APPENDIX L

PERTINENT CORRESPONDENCE

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US Army Corps of Engineers®
New York District

FIRE ISLAND TO MONTAUK POINT
REFORMULATION STUDY

SUFFOLK COUNTY, NEW YORK

Programmatic Agreement

FEBRUARY 2020

PROGRAMMATIC AGREEMENT AMONG THE U.S. ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT AND THE NEW YORK STATE HISTORIC PRESERVATION OFFICE REGARDING THE FIRE ISLAND TO MONTAUK POINT, SUFFOLK COUNTY, NEW YORK REFORMULATION STUDY

WHEREAS, the US Army Corps of Engineers, New York District (District) is proposing to undertake measures to reduce coastal storm damages and minimize impact along the Atlantic Coast from Fire Island to Montauk Point and the backbay and mainland areas along the Great South, Shinnecock and Moriches Bays (Project); and

WHEREAS, the Fire Island Inlet to Montauk Point, New York, Combined Beach Erosion Control and Hurricane Protection Project was authorized by the River and Harbor Act of 14 July 1960, and subsequently modified in accordance with Section 31 of the Water Resources Development Act of 1974 and Sections 103, 502 and 934 of the Water Resources Development Act of 1986 (P.L. 99-662), and Public Law 113-2; and

WHEREAS, the New York State Department of Environmental Conservation is the non-federal sponsor; and

WHEREAS, the Project consists of the continuation of authorized inlet navigation projects, including ebb shoal dredging and the placement of sand on adjacent beaches; measures for residential/non-residential structures consisting of wet/dry flood-proofing, relocations, acquisitions/demolitions and the construction of ringwalls; breach response along the barrier islands; beach and dune fill with renourishment every four years for up to thirty years; modifications (tapering or shortening) of existing groins; and the construction of coastal process features; and

WHEREAS, the Areas of Potential Effect include the offshore borrow sites; the near shore sand placement and groin modification areas; the mainland locations for measures for residential/non-residential structures, which extends from the Nassau-Suffolk County border on the west to First Neck Lane on the western edge of Southampton Village to the east and from the bayshore north to Montauk Highway; and the location of the individual coastal process features (Appendix A); and

WHEREAS, the Area of Potential Effect for the mainland measures for residential and non-residential structures includes the Shinnecock Indian Nation (federally-recognized), tribal lands and Unkechaug Indian Nation (state-recognized) property, however, no Project actions are proposed for these areas (see Appendix A).

WHEREAS, the continuation of the current inlet management, including the dredging of the ebb-shoal and its placement on the adjacent shoreline and the modifications (tapering or shortening) of existing groins will not have an adverse effect on historic properties

(Appendix B); and

WHEREAS, the previously developed Breach Response Plan has its own process for coordination with the New York State Historic Preservation Office (New York SHPO) in the event of a breach of the barrier island; and

WHEREAS, the Fire Island Light Station Historic District/Fire Island National Seashore, including the William Floyd Estate, the Beach Road Historic District, the Cutting (Bayard) Estate-Westbrook, Bellport Village Historic District, the Remsenberg Historic District, the Quogue Summer Colony Historic District, the Quogue Historic District, the Canoe Place Historic District, and a portion of the Southampton Village Historic District are located within the Areas of Potential Effect for the Atlantic shoreline and mainland portions of the Project (Appendix C);

WHEREAS at least 70 archaeological sites and more than 150 buildings, structures and objects that are listed, determined eligible or potentially eligible for the National Register are also located within the Areas of Potential Effect (see Appendix C); and

WHEREAS, a portion of the Sugar Loaf Hill Shinnecock Indian Burial Ground Critical Environmental Area designated by the Town of Southampton in 1990, which includes the Shinnecock Indian Contact Period Village Fort and Burial Ground, is located along Montauk Highway in the Town of Southhampton within the Area of Potential Effect (see Appendix C); and

WHEREAS, pursuant to 36 CFR Part 800, the regulations implementing Section 106 of the National Historic Preservation Act (NHPA) (54 U.S.C § 306108), the District has determined, in accordance with 36 CFR 800.6(c) that implementation of Project actions will have the potential to have adverse effects on properties listed on or eligible for listing on the National Register of Historic Places (NRHP) and within the Areas of Potential Effect for near shore sand placement, offshore borrow areas, mainland locations and individual coastal process features; and

