Policy

The Service's Mitigation Policy (Policy) (USFWS 1981) was developed to guide our preparation of recommendations on mitigating the adverse impacts of land and water developments on fish, wildlife, their habitats, and uses thereof. It helps both the Service and the federal action agency, in this case, the Corps, by assuring consistent and effective recommendations, by outlining policy for the levels of habitat mitigation needed, and the various methods for accomplishing mitigation for habitat losses associated with such projects. It allows federal action agencies to anticipate Service recommendations and to assist in the preparation of mitigation measures early, thus avoiding delays and assuring equal consideration of fish and wildlife resources with other project features and purposes.

The term "mitigation" is defined as: (a) avoiding the impact altogether by not taking a certain action or parts of an action; (b) minimizing impacts by limiting the degree or magnitude of the action and its implementation; (c) rectifying the impact by repairing, rehabilitating, or restoring the affected environment; (d) reducing or eliminating impacts over time; and (e) compensating for impacts by replacing or providing substitute resources or habitats.

Conservation Goal

Under the Fish and Wildlife Coordination Act of 1958, as amended (FWCA; 48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), federal agencies are required to ensure equal consideration of fish and wildlife resources in the planning of water resource development projects. The Service's emphasis in this regard is to identify means and measures to mitigate the potential adverse impacts of the proposed project and to make positive contributions to fish and wildlife resource problems and opportunities.

From the Service's perspective, a desired output of the proposed project is to avoid and minimize further losses of habitat value and as such, the mitigation goal for this project is no net loss. In developing mitigation recommendations, the Service also relied on professional experience, literature searches, and local, state, and federal conservation plans (e.g., bird conservation plans and local, state, and federal land and water conservation plans) to derive appropriate recommendations for mitigation and fish and wildlife enhancement opportunities.

Description of Evaluation Methods

The descriptions of natural resources are based on previous studies for similar projects, relevant grey and peer-reviewed literature, local, state, and federal fish and wildlife reports and plans. As discussed in more detail in the following section, this report discusses fish and wildlife resources which may be found within the Study Area.

Description of Fish and Wildlife Resources

Environmental Setting

The Town occupies the eastern 20 mi of Long Island's northern peninsula and includes Robins, Plum, Great Gull, Little Gull, and Fishers Islands. Because of the Town's insular nature, its latitude, and the proximity of the Atlantic Ocean, Southold has a predominantly temperate, marine climate. Temperatures are moderate, and precipitation is abundant during the fall, winter, and spring. Southold is naturally subdivided by saltwater ponds, marshes, and inlets into six separate morphologic and hydrologic areas.

Although the shoreline is generally smooth and regular, erosion by wave action and storm tides has created steep bluffs along the Long Island Sound waterfront. A ridgeline feature is present along most of the shoreline and is commonly 50 ft above sea level, reaching a maximum of slightly over 160 ft above sea level (USGS 1964). Freshwater wetlands are scattered throughout the Town. The largest concentration of freshwater wetlands, the Arshamomaque Preserve wetland complex, is located between Hashamomuck Pond and Chapel Lane, south of the central cove. In March of 1987, the NYSDOS designated Hashamomuck Pond as a Significant Coastal Fish and Wildlife Habitat.

The coast along the Study Area is developed with residential properties, a Town beach, a restaurant, and an inn. Running south of the Study Area is County Road 48, one of two main roads providing access to areas east of the Study Area.

The Study Area is comprised of a number of habitats found in the marine systems. For the purposes of describing the fish and wildlife resources found within the Study Area, the communities are identified using "Ecological Communities of New York State Second Edition" (Edinger et al. 2014).

Water Quality

The Study Area is bounded to the north by the Long Island Sound. The New York State Department of Environmental Conservation (NYSDEC) classifies the surface waters of the State of New York pursuant to Title 6, Chapter 10 of the Codes, Rules and Regulations of New York State. The portion of the Long Island Sound located adjacent to the Study Area is "Long Island Sound, Suffolk County, East (1702-0266)." This body of water and extends from Mattituck Inlet to East Point/Fishers Island and is classified as 'SA' – suitable for fish propagation and survival, shellfishing for market purposes, primary and secondary contact recreation and fishing. This water body is not included on the NYSDEC's current (2014) NYS Section 303(d) List of Impaired/TMDL Waters.

Ecological Communities

Marine Ecosystem

Within the Study Area, the marine system consists of marine subtidal, marine intertidal, marine cultural, and maritime beach (Edinger et al. 2014). The marine subtidal habitat consists of the marine deepwater community, the marine intertidal subsystem includes the marine intertidal gravel/sand beach community, and the marine cultural subsystem includes marine riprap and artificial shore communities. The marine intertidal zone is comprised of sands, gravel, cobbles, and large boulders. This zone is alternately exposed and submerged throughout tidal fluctuations, and is subject to the turbulence of waves, currents, and the shifting nature of the substrate. The marine cultural system includes man-made structures such as groins, bulkheads, and rock revetments. It provides rocky habitat for both aquatic and avian species, and represents the marine riprap/ artificial shore community (See Appendix A and Figure 2 for photographs of the Study Area).

The maritime beach system is represented by extremely sparse vegetation that occurs on unstable sand, gravel, or cobble ocean shores above mean high tide, where the shore is modified by storm waves and wind erosion. The maritime beach within the Study Area is narrow and bounded to the south by residential development including shoreline protective structures such as bulkheads, large rocks, etc. During a Service site visit in March 2016, dunes were poorly developed or absent and that limited vegetation was observed on the maritime beach with the majority of vegetation located upland of the shore hardening structures (Figure 2). The vegetation documented by the Corps in the upland areas includes: evening primrose (*Oenothera biennis*), common milkweed (*Asclepias syriaca*), Montauk daisy (*Nipponanthemum nipponicum*; escaped from residential gardens), catbrier (*Smilax rotundifolia*), staghorn sumac (*Rhus typhina*), white oak (*Quercus alba*), red oak (*Q. rubra*), red maple (*Acer rubrum*), American beech (*Fagus grandifolia*), American elm (*Ulnus americana*), yellow poplar (*Liriodendron tulipifera*), hickory (*Carya* spp.), American beachgrass (*Ammophila breviligulata*), silverweed (*Potentilla anserina*), sea lavender (*Limonium nashii*), morning glory (Family: *Convolvulaceae*), and seaside goldenrod (*Solidago sempervirens*) (USACE 2016). Non-native species identified within the Study Area include common reed, Japanese knotweed (*Fallopia japonica*) and honeysuckle shrubs (*Lonicera* spp.) (USACE 2016).

FIGURE 2.—Photo of maritime beach. Illustration credit: USFWS, March 29, 2016.

The Corps conducted a one day benthic sampling and eelgrass (*Zostera marina*) survey on September 21, 2015. A total of 15 different taxa were identified during the survey effort. The dominant species observed were primarily annelidae: *Capitella capitata, Scalibregma inflatum*, and oligochaetes. Other species documented at the low intertidal stations included crustacean isopods, amphipods, and decapods, as well as some typical intertidal gastropods species (eastern white slipper shell (*Crepidula plana*) and three-line mudsnail (*Nassarius trivitatus*). Blue mussels (*Mytilus edulis*) were documented at one station in the mid-intertidal station and one blue mussel was found in the low intertidal station (USACE 2016). The Corps did not document any eelgrass within the Study Area.

Trust Resources

The Service has legal responsibility for the welfare of Federal trust resources including wetlands, migratory birds, inter-jurisdiction fishes, species listed under the Endangered Species Act (ESA; 87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.), and Service lands. The Service has statutory authority and responsibility for enforcing the FWCA, the ESA, the Migratory Bird Treaty Act of 1918 (MBTA; 16 U.S.C. 703-712), and the Bald and Golden Eagle Protection Act of 1940 (BGEPA; 16 U.S.C. 668-668c). The following section discusses trust resources that occur or may occur within the Study Area.

Wetlands

The Service defines wetlands as transitional lands between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. Intertidal and shallow subtidal habitats, such as those described above, provide a suite of ecosystem services, including primary production, provision of fish and shellfish habitat and nursery areas, biogeochemical cycling of nutrients, carbon sequestration, sediment trapping, and wave attenuation (Currin et al. 2010). According to the National Wetlands Inventory (NWI; https://www.fws.gov/wetlamds/nwi), the following wetland habitat types occur within the Study Area: estuarine and marine wetlands, and estuarine and marine deepwater. Additional wetland habitat types that occur within the vicinity of the study area include freshwater emergent wetland, freshwater pond, and freshwater forested/shrub wetland (Figure 3).

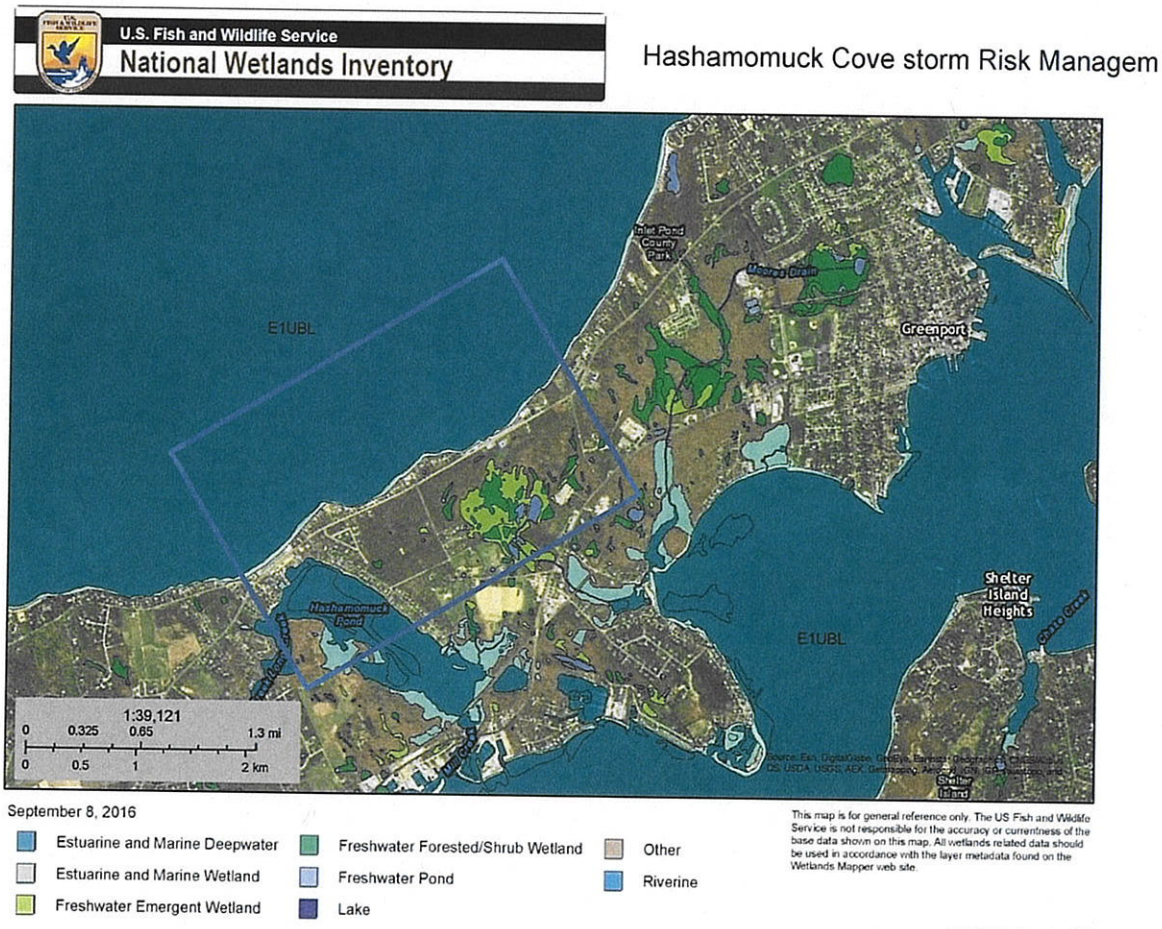

FIGURE 3.—Map of NWI wetlands within the Study Area and surrounding areas.

Avian Resources

The primary statutory authority for Birds of Conservation Concern (BCC) 2008 (USFWS 2008) is the Fish and Wildlife Conservation Act of 1980, as amended; other authorities include the FWCA of 1956 (16 U.S.C. 742a-j), the ESA, and the MBTA. The BCC birds presented in Table

1 are protected under the MBTA, which prohibits the intentional taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Service. The word "take" is defined as "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect." Bald and golden eagles are afforded additional legal protection under the BGEPA (16 U.S.C. 668-668d). We recommend that these lists be consulted in accordance with Executive Order 13186, "Responsibilities of Federal Agencies to Protect Migratory Birds."

Table 1.—BCR 30 (New England/Mid-Atlantic Coast) *BCC 2008* list: (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR, * Listed under ESA.

Common Name	Scientific Name	Status	Common Name	Scientific Name	Status
Red-throated Loon	*Gavia stellata*	nb	Bald Eagle	*Haliaeetus leucocephalus*	b
Pied-billed Grebe	*Podilymbus podiceps*		Peregrine Falcon	*Falco peregrinus*	b
Horned Grebe	*Podiceps auritus*	nb	Rusty Blackbird	*Euphagus carolinus*	nb
American Bittern	*Botaurus lentiginosus*		Black Rail	*Laterallus jamaicensis*	
Least Bittern	*Ixobrychus exilis*		Wilson's Plover	*Charadrius wilsonia*	
Snowy Egret	*Egretta thula*		American Oystercatcher	*Haematopus palliatus*	
Lesser Yellowlegs	*Tringa flavipes*		Solitary Sandpiper	*Tringa solitaria*	nb
Whimbrel	*Numenius phaeopus*	nb	Upland Sandpiper	*Bartramia longicauda*	
Hudsonian Godwit	*Limosa haemastica*	nb	Buff-breasted Sandpiper	*Calidris subruficollis*	
Marbled Godwit	*Limosa fedoa*	nb	Short-billed Dowitcher	*Limnodromus griseus*	nb
Red Knot (*rufa* ssp.)	*Calidris canutus rufa*	a*, nb	Least Tern	*Sternula antillarum*	c
Semipalmated Sandpiper	*Calidris pusilla*	nb	Gull-billed Tern	*Gelochelidon nilotica*	
Purple Sandpiper	*Calidris maritima*	nb	Black Skimmer	*Rynchops niger*	
Red-headed Woodpecker	*Melanerpes erythrocephalus*		Short-eared Owl	*Asio flammeus*	nb
Brown-headed Nuthatch	*Sitta pusilla*		Whip-poor-will	*Antrostomus vociferus*	
Wood Thrush	*Hylocichia mustelina*		Loggerhead Shrike	*Lanius ludovicianus*	
Golden-winged Warbler	*Vermivora chrysoptera*		Sedge Wren	*Cistothorus platensis*	
Cerulean Warbler	*Setophaga cerulean*		Blue-winged Warbler	*Vermivora Cyanoptera*	
Kentucky Warbler	*Geothlypis formosa*		Prairie Warbler	*Setophaga discolor*	
Nelson's Sharp-tailed Sparrow	*Ammospiza nelsoni*		Worm-eating Warbler	*Helmitheros vermivorum*	
Seaside Sparrow	*Ammospiza maritimus*	c	Henslow's Sparrow	*Ammospiza henslowii*	
Saltmarsh Sparrow	*Ammospiza caudacutus*				

Finfish, Shellfish, and Invertebrates

There are no specific surveys for finfish or commercial shellfish within the Study Area, however, finfish surveys have been conducted within other areas of the Long Island Sound. For the purposes of this project, the information in Table 2 was compiled from Connecticut Department of Energy and Environmental (DEEP) Protection Marine Fisheries Division's *Long Island Sound Trawl Survey* and the Corps' Asharoken and Bayville Nearshore Investigation Final 2005 Finfish, Invertebrate Infauna, and Water Quality Summary Report.

Finfish

The Connecticut DEEP Marine Fisheries Division conducts an annual trawl survey of the Long Island Sound. The surveys are conducted in the spring, from April through June, and during the fall, from September through October. The survey locations are situated between from 5 to 46 meters (m) in depth from New London to Greenwich, Connecticut. During the 2014 survey effort, sixty finfish species were documented. This trawl survey effort started in 1984 and over the course of the 31 years has documented one hundred and six finfish species (Connecticut DEEP 2014).

Baseline biological conditions of the Asharoken and Bayville Study Areas are based on surveys undertaken in 2003 and 2004 (USACE 2005). These proposed sites are also located along the north shore of Long Island and are located approximately 50 mi west of the Study Area.

Table 2.—List of finfish species that may occur within the project area. This abridged list contains the species identified during the Connecticut DEEP Marine Fisheries Division Long Island Sound Trawl Survey and the Corps' Asharoken and Bayville Nearshore Investigation Final 2005 Finfish, Invertebrate Infauna and Water Quality Summary Report. A complete list of the species observed within the Connecticut DEEP Trawl Survey is provided in Appendix B.

Common name	*Scientific* Name	Common name	Scientific Name
anchovy, bay	*Anchoa mitchilli*	minnow, sheepshead	*Cyprinodon variegatus*
bass, striped	*Morone saxatilis*	mummichog	*Fundulus heteroclitus*
bluegill	*Lepomis macrochirus*	pipefish, northern	*Syngnathus fuscus*
cusk-eel, striped	*Ophidion marginatum*	sand lance, American	*Ammodytes americanus*
flounder, yellowtail	*Pleuronectes ferrugineus*	sea robin, northern	*Prionotus carolinus*
glasseye snapper	*Priacanthus cruentatus*	silverside, Atlantic	*Menidia menidia*
gunnel, rock	*Polis gunnels*	tautog (blackfish)	*Tautoga onitis*
hog choker	*Trisects maculatus*	tomcod, Atlantic	*Microgadus tomcod*
killifish, striped	*Fundulus majalis*	weakfish	*Cynoscion regalis*
menhaden, Atlantic	*Brevoortia tyrannus*		

Shellfish and Invertebrates

Shellfish found in the Town of Southold include hard-shell clams, soft-shell clams (*Mya arenaria*), surf clams (*Spisula solidissima*), oysters (*Crassostrea virginica*), bay scallops, blue mussels (*Mytilus edulis*), and channeled whelk and knobbed whelk (*Busycon canaliculatum* and *B. caricum*, respectively). Surf clams are found in off-shore shoals in Long Island Sound (Town of Southold 2014). Additional invertebrates, including horseshoe crab (*Limulus polyphemus*) and blue crab (*Callinectes sapidus*), were documented during the Connecticut DEEP Marine Fisheries Division Long Island Sound Trawl Surveys. Information regarding the species identified during these efforts is provided in Appendix C.

Federally-listed Threatened and Endangered Species

Of the six federally-listed species which occur in Long Island, three of these species may occur within the Study Area. The piping plover (threatened), red knot (*Calidris canutus rufa*; threatened), and roseate tern (endangered) occur or may occur within the Study Area. The

remaining three species, seabeach amaranth (*Amaranthus pumilus*; threatened), northern long-eared bat (*Myotis septentrionalis*; threatened) and sandplain gerardia (*Agalinis acuta*; endangered) are not known to occur within the Study Area.

Seabeach amaranth is a small annual plant which is restricted to sparsely-vegetated sandy ocean beaches (USFWS 1996b). As such, it is unlikely that this plant occurs within the project area.