WHEREAS, the District has notified the Advisory ACHP on Historic Preservation (ACHP) of the potential for the Undertakings to affect historic properties and that a programmatic agreement will be prepared; and

WHEREAS, the District has consulted and will continue to consult with the NYSHPO, the Shinnecock Indian Nation, the Delaware Tribe of Indians (federally-recognized tribes), the Unkechaug Nation, the Fire Island National Seashore, and municipal and county historic societies, and other appropriate consulting parties to define and implement process for taking into consideration the effects of the Project on historic properties; and

WHEREAS, the District involved the general public through public scoping and review periods (July through October 2016) of the National Environmental Policy Act (NEPA) process, which affords all persons, organizations, and government agencies the right to review and comment on proposed major federal actions that are evaluated by a NEPA document and participate in public meetings during the review of the feasibility report; and

NOW, THEREFORE, the District, New York SHPO, and ACHP agree that the Undertakings shall be implemented in accordance with the following stipulations in order to take into account the effects of the Project on historic properties.

STIPULATIONS

I. BEACH AND DUNE FILL - NEAR SHORE/TIDAL ZONE

A. The District shall conduct a remote sensing survey(s) of the near shore tidal zone anticipated for the beach fill and placement Area of Potential Effect that were not previously surveyed, or have not been previously disturbed by the placement of sand, or in which sand will be placed and for which the limit of fill will extend into the near shore area.

B. The District shall evaluate the targets identified by this remote sensing survey(s) as potential resources to determine if they are cultural resources. If determined to be cultural resources, an assessment of the integrity of the sites and their historic significance, in accordance with the eligibility criteria of the National Register of Historic Places, will be conducted. Following that evaluation a determination will be made regarding the effect the Project will have on any items determine to be eligible for the National Register and the need for further investigation.

C. The District will coordinate these investigations in accordance with the process identified in Stipulation XI.B below.

II. OFFSHORE BORROW AREAS

A. A remote sensing survey, to include but not limited to the use of magnetometer and side scan sonar, of any borrow area not previously surveyed and/or not previously used will be conducted to identify any potential cultural resources.

B. If targets and/or anomalies are identified, the District will designate a buffer zone around each potential resource, as determined by the nature of the target/anomaly, for avoidance during the dredging of the borrow area. Buffer zone(s) shall be clearly delineated on construction plans. No construction activities, including the removal of sand, anchoring, anchor dragging, etc., which could potentially impact these features will occur within the designated buffer zones.

C. If any targets and/or anomalies cannot be avoided, the District will undertake coordination and consultation as identified in Stipulation XI.B.2 below.

D. A geomorphological study of the offshore borrows areas to aid in the identification of borrow areas that have the potential for buried landsurfaces will also be conducted. This investigation may include, but not limited to, the research and analysis of locations of ancient watercourses and/or the analysis of soil cores, etc.

E. The District will coordinate the results of any geomorphological studies/investigations in accordance with the process identified in Stipulation XI.B below.

III. MAINLAND LOCATIONS FOR RESIDENTIAL AND NON-RESIDENTIAL MEASURES

A. NON-STRUCTURAL MEASURES

1. Non-structural measures include flood proofing, elevation, and acquisition/demolition and involve the alteration of buildings and structures. The District will identify the properties to be acquired/demolished, flood-proofed and/or relocated and determine if these properties are listed or eligible for the National Register based on, but not limit to:

    a. review(s) of the National Register and/or the NYSHPO CRIS or subsequent database; and/or
    b. additional field investigations; and
    c. consultation in accordance with Stipulation XI.B.3 below.

2. As part of these investigations, the District will also determine if archaeological survey(s) are required and carry out these investigations, if necessary. All investigations will be coordinated in accordance with Stipulation XI.B.3 below.

3. If a property is determined to be eligible for the National Register, the District will determine in accordance with Stipulation XI.B.3 below, if the historic property will be adversely affected by the proposed non-structural measure and, if adversely affected, ways to resolve the adverse effect(s) in accordance with Stipulation V.