The northern long-eared bat is a medium-sized bat found across much of the eastern and north-central United States. White-nose syndrome is responsible for much of the species' recent population decline. Northern long-eared bat typically winters in caves and abandoned mines. There are approximately ninety hibernacula known to occur across the state (USFWS 2015). During the summer months, northern long-eared bats roost under loose bark, in cracks, crevices, and cavities within a variety of tree species. Other roosting habitat includes human made structures such as buildings, utility poles, and barns (USFWS 2015). Within the Planning Aid Letter, the Service stated that the northern long-eared bat may be found within the Study Area as they may utilize the forested uplands for summer roosting habitat. However, the southern boundary of the Study Area is located adjacently north of these forested uplands and as such; it is unlikely that the northern long-eared bat will be affected by the proposed action. However, if the Corps proposes to clear the upland vegetation, south of County Road 48, the proposed action may affect northern long-eared bat.

Sandplain gerardia is an annual hemi-parasitic grassland plant native to Maryland, Massachusetts, Rhode Island, Connecticut, and Long Island, New York. As such, it is unlikely that this plant occurs within the Study Area.

Piping plover is a small species of shorebird which breeds in the northeastern Atlantic coast. Plovers nest above the high tide line on coastal beaches, sandflats at the ends of sand spits and barrier islands, gently sloping foredunes, blowout areas behind primary dunes, sparsely-vegetated dunes, and washover areas cut into or between dunes. Feeding areas include intertidal portions of ocean beaches, washover areas, mudflats, sandflats, wracklines, and shorelines of coastal ponds, lagoons, or saltmarshes (USFWS 1996a). Plover broods prefer ephemeral pools and bay tidal flats over other habitat types due to higher arthropod abundance and relatively increased availability of escape cover (Elias et al. 2000). In 2004, a piping plover pair nested in the west cove. There have been no other documented nesting attempts since 2004, likely a result of the limited suitable habitat documented within the site. However, the construction of this project will increase habitat and provide potential foraging and breeding habitat. Additionally, the Corps proposes to construct the project during migration and the breeding season when piping plover are present on Long Island. Therefore, it is likely that this project may affect the piping plover.

Red knots breed in the Canadian arctic and winters mainly in Tierra del Fuego, northern Brazil, or Florida, and migrates through New York, to and from its breeding sites in the spring and fall (USFWS 2014a). Red knots utilize coastal marine and estuarine habitats during the spring and fall migrations. Red knots show moderate fidelity to particular migration staging areas between years (USFWS 2014a). These habitats include high energy ocean or bay front shores, tidal flats in sheltered bays, and lagoons (USFWS 2014a). In North America, red knots are found along

sandy, gravel, or cobble beaches, tidal mudflats, saltmarshes, shallow coastal impoundments and lagoons, and peat banks. Red knots use sandy beaches during both the spring and fall migration (USFWS 2014a). The red knot is a specialized molluscivore, primarily eating hard-shelled mollusks and supplementing with softer invertebrate prey (USFWS 2014a). Red knots are restricted to foraging in the top 0.8 to 1.2 inches of sediment due to bill morphology (USFWS 2014a). Red knots forage on a number of prey, exhibiting preference for specific prey within specific stop overs, during the spring and fall migrations and based on wintering location (USFWS 2014a). In New York, red knots in Moriches Bay exhibited preference of horseshoe crab eggs during the spring migration (USFWS 2014a). Red knots also forage on small periwinkles (*Littorina* spp.), tiny blue mussels and blue mussel spat (*Mytilus edulis*), gem clams (*Gemma gemma*) (not preferred), amphipods, naticid snails, polychaete worms, insect larvae, crustaceans, sand fleas (*Haustortids* spp.), mole crabs (*Emerita talpoida*), dwarf surf clams (*Mulinia lateralis*), small bivalves (*Tellina, Maeoma, Donax, Gemmula, Iphigenia, Tivella*, and *Area* spp.), and mud snails (*Peringia ulvae*) (USFWS 2014a). The Service is not aware of any comprehensive monitoring of red knots on Long Island, New York, or within the Study Area. Some data for Long Island is available from individual birders or associated with horseshoe crab monitoring. However, no observations of red knots have been documented within the Study Area and horseshoe crab monitoring has not been conducted within the site. It is possible that red knots utilize the site and have not been reported or it is possible that upon completion of this project, red knots will utilize this site.

Roseate terns are medium-sized, gull-like terns. Roseate terns are specialist feeders eating almost exclusively small fish, primarily the American sand lance (*Ammodytes americanus*) in northeastern populations. It captures food mainly by plunge diving, completely submerging its body underwater to catch prey, but it also feeds in shallow waters. Roseate terns are an exclusively marine bird, usually breeding on small islands and occasionally on sand dunes of barrier beaches (USFWS 2011). During the breeding season, birds typically forage over shallow coastal waters around the breeding colony. Roseate terns nest on Great Gull Island which is located east of the Study Area. There is no history of nesting within the Study Area; however, it is possible that roseate terns may utilize the offshore waters for foraging.

Section 7(a) (2) of the ESA, requires all federal agencies, in consultation with the Secretary of the Interior, to ensure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any listed species. In consultation with the Service, the Corps shall utilize its authority to further the purposes of the ESA in the conservation and recovery of listed species and the ecosystems on which they depend. Further, 50 CFR 402.02 states that the "effects of an action" to be considered during consultations include direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action. As such, consultation under section 7 will need to be initiated. The Corps has engaged the Service in early coordination regarding this proposed action.

Future without Project Conditions

The description of the Future without Project Conditions is based on the information provided by the Corps (2016). The existing structures, homes and businesses will continue to be at risk of

damage from flooding and storm surge. County Road 48 may be damaged or undermined in several locations, requiring closure and detours to State Road 25, the only other road providing access east and west. As such, the future without project condition at Hashamomuck Cove includes continued damages to shoreline properties, structures, and roads from future storm events resulting in continued maintenance and reconstruction of private shoreline structures (i.e., bulkheads) and repairs to houses and roads following storm events.

Sea-level Rise

The Corps identified and used the mean sea-level trend at Montauk, New York (NOAA Tide Station ID 8510560), 0.00961 ft/year (yr) based on regionally corrected mean sea level data from 1947 to 2014, for calculating future sea-level rise (USACE 2016). Regulation No. 1100-2-8162 dated December 31, 2013, and entitled "Incorporating Sea Level Change (SLC) in Civil Works Programs" provides guidance to the Corps for incorporating the direct and indirect physical effects of projected future SLC across the project life cycle in managing, planning, engineering, designing, constructing, operating, and maintaining projects and systems of projects. The Corps' Regulation 1100-2-8162 provides internal guidance on calculating low, intermediate, and high SLC rates and directs planning studies and engineering designs over the project life cycle, for both existing and proposed projects, consider alternatives that are formulated and evaluated for the entire range of possible future rates of SLC, represented here by three scenarios of low, intermediate, and high SLC and include structural, nonstructural, nature-based, or natural solutions, or combinations of these solutions. The Corps calculated the "low" future rate of SLC by applying the historical rate of mean SLC trend of 0.00961 ft/yr in all Beach-fx simulations. Beach-fx is a model developed by USACE to assist study teams with coastal storm risk assessments. The "intermediate" rate of future SLC was computed using modified National Research Council (NRC) Curve 1 and equations 2 and 3 in Environmental Regulations (ER)-1100-2-8162 Appendix B. The "high" rate of future SLC was computed using modified NRC Curve III and equations 2 and 3 in ER-1100-2-8162 Appendix B. Based on these rates, the Corps determined that, over the 50 years of this project, an increase of about 0.5 ft for the low rate and about 2.5 ft for the high rate could be seen (USACE 2016). The Corps utilized the low rate of sea-level rise to analyze the damages. The Corps indicated in their response dated October 2, 2018, to the draft FWCA report that they evaluated the Tentatively Selected Plan (TSP) under all three rates of SLC in compliance with USACE Regulation ER 1100-2-8162.

Fish and Wildlife Resources

In terms of fish and wildlife resources in the without-project condition, physical and human activities would continue to greatly influence the ecological communities. The maritime beach would continue to erode due to natural processes, sea-level rise, and sediment movement in some areas, perhaps eventually being eliminated entirely since residential structures and associated infrastructure limit the retreat of the maritime beach, estuaries, and their associated communities. As wave energy hits the bulkheads located within this area, sand is scoured away and reduces the sediment on the beach. Increased coastal flooding and erosion are expected as a result of sea-level rise, heavy precipitation, and increased storm surges (both intensity and frequenCY) (Moser et al. 2014). The changes in the frequenCY, intensity, timing, and distribution of tropical storms will have significant impacts on coastal wetland patterns and processes and will likely

affect biotic functions (e.g., community structure, natural selection, extinction rates, and biodiversity), as well as underlying processes such as nutrient cycling and primary and secondary productivity (Michener et al. 1994).

Project Alternatives

Description of Alternatives

The Corps developed the following six alternatives to determine if there is an economically justified and environmentally compliant recommendation for federal participation in coastal storm risk management. These are summarized below based on information contained in USACE (2016).

Alternative 1 – No Action

No federal action would be taken within any of the coves.

Alternative 2 – Beach Nourishment (Berm)

Under this alternative, beach nourishment would be placed along the shoreline at each cove. The berm crest height was set at +6 ft North American Vertical Datum 1988 (NAVD88) elevation based on survey data and the estimated historical natural elevation of the beach. Three variations of berm height were identified for this alternative:

- Alternative 2A consisted of a 25 ft wide berm.
- Alternative 2B consisted of a 50 ft berm.
- Alternative 2C consisted of a 75 ft berm in the area of the highest historic shoreline change rate and/or damages, tapering to a 25 ft berm.

The existing groins will help to prevent excessive lateral movement of sand. Periodic beach renourishment will be required.

Alternative 3 – Beach Nourishment (Berm and Dune)

Under this Alternative, a dune would be constructed in addition to the beach nourishment berm. Alternative 3 is similar to Alternative 2 in that it will be effective in protecting the properties, the existing erosion control armor, and the road. The berm width for all model runs for this Alternative was assumed to be 50 ft.

- West Cove - a dune top width of 10 ft was assumed. The dune elevation was assumed to be +12 ft NAVD88 for the West Cove, variable from +9 to +12 ft.
- Central and East Cove - a dune top width of 5 ft was assumed. It was assumed that the dune would be sloped at 3 vertical (V):1 horizontal (H). NAVD88 for the Central Cove (depending on the Reach), and +11 ft NAVD88 for the East Cove.

Alternative 4 – Bulkhead Installation

Alternative 4A

Under this alternative, a new bulkhead would be constructed to protect all the properties within the Study Area. The bulkhead would be constructed in front of the existing erosion protection measures (where they exist). The bulkhead would be approximately 8,500 linear ft. It was assumed that the bulkhead would be driven 20 ft deep with 10 ft above grade, which is consistent with standard USACE engineering practices (one third of structure above grade). It was assumed that the sheeting would be steel sheeting due to the proposed installation depth, and the observed cobbles, both of which would hinder the installation of fiberglass or vinyl sheeting. The toe of the bulkhead would be protected from scour by two layers of toe protection (1 to 2 ton stones). It was assumed that the sheeting could be installed at a rate of 100 ft per day. The final crest elevation for the bulkhead will be +10.5 ft NAVD88, matching the one percent tidal flood elevation. The bulkhead will require timber stair walkovers to maintain waterfront access at six locations.

Alternative 4B

Alternative 4B was a variation of this alternative in that the bulkhead was only constructed in areas where the road was vulnerable to damage. The bulkhead would be installed immediately adjacent to the road. The bulkhead would be driven flush with the existing grade to allow access to existing property seaward of the bulkhead. This alternative would require utility relocation for existing services to the affected homes. For the West Cove, the bulkhead would be installed in Reach E3 (approximately 1500 linear ft). At Central Cove, the bulkhead would be installed in Reach E8 (approximately 500 linear ft). At East Cove, the bulkhead would be installed in Reach E13-E15 (approximately 1500 linear ft).

Alternative 5 – Property Buyouts

Under this Alternative, properties at high risk of damage were evaluated for removal from the coastal hazard area. Based on this appraisal process, residential properties in West Cove, Central Cove, and East Cove were considered. In addition, the East Cove also includes commercial properties that were considered.

Description of Tentatively Selected Plan

The TSP is a combination of Alternative 2A for West Cove (25 ft wide berm), Alternative 2C for the Central Cove (a combination 25-75 ft wide berm), and Alternative 2A for the East Cove (25 ft wide berm).

The Corps provided the following description of the proposed action:

West Cove: The proposed work in the West Cove involves the placement of a 25 ft berm beach fill with a top elevation of 6 ft NAVD88. The footprint of the berm will encompass 164,000 square feet (sq ft) of intertidal habitat and 69,000 sq ft of subtidal habitat. It is estimated that 33,630 cubic yards (CY) of sand will be used initially to construct the sand berm in this reach (Figure 4).

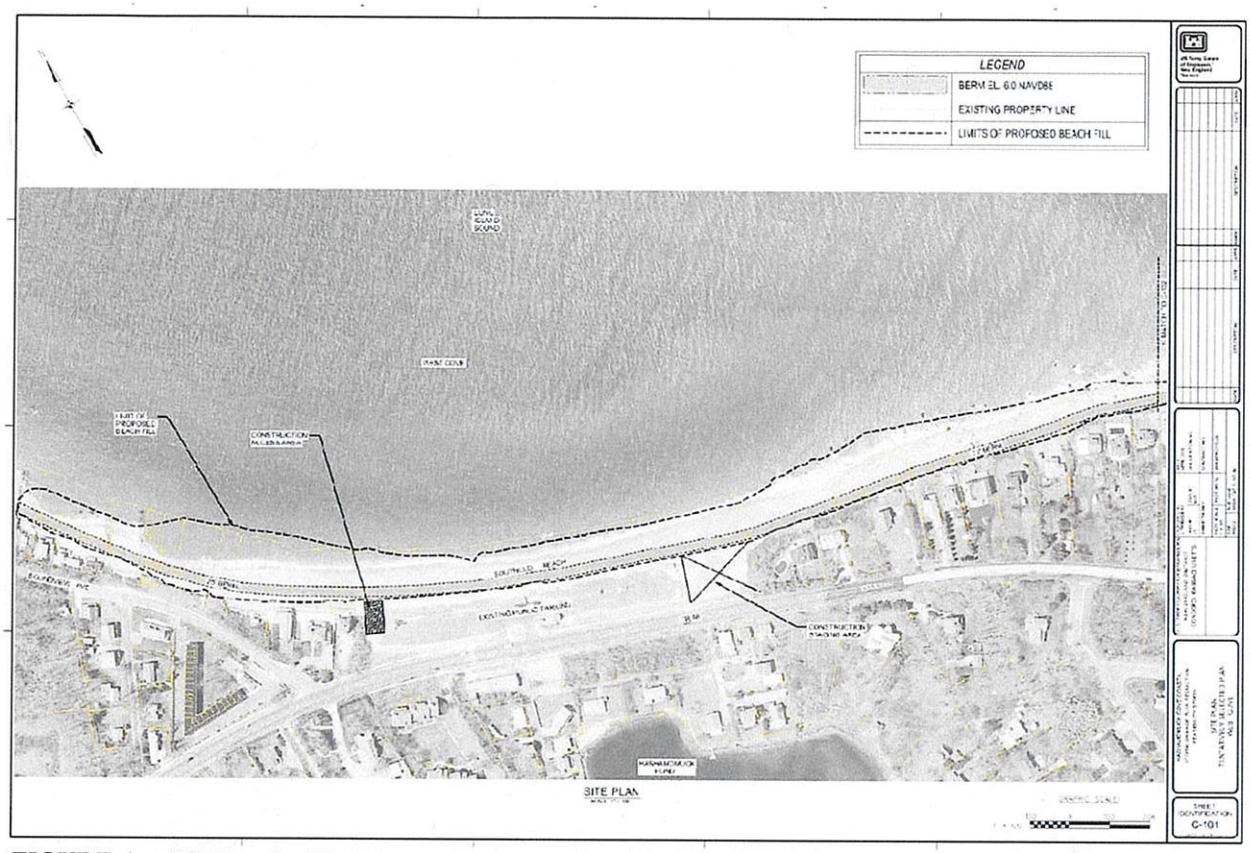

FIGURE 4.—TSP for the West Cove. Illustration credit: USACE (2016).

Central Cove: The proposed work in the Central Cove involves the placement of a 25 ft berm beachfill with a 75 ft berm in the economic reaches with the highest damages. The top elevation of the berm will be 6 ft NAVD88. The footprint of the berm will encompass 149,000 sq ft of intertidal habitat and 249,000 sq ft of subtidal habitat. It is estimated that 55,850 CY of sand will be used initially to construct the sand berm in this reach (Figure 5).

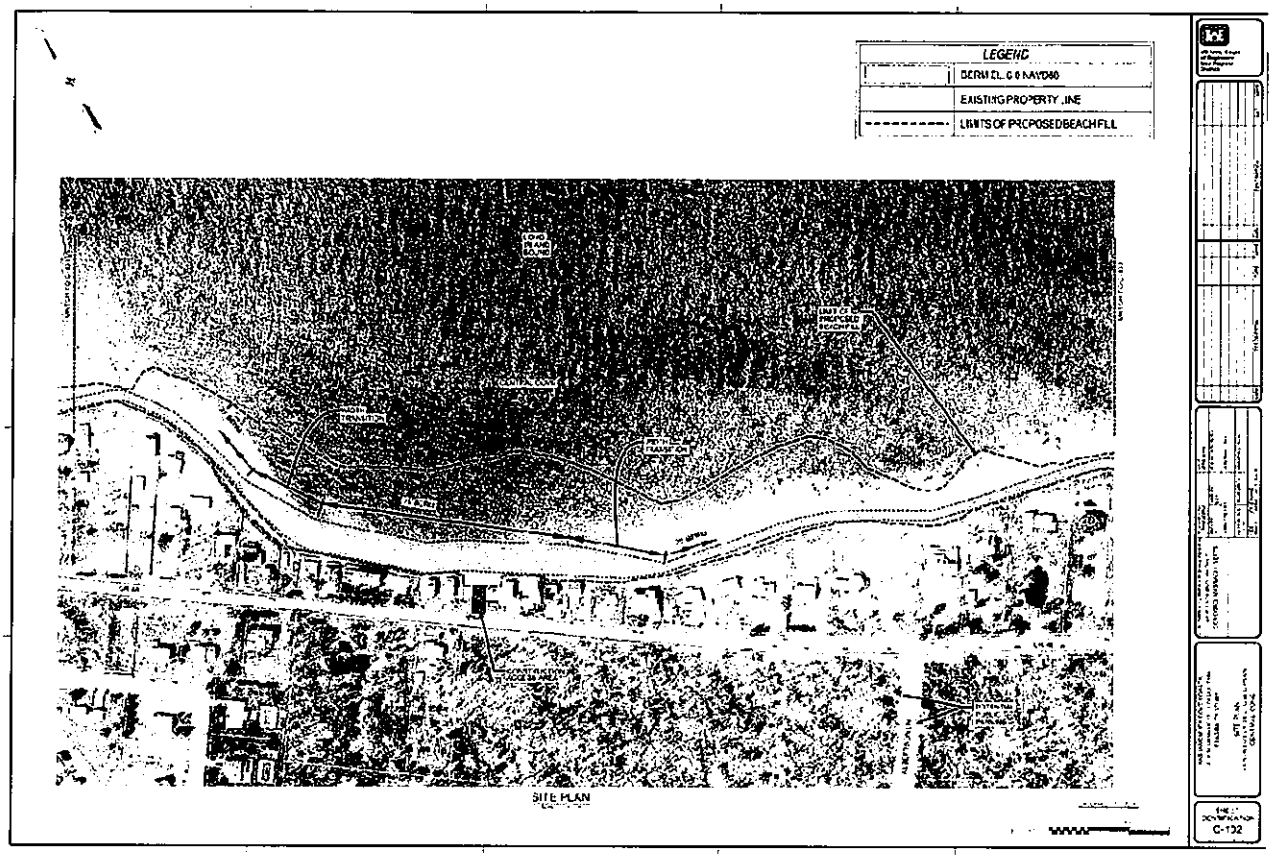

FIGURE 5.—TSP for the Central Cove. Illustration credit: USACE (2016).