4. Archaeological investigations associated with non-structural measures, if required, should be a part of any treatment plan identified as part of the resolution of adverse effects in accordance with Stipulation V.

5. The District will coordinate the results of investigations in accordance with the process identified in XI.B.3 below.

B. RINGWALLS

1. The District will determine the location of ringwalls. Prior to construction, the District will conduct archaeological investigations for the placement of each ringwall, unless the research determines the location has been previously surveyed and/or disturbed.

2. For any identified archaeological site, the District will determine if the property is eligible for the National Register. If a property is determined to be eligible for the National Register, the District will determine in accordance with Stipulation XI.B.3 below, if the historic property will be adversely affected by the proposed ringwall construction and, if adversely affected, ways to resolve the adverse effect(s) in accordance with Stipulation V.

3. The District will coordinate the results of any investigations completed in accordance with the process identified in XI.B below.

IV. COASTAL PROCESS FEATURES

A. The District will determine, in coordination and consultation with the New York SHPO, the Shinnecock Indian Nation, the Delaware Tribe of Indians, the Unkechaug Indian Nation, and the Fire Island National Seashore for areas within its boundaries, and relevant local historical societies and organizations regarding what investigations are necessary to determine if the construction of any coastal process features would have an adverse effect on historic properties. The District would carry out investigations, as necessary, to identify historic properties, determine the proposed features effect, including review of the CRIS or subsequent database.

B. The District coordinate the results of any investigations completed in accordance with the process identified in XI.B below.

C. If a property is determined to be eligible for the National Register, the District will consult with the NYSHPO, relevant signatories and interested parties to resolve the adverse effects in accordance with Stipulation V.

V. RESOLUTION OF ADVERSE EFFECTS

A. The District shall continue consultation in accordance with XI.B below, as appropriate, pursuant to 36 CFR Part 800.6 to avoid, minimize or mitigate adverse effects to historic properties.

B. The District shall notify the NYSHPO, the Shinnecock Indian Nation, the Delaware Tribe of Indians, the Unkechaug Indian Nation, the Fire Island National Seashore for adverse effects to historic properties within its boundaries, municipalities, and property owners and others as necessary to provide documentation regarding the identification and evaluation of the historic properties. The District will work with the

NYSHPO, the Shinnecock Indian Nation, the Delaware Tribe of Indians, the Unkechaug Indian Nation, municipalities, and property owners and others as necessary to determine how best to resolve any adverse effects and document the proposed resolution.

C. Once there is agreement on how the adverse effects will be resolved, the District shall prepare treatment plan that will identify the activities to be implemented that will resolve the adverse effects. The treatment plan will be provided for review and comment prior to implementation.

D. If there are disputes and/or disagreements on the resolution of adverse effects, the District shall seek to resolve such objection through consultation in accordance with procedures outlined in Stipulation XII.

VI. PUBLIC INVOLVEMENT AND OUTREACH

A. The District shall inform the public of the existence of this PA and the District's plan for meeting the stipulations of the PA. Copies of this agreement and relevant documentation prepared pursuant to the terms of this PA shall be made available for public inspection via the District's website. Information regarding the specific locations of terrestrial and submerged archaeological sites, including potential wreck areas, will be withheld in accordance with the Freedom of Information Act and National Register Bulletin No. 29, if it appears that this information could jeopardize archaeological sites. Any comments received from the public related to the activities identified by this PA shall be taken into account by the District.

B. The District shall develop publically accessible information about the cultural resources and historic properties investigations for the Undertaking in the form of brief publication(s), exhibit(s), or website.

VII. CURATION

A. Any collection resulting from the investigations undertaken as part of the agreement are the property of the landowner at the time the collection was made. The District does not retain ownership of any collection removed from land(s) it does not own.

B. The District shall ensure that all collections resulting from the identification and evaluation of surveys, data recovery operations, or other investigations pursuant to this PA are maintained in accordance with 36 CFR Part 79 until the collection is turned over to the landowner or other entity. Minimally, the District will ensure that analysis is complete and the final report(s) are produced and accepted by the New York SHPO before the collection is provided to the landowner.