East Cove: The proposed work in the East Cove involves the placement of a 25 ft berm beach fill with a top elevation of 6 ft NAVD88. The footprint of the berm will encompass 151,000 sq ft of intertidal habitat and 198,000 sq ft of subtidal habitat. It is estimated 70,253 CY of sand will be used initially to construct the sand berm in this reach (Figure 6).

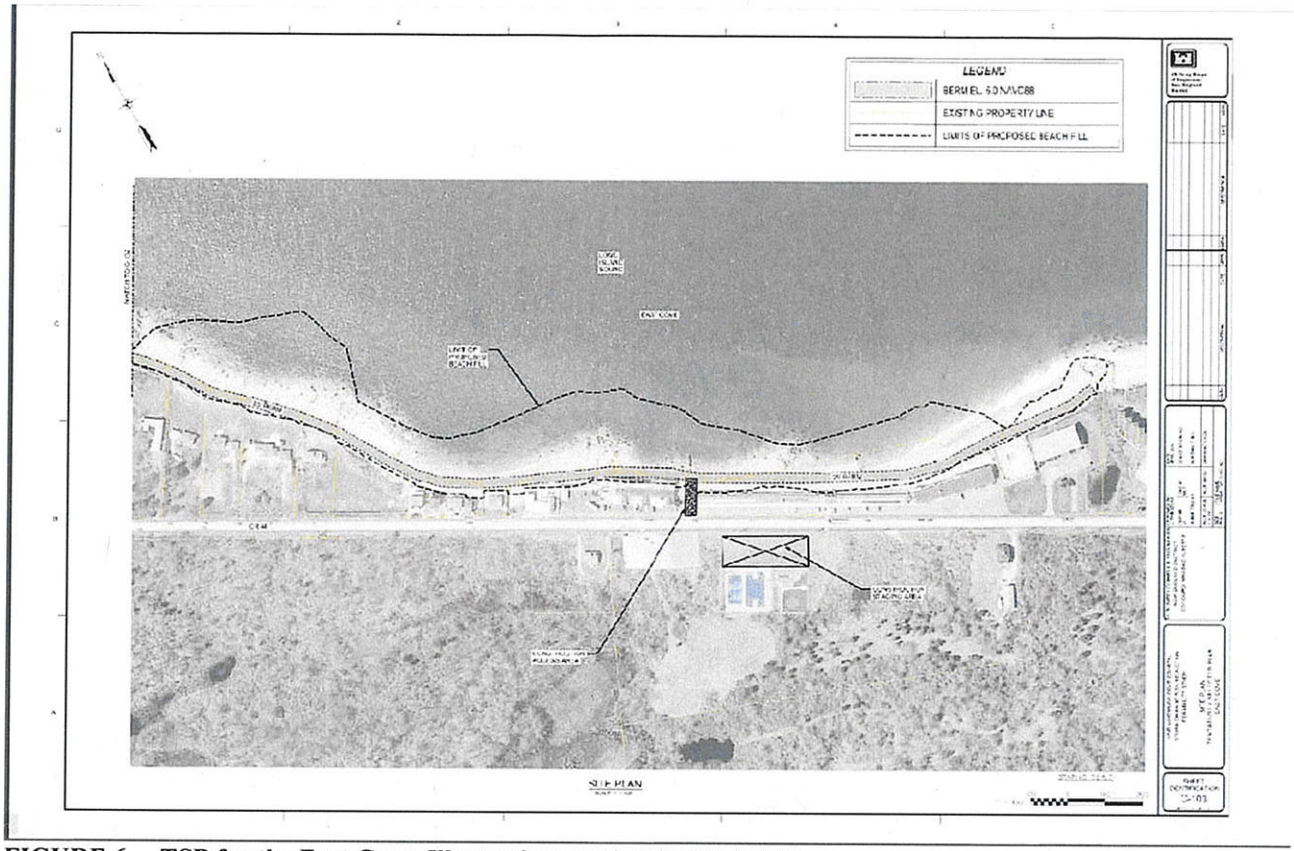

FIGURE 6.—TSP for the East Cove. Illustration credit USACE (2016).

A total of 159,733 CY will be used during initial construction to build the sand berm in the West, Central, and East Coves. Sand will be trucked to the site and would be delivered to staging points with direct access to the beach. Trucks would deposit sand at appropriate locations for subsequent spreading and regrading by bulldozers or front end loaders. The work is estimated to take 7 to 10 months to complete. Sand will be placed on the beach and graded seaward on a slope of 1 V to 10 H (USACE 2016).

Beach Nourishment

The beach renourishment cycle is estimated to be conducted approximately every 10 years over the 50-year life of the project depending on the actual storm events that occur. Only areas of significant erosion would be renourished. The total volume of sand needed to renourish the beach to the design profile over the 50-year project life is estimated to be 224,994 CY (on average).

Description of the Preferred Plan

After the draft FWCA report was submitted to the Corps in October 2016, the Corps optimized the TSP to develop the Preferred Plan. The Corps provided the following description of the Preferred Plan in their comments on the draft FWCA report dated October 2, 2018:
"*As stated above, the TSP...involved the placement of a 25 ft wide beach fill and berm in the West and East Coves and a variable width berm (25 to 75 ft) in the Central Cove. Following*

Optimization, the Preferred Plan for the Hashamomuck Cove CSRM project involves the placement of a 25 ft wide beach fill and berm in all three coves (West, Central, and East Coves)... After the initial placement of sand, re-nourishment will be required at periodic intervals to counteract long-term and storm-induced erosion. Periodic re-nourishment is anticipated to occur approximately 9 times (every 5 years) over the 50-year period of analysis to maintain project design profile. The TSP and the Preferred Project are similar projects; beach nourishment with a 50-year project life and comparable number of estimated re-nourishment events. The only difference is a reduction in the width of the berm in Central Cove from a variable width berm (75 to 25 ft) to a 25 ft berm."

The total initial placement volume for the Preferred Plan will be 215,600 CY, and the total renourishment volume across the 50 years of the project will be 577,800 CY. A breakdown of the volumes for each cove are below:

Initial Placement Volume:

- West Cove: 94,4000 CY
- Central Cove: 83,000 CY
- East Cove: 38,200 CY

Average Renourishment Volume (per nourishment):

- West Cove: 30,7000 CY
- Central Cove: 12,900 CY
- East Cove: 20,600 CY

Project Impacts

The Corps' Preferred Plan would have direct and indirect impacts on fish and wildlife resources during the construction of the project and over the 50-year life. Approximately, 11.2 ac of intertidal habitat and 10.3 ac of subtidal habitat are expected to be directly impacted from the initial construction. The use of heavy machinery to complete the construction will affect both the marine and terrestrial ecosystems and associated wildlife. In particular, these impacts would include burial and crushing of benthic organisms in the intertidal habitat, increased turbidity of local waters, and habitat modification. These impacts could adversely affect fish and wildlife resources within the Study Area but may also have temporary beneficial impacts to nesting shorebirds. Based on the review of the literature, the proposed project has the potential to result in a number of direct and indirect physical and biological impacts in terms of scale and duration in the marine subtidal, marine intertidal and maritime beach communities in the proposed Study Area. Speybroeck et al. (2006) compiled an integrated network of ecological effects (tentative summary) that may occur as a result of beach nourishment (Figure 7).

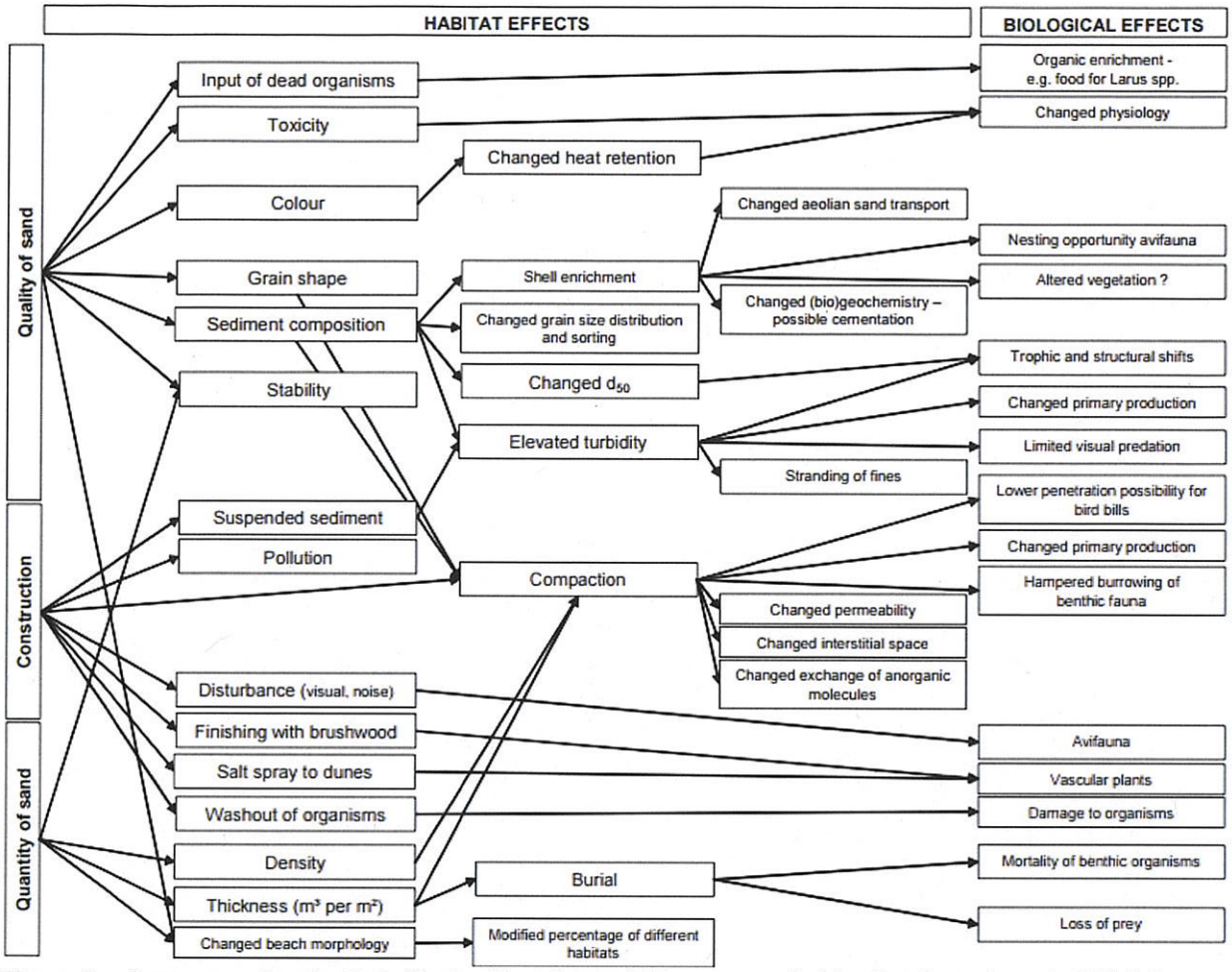

Figure 7.—Summary of ecological effects of beach nourishment compiled by Speybroeck et al. *(2006)* from literature data and consultation from all authors. * It should be noted that not all of these impacts are present during every beach nourishment.

The following is a discussion of the likely impacts resulting from the proposed action. Direct impacts include:

- Habitat modification of upper beach, intertidal and subtidal habitats;
- Burial of marine intertidal and marine beach invertebrate species and temporal modification of intertidal and marine habitats;
- Increased temporary turbidity; and
- Disturbance due to construction activities.

Indirect impacts include:

- Accelerated vegetative succession on the maritime beach;
- Development of habitat preferred by mammalian and avian predators; and
- Development of opportunities for recreational activities by increasing the width of the beach and increasing the accessibility.

The duration of these impacts may be short- and long- term as they are expected to occur during construction, post-construction, and renourishment phases of the proposed project extending 50 years into the future.

Direct Effects

Habitat Modification

Intertidal and Maritime Beach

Changes in the beach morphology and sedimentology characteristics (slope, height, grain size, sorting coefficient, etc.) to the intertidal zone, may affect colonization of marine invertebrates, a major forage resource for shorebirds that nest on the upland beach and depend on the intertidal habitat for foraging and brood-rearing. Changes in the grain size can affect the invertebrate assemblage found within the intertidal environment and upper beach which can further affect high trophic levels (Peterson and Manning 2001). Morphological and sedimentological changes to the maritime beach and dunes can impact breeding and foraging habitat, either adversely or beneficially. In this case, beach nourishment may partially offset habitat loss due to erosion (Cohen et al. 2009), and temporarily create habitat. However, the quality of the nourishment material and degradation of the habitat over time may preclude productive use of the habitat. The proposed action may result in the degradation or loss of the intertidal habitat during the life of the project. Horseshoe crabs, fish, shorebirds, and migratory birds use or may use this habitat for breeding and/or foraging and the likely shift in the invertebrate community composition and abundance may limit the functional foraging habitat available. Changes to the beach slope, elevation, porosity, moisture content, and grain size may also affect the nest locations of horseshoe crabs (Penn and Brockman 1994).

Burial of Marine Intertidal and Marine Beach Invertebrate Species

In addition to habitat modification, the burial, mortality, and destruction of beach ecosystem resources due to placement of large quantities of sand is a direct effect resulting from the placement of 159,733 CY of fill during initial construction. Subsequent renourishment events as proposed in the Corps' Preferred Plan would also result in the burial, mortality, and destruction of these resources. The Corps anticipates invertebrate recolonization will occur and recovery of the benthic community to pre-construction levels will occur within approximately one year (Wilber and Clarke 1998 *In* USACE 2016). The Corps will use substrate of a similar grain size to the existing conditions (USACE 2016) which will facilitate the recolonization of species.

Beach resources affected by the placement of sand include: flora and fauna found on the upland (vascular plants, terrestrial arthropods, and avifauna, etc.) and microphytobenthos (benthic microalgae) and marine zoobenthos (Speybroeck et al. 2006). Speybroeck et al. (2006) state that the speed and degree of ecological recovery is largely dependent on four factors: the quality and quantity of the sediment; the nourishment technique and strategy applied; the place and size of nourishment; and the physical environment prior to nourishment. Model simulations conducted by Vanden Eede et al. (2014) found that species richness is not affected by beach nourishment because ecological niches remain available, however, as a result of steeper slopes, the niches are

smaller. The model also indicated that sediment grain size is important to the recolonization of macrobenthos as well as nourishment specific and ecosystem dependent factors such as nourishment period, method and technique, erosion susceptibility, and the recolonizing capabilities of the species as discussed in Speybroeck et al. (2006).

However, Speybroeck et al. (2006) recognizes that the majority of studies have focused on macrobenthic infauna (e.g., Reilly and Bellis 1978; Parr et al. 1978; Gorzelany and Nelson 1987; Peterson et al. 2000; Peterson and Manning 2001; Lindquist and Manning 2001), were not standardized and that these studies are primarily short-term studies and that little is known about the cumulative effects of repeated renourishments. Few studies have focused on the impacts to primary producers (Cahoon et al. 2012). Studies report that recovery of benthic infauna can occur within a matter of months or may take several years to recover. This variation is likely due to variations in the factors listed above. Reilly and Bellis (1978) and Parr et al. (1978) noted that when nourishment ceases, the recovery of the community is rapid and complete recovery may occur within one or two seasons.

Gorzelany and Nelson (1987) found no significant long-term negative effects of beach nourishment on nearshore benthic fauna during monitoring of a beach replenishment project on a central Florida east coast sand beach community while Peterson and Manning (2001) stated that long-term adverse impacts to benthic fauna at North Topsail Beach, North Carolina, resulted following beach nourishment. However, Lindquist and Manning (2001) reported that periodic nourishment of beaches appeared to prevent the full recovery of benthic species. The ability of macrofauna to recover is due to: (a) their short life cycles, (b) their fast reproductive potential, and (c) the recruitment of plankton larvae and motile macrofauna from nearby unaffected areas (Naqvi and Pullen 1982). When nourishment is completed between early August and early October, the community may recover within two months prior to the winter decline. Recovery time following nourishment in mid to late October is expected to occur within the range of two to six months. If nourishment occurs between the months of late October and January, the compounding effects of nourishment and seasonal population decline will result in a minimum of six months recovery time for the community (Burlas et al. 2001). In 2003, the time period for benthic recolonization was approximately 12 to 18 months for the Fire Island Community project area (Land Use Ecological Services, Inc. 2005). Terwilliger Consulting Inc. (2009) states that beach fill should be of the thinnest depth possible to facilitate the repopulation of the fill areas based on Defeo et al. (2009) who recommend repeated application of layers no thicker than 30 centimeters.

The Corps is proposing to initiate construction in March and anticipates construction lasting approximately 7 to 10 months. The Corps states that 'Portions of the beach constructed prior to the spring would benefit from recruitment of benthic organisms to intertidal and adjacent subtidal habitats from neighboring habitats and, consequently, recovery would be quicker' (USACE 2016). While some recovery may occur in the portions of the project completed early in the season, it will likely take longer than one year for the invertebrate assemblage to recover to pre-project conditions. During renourishment, the impact to the benthic invertebrates will likely be less intensive and last for a shorter period of time, as a result of the Corps renourishing only portions of the beach which have eroded badly. However, as sea-level rise increases and the

intensity and frequency of storms increase, the renourishment may be required for the entire Study Area.

Turbidity

Turbidity or the suspension of solids in the water column can be detrimental to both mobile and sessile organisms and is likely to occur during the initial construction and renourishment activities. It is anticipated that this will be a temporary impact that will cease shortly after the completion of the project; however, turbidity could be a long-term impact if the sediment contains high levels of silt or clay (Greene 2002). Suspended solids in water can affect fish populations by delaying hatching time of fish eggs (Schubel and Wang 1973), killing fish by coating their gills, and by creating anoxic conditions (O'Connor et al. 1976). Sherk et al. (1974) found that demersal fish are more tolerant of suspended solids than filter-feeding fish, resulting in an advantage to demersal fish and a disadvantage to filter feeders. Depositing material in the intertidal zone may result in an increase in nutrients and anoxic sediments high in organics and sulfides suspended in the water column. Fish tolerance to suspended solids varies from species to species and by age.

Construction Activity

The direct effects resulting from construction activities include disruption of breeding/spawning, foraging, and roosting activities. Beach construction activities are usually very intensive environmentally disruptive operations, which involve the mobilization and use of heavy equipment and vehicles on the beach. Operation of machinery used to grade the nourished beach can greatly disturb shorebirds, their nests, and can endanger the lives of chicks (USFWS 2014b). Even low levels of human activity have been shown to result in disturbance and displacement of shorebirds at migration staging and roosting areas (Pfister et al. 1992). Migratory shorebirds are particularly vulnerable to disturbance at roosting sites at high tides where the habitat available for roosting is diminished (USFWS 1998). Spawning horseshoe crabs may be disturbed or buried during construction activities.

Indirect Effects

Recreational Activity

The Service believes with the placement of approximately 159,733 CY of material on a narrow beach, will have the potential for an increase in recreational activity by creating a beach that is approximately 25 ft wide by approximately 1.5 mi long. Currently, the Study Area is primarily a private beach with the public beach limited to the West Cove. As a result, recreational beach users are limited in their use of the beach within the Study Area. The proposed project will increase the width of the beach, increasing the area of beach and thereby allowing more opportunity for recreation, especially in the Central and East Coves. Additionally, public access to the Study Area is required by the Corps' public access requirements which are identified in ER 1165-2-130, and based upon 33 U.S.C. 426e (d). The Corps policy requires public access points every one-half mile, so that a visitor is never more than a quarter mile away from an access point while on the beach. As a result of increased access, the Service anticipates increased

recreational activity. Recreational activities can be a source of both direct mortality and harassment to breeding and foraging shorebirds. Pedestrians on beaches may crush eggs (Burger 1987; Collazo et al. 1994; and Hill 1988) and vegetation. Unleashed dogs may chase shorebirds (McConnaughey et al. 1990), destroy nests (Hoopes et al. 1992), and kill chicks (Cairns and McLaren 1980).

Cumulative Impacts

As described in the Service's Mitigation Policy (40 Code of Federal Regulations (CFR) 1508.20), the Service must consider project impacts, including: (1) the total long-term biological impact of the project, including any secondary or indirect impacts regardless of location; and (2) any cumulative effects, when viewed in the context of existing or anticipated projects. The Council on Environmental Quality (CEQ) defines cumulative impacts (40 CFR 1508.7) as "the impacts on the environment which results from the incremental impacts of the action when added to other past, present and reasonably foreseeable future actions...."

Previous projects within the Study Area have been limited to the construction of shore hardening structures in the Study Area. The construction of the Corps' project should eliminate the need for additional small projects within the Study Area. Additional efforts may occur along the shoreline adjacent to the Study Area that may contribute to erosion or result in additional sediment inputs. The type and extent of these effects will be based on the type of project. Construction of bulkheads, jetties, groins, and other shore hardening structures may result in additional scour or downdrift erosion, while other beach nourishment projects may contribute sediment if constructed updrift of the Study Area.

Recommendations

General Recommendations

<u>Consideration of Sea-level Rise Rates</u>

Using the methods described above in the "Sea-level Rise" discussion in the "Future without Project Conditions" section (page 13), the Corps determined that over the 50-year life of this project, an increase of about 0.5 ft for the low rate and about 2.5 ft for the high rate could be seen (U.S. Army Corps of Engineers 2016). The Corps utilized the low rate of SLC when calculating the economic damages within the project area. As described in their comments on the draft FWCA report, the Corps evaluated the sensitivity of the TSP to the Corps' Intermediate and High Rate of SLC during the optimization phase. Computer models demonstrated that the adaptability of the selected plan to higher rates of rise (e.g., higher rates of sea-level rise would likely require additional sand).

We recommend that the Corps consider using established rates and ranges of sea-level rise scenarios for future sea-level rise including the 2012 National Climate Assessment, Rahmstorf et al. (2012), and Kopp et al. (2014).

Recommended Mitigation

The Service's main objective is to identify potential impacts of the proposed habitat to fish and wildlife resources, identify potential mitigation measures, and make recommendations for opportunities to improve habitat for fish and wildlife resources in the Study Area. The Service identified a goal of no net loss of resources and their values, services, and functions resulting from the proposed action.

Consideration of Alternatives and Methods

In general, the Service recommends that the Corps consider alternatives or methods that incorporate hybrid or natural approaches over traditional shoreline hardening techniques into project designs as appropriate. Incorporating these approaches into projects will provide a more resilient habitat for wildlife as well as protect communities and infrastructure. The Corps may also consider other measures such as: relocation/buyouts/retreat, and changes to policy and land use regulations. The Service would be available to coordinate further with the Corps on a landscape scale effort to identify opportunities where these measures could be incorporated into project design.

For the current project, the Corps may also consider investigating the impacts of the groins, bulkheads, and other structures that may be contributing to erosion within the study area and along the adjoining shoreline.

Time-of-year (TOY) Restrictions and Monitoring

Activities associated with beach nourishment and renourishment should be accomplished outside of the migration period and breeding season of shorebirds, and spawning season of fish and horseshoe crabs. TOY restrictions should apply to both the initial beachfill and the renourishment cycles. To protect these resources the Corps should coordinate with NYSDEC and the National Marine Fisheries Service (NMFS) to determine appropriate work windows to avoid impacts to fish, and the Service recommends a TOY restriction during which no work should be conducted between April 1 and September 30 to avoid adverse impacts to shorebirds and spawning horseshoe crabs.

However, the Corps has indicated during coordination in preparation for this document, that they will begin construction in March, and will not be using the TOY restriction for the initial beach fill. The anticipated time frame for construction is 7 to 10 months. To minimize impacts under this construction timeline, the Service recommends that a Service-approved biologist should be present on-site during initial construction activities from March 15 to July 1. The biologist should monitor for the presence of breeding shorebirds, such as piping plover and least tern. The biologist should document breeding activities (i.e., for plover: territorial displays [aerial displays, parallel run displays], courtship behaviors [scraping], and nesting behaviors). Should any of the above-mentioned behaviors be observed for the piping plover, the Corps or the Corps' contractor will immediately cease construction. Upon observation of above mentioned behaviors, the breeding area should be symbolically fenced, in accordance with the Service's Guidelines (Kress and Hall 2004 for tern species), and a 1,000-meter (m) buffer should be delineated around the

breeding areas where no work should occur. The Corps may consider utilizing fencing (i.e., sand fencing) to delineate the 1,000-m buffer. Construction activities outside of the 1,000-m buffer may recommence upon completion of fencing. These measures will be further developed during the section 7 coordination.

The Service recommends the following qualifications for the biologist:

- A person who is listed on the NYSDEC qualified monitors list; or
- A person who has completed 1 season of piping plover monitor with a recommendation from the monitor's direct supervisor; or
- A person who has attended the Service, The Nature Conservancy (TNC), and the NYSDEC joint steward training and is currently employed by an organization or agency (i.e., Audubon Society, Group for the East End, etc.) who carries out piping plover monitoring.

The biologist should also monitor for spawning horseshoe crabs within the Study Area. Prior to construction, the Service recommends that the Corps coordinate with the NYSDEC and the Service to develop a plan to relocate horseshoe crabs to reduce the risk of burial during construction.

Shorebird Management Plan

An indirect benefit of the proposed project would be the significant improvement of opportunities for recreational beach use. As discussed in this report, increases in recreational use of beaches can also result in increased adverse impacts to shorebirds and waterbirds that utilize these beaches and nearshore waters. This site was used in 2004 by a pair of piping plover and upon completion of the project the Study Area has the potential to be suitable habitat for piping plover and other nesting shorebirds.

To avoid or minimize recreational impacts, protection and management of shorebirds should be secured with the local cost share sponsor prior to project implementation. The Shorebird Management Plan should be completed prior to project commencement, by obtaining a written agreement from the village, residents, landowners, or beach managers for full cooperation with the Corps, the Service, or mutually agreed-upon designated representatives. This can be further discussed and developed during the ESA consultation. The following topics should be considered and addressed within the management plan:

Access

Access to the Study Area should be provided to the Service, the Corps, the Town, and their designated contractor in order to survey and monitor shorebird use areas. Access should be assured through easements, agreements, or other legally binding mechanisms.

Monitoring and Management

Annual Surveys

- Annual piping plover and tern breeding surveys should be conducted during the breeding season (April – September).
- Surveys should be conducted frequently in order to achieve a confidence rating of A or B, as defined by the NYSDEC in their "Confidence Rating for New York Piping Plover Productivity Data" guidance (Appendix D).
- The area to be monitored should be identified and delineated. Based on the drawings provided by the Corps, the southern boundary of the beachfill runs parallel to the shore-hardening structures. As such, the Service recommends that the southern boundary of the monitoring area run parallel to the shore-hardening structures. Should any breeding activity occur south of this boundary, within private property, the Town should contact the homeowner for permission prior to erecting symbolic fence.

Symbolic Fencing

Symbolic fencing should be erected around breeding areas to avoid or minimize the impacts associated with recreational users. Symbolic fencing should be erected in accordance with the guidelines for managing piping plover (Service 1996b) and least terns (Kress and Hall 2004).

- The Service recommends pre-season symbolic fencing (pre-fencing) be in place by April 1 of each year. The Service recommends that the Town, the NYSDEC, the Service, and the Corps coordinate to determine the location and extent of fencing within the Study Area. This should be completed after construction has ended and prior to April 1 of the following year.
- After 5 years, the extent of pre-fencing may be reduced to those areas where plover or terns have been documented upon coordination with the Service and the NYSDEC.
- Should plovers or terns nest outside of the pre-fenced areas, the manager should follow the guidance referenced above and immediately erect symbolic fencing within breeding areas.

Domestic and Feral Animals

Within the Town, dogs or other domestic animals are permitted on "*beaches, if the dog or domestic animal is restrained on a leash, from May 1 through October 1 between the hours of 9:00 a.m. and 6:00 p.m. Dogs or other domestic animals are not permitted on the following Town-owned recreation areas: Designated bathing beaches during such times that a lifeguard is on duty. Designated bathing beaches include Goose Creek Beach, Kenny's Beach, Norman E. Klipp Marine Park Beach, McCabe's Beach, New Suffolk Beach, Southold Town Beach, and any other bathing beach designated by the Town Board in a duly adopted resolution; Land that is within 50 feet of any recreation area that is posted for protection of piping plovers and other endangered species (Town of Southold 2016).*"

The Service recommends that pet control be considered and addressed within the Shorebird Management Plan.

Predator Management

The Service recommends that predator management be addressed within the Shorebird Management Plan. The plan should address potential predator management efforts that may be undertaken as needed and appropriate, such as the use of exclosures, conditioned taste aversion, and/or use of electric fencing around predator exclosures.

Beach Management

The Service recommends that the plan address TOY restrictions on beach raking, small beach nourishment or bulkhead/rock revetment repair projects, construction activities, fireworks, and bonfires.

Public Outreach and Education

The Service recommends that the shorebird management plan include a public outreach component.

Off Road Vehicle Management (ORV)

Currently, ORVs are not permitted to drive on the Hashamomuck Beach; however, the beach is easily accessible from the Hashamomuck Beach Parking Lot (Figure 8). The Service recommends that plan include ORV management should the Town consider ORV access during the next 50 years. Additionally, the plan should evaluate the use of temporary barriers (bollards, gates, railings, etc.) to prevent ORV access during the shorebird breeding season.

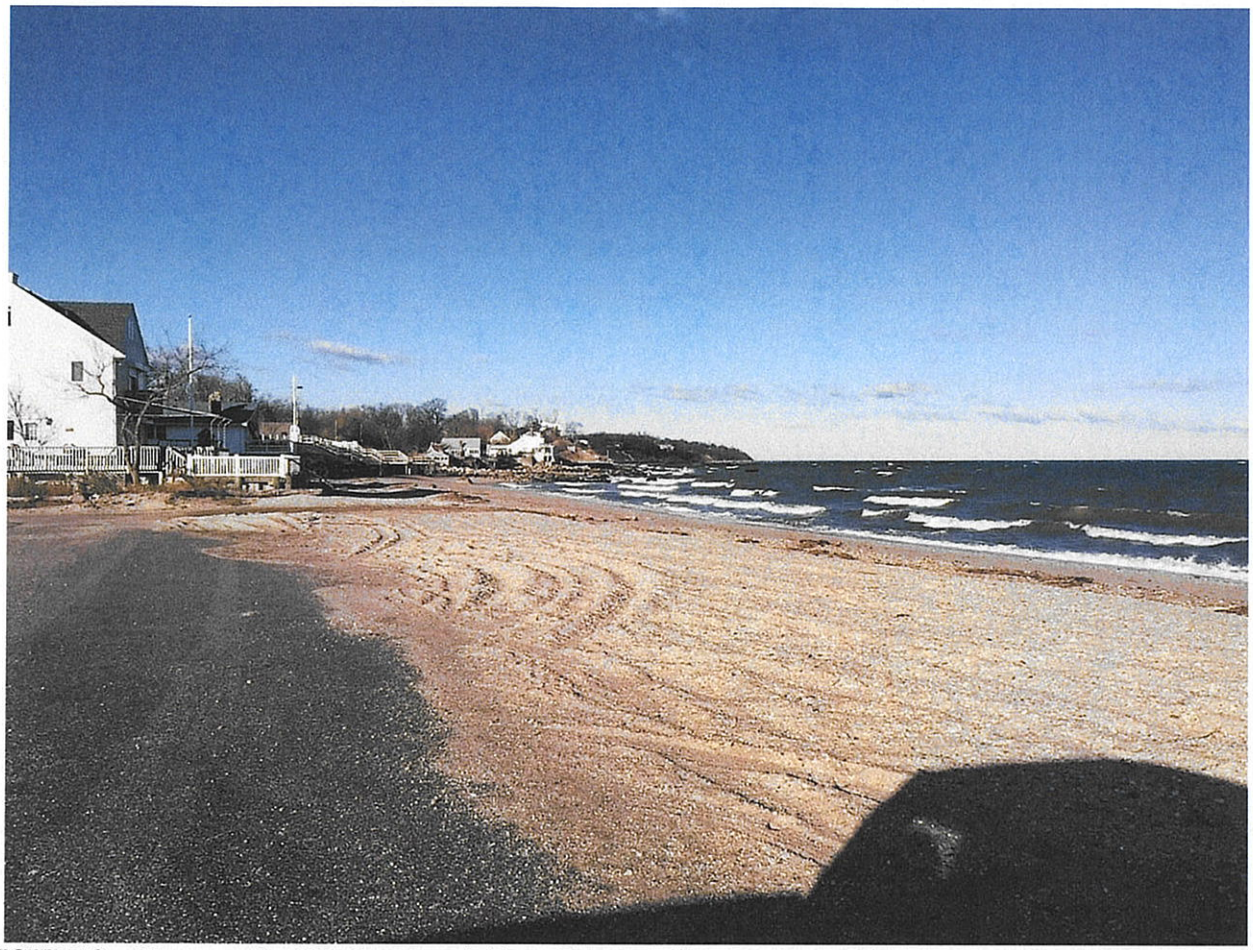

FIGURE 8.—Photograph of Hashamomuck Town Beach parking lot. Illustration credit: USFWS, March 29, 2016.

Additional Recommendations

The Corps should ensure that the initial dredged material and the sand used during each renourishment cycle is clean upland sand of equivalent in size and similar in color to existing conditions.

During the initial construction and after each renourishment cycle, the Corps should ensure that the beach is graded at a gentle uniform slope with no piles, ridges, or holes left in the final graded beach placement materials.

If the berm is to be planted with vegetation, then the Service recommends that the Corps develop a planting schedule that:

1) Incorporates native species that reflect the local plant communities for the appropriate planting zone (e.g., foredune, dune face, dune crest, back of dune) (Terwilliger Consulting, Inc. 2009) such as American beachgrass, seaside goldenrod, sea rocket (*Cakile edentula var. edentula*); and seaside spurge (*Euphorbia polygonifolia*); and

2) Mimics an early successional, sparsely-vegetated beach strand habitat by developing a plan that promotes natural and random spacing. We recommend 10 percent vegetation cover as a target density with a threshold action of 17 percent cover.

As discussed above, there is variation among studies focused on the short- and long- term effects of beach nourishment on the benthic community. Recovery depends on the quality and quantity of the sediment; the nourishment technique and strategy applied; the place and size of nourishment; and the physical environment prior to nourishment (Speybroeck et al. 2006). Best management practices (BMP) for renourishment cycles should be incorporated into the project to the greatest extent practicable. The Corps has stated that the renourishment activities will only occur within areas of high erosion and will be conducted as needed, this method enhances the chances to minimize the adverse effects to benthic invertebrate recovery. The Service recommends that all heavy equipment be staged off the beach where possible.

The Corps should implement best management practices to manage and limit turbidity during placement of material within the intertidal zone.

Monitoring Recommendations

The Service emphasizes the need to quantify the long term effects of projects similar to Hashamomuck Cove Storm Risk Management Study. Pre- and post-construction studies need to be completed to assess benthic invertebrate recovery, and impacts to migratory and breeding shorebirds (including federally- and state-listed species such as red knot and piping plover) and horseshoe crabs. The Corps conducted one monitoring survey in September of 2015 to document benthic invertebrate species. The Service recommends that the Corps perform pre- and post-construction surveys for benthic invertebrates, red knot, piping plover, and horseshoe crabs. The results from the pre-construction surveys will aid in the development and refinement of FWCA recommendations.

Fish and Wildlife Enhancement Opportunities

The Service recommends that the Corps develop construction techniques and approaches which will assist in preventing a net loss of habitat for the shorebird species discussed in this report. This should not be considered single species management, as the health of these species depends in large measure on ecosystems which are functioning as closely to a natural condition as possible. As one example, the Corps can collect information on the physical and environmental characteristics of existing shorebird breeding habitat within the surrounding area, and look to replicate those conditions in the Study Area in order to make the constructed beaches more attractive to those species.

The Service recommends that the Corps participate throughout this project or under other authorities in the protection and restoration of wetland habitats which support breeding and non-breeding birds, as well as fish and shellfish. The project is within proximity of numerous freshwater and tidal wetlands (Figure 9).

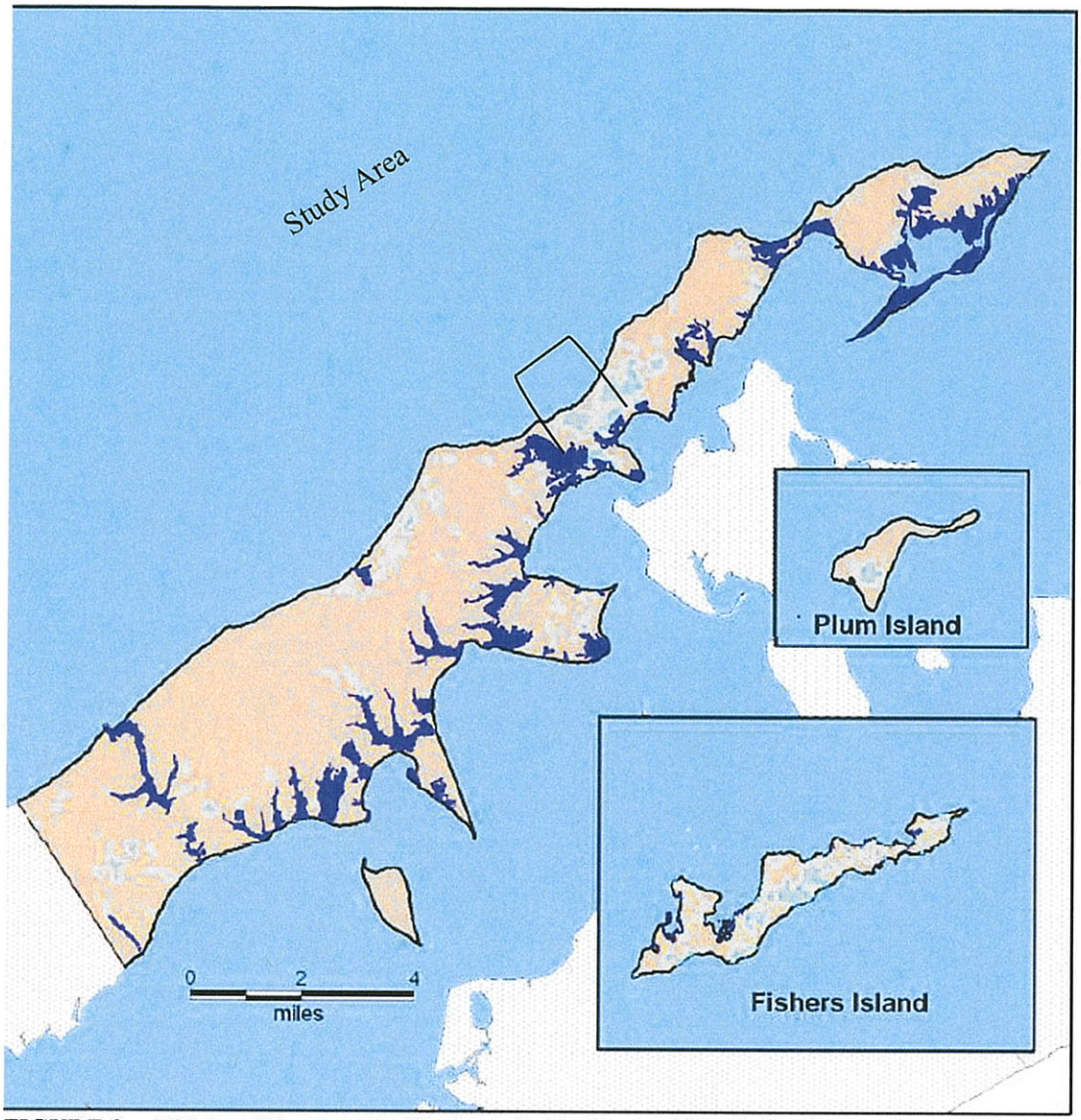

FIGURE 9.—Tidal and Freshwater Wetlands in the Town of Southold. Illustration credit: Town of Southold (2020).