C. The District shall be responsible for consulting with landowners regarding the curation of collections resulting from archaeological surveys, data recovery operations, or other studies and activities pursuant to this agreement. The District shall coordinate the return of collections to non-federal landowners. If landowners wish to donate the collection, the District, in coordination with the New York SHPO, determine an appropriate entity to take control of the collection.

D. The District shall be responsible for the preparation of federally-owned collections and the associated records and non-federal collections donated for curation in accordance with the standards of the curation facility.

VIII. UNANTICIPATED DISCOVERY

A. The following language shall be included in construction plans and specifications:

“When a previously identified cultural resource, including but not limited to archaeological sites, shipwrecks and the remains of ships and/or boats, standing structures, and properties of traditional religious and cultural significance to the Shinnecock Indian Nation and/or the Delaware Tribe of Indians are discovered during the execution of the Project, the individual(s) who made the discovery shall immediately secure the vicinity and make a reasonable effort to avoid or minimize harm to the resource, and notify the Project’s Contracting Officer’s Representative (COR) and the District. All activities shall cease within a minimum of 50 feet from the inadvertent discovery (50-foot radius ‘no work’ buffer) until authorized by the District and the Project COR.

B. If previously unidentified and unanticipated properties are discovered during Project activities, the District shall cease all work in the vicinity of the discovery until it can be evaluated in accordance with 36 CFR Part 800.13 “Post Review Discoveries”. Upon notification of an unanticipated discovery, the District shall implement any additional reasonable measures to avoid or minimize effects to the resource. Any previously unidentified cultural resource will be treated as though it is eligible for the NRHP until such other determination may be made.

C. The District shall immediately notify the New York SHPO, the Fire Island National Seashore for unanticipated discoveries within the its boundaries, and the Shinnecock Indian Nation and Delaware Tribe of Indians within 48 hours of the finding and request consultation to determination the nature of the find, the National Register eligibility and the assessment and resolution adverse effects, if identified.

1. If it is determined the unanticipated discovery is not eligible for the National Register, then the suspension of work in the area of the discovery will end.

2. If it is determined that the cultural resource is eligible for the National Register, then the suspension of work will continue, and the District, in

consultation with the NYSHPO, the National Park Service for unanticipated discoveries within the Fire Island National Seashore, the Shinnecock Indian Nation, and the Delaware Tribe of Indians will determine the actions to avoid, minimize, or mitigate adverse effects to the historic property and will ensure that the appropriate actions are carried out.

3. If there is a disagreement on the appropriate course of action to address an unanticipated discovery or effects to an unanticipated discovery, then the District shall initiate the dispute resolution process set forth in Stipulation XII below.

IX. DISCOVERY OF HUMAN REMAINS

A. If any human remains and/or grave-associated artifacts are encountered during any of the investigations, including data recovery, the District shall follow the NYSHPO Human Remains Discovery Protocol (2018; see Appendix D) and, as appropriate, develop a treatment plan for human remains that is responsive to the ACHP's Policy Statement on Human Remains" (September 27, 1988), the Native American Graves Protection and Repatriation Act (PL 101-601) and , US Army Corps of Engineers, Policy Guidance Letter No. 57 (1998) Indian Sovereignty and Government-to-Government Relations with Indian Tribes.

B. The following language shall be included in the construction plans and specifications:

"When human remains, suspected human remains, or indications of a burial are discovered during the execution of a Project, the individual(s) who made the discovery shall immediately notify the local law enforcement, coroner/medical examiner, and the Project COR and the District, and make a reasonable effort to protect the remains from any harm. The human remains shall not be touched, moved or further disturbed. All activities shall cease within a minimum of 50 feet from the area of the find (50-foot radius 'no work' buffer) until authorized by the District."

X. PROFESSIONAL QUALIFICATIONS AND STANDARDS

A. The District shall ensure that qualified professionals meeting the National Park Service professional qualifications for the appropriate discipline [National Park Service Professional Qualification Standards, Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 FR 44738-39)] are used to complete all identification and evaluation plans related to this undertaking, to include remote sensing surveys, underwater investigations, historic structure inventory and documentation.