The Draft Comprehensive Plan for the Town of Southold "Southold 2020" (2013) and Southold Town Local Waterfront Revitalization Program (LWRP) (2014) identified the need to protect and restore tidal and freshwater wetlands habitats to foster their continued existence as natural systems.

In addition to wetland protection and restoration, the above mentioned plans and programs (as well as the Hashamomuck Pond Watershed Management Plan (Horsley Witten Group, Inc. 2006) and the Long Island Sound Comprehensive Conservation and Management Plan (Long Island Sound Study 2015) call for the improvement of water quality and storm water management. The Service recommends that the Corps participate throughout this project or under other authorities to further these goals. Project related efforts might include addressing storm water run-off in the beach parking lot and other access points, as well as efforts that will aid in the improvement of water quality such as the replacement of flush toilets with composting toilets. More information

about composting toilets can be found at https://www.epa.gov/sites/production/files/2015-06/documents/comp.pdf.

Corps' Response to Draft FWCA Report

The Corps provided their response to the analysis and recommendations documented in the Service's Draft FWCA Report in the Corps' correspondence, dated October 2, 2018 (Appendix E). The Corps' response can be found in its entirety in Appendix D. The following discussion summarizes the Corps' key comments and concerns and provides the Service's response. For the purpose of convenience and clarity, the following discussion follows the same order as the Corps' document. We provide the following responses and where applicable within the final document, we revised the information to reflect the information the Corps provided and our responses.

Project Impacts

Corps' Comments: In response to the draft report, the Corps acknowledges that there will be some direct and indirect impacts on fish and wildlife resources, however, they indicate that the impacts will be temporary. The Corps indicates that they incorporated the use of BMPs into the project design to avoid or minimize project related impacts.

> **Service Response:** The Service acknowledges the Corps' comments and supports the use of BMPs.

Corps' Comments: The Corps stated that many of the effects appearing in Speybroeck et al. are not applicable to this project, primarily due to the fact that the sand will be sourced from an upland location, that the project is located in a north Atlantic inland estuary glacial till/cobble/sand beach and not a south Atlantic coast sand beach (as used in Speybroeck et al. 2006).

> **Service Response:** The Service recognizes that not all of the impacts summarized in this study are applicable to this study and provided a discussion of both the direct and indirect impacts anticipated from the proposed action herein (page 30). The Service provided a discussion of the project related impacts that may occur as a result of the proposed action and included a figure of an integrated network of the ecological effects of beach nourishment from Speybroeck et al. (2006). The integrated network was developed by the authors in order to present a "*tentative summary of the potential effects from the compiled literature data and consultation with the authors*". The compilation of potential effects came from numerous studies which examined the impacts of beach nourishment on beaches along the western Atlantic Ocean coastline (New Jersey, Maryland, Virginia, Delaware, Florida, etc.), as well as other areas of the world (Spain, Chile, Spain, Netherlands, etc.).

Corps' Comments:

In regard to habitat and biological effects listed in Figure 7 of the draft FWCA report, the Corps provided the following comments:

- *There will be little to no input of abundant dead organisms for enrichment as the sand is from an upland source, not benthic material.*
- *There will be no toxicity or pollution as the sand will be tested thoroughly.*
- *"Finishing with brushwood," which is used to reduce wind speed to allow sand to accumulate and encourage colonization of early successional vegetation, is not proposed. The top of the berm will be planted to mimic an early successional, sparsely-vegetated beach strand habitat similar to existing conditions*
- *There are no dunes and/or little dune type vegetation to speak of, therefore, presence or absence of salt spray is inconsequential.*
- *There will be no washout of organisms (e.g., organic enrichment), although this is generally a beneficial consequence.*
- *The sediment composition used to re-nourish the beach will be of similar grain size and color to existing conditions. Therefore, post construction beach physiology should be consistent with existing conditions which will allow the recovery of similar structure and function (e.g., benthic community).*

Service Response: The project related documents that the Service reviewed to produce the draft FWCA report did not identify the specific source of sand, rather identified that the sand would come from an upland source (page 72 of the draft Integrated Feasibility Report and Environmental Assessment dated July 2016) and there was no in-depth information provided by the Corps regarding the location of the source, organic content, or the quality of the sediment. We note the Corps' comments specify that sediment will be of similar grain size and color to existing conditions.

We recommend that the Corps coordinate with the NYSDEC Region 1 in order to determine if the NYSDEC's "Technical and Operational Guidance Series (5.1.9) In-water and Riparian Management of Sediment and Dredged Material" application procedures should be followed, specifically, Step 2: "*A sampling plan should be submitted to the Divisions prior to sampling to ensure proper characterization of the proposed dredged material. The sampling plan should specify the type, number, and location of samples as well as laboratory analyses and analytical methods.*" Additionally, we recommend that the Corps identify chemical analytes including grain size, TOC, and analytes from Table 1 with additional case-specific analytes as necessary.

The Service recognizes that the corps will not be using brushwood in their project design and that the berm will be planted to mimic an early successional, sparsely-vegetated beach strand habitat. The Service also notes that washout of organisms would not normally be considered a beneficial consequence in this context as it would result in damage to the organisms, but acknowledges this impact may not be applicable in this project as it is likely a result of placement of the slurry mix being placed on the beach. Since the sand will be sourced from an upland location, this method of placement is not being used.

Direct Effects: Habitat Modification - Intertidal and Maritime Beach

Corps' Comments:

"The sediment composition that will be used to nourish the beach will be of similar color and grain size (or larger) to existing conditions. The existing benthic community is a mixture of typical opportunistic species and therefore, the recovery of a similar benthic structure and function would be expected to occur. Periodic re-nourishment activities will only occur in areas of high erosion leaving other areas of the beach untouched and available of foraging shorebirds. The project area does not provide optimal habitat for horseshoe crabs as spawning adults prefer sandy beach areas within bays and coves that are protected from wave energy. No horseshoe crabs were observed in the project area during the 2015 Sediment Sampling, Benthic Community Analysis and Submerged Aquatic Vegetation Survey. In addition, the Center for Environmental Research and Coastal Oceans Monitoring (CERCOM) Molloy College conducts horseshoe crab monitoring on Long Island during spawning season (between May to July). In 2014, the CERCOM survey site closest to the Hashamomuck Cove project area (on Long Island Sound) was approximately 15,000 feet west (Site 27 - Leeton Drive). Nor horseshoe crabs were observed during the 2014 survey. In 2015, CERCOM surveyed another site (on the Long Island Sound) located 13,500 feet west of the project area (Site 25 - Kenney's Road Beach). No horseshoe crabs were observed during the 2015 survey. South Harbor Park, on Little Peconic Bay in Southold, was also surveyed in 2014 and 2015 and no horseshoe crabs were observed at that location in either year.

Based on the recent sampling and monitoring results cited in the previous paragraph, it is unlikely that horseshoe crabs will be present during the Hashamomuck Cove project initial sand placement due to sub-optimal habitat conditions in the project area. However, to assure that there will be no direct impact to horseshoe crab, the District will provide a horseshoe crab monitor during the initial placement of sand to relocate any horseshoe crabs found to another location outside of the project area. In the years following the initial placement of sand, the beach will be wider and therefore, more suitable for horseshoe crab spawning. As such, due to this increased likelihood of horseshoe crab presence in the project area in subsequent years, the District will incorporate a no-construction window during horseshoe crab spawning season (April 15-July 15, of any year) during nourishment events. The National Marine Fisheries Service (NMFS) concurs with these conservation recommendations as per a March 15, 2018, telecom with Ursula Howson of the NMFS Greater Atlantic Regional Fisheries Office Habitat Conservation."

Service Response: While horseshoe crabs generally prefer sandy beach areas within bays and coves that are protected from wave energy (http://asmfc.org/uploads/file/hscHabitatFactsheet.pdf), horseshoe crabs have been observed spawning at beaches located on the north shore of Long Island, to the west of the project area (Sclafani et al. 2014). It is unlikely that the Corps would have documented horseshoe crabs during their benthic survey unless the observation was incidental. The Corps conducted their benthic survey on September 21, 2015. Horseshoe crabs spawn during the high tides of full and new moon, typically in May and June and would not have been observed spawning along the shoreline in late September. In the fall, adults may migrate to the Atlantic Ocean to overwinter on the continental shelf or remain in bay areas (http://asmfc.org/uploads/file/hscHabitatFactsheet.pdf). Since it is believed that most juvenile horseshoe crabs spend their first two years on intertidal sandflats, it is probable that the Corps

would have found evidence of young horseshoe crabs during their sampling effort. However, based on the Corps' use of a 0.003 square meter (m^2) sized benthic core sampler and single sampling event, it is possible that horseshoe crabs may be present at the project site and were not detected. In their response to the monitoring recommendation, the Corps indicates that they will include the presence/absence of horseshoe crabs in their benthic sampling report. The Service is available to assist in the development of a benthic sampling survey protocol. The Service notes the absence of horseshoe crabs in the surveys performed by CERCOM described above. However, as no horseshoe crab surveys have been performed during spawning periods within the project area, the Service will retain the discussion of project impacts as they pertain to horseshoe crabs in the final FWCA report. The Service supports the Corps' plan to provide a horseshoe crab monitor during initial placement. In addition to relocating horseshoe crabs should they be present, the Service also recommends suspending sand placement activities from April 15-July 15, should horseshoe crabs be located, to prevent burial of horseshoe crab eggs.

Corps' Comments:

The project area also lacks habitat features preferred by migrating and roosting shorebirds (e.g., shallow coastal wetlands, mud and sandflats, saltmarshes, and grasslands) and nesting shorebirds due to the narrowness of the upland beach, lack of vegetation, high energy environment, and high level of human disturbance. Therefore, direct impacts of significance during initial construction are not anticipated to occur in these species. The placement of sand and widening of beach may result in a beneficial effect to these species.

Service Response: The Service acknowledges that some preferred migratory and nesting shorebird habitat features are not present within the project area. However, the intertidal and maritime beach habitats within the project area do support some migratory shorebird and tern species. EBird records indicate that seven species of shorebirds and six species of terns have been recorded within the project area, including piping plover, least tern, and roseate tern (eBird 2018). Shorebird and tern species in the project area have mostly been observed in small numbers, however, eBird records are not exhaustive, and reports only occur in the publicly accessible Town owned portion of the project area. Given these factors, the Service retains the discussion of impacts to shorebird habitat as related to initial placement in the final FWCA report.

Direct Effects: Construction Activity

Corps' Comments: The Corps responded that initial construction activities would be unlikely to impact horseshoe crabs and shorebirds for the reasons listed above. However, during initial construction, the Corps will hire a piping plover biological monitor who will also check for the presence of horseshoe crabs and red knot in the project area during initial construction. Details pertaining to monitoring of piping plovers and red knots will be provided to the Service in a Shorebird Management Plan as part of section 7 consultation. As described above, horseshoe crabs observed in the work area would be relocated to avoid burial. Additionally, in response to the draft FWCA report, the Corps will incorporate a time of year restriction from April 1 to September 30 during renourishment activities.

Service Response: The Service supports the Corps' inclusion of a monitor for piping plover, red knot, and horseshoe crab and will continue to work with the Corps in developing appropriate conservation measures for piping plover and red knot through the section 7 consultation process. As described above, the Service recommends the Corps enact measures to avoid impacts to horseshoe crab eggs should horseshoe crabs be observed during the spawning season. The Service also supports the Corps' proposed time of year restriction for renourishment activities.

General Recommendations: Consideration of Sea-level Rise Rates - Consideration of Alternative Methods

In the draft FWCA report the Service commented that the Corps used EC 1165-2-212 to calculate intermediate and high SLC rates.

Corps' Comments: In their comments on the draft FWCA report the Corps stated that they had referenced this incorrectly and instead should have referenced Corps Regulation ER 1100-2-8162. We have changed all references in the final FWCA report to reflect this (i.e., we changed all references to EC 1165-2-212 to ER 1100-2-8162) in anticipation that the Corps will make this correction in the final Feasibility Report.

In response to the draft FWCA report, the Corps also provided further description of their assessment of sea-level rise and their evaluation of Intermediate and High Rates of SLC. We incorporated this language in the final FWCA report where appropriate.

Service Response: We thank the Corps for their comments regarding their sea-level rise analysis. We continue to recommend that the Corps consider using established rates and ranges of sea-level rise scenarios for future sea level rise (full recommendation can be found in the General Recommendations section of this final FWCA report).

Recommended Mitigation: Consideration of Alternative and Method

Corps' Comments: In response to the draft FWCA report, the Corps stated that they considered a wide array of alternatives including non-structural measures and found that they did not possess a positive benefit cost ratio, nor would they result in achieving the objectives of the study.

Service Response: Thank you for responding to this recommendation.

Recommended Mitigation: TOY Restrictions and Monitoring

Corps' Comments: In response to the draft FWCA report, the Corps stated that they will incorporate a TOY restriction from April 1 to September 30 for renourishment activities.

Service Response: The Service supports using the proposed time of year restriction for renourishment activities.

Additional Recommendations

Within the draft FWCA report, the Service referred to the project as a dune instead of a berm. The language has been revised in the final FWCA report to reflect that the project will result in the construction of a berm and not a dune.

Corps' Comments: The Corps states that the project includes planting of vegetation along the top of the berm and would mimic an early successional, sparsely-vegetated beach strand habitat. This is in line with the Service's recommendations. The Corps states that the "*planted areas shown represent 35 percent cover which is in keeping with recommendations for optimal cover for piping plover (30-40 percent).*"

> **Service Response:** Classification and regression tree analysis of piping plover nest-site selection at 19 New Jersey beaches was used to develop target values for habitat (i.e., goals for restoration projects). The target value for vegetative cover was identified as <10 percent on the backshore and 13 percent on the primary dune (Maslo et al. 2011). "Triggers" (when action is required to maintain suitable conditions) included vegetation density of 17 percent on the backshore and 22 percent on the primary dune. Habitat became unsuitable when vegetative cover exceeded 33.5 percent (Maslo et al. 2011). These findings are contrary to the values the Corps presented above. We recommend that the Corps reduce the density of the proposed plantings.

Monitoring Recommendations

Corps' Comments: The Corps objected to the use of the Mineral Management Service (2001) study as an appropriate document from which to design monitoring activities for the current project. The Corps also described the direct and indirect effects of nourishment and renourishment to finfish as short-term and temporary, and as NMFS did not have any conservation recommendations with regard to finfish, they did not agree that long-term monitoring is warranted.

The Corps also stated that the following monitoring activities for benthic resources would be used:

"*As part of the project, the District would conduct sampling similar to the 2015 benthic sampling conducted to establish existing conditions for the project area (e.g., high, mid, and low intertidal sampling and eelgrass survey). Sampling would be conducted prior to beach nourishment activities (with the exception of the first beachfill) and then again one year after nourishment activities. The presence/absence of red knot and horseshoe crab will also be included in the benthic sampling reports.*"

> **Service Response:** The Service continues to recommend the need to quantify the long-term effects of projects similar to Hashamomuck Cove Storm Risk Management Study along the Long Island Sound shoreline. The results from the pre-construction surveys will aid in the development and refinement of both FWCA and ESA recommendations. The data collected

during post-construction surveys will allow the Corps and the Service to better understand the project related impacts for this and future projects along the north shore of Long Island. Therefore, the Service supports the Corps' inclusion of benthic monitoring into the project. We understand if the Mineral Management Service (2001) is not the appropriate guidance for a project of this nature. We removed reference to this document in the body of the FWCA report. However, we did not find the Corps preliminary survey for the Feasibility Report to be sufficient in accurately characterizing the biota. The Service is available to assist in further development of a benthic sampling survey protocol.

The Service defers to the National Marine Fisheries Service and will therefore remove the recommendation pertaining to post-project monitoring of finfish.

Fish and Wildlife Enhancement Opportunities

Corps' Comments: In response to the draft report, the Corps states that they will consider adding a water quality improvement feature to capture runoff from the Southold Beach parking lot but that additional measures to protect or restore nearby tidal and freshwater wetlands is beyond the scope of the project.

Service Response: The Service recognizes the Corps' project specific authority but continues to encourage the Corps to consider these efforts for future projects should funding and authorities become available.

Summary and Service Position

The Service finds that implementation of the proposed project may result in both adverse and beneficial impacts to the ecological communities of the marine subtidal, maritime intertidal, and beach communities. The proposed project will impact marine and intertidal communities, resulting in the elimination and disturbance of invertebrate species of the maritime beach and intertidal communities. In its current condition, the Study Area lacks suitable maritime beach habitat for nesting shorebirds. The construction of a 25-ft berm and subsequent renourishments will increase the beach which will provide potential breeding habitat for shorebirds including piping plover and least terns.

Impacts from the proposed project will vary in duration, and recurring impacts will occur throughout the 50-year project life. Periodic renourishments will affect the benthic invertebrates of the intertidal and upper beach. With periodic nourishment scheduled over the 50-year project life this may have some serious implications for the species using the proposed Study Area. However, the implementation of the Shorebird Management Plan, benthic resource (invertebrates and horseshoe crab) monitoring program, and mitigation measures provided in this report will assist the Corps in offsetting the potential adverse impacts presented in this report, by using the monitoring information to guide appropriate design and construction approaches.
In summary, the Preferred Plan will impact 21.5 ac of intertidal and subtidal habitat. The Service has provided a suite of avoidance, minimization, and mitigation measures that should the Corps incorporate into their project design, will help ameliorate the impacts from the project.

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Appendix A

Photos of Existing Conditions at Project Area

Photo 1 from March 2016 Site Visit (Photo credit: Terra Willi).\

Photo 2 from March 2016 site visit (Photo credit: Terra Willi).

Photo 3 from March 2016 site visit (Photo credit: Terra Willi).

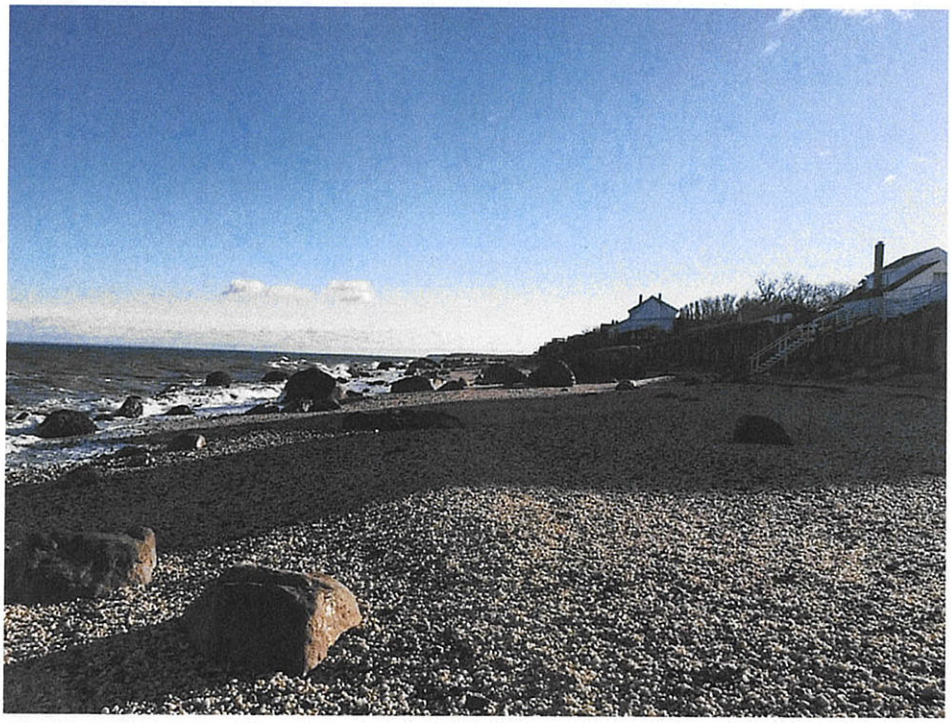

Photo 4 from March 2016 site visit (Photo credit: Terra Willi).

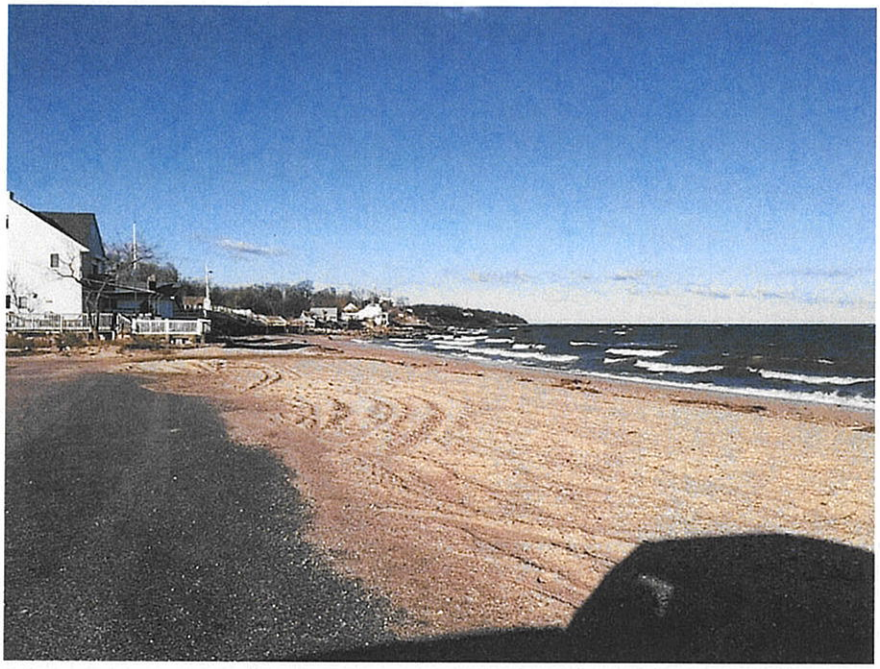

Photo 5 from March 2016 site visit (Photo credit: Terra Willi).

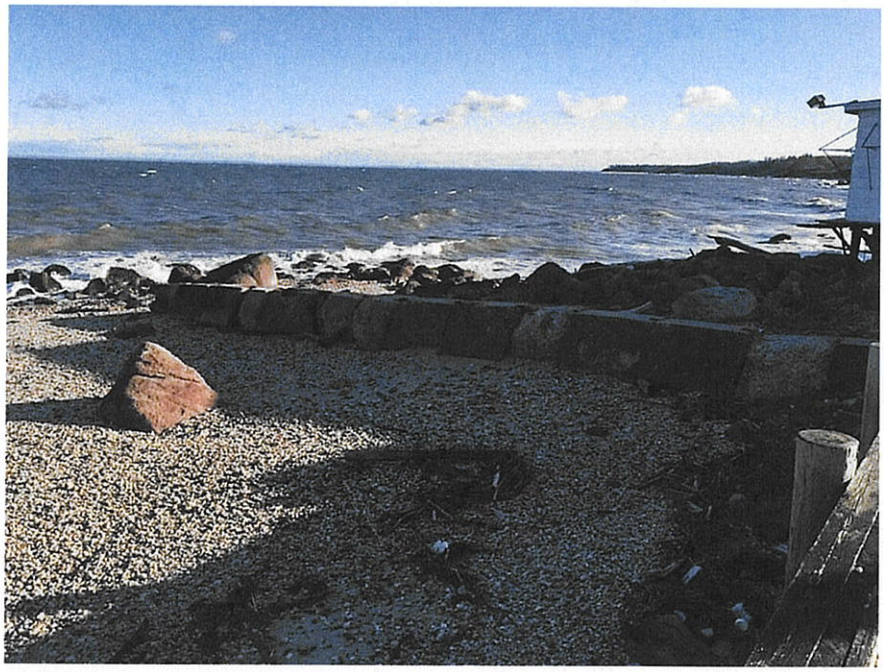

Photo 6 from March 2016 site visit (Photo credit: Terra Willi).

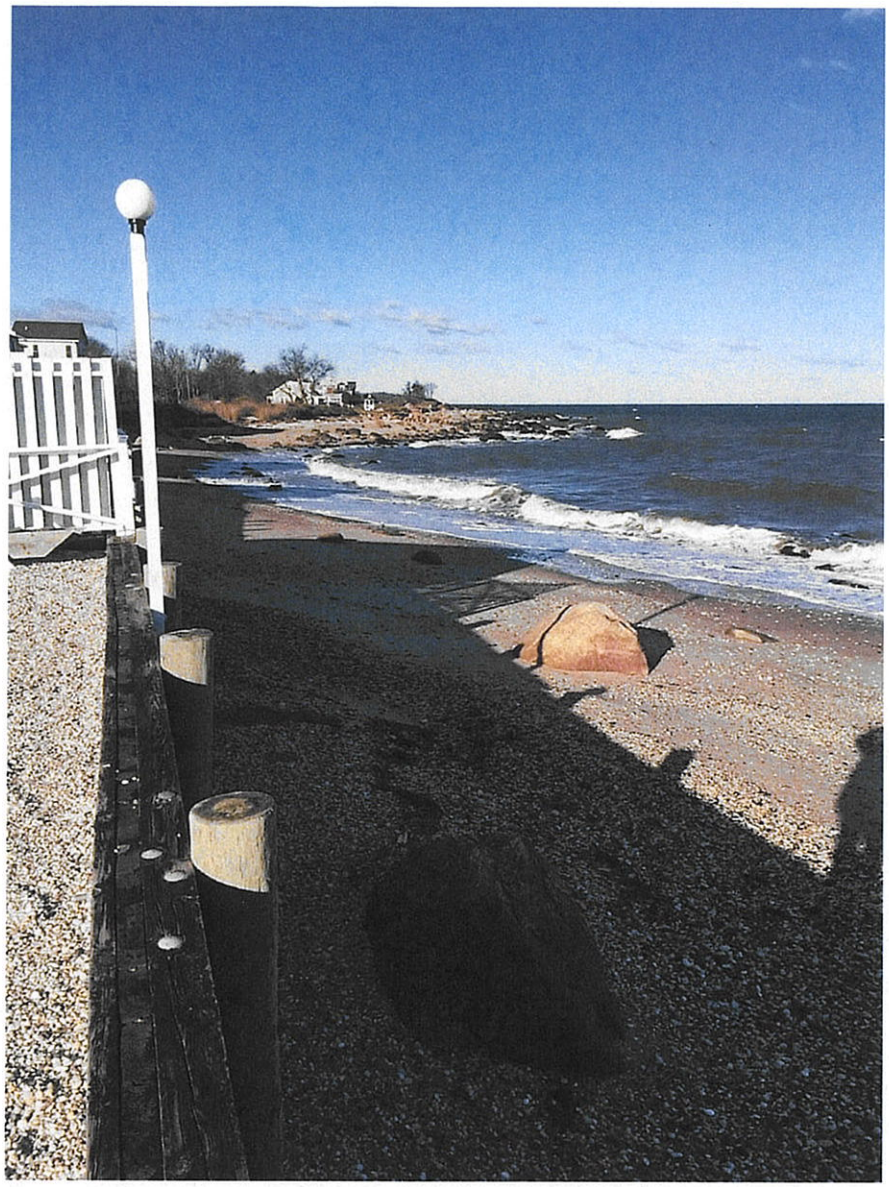

Photo 7 from March 2016 site visit (Photo credit: Terra Willi).

Appendix B

List of finfish species that may occur within the project area generated from Connecticut DEEP Marine Fisheries Division Long Island Sound Trawl Survey (a) and the Corps' Asharoken and Bayville Nearshore Investigation Final 2005 Finfish, Invertebrate Infauna and Water Quality Summary Report (b). A complete list of the species observed within the Connecticut DEEP Trawl Survey is provided in Appendix B.

Common name	***Scientific* Name**	**Source**	**Common name**	**Scientific Name**	**Source**
anchovy, bay	*Anchoa mitchilli*	a, b	kingfish, northern	*Menticirrhus saxatilis*	a
anchovy, striped	*Anchoa hepsetus*	a	lamprey, sea	*Petromyzon marinus*	a
banded rudderfish	*Seriola zonata*	a	lizardfish, inshore	*Synodus foetens*	a
bass, largemouth	*Micropterus salmoides*	a	lookdown	*Selene vomer*	a
bass, rock	*Ambloplites rupestris*	a	lumpfish	*Cyclopterus lumpus*	a
bass, smallmouth	*Micropterus dolomieui*	a	mackerel, Atlantic	*Scomber scombrus*	a
bass, striped	*Morone saxatilis*	a, b	mackerel, Spanish	*Scomberomorus maculatus*	a
bigeye	*Priacanthus arenatus*	a	menhaden, Atlantic	*Brevoortia tyrannus*	a, b
bigeye, short	*Pristigenys alta*	a	minnow, sheepshead	*Cyrinodon variegatus*	a, b
black sea bass	*Centropristes striata*	a	moonfish	*Selene setapinnis*	a
blenny, feather	*Hypsoblennius hentz*	a	mullet	*Mugil cephalus*	b
bluefish	*Pomatomus saltatrix*		mullet, white	*Mugil curema*	a
bluegill	*Lepomis macrochirus*	a, b	mummichog	*Fundulus heteroclitus*	a, b
bonefish	*Albula vulpes*	a	needlefish, Atlantic	*Strongylura marina*	a
bonito, Atlantic	*Sarda sarda*	a	ocean pout	*Macrozoarces americanus*	a
bullhead, brown	*Ameiurus nebulosus*	a	oyster toadfish	*Opsanus tau*	a
burrfish, striped	*Chilomycterus schoepfi*	a	perch, white	*Morone americana*	a
burrfish, web	*Chilomycterus antillarum*	a	perch, yellow	*Perca flavescens*	a
butterfish	*Peprilus triacanthus*	a	perch, silver	*Bairdiella chrysoura*	a
carp	*Cyprinus carpio*	a	pickerel, chain	*Esox niger*	a
catfish, channel	*Ictalurus puctatus*	a	pike, northern	*Esox lucius*	a
catfish, white	*Ameiurus catus*	a	pinfish	*Lagodon rhomboides*	a
cod, Atlantic	*Gadus morhua*	a	pipefish, northern	*Syngnathus fuscus*	a, b
cornetfish, bluespotted	*Fistularia tabacaria*	a	pollock	*Pollachius virens*	a
cornetfish, red	*Fistularia petimba*	a	pompano, African	*Alectis ciliaris*	a
crappie, black	*Pomoxis nigromaculatus*	a	porgy	*Stenotomus chrysops*	b
crappie, white	*Pomoxis annularis*		puffer, northern	*Sphoeroides maculatus*	a
croaker, Atlantic	*Micropogonias undulatus*	a	pumpkinseed	*Lepomis gibbosus*	a
cunner	*Tautogolabrus adspersus*	a	radiated shanny	*Ulvaria subbifurcata*	a
cusk-eel, fawn	*Lepophidium profundorum*	a	ray, bullnose	*Myliobatis freminvillei*	a
cusk-eel, striped	*Ophidion marginatum*	a, b	ray, roughtail stingray	*Dasyatis centroura*	a
darter, tessellated	*Etheostoma olmstedi*	a	rockling, fourbeard	*Enchelyopus cimbrius*	a
dogfish, smooth	*Mustelus canis*	a	salmon, Atlantic	*Salmo salar*	a
dogfish, spiny	*Squalus acanthius*	a	sand lance, American	*Ammodytes americanus*	a, b
drum, black	*Pogonias cromis*	a	sandbar (brown) shark	*Carcharhinus plumbeus*	a
eel, American	*Anguilla rostrata*	a	scad, bigeye	*Selar crumenophthalmus*	a
eel, conger	*Conger oceanicus*	a	scad, mackerel	*Decapterus macarellus*	a
fallfish	*Semotilus corporalis*	a	scad, rough	*Trachurus lathami*	a
filefish, orange	*Aluterus schoepfi*	a	scad, round	*Decapterus punctatus*	a
filefish, planehead	*Monacanthus hispidus*	a	sculpin, longhorn	*Myoxocephalus octodecemspinosus*	a

Common name	*Scientific* Name	Source	Common name	Scientific Name	Source
filefish, scrawled	*Aluterus scriptus*	a	sea raven	*Hemitripterus americanus*	a
flounder, American plaice	*Hippoglossoides platessoide*	a	seahorse, lined	*Hippocampus erectus*	a
flounder, fourspot	*Paralichthys oblongus*	a	sea robin, northern	*Prionotus carolinus*	a, b
flounder, smallmouth	*Etropus microstomus*	a	sea robin, striped	*Prionotus evolans*	a
flounder, summer	*Paralichthys dentatus*	a	seasnail	*Liparis atlanticus*	a
flounder, windowpane	*Scophthalmus aquosus*	a	sennet, northern	*Sphyraena borealis*	a
flounder, winter	*Pseudopleuronectes americanus*	a	shad, American	*Alosa sapidissima*	a
flounder, yellowtail	*Pleuronectes ferrugineus*	a, b	shad, gizzard	*Dorosoma cepedianum*	a
glasseye snapper	*Priacanthus cruentatus*	a, b	shad, hickory	*Alosa mediocris*	a
goatfish, dwarf	*Upeneus parvus*	a	sharksucker	*Echeneis naucrates*	a
goatfish, red	*Mullus auratus*	a	shiner, golden	*Notemigonus crysoleucas*	a
goby, code	*Gobiosoma robustum*	a	shiner, spottail	*Notropis hudsonius*	a
goby, naked	*Gobiosoma bosci*	a	silverside, Atlantic	*Menidia menidia*	a, b
goldfish	*Carassius auratus*	a	silverside, inland	*Menidia beryllina*	a
goosefish	*Lophius americanus*	a	skate, barndoor	*Dipturus laevis*	a
grubby	*Myoxocephalus aeneus*	a	skate, clearnose	*Raja eglanteria*	a
gunnel, banded	*Pholis fasciata*	a	skate, little	*Leucoraja erinacea*	a
gunnel, rock	*Pholis gunnellus*	a, b	skate, winter	*Leucoraja ocellata*	a
gurnard, flying	*Dactylopterus volitans*	a	smelt, rainbow	*Osmerus mordax*	a
haddock	*Melanogrammus aeglefinus*	a	snapper, grey	*Lutjanus griseus*	a
hake, red	*Urophycis chuss*	a	spot	*Leiostomus xanthurus*	a
hake, silver	*Merluccius bilinearis*	a	stargazer, northern	*Astroscopus guttatus*	a
hake, spotted	*Urophycis regia*	a	stickleback, four-spine	*Apeltes quadracus*	a
harvestfish	*Peprilus paru*	a	stickleback, nine-spine	*Pungitius pungitius*	a
herring, Atlantic	*Clupea harengus*	a	stickleback, three-spine	*Gasterosteus aculeatus*	a
herring, alewife	*Alosa pseudoharengus*	a	sturgeon, Atlantic	*Acipenser oxyrinchus*	a
herring, blueback	*Alosa aestivalis*	a	sucker, white	*Catostomus commersoni*	a
herring, round	*Etrumeus teres*	a	tautog (blackfish)	*Tautoga onitis*	a, b
hogchoker	*Trinectes maculatus*	a, b	tomcod, Atlantic	*Microgadus tomcod*	a, b
jack, blue runner	*Caranx crysos*	a	triggerfish, gray	*Balistes capriscus*	a
jack, crevalle	*Caranx hippos*	a	trout, brook	*Salvelinus fontinalis*	a
jack, yellow	*Caranx bartholomaei*	a	trout, brown	*Salmo trutta*	a
killifish, rainwater	*Lucania parva*	a	walleye	*Sander vitreus*	a
killifish, striped	*Fundulus majalis*	a, b	weakfish	*Cynoscion regalis*	a, b

Appendix C

Connecticut DEEP: List of invertebrates observed in 2014.

Common name	***Scientific* Name**	**Common name**	**Scientific Name**
anemones	*anemomes spp.*	mussel, ribbed	*Geukensia demissa*
arks	*Noetia-Anadara spp.*	northern moon snail	*Lunatia heros*
bryozoan, bushy	*Phylum Bryozoa*	oyster, common	*Crassostrea virginica*
bryozoan, rubbery	*Alcyonidium verrilli*	sea grape	*Molgula spp.*
clam, common razor	*Ensis directus*	sea urchin, purple	*Arbacia punctulata*
clam, hard clams	*Artica-Mercinaria-Pitar spp.*	shrimp, brown	*Penaeus aztecus*
clam, surf	*Spisula solidissima*	shrimp, coastal mud	*Upogebia affinis*
coral, star	*Astrangia poculata*	shrimp, ghost	*Gilvossius setimanus*
crab, blue	*Callinectes sapidus*	shrimp, mantis	*Squilla empusa*
crab, flat claw hermit	*Pagurus pollicaris*	shrimp, sand	*Crangon septemspinosa*
crab, horseshoe	*Limulus polyphemus*	slipper shell, common	*Crepidula fornicata*
crab, lady	*Ovalipes ocellatus*	sponge spp.	*sponge spp.*
crab, mud	*Family Xanthidae*	sponge, boring	*Cliona celate*
crab, rock	*Cancer irroratus*	sponge, deadman's fingers	*Haliclona spp.*
crab, spider	*Libinia emarginata*	sponge, red bearded	*Microciona prolifera*
hydroid spp.	*hydroid spp.*	squid, longfin inshore	*Loligo pealeii*
jelly, comb	*Phylum Ctenophora*	starfish spp.	*Asteriid spp.*
jelly, water	*Rhacostoma atlanticum*	tubularia hydroids	*Tubularia, spp.*
jellyfish, lion's mane	*Cyanea capillata*	tunicates, misc.	*class ascidiacea*
lobster, American	*Homarus americanus*	whelk, channeled	*Busycotypus canaliculatus*
mussel, blue	*Mytilus edulis*	whelk, knobbed	*Busycon carica*

Appendix D

CONFIDENCE RATING FOR NEW YORK PIPING PLOVER PRODUCTIVITY DATA

In order to collect accurate productivity data for piping plovers, site monitoring of 3 days/week or more is recommended. Due to staff shortages, many sites on Long Island cannot be monitored this frequently. For this reason, the following confidence ratings have been developed Confidence ratings should be assigned by site, not for each nest. However, in some cases, monitors may have varying confidence ratings for different portions of a site, usually as a result of varying nest check frequency. For example, at one survey site in 1994 with a total of 18 pairs, a plover biologist monitored one segment of the site with 13 pairs 3-4 times/week throughout the summer, yet another section of the site with 5 pairs was only monitored 2 times/summer. A confidence rating of A was assigned to the area with 13 pairs, and a confidence rating of D was assigned to the area with 5 pairs. The 13 pairs were include in the statewide average, the 5 pairs were not. Though dividing a site like this is better than excluding high confidence data because some data within the site is low confidence, it is necessary to be careful not to bias the productivity estimate towards pairs that are more or less successful than average.
Please assign each survey site a confidence rating based on the following categories.