B. All historic structures surveys carried out pursuant to this PA will be undertaken in accordance with the standards and guidelines of the NYSHPO and the Secretary of the Interior's *Standards for the Treatment of Historic Properties* (36 CFR Part 68).

C. All archaeological investigations carried out pursuant to this PA will be undertaken in accordance with the New York State Archaeological ACHP's Standards for Cultural Resource Investigations and the Curation of Archaeological Collections in New York State (1994) and Cultural Resources Standards Handbook (2000), the NYSHPO Archaeological Report Format Requirements (2005), and the Secretary of the Interior's *Standards for the Treatment of Historic Properties* (36 CFR Part 68).

XI. ADMINISTRATIVE TERMS

A. REPORTING

1. Each year following the execution of this PA until it expires or is terminated, the District shall provide the New York SHPO, Fire Island National Seashore, the Shinnecock Indian Nation, the Delaware Tribe of Indiands, the Unkechaug Indian Nation, and local historical societies and organizations (Appendix E), a summary report detailing work undertaken pursuant to this PA. This report will include any scheduling changes, problems encountered, project work completed, PA activities completed, and any objections and/or disputes received by the District in its efforts to carry out the terms of this PA. Copies of the summary report with be posted in the District project website.

2. Following authorization and appropriation, the District shall coordinate a meeting or equivalent with the signatories to be held annually on a mutually agreed upon date to evaluate the effectiveness of this PA and discuss activities carried out pursuant to this PA during the preceding year and activities scheduled for the upcoming year.

B. COORDINATION, CONSULTATION, AND REVIEW PERIODS

1. Fire Island National Seashore, including the William Floyd Estate
    a. For all activities involving properties and/or investigations within the bounds of the Fire Island National Seashore, the District will obtain the required National Park Service permits to complete investigations.

    b. The District will provide the draft and final reports pertaining to the investigations within the bounds of the Fire Island National Seashore, including the William Floyd Estate, to the Fire Island National Seashore, the New York SHPO, the Shinnecock Nation, the Delaware Tribe of Indians, and the Unkechaug Indian Nation for review.

   c. Coordination and consultation on eligibility determinations, the need for additional investigations within the Fire Island National Seashore based on results of completed investigations will include the Fire Island National Seashore Service, the New York SHPO, the Shinnecock Nation, the Delaware Tribe of Indians, and the Unkechaug Indian Nation.

2. Borrow Areas
   a. All draft and final reports pertaining to investigations of Project borrow areas will be provided to the New York SHPO, the Shinnecock Nation, the Delaware Tribe of Indians and the Unkechaug Indian Nation for review.

   b. Coordination and consultation on eligibility determinations, the need for additional investigations for targets and anomalies will include the New York SHPO, the Shinnecock Nation, Delaware Tribe of Indians, and the Unkechaug Indian Nation.

3. Nearshore Sand Placement, Coastal Process Features, Measures for Residential and Non-Residential Structures, and Ringwalls
   a. All draft and final reports pertaining to investigations of the nearshore, the coastal process features, the measures for residential and non-residential structure Areas of Potential Effect outside of the Fire Island National Seashore will be provided to the New York SHPO, the Shinnecock Indian Nation, the Delaware Tribe of Indians, the Unkechaug Nation, the relevant municipality(ies) and local historical society(ies) or historic preservation group(s) for review (see Appendix E).

   b. Coordination and consultation on eligibility determinations, the need for additional investigations, etc., resulting from the reviews completed in Stipulation XI.B.3.a above will include the New York SHPO, the Shinnecock Nation, the Delaware Tribe of Indians, the Unkechaug Indian Nation, the relevant municipality, its local historical society or historic preservation group(s) (see Appendix E), and the landowner(s).

4. Unless otherwise stated, all review periods will be 30 calendar days and any comments resulting from those reviews must be submitted to the District in writing (via electronic or regular mail).

5. With the submission of final reports, the District will respond to comments, identifying how comments were/were not taken into account as part of report revisions or recommendation for additional action.

6. If a response is not received by the end of the review period, the District will assume concurrence with the subject determination, evaluation, plan, report or other document submitted.

XII. DISPUTE RESOLUTION

1. Should any signatory object in writing to the District at any time to any actions proposed or the manner in which the terms of this PA are implemented, the District and the signatories shall attempt to resolve any disagreement arising from implementation of this PA.

2. If there is a determination that the disagreement cannot be resolved, the District shall forward all documentation relevant to the dispute to the ACHP and request the ACHP's recommendations or request the comments of the ACHP in accordance with 36 CFR Part 800.7(c).

3. The ACHP shall provide the District with its advice on the resolution of the objection within thirty (30) days of receiving adequate documentation. Any ACHP recommendations or comments provided in response will be considered in accordance with 36 CFR Part 800.7(c), with reference only to the subject of the dispute. The District shall respond to ACHP recommendations or comments indicating how the District has taken the ACHP's recommendations or comments into account and complied with the ACHP's recommendations or comments prior to proceeding with the Undertaking activities that are the subject to dispute. Responsibility to carry out all other actions under this PA that are not the subject of the dispute will remain unchanged.

4. If the ACHP does not provide its advice regarding the dispute within the thirty (30) calendar day time period, the District may make a final decision on the dispute and proceed accordingly. Prior to reaching such a final decision, the District shall prepare a written response that takes into account any timely comments regarding the dispute from the signatories to the PA, and provide them and the ACHP with a copy of such written response.

XIII. WITHDRAWAL AND TERMINATION

1. Any signatory may withdraw its participation in this PA by providing thirty (30) days advance written notification to all other signatories. In the event of withdrawal, any signatory to this PA may terminate it by providing 30 calendar days, written notice to the signatories. In the event of withdrawal, this PA will remain in effect for the remaining signatories.

2. This agreement may be terminated in accordance with 36 CFR Part 800, provided that the signatories consult during the period prior to termination to seek agreement on amendments or other actions that would avoid termination. Any signatory requesting termination of this PA will provide thirty (30) days advance written notification to all other signatories.

3. In the event of termination, the District will comply with 36 CFR 800.4 through 800.6 with regard to individual undertakings covered by this Agreement.

XIV. DURATION AND SUNSET CLAUSE

1. This PA shall take effect upon execution by the District, the New York SHPO, and the signatories with the date of the final signature.

2. This PA will continue in full force and effect until the construction of the Undertaking is complete and all terms of this PA are met, unless the Undertaking is terminated or authorization is rescinded or a period of five years from execution of the PA has passed, at which time the agreement may be extended as written provided all signatories concur.

XV. AMENDMENT

1. This PA may be amended upon agreement in writing by all signatories. Within thirty (30) days of a written request to the District, the District will facilitate consultation between the signatories regarding the proposed amendment.

2. Any amendments will be in writing and will be in effect on the date the amended PA is filed with the ACHP.

XVI. ANTI-DEFICIENCY ACT

All requirements set forth in this PA requiring expenditure of funds by the District are expressly subject to the availability of appropriations and the requirements of the Anti-Deficiency Act (31 U.S.C. 1341). No obligation undertaken by the District under the terms of this PA shall require or be interpreted to require a commitment to extend funds not appropriated for a particular purpose. If the District cannot perform any obligation set forth in this PA because of unavailability of funds that obligation must be renegotiated among the District and the signatories as necessary.

PROGAMMATIC AGREEMENT
AMONG
THE U.S. ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT
AND
THE NEW YORK STATE HISTORIC PRESERVATION OFFICE
REGARDING
THE FIRE ISLAND TO MONTAUK POINT
SUFFOLK COUNTY, NEW YORK
REFORMULATION STUDY

Execution and implementation of this PA evidences that the District has satisfied its Section 106 responsibilities 36 CFR 800.6(b)(1)(iv) for all individual undertakings of the Project, and has afforded the New York SHPO and the ACHP an opportunity to comment on the undertaking and its effects on historic properties.

Thomas D. Asbery
Colonel, U.S. Army
Commander and District Engineer

20200210
Date

PROGAMMATIC AGREEMENT
AMONG
THE U.S. ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT
AND
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R Daniel Mackay 2/14/2020

R. Daniel Mackay Date
Deputy Commissioner for Historic Preservation/SHPO
NYS Office of Parks, Recreation and Historic Preservation

PROGAMMATIC AGREEMENT
AMONG
THE U.S. ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT
AND
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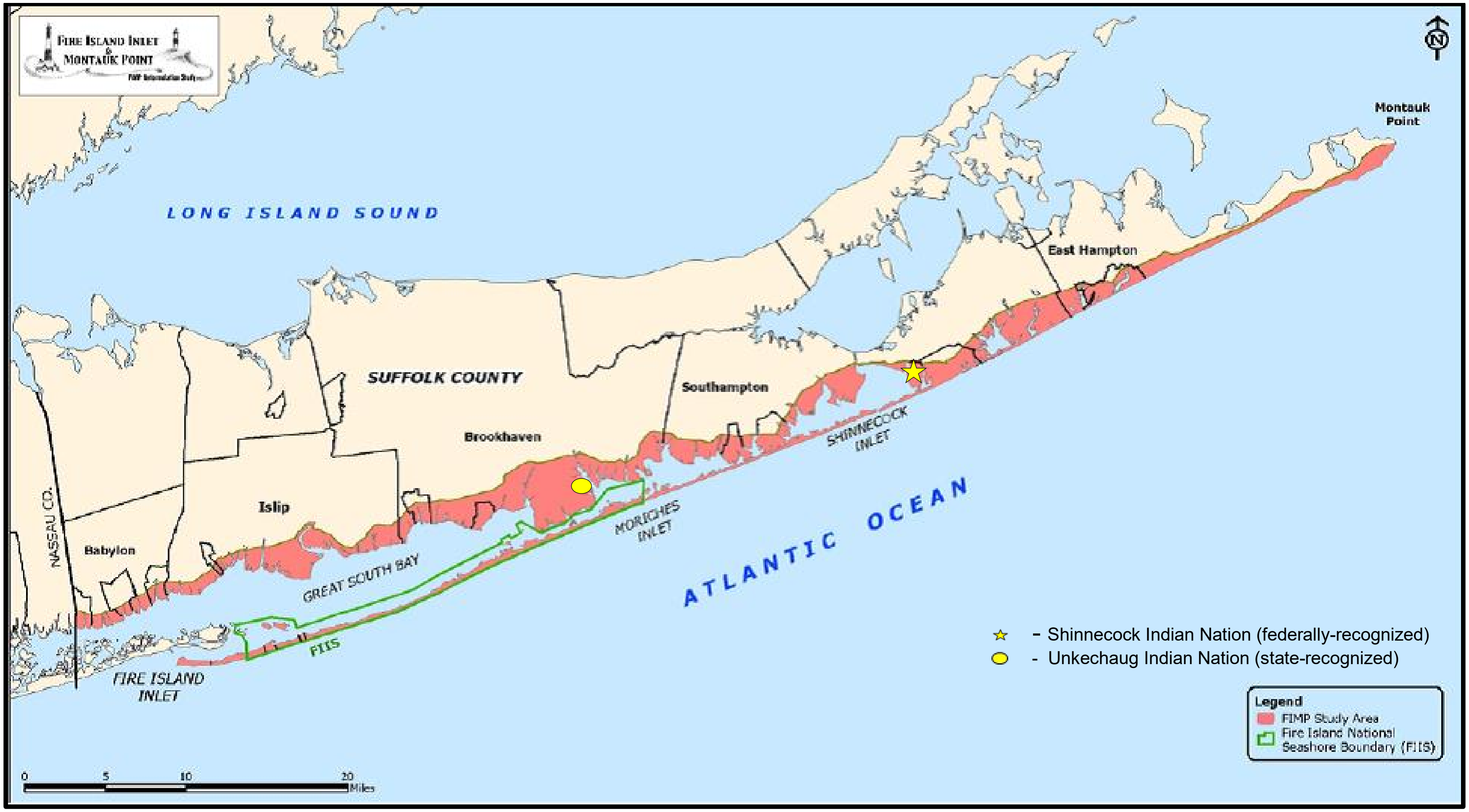