A = 1. All fledglings in the total were seen by plover biologists or another qualified individual either in sustained flight for $\geq$ 15 meters or at least 25 days old.
2. It is very unlikely that any chicks fledged without being documented.
3. It is very unlikely that fledglings in the total for this site came from another site.
4. You are highly confident that you did not over count or under count the total number of pairs (ex., you did not count a renest as an additional pair, or vice versa).
5. You are confident that no nests were undetected.
6. The fate of all eggs is known (i.e., either there is a suspected cause of egg loss, or chicks are known to have hatched).

B = 1. Same as "A."
2. The possibility exists that additional chicks fledged. (ex., at a site where observations are difficult [chicks forage within beachgrass or behind dunes], 3 chicks were consistently seen in a brood until 20 days old, after that only 2 chicks were seen. A 3rd chick may have been present, but undetected.)
3. Same as "A."
4. You are moderately confident that you did not over count or under count the total number of pairs, though a slight margin of error exists. (ex., a renest may have been counted as an additional pair, or an additional pair may have been counted as a renest.)
5. It is possible that nests were undetected. (ex., 1st nests were found late in the season [end of May and after]. They were probably renests, though you are not sure from where.)
6. Same as "A."

C = 1. Chicks were seen at $\geq$ 20 days old, appearing healthy, and you have no reason to believe they did not fledge.
2. Same as "B."

3. It is possible the fledglings you saw at this site came from another site. (ex., 2 chicks from a brood were not seen between ages 15-27 days old, but at 27 days old 1 fledgling at the site was observed. The fledgling could have come from an adjacent site which produced fledglings.)
4. It is possible the total number of pairs was over counted or under counted (i.e., you could never get an exact count on the total number of pairs for reasons such as renesting, territoriality or defensive behaviors.)
5. Same as "B."
6. The fate of nests with eggs was not known for all pairs. (ex., the nest was missing around the time of the hatch date, with no signs of predation, yet chicks not seen.)

D = Qualifying criteria for A, B, or C cannot be met. The number of fledglings and/or total number of pairs cannot be determined.

Appendix E
USACE Response to the draft FWCAR

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT
JACOB K. JAVITS FEDERAL BUILDING
26 FEDERAL PLAZA
NEW YORK NEW YORK 10278-0090

Environmental Analysis Branch

October 2, 2018

David A. Stilwell, Field Supervisor
New York Field Office
U.S. Fish and Wildlife Service
2817 Luker Road
Cortland, New York 13045

Dear Mr. Stilwell:

The U.S. Army Corps of Engineers, New York District (District) received your October 28, 2016 draft Section 2(b) Fish and Wildlife Coordination Act Report (FWCAR) for the Hashamomuck Cove Coastal Storm Risk Management (CSRM) Feasibility Study. The District proposes a beach nourishment project along a 1.5 mile stretch of coastal shoreline in Southold, New York located on the north fork of Long Island. The Tentatively Selected Plan (TSP) previously provided to your office involved the placement of a 25-foot (ft) wide beach fill and berm in the West and East Coves and a variable width berm (25 to 75 ft) in the Central Cove. Since receiving your October 28, 2016 draft FCAR, the District has been conducting a detailed evaluation of the project alternatives (the Optimization Phase of the planning process). The purpose of this letter is to provide your office with a revised project description (the Preferred Plan), provide comments on your draft FWCAR, and to request a final FWCAR from your office. Coordination with your office pursuant to the Endangered Species Act (ESA) will be provided in a separate letter. The District requests that final coordination pursuant to both the Fish and Wildlife Coordination Act and the ESA be provided in one letter if that is agreeable to your office.

As stated above, the TSP (evaluated in your draft FWCAR) involved the placement of a 25-ft wide beach fill and berm in the West and East Coves and a variable width berm (25 to 75 ft) in the Central Cove. Following Optimization, the Preferred Plan for the Hashamomuck Cove CSRM project involves the placement of a 25-ft wide beach fill and berm in all three coves (West, Central, and East Coves) (see attached C-101, C-102 and C-103). Beach nourishment (sand placement) represents a near natural, soft solution for reducing damages on the open coast. After the initial

placement of sand, re-nourishment will be required at periodic intervals to counteract long term and storm-induced erosion. Periodic re-nourishment is anticipated to occur approximately 9 times (every 5 years) over the 50 year period of analysis to maintain the project design profile. The TSP and the Preferred Project are similar projects; beach nourishment with a 50-year project life and comparable number of estimated re-nourishment events. The only difference is a reduction in the width of the berm in Central Cove from a variable width berm (75 to 25 ft) to a 25 ft berm. Therefore, it is the District's opinion that your draft FWCAR remains applicable to the current Preferred Plan and as such, this letter provides a response to your draft FWCAR comments.

Your draft FWCAR provided a comprehensive description of pertinent environmental resources in the project area which will be helpful in the preparation of the final Hashamomuck Cove CSRM Feasibility Study. In addition, your draft FWCAR identified six federally-listed species which occur in Long Island, three of which may occur in the Study Area. As outlined in the draft CAR, the piping plover *(Charadrius melodus;* threatened), red knot *(Calidris canutus rufa;* threatened), and roseate tern *(Sterna dougallii dougallii;* endangered), occur or may occur within the Study Area. The remaining three species, seabeach amaranth *(Amaranthus pumilus;* threatened), northern long-eared bat *(Myotis septentrionalis;* threatened) and sandplain gerardia *(Agalinis acuta;* endangered) are unlikely to occur within the Study Area. As previously stated, the District will send a separate letter initiating consultation under Section 7 of the Endangered Species Act for this project.

The District provides the following responses to your comments as provided in the October 28, 2016 draft Section 2(b) FWCAR for the Hashamomuck Cove CSRM Feasibility Study:

1. USFWS comment (abridged):

Project Impacts

The Corps' TSP would have direct and indirect impacts on fish and wildlife resources during the construction of the project and over the 50-year life. In particular, these impacts would include burial and crushing of benthic organisms in the intertidal habitat, increased turbidity of local waters, and habitat modification. These impacts could adversely affect fish and wildlife resources within the Study Area but may also have temporary beneficial impacts to nesting shorebirds. Based on the review of the literature, the proposed project has the potential to result in a number of direct and indirect physical and biological impacts in terms of scale and duration in the marine subtidal, marine intertidal and maritime beach communities in the proposed Study Area. Speybroeck *et al.* (2006) compiled an integrated network of ecologic effects (tentative summary) that are likely to occur as a result of beach nourishment (Figure 7).

District response to comment:

The District agrees that there will be some direct and indirect impacts on fish and wildlife resources during construction of the project and over the 50-year life (e.g., burial of benthic resources, turbidity, etc.). However, as discussed in the July 2016 Draft Integrated Feasibility Report & Environmental Assessment, many of the impacts will be temporary. The District incorporated the use of best management practices (BMP's) for beach nourishment, as recommended by Speybroeck *et al.* 2006, to avoid or minimize the potential detrimental ecological effect on fish and wildlife resources in the project area.

In addition, many of the habitat/biological effects appearing in the Speybroeck *et al.* "integrated network" chart (Fig. 7) are not applicable to the Hashamomuck Cove project. In general, the 2006 Speybroeck *et al.* study draws conclusions from a beach nourishment project that used offshore borrow sediments instead of sand derived from an upland sand source as planned for the Hashamomuck Cove project. In addition, sand in the 2006 Speybroeck *et al.* study was used to nourish a south Atlantic coast sand beach as compared to a north Atlantic inland estuary glacial till/cobble/sand beach. Some additional comments regarding the habitat/biological effects listed in Figure 7 are provided below:

- There will be little to no input of abundant dead organisms for enrichment as the sand is from an upland source, not benthic material.
- There will be no toxicity or pollution as the sand will be tested thoroughly.
- "Finishing with brushwood", which is used to reduce wind speed to allow sand to accumulated and encourage colonization of early successional vegetation, is not proposed. The top of the berm will be planted to mimic an early successional, sparsely-vegetated beach strand habitat similar to existing conditions.
- There are no dunes and/or little dune type vegetation to speak of, therefore presence or absence of salt spray is inconsequential.
- There will be no washout of organisms (e.g., organic enrichment), although this is generally a beneficial consequence.
- The sediment composition used to re-nourish the beach will be of similar grain size and color to existing conditions. Therefore, post-construction beach physiology should be consistent with existing conditions which will allow the recovery of similar structure and function (e.g., benthic community).

2. USFWS Comment (abridged):

Direct Effects - Habitat Modification -Intertidal and Maritime Beach

Changes in the beach morphology and sedimentology characteristics (slope, height, grain size, sorting coefficient, *etc.)* to the intertidal zone, may affect colonization of marine invertebrates, a major forage resource for shorebirds that nest on the upland beach and depend on the intertidal habitat for foraging and brood rearing. The proposed action may result in the degradation or loss of the intertidal habitat during the life of the project. Horseshoe crabs, fish, shorebirds, and migratory birds may use this habitat for breeding and/or foraging and the likely shift in the

invertebrate community composition and abundance may limit the functional foraging habitat available. Changes to the beach slope, elevation, porosity, moisture content, and grain size may also affect the nest locations of horseshoe crabs.

District response to comment

The sediment composition that will be used to nourish the beach will be of similar color and grain size (or larger) to existing conditions. The existing benthic community is a mixture of typical opportunistic species and therefore, the recovery of a similar benthic structure and function would be expected to occur. Periodic re-nourishment activities will only occur in areas of high erosion leaving other areas of the beach untouched and available of foraging shorebirds.

The project area does not provide optimal habitat for horseshoe crabs as spawning adults prefer sandy beach areas within bays and coves that are protected from wave energy. No horseshoe crabs were observed in the project area during the 2015 Sediment Sampling, Benthic Community Analysis, and Submerged Aquatic Vegetation Survey. In addition, the Center for Environmental Research and Coastal Oceans Monitoring (CERCOM) Molloy College conducts horseshoe crab monitoring on Long Island during spawning season (between May to July). In 2014, the CERCOM survey site closest to the Hashamomuck Cove project area (on Long Island Sound) was approximately 15,000 feet west (Site 27 - Leeton Drive). No horseshoe crabs were observed during the 2014 survey. In 2015, CERCOM surveyed another site (on the Long Island Sound) located 13,500 feet west of the project area (Site 25 - Kenney's Road Beach). No horseshoe crabs were observed during the 2015 survey. South Harbor Park, on Little Peconic Bay in Southold, was also surveyed in 2014 and 2015 and no horseshoe crabs were observed at that location in either year.

Based on the recent sampling and monitoring results cited in the previous paragraph, it is unlikely that horseshoe crabs will be present during the Hashamomuck Cove project initial sand placement due to sub-optimal habitat conditions in the project area. However, to assure that there will be no direct impact to horseshoe crab, the District will provide a horseshoe crab monitor during the initial placement of sand to relocate any horseshoe crabs found to another location outside of the project area. In the years following the initial placement of sand, the beach will be wider and therefore, more suitable for horseshoe crab spawning. As such, due to this increased likelihood of horseshoe crab presence in the project area in subsequent years, the District will incorporate a no-construction window during horseshoe crab spawning season (April 15 to July 15, of any year) during nourishment events. The National Marine Fisheries Service (NMFS) concurs with these conservation recommendations as per a March 15, 2018 telecom with Ursula Howson of the NMFS Greater Atlantic Regional Fisheries Office Habitat Conservation.

The project area also lacks habitat features preferred by migrating and roosting shorebirds (e.g., shallow coastal wetlands, mud and sand flats, salt marshes and grasslands) and nesting shorebirds due to the narrowness of the

upland beach, lack of vegetation, high energy environment and high level of human disturbance. Therefore, direct impacts of significance during initial construction are not anticipated to occur in these species. The placement of sand and widening of the beach may result in a beneficial effect to these species.

3. USFWS Comment (abridged):

Direct Effects - Construction Activity

The direct effects resulting from construction activities include disruption of breeding/spawning, foraging, and roosting activities. Operation of machinery used to grade the nourished beach can greatly disturb shorebirds, their nests, and can endanger the lives of chicks (U.S. Fish and Wildlife Service 2014b). Migratory shorebirds are particularly vulnerable to disturbance at roosting sites at high tides where the habitat available for roosting is diminished (U.S. Fish and Wildlife Service 1998). Spawning horseshoe crabs may be disturbed or buried during construction activities.

District response to comment

As previously stated, currently the project area does not provide optimal habitat for nesting or migratory shorebirds or horseshoe crabs. Therefore, impacts to these species would be unlikely during initial project construction. The District will conduct monitoring for piping plover during the initial placement of sand. The details of pre- construction monitoring will be provided to the USFWS in a Shorebird Management Plan as part of Section 7 consultation. In addition, the piping plover biological monitor will also check for the presence of horseshoe crab and red knot in the project area during initial construction. Horseshoe crabs observed in the work area will be relocated to avoid burial. The presence of horseshoe crab and red knot will also be noted in annual monitoring reports.

Widening the beach may improve habitat for some species which could increase the likelihood of construction related impacts during re-nourishment activities. Therefore, the District concurs with establishing a no construction window for subsequent re-nourishment events from April 1 to August 31 which incorporates protections for both piping plover and horseshoe crab.

4. USFWS Comment (abridged):

General Recommendations - Consideration of Sea Level Rise Rates - Consideration of alternative methods

We recommend that the Corps consider using established rates and ranges of sea level rise scenarios for future sea level rise including the 2012 National Climate Assessment, Rahmstorf *et al.* (2012) and Kopp *et al.* (2014).

District response to comment

The Draft Coastal Engineering Appendix incorrectly referenced EC 1165-2-212 instead of Corps Regulation ER 1100-2-8162 "INCORPORATING RELATIVE SEA LEVEL CHANGE IN CIVIL WORKS PROGRAMS USACE" dated 31 Dec 13. Corps sea level rise rates and ranges used for studies were established in coordination with other Federal agencies including USGS and NOAA, and we are required by our regulations to be used in our study assessments.

Regarding the assessment of sea level rise, during the optimization phase, the sensitivity of the TSP to the Corps Intermediate and High Rate of SLC was evaluated using a computer model. The results demonstrated the adaptability of the selected plan to higher rates of rise (e.g., higher rates of sea level rise would likely require additional sand). The Hashamomuck Cove project Preferred Plan is based on the Corps Low Rate of Sea Level Change (SLC) which reflects the historic trend in Sea Level Rise for the project area. Evaluation of the TSP under all three rates of SLC complies with Corps Regulation ER 1100-2-8162 "INCORPORATING RELATIVE SEA LEVEL CHANGE IN CIVIL WORKS PROGRAMS USACE" dated 31 Dec 13.

The SLC Curve Calculator tool also provides comparisons of the Corps' scenarios to National Oceanic and Atmospheric Administration (NOAA) 2012 Technical Report OAR CPO-1, "Global Sea Level Rise Scenarios for the United States National Climate Assessment". Please see the links below for more information on the Corps and NOAA rates.
https://www.usace.army.mil/corpsclimate/Climate Preparedness and Resilience.aspx

http://corpsmapu.usace.army.mil/rccinfo/slc/slcc calc.html

5. USFWS Comment (abridged):

Recommended Mitigation - Consideration of Alternatives and Methods

In general, the Service recommends that the Corps consider alternatives or methods that incorporate hybrid or natural approaches into the project design such as sand dunes, marshes and oyster reefs as appropriate in their Civil Works Program. Incorporating these approaches into projects will provide a more resilient habitat for wildlife as well as protect communities and infrastructure. The Corps may also consider other measures such as: relocation/buyouts/retreat, and changes to policy and land use regulations. Additionally, the Corps may consider investigating the impacts of the groins, bulkheads, and other structures that may be contributing to erosion within the study area and along the adjoining shoreline.

District response to comment

The District considered a wide array of alternatives in the July 2016 Draft Integrated Feasibility Report & Environmental Assessment, including nonstructural

measures such as elevating buildings, moving buildings away from the shoreline, and buyouts. Elevating buildings does not prevent erosion and will ultimately result in damage to the road. Most of the structures that are at the highest risk of damage do not have sufficient property to move them back to prevent damages. Buyouts were evaluated in the Feasibility Report for the 29 homes most susceptible to damage. The buyout alternative did not have a positive benefit cost ratio.

Dunes and reinforced dunes were also considered as "soft" structural measures in the Feasibility Report. In the evaluation, it was demonstrated that the dune alternatives had a lower benefit cost ratio than the berm by itself. As such, they were not selected as the TSP and removed from further consideration. The District recognizes the benefits of bioengineering alternatives, however, the creation of oyster reefs and marshes would not be feasible based upon the physical characteristics of the project area.

Regarding an investigation of existing structures, the Corps did document all structures within the project area. The District alternatives are compatible with the existing structures. The existing groins are generally in poor condition and the assumption in the study is that they would be left in place and continue to degrade over time. The existing bulkheads provide costal storm risk management and removing these would increase costal storm damages and be contrary to the objectives of the study to reduce coastal storm damages to shore front properties.

6. USFWS Comment (abridged):

Recommended Mitigation - Time-of-Year Restrictions and Monitoring

Activities associated with beach nourishment and re-nourishment should be accomplished outside of the migration period and breeding season of shorebirds, and spawning season of fish and horseshoe crabs. Time-of-year restrictions should apply to both the initial beach fill and the Re-nourishment cycles. As such, the Service recommends a time of year restriction during which no work should be conducted between April 1 and September 30 to avoid adverse impacts to nesting and migrating shorebirds, spawning finfish, and horseshoe crabs.

District response to comment

Initial placement is expected to take approximately one year; estimated to begin in March and to end the following February. As discussed in a previous section of this letter, the Corps does not anticipate significant impacts to occur to fish and wildlife resources during the initial beachfill. To assure that there are no direct impacts to piping plover and horseshoe crab, monitoring will occur during the initial sand placement. The District agrees that beach nourishment may increase the suitability of the beach for a variety of species and has incorporated a no construction window of April 1 to August 31 to protect both piping plover nesting and horseshoe crab spawning seasons. Presence/absence monitoring of red knot will also be added to the

annual piping plover monitoring plan. The District disagrees that the no construction window should extend to September 30 as recommended by the USFWS.

7. USFWS Comment (abridged):

Additional Recommendations

If the dunes are to be planted with vegetation, the Service recommends that the Corps develop a planting schedule that:

1) Incorporates native species that reflect the local plant communities for the appropriate planting zone *(e.g.,* foredune, dune face, dune crest, back of dune) (Terwilliger Consulting, Inc. 2009) such as, American beachgrass, seaside goldenrod, sea rocket *(Cakile edentula var. edentula);* and seaside spurge *(Euphorbia polygonifolia);* and 2) Mimics an early successional, sparsely-vegetated beach strand habitat by developing a plan that promotes natural and random spacing,

Public access on dunes should be limited to wooden walkways over the dune in order to maintain vegetation beneath the walkway and on the dunes.

District response to comment

The project area is currently sparsely vegetated due to the limited amount of upland beach habitat. It should also be noted that the project involves the construction of a berm, not a dune. The top of the berm is approximately 25' ft in width in all three coves which does not increase upland beach habitat to a great extent. However, District has identified some areas that may be suitable for planting. A Planting Plan will be incorporated into the Shorebird Management Plan and coordinated with the USFWS as part of Section 7 consultation. In general, vegetation would be sited in the high beach area along the top of the berm (above mean high water) and would mimic an early successional, sparsely-vegetated beach strand habitat as recommended by the USFWS. Planted areas will represent 35% cover (along the top of the berm) which is in keeping with recommendations for optimal cover for piping plover (30-40% cover).

The Public Access Plan (PAP), prepared by the NYSDEC, is attached for your information. There are no provisions for the construction of wooden walkways in the PAP. However, the PAP states that public access to the beach on pathways may be limited in order to allow habitat for federally or state endangered or threatened species and bird nesting habitat at certain times of the year.

8. USFWS Comment (abridged):

Monitoring Recommendations

Pre- and post-construction studies need to be completed to assess benthic invertebrate recovery, and impacts to migratory and breeding shorebirds (including federally- and state-listed species such as red knots and least and common terns) as well as finfish and horseshoe crabs. Therefore, the Service recommends that the Corps develop a pre- and post-monitoring program based on the guidance protocols developed by the U.S. Department of the Interior's Minerals Management Service (see Minerals Management Service 2001) in order to assess benthic invertebrate recovery and finfish.

District response to comment

The primary objectives of the Mineral Management Service (2001) study was to design a monitoring program to be used to evaluate the potential physical and biological impacts resulting from the long-term use of outer continental shelf (OCS) sand, and to prepare protocols for the monitoring plan elements. The Hashamomuck Cove project involves beach nourishment using an upland sand source and as such, the Mineral Management Service (2001) study does not seem to be applicable to the development of a monitoring program for this project.

With that said, District recognizes that there may be temporary impacts to benthic resources as discussed in the July 2016 Draft Integrated Feasibility Report & Environmental Assessment. As part of the project, District would conduct sampling similar to the 2015 benthic sampling conducted to establish existing conditions for the project area (e.g., high, mid and low intertidal sampling and eelgrass survey). Sampling would be conducted prior to beach nourishment activities (with the exception of the first beach fill) and then again one year after nourishment activities. The presence/absence of red knot and horseshoe crab will also be included in the benthic sampling reports. (Note: Presence/absence observations for red knot and horseshoe crab will also be incorporated into the Shorebird Management Plan prepared pursuant to Endangered Species Act Section 7 consultation.) .

The direct and indirect effects to finfish during initial and re-nourishment activities are short-term and temporary as discussed in the July 2016 Draft Integrated Feasibility Report & Environmental Assessment. In addition, the National Marine Fisheries Service (NMFS) had no conservation recommendations in their Essential Fish Habitat (EFH) review dated September 12, 2016. In addition, the District re-coordinated the EFH Assessment with the NMFS recently due to a change in the project from the TSP to the Preferred Plan. The NMFS has no conservation recommendations with regard to finfish as per a telecom with Ursula Howson at the NMFS dated March 15, 2018. As such, the District considers long-term monitoring of finfish to be unwarranted for this project.

9. USFWS Comment (abridged):

Fish and Wildlife Enhancement Opportunities

The Service recommends that the Corps participate throughout this project, or under other authorities, in the protection and restoration of wetland habitats which support breeding and non-breeding birds, as well as fish and shellfish. The project is within proximity of numerous freshwater and tidal wetlands. The Service recommends that the Corps participate throughout this project or under other authorities to further these goals. Project related efforts might include addressing storm water run-off in the beach parking lot and other access points, as well as efforts that will aid in the improvement of water quality such as the replacement of flush toilets with composting toilets.

District response to comment

The District has incorporated plantings to mimic an early successional, sparsely- vegetated beach strand habitat for wildlife enhancement. USAGE will also consider adding a water quality improvement feature to capture runoff from the Southold Beach parking lot (e.g., inclusion of a swale) as suggested by the USFWS. Additional measures to protect or restore nearby tidal and fresh water wetlands is beyond the scope of this project.

Should you have any additional questions or need additional information, please contact at the project biologist, Mr. Matthew Voisine at (917) 790-8718 or by email at Matthew.Voisine@usace.army.mil. As previously stated, the Corps requests that your office provide the Final Section 2(b) Coordination Act Report for the Hashamomuck Cove CSRM project Preferred Plan. Combining your response pursuant to the Fish and Wildlife Coordination Act and the ESA would be preferable if feasible.

S· r ly,

Peter W eppler
Chief, Environmental Analysis Branch

cc: USFWS-LIFO

EMailed 8/14/15

United States Department of the Interior

FISH AND WILDLIFE SERVICE
3817 Luker Road
Cortland, NY 13045

August 13, 2015

Colonel David A. Caldwell
District Engineer, New York District
U.S. Army Corps of Engineers
26 Federal Plaza, Rm. 2109
New York, NY 10278-0090

Attention: Peter M. Weppler, Chief, Environmental Analysis Branch

Subject: Hashamomuck Cove, New York Coastal Storm Risk Management Feasibility Study, U.S. Fish and Wildlife Service Planning Aid Letter

Dear Colonel Caldwell:

This letter transmits the U.S. Fish and Wildlife Service's (Service) Planning Aid Letter (PAL) for the U.S. Army Corps of Engineers' (Corps) feasibility study entitled, "Hashamomuck Cove, Southold, New York Feasibility Study," (Project) for the north shore of Long Island within the incorporated Town of Southold, New York (NY). This report was developed in support of the Service's Fish and Wildlife Coordination Act (FWCA) responsibilities (48 Stat. 401, as amended; 16 U.S.C. 661 *et seq.*) in reviewing Corps' water resources development projects. This report does not constitute the report of the Secretary of Interior as required by section 2(b) of the FWCA.

In March of 2014, the Service received the Corps' initial request for a project PAL. In a June 2015 correspondence, the Corps indicated that appropriate project alternatives had not yet been completed. At that time, the Corps suggested the Service defer issuance of the PAL citing lack of plan development. In August of 2015, the Corps requested the Service prepare an abbreviated PAL, primarily for use in a status meeting related to the project's Environmental Assessment. This document represents the Services' response to the Corps' most recent request and only includes summary information, as requested by the Corps, regarding fish and wildlife resources within the Study Area (defined below). A subsequent Planning Aid Report (PAR) and FWCA 2(b) Report will be prepared as details of the feasibility study are finalized.

Introduction

Identification of Purpose, Scope, and Authority

The Corps' is preparing a Feasibility Study to investigate Coastal Storm Risk Management project alternatives for the Hashamomuck Cove Study Area (Study Area) within the Town of Southold, NY. The FWCA provides for the equal and integrated consideration of fish and wildlife conservation needs, and requires coordinated planning with other features of federal water resource development proposals. Pursuant to our authorities and shared responsibilities under the FWCA, the Service has prepared this PAL for the Corps' use and consideration in this phase of the Feasibility Study. As such, the PAL briefly summarizes and characterizes the existing environment, and identifies important fish and wildlife resources, including rare and declining habitats within the Study Area. The PAL will assist the Corps and the Service in better understanding the baseline environmental conditions within the Study Area.

The Study Area is located within the Town of Southold, Suffolk County, NY. The easternmost section of the Study Area is situated near Soundview Road and adjacent to Southold Town Beach and extends westerly for approximately 1.5 miles. The Study Area also includes Hashamomuck Cove, Southold Cove, Pebble Beach Cove, and is bordered by Long Island Sound to the north (U.S. Army Corps of Engineers 2014).

The Study Area is affected by both nor'easters and tropical storms. Storm driven surge and waves cause beach and bluff erosion and flooding. Erosion during storms results in the loss of land, damage to homes, businesses, and roads. The properties, utilities, and County Road 48 are most susceptible to damage within the concave portions of the above mentioned coves. In 2012, Hurricane Sandy impacted the Town of Southold with a storm surge of about 6 feet (ft) and flooding of low-laying areas (U.S. Army Corps of Engineers 2014).

Description of Study Area

Climate, Topography, and Ecology

The Township of Southold occupies the eastern 20 miles (mi.) of Long Island's northern peninsula and includes Robins, Plum, Great Gull, Little Gull, and Fishers Islands. Because of the Towns insular nature, its latitude, and the proximity of the Atlantic Ocean, Southold has a predominantly temperate marine climate. Temperatures are moderate, and precipitation is abundant during the fall, winter, and spring. Peninsular Southold is naturally subdivided by saltwater ponds, marshes, and inlets into six separate morphologic and hydrologic areas. Although the shoreline is generally smooth and regular, erosion by wave action and storm tides has created steep bluffs along the Long Island Sound waterfront. A ridgeline feature is present along most of the shoreline and is commonly 50 ft above sea level, reaching a maximum of slightly over 160 ft above sea level (U.S. Geological Survey 1964).

Freshwater wetlands are scattered throughout the Town of Southold. The largest concentration of freshwater wetlands, the Arshamomaque Preserve wetland complex, is located between Hashamomuck Pond and Chapel Lane. In March of 1987, the New York State Department of

State designated Hashamomuck Pond as a Significant Coastal Fish and Wildlife Habitat (New York State Department of State 2005). Hashamomuck Pond is located west of Conklin Point emptying through Mill Creek into Shelter Island Sound in the Town of Southold. There is moderate to high density residential development on the north and northwest sides of the pond and marina development at the mouth of Mill Creek. The southwest side of the pond remains largely undeveloped, and a large parcel on the eastern side of the pond has been preserved (New York State Department of Environmental Conservation 2002). See enclosed Figure 1 for a regional map of the Study Area.

Fish and Wildlife Resources within the Study Area

Trust Resources

The Service has legal responsibility for the welfare of Federal trust resources including migratory birds, anadromous fish, endangered animals and plants occurring in the United States, and Federal wildlife refuges. The Service has statutory authority and responsibility for enforcing the FWCA, the Endangered Species Act (ESA) of 1973, as amended (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.)*, the Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703–712), and the Bald and Golden Eagle Protection Act of 1940 (16 U.S.C. 668-668c). The following section discusses trust resources that may occur within the Study Area.

Federally-listed Threatened and Endangered Species

The piping plover (*Charadrius melodus;* threatened) is a small species of shorebird which breeds in the northeastern Atlantic coast. Plovers nest above the high tide line on coastal beaches, sand flats at the ends of sandspits and barrier islands, gently sloping fore dunes, blowout areas behind primary dunes, sparsely vegetated dunes, and wash over areas cut into or between dunes. Feeding areas include intertidal portions of ocean beaches, wash over areas, mudflats, sandflats, wrack lines, and shorelines of coastal ponds, lagoons, or salt marshes (U.S. Fish and Wildlife Service 1996). Plover broods prefer ephemeral pools and bay tidal flats over other habitat types due to higher arthropod abundance and relatively increased availability of escape cover (Elias *et al.* 2000). Breeding plovers on the Atlantic Coast are generally found at accreting ends of barrier islands, along sandy peninsulas, and near coastal inlets (U.S. Fish and Wildlife Service 1996). The Study Area's Long Island Sound coastline may support suitable nesting and foraging piping plover habitat.

The northern long-eared bat (*Myotis septentrionalis;* threatened) is a medium-sized bat found across much of the eastern and northcentral United States. White-nose syndrome is responsible for much of the species' recent population decline. Northern long-eared bat typically winters in caves and abandoned mines. There are approximately 90 hibernacula known to occur across the state (U.S. Fish and Wildlife Service 2015). During the summer months, northern long-eared bats roost in under loose bark, in cracks, crevices, and cavities within a variety of tree species. Other roosting habitat includes human made structures such as buildings, utility poles, and barns (U.S. Fish and Wildlife Service 2015). Within the Study Area, forested uplands may support summer roosting habitat for northern long-eared bat.

Migratory Birds

The primary statutory authority for *Birds of Conservation Concern 2008* (U.S. Fish and Wildlife Service 2008) is the Fish and Wildlife Conservation Act of 1980, as amended; other authorities include the Fish and Wildlife Act of 1956 (16 U.S.C. 742a–j), the ESA, and the MBTA. The BCC birds presented in Table 1of this PAL are protected under the MBTA, which prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Service. The word "take" is defined as "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect." Unauthorized taking of birds is a violation of the MBTA. Neither the MBTA nor its implementing regulations, 50 CFR Part 21, provide for permitting of "incidental take" of migratory birds. Bald and golden eagles are afforded additional legal protection under the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d). We recommend that these lists be consulted in accordance with Executive Order 13186, "Responsibilities of Federal Agencies to Protect Migratory Birds."

Table 1.0 - BCR 30 (New England/Mid-Atlantic Coast) *BCC 2008* list: (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR.

Common Name	Scientific Name	Status	Common Name	Scientific Name	Status
Red-throated Loon	*Gavia stellate*	(nb)	Rusty Blackbird	*Euphagus carolinus*	(nb)
Pied-billed Grebe	*Podilymbus podiceps*		Purple Sandpiper	*Calidris maritima*	(nb)
Horned Grebe	*Podiceps auritus*	(nb)	Least Tern	*Sternula antillarum*	(c)
American Bittern	*Botaurus lentiginosus*		Gull-billed Tern	*Gelochelidon nilotica*	
Least Bittern	*Ixobrychus exilis*		Black Skimmer	*Rynchops niger*	
Snowy Egret	*Egretta thula*		Short-eared Owl	*Asio flammeus*	(nb)
Bald Eagle	*Haliaeetus leucocephalus*	(b)	Whip-poor-will	*Antrostomus vociferus*	
Peregrine Falcon	*Falco peregrinus*	(b)	Red-headed Woodpecker	*Melanerpes erythrocephalus*	
Black Rail	*Laterallus jamaicensis*		Loggerhead Shrike	*Lanius ludovicianus*	
Wilsons Plover	*Charadrius wilsonia*		Brown-headed Nuthatch	*Sitta pusilla*	
American Oystercatcher	*Haematopus palliatus*		Sedge Wren	*Cistothorus platensis*	
Solitary Sandpiper	*Tringa solitaria*	(nb)	Wood Thrush	*Hylocichla mustelina*	
Lesser Yellowlegs	*Tringa flavipes*	(nb)	Blue-winged Warbler	*Vermivora cyanoptera*	
Upland Sandpiper	*Bartramia longicauda*		Golden-winged Warbler	*Vermivora chrysoptera*	
Whimbrel	*Numenius phaeopus*	(nb)	Prairie Warbler	*Setophaga discolor*	
Hudsonian Godwit	*Limosa haemastica*	(nb)	Cerulean Warbler	*Setophaga cerulea*	
Marbled Godwit	*Limosa fedoa*	(nb)	Worm-eating Warbler	*Helmitheros vermivorum*	
Red Knot	*Calidris canutus*	(nb), (a)	Kentucky Warbler	*Geothlypis formosa*	
Semipalmated Sandpiper	*Calidris pusilla*	(nb)	Henslow's Sparrow	*Ammodramus henslowii*	
Buff-breasted Sandpiper	*Calidris subruficollis*	(nb)	Nelson's Sharp-tailed Sparrow	*Ammodramus nelsoni*	
Short-billed Dowitcher	*Limnodromus griseus*	(nb)	Saltmarsh Sharp-tailed Sparrow	*Ammodramus caudacutus*	
Seaside Sparrow	*Ammodramus maritimus*	(c)			

Wetlands

The Service defines wetlands as transitional lands between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. Intertidal and shallow subtidal habitats, such as those described above, provide a suite of ecosystem services, including primary production, provision of fish and shellfish habitat and nursery areas, biogeochemical cycling of nutrients, carbon sequestration, sediment trapping, and wave attenuation (Currin *et al.* 2010). According to the National Wetlands Inventory, the following wetland habitat types occur within the Study Area: estuarine and marine wetlands, estuarine and

marine deepwater, freshwater emergent wetland, freshwater pond, and freshwater forested/shrub wetland. See enclosed Figure 2 for a regional map of wetland habitats within the Study Area

Conclusion

The Service appreciates the opportunity to coordinate with the Corps on this study. As discussed above, a subsequent PAR and FWCA 2(b) Report will be prepared following the development of the feasibility study. If you have any questions or require additional information, please contact Mr. Chris Allen of the Long Island Field Office at (631) 286-0485.

Sincerely,

ACTING FOR David A. Stilwell
Field Supervisor

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Enclosures

cc: NYSDEC, Stony Brook, NY (R. Marsh)

Figure 1 – Hashamomuck Cove Study Area Boundary.

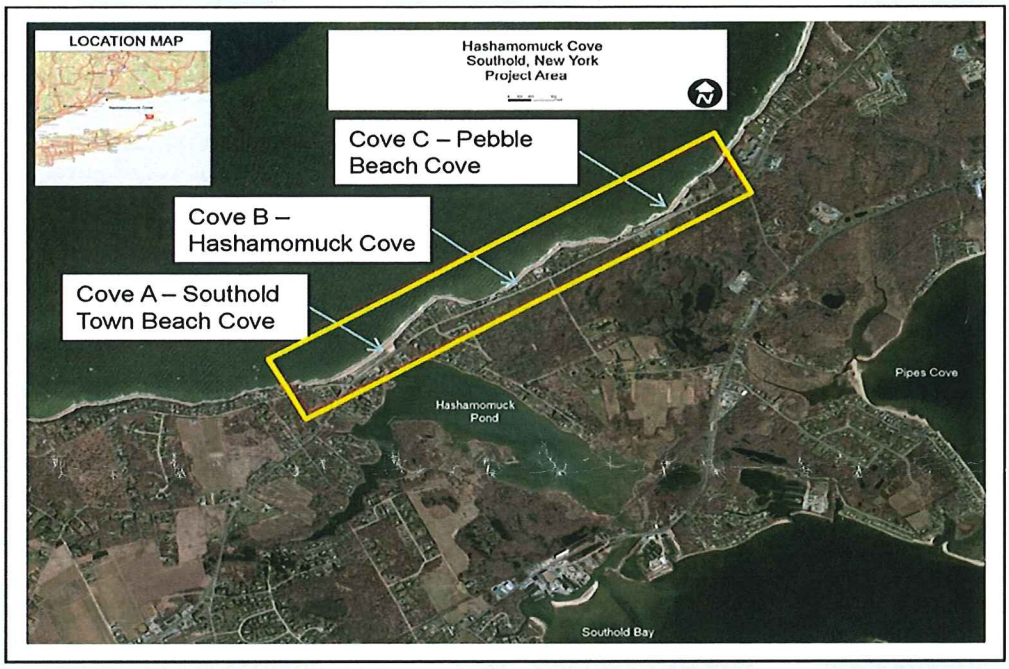

Figure 2 – Hashamomuck Cove Feasibility Study Area National Inventory Wetlands.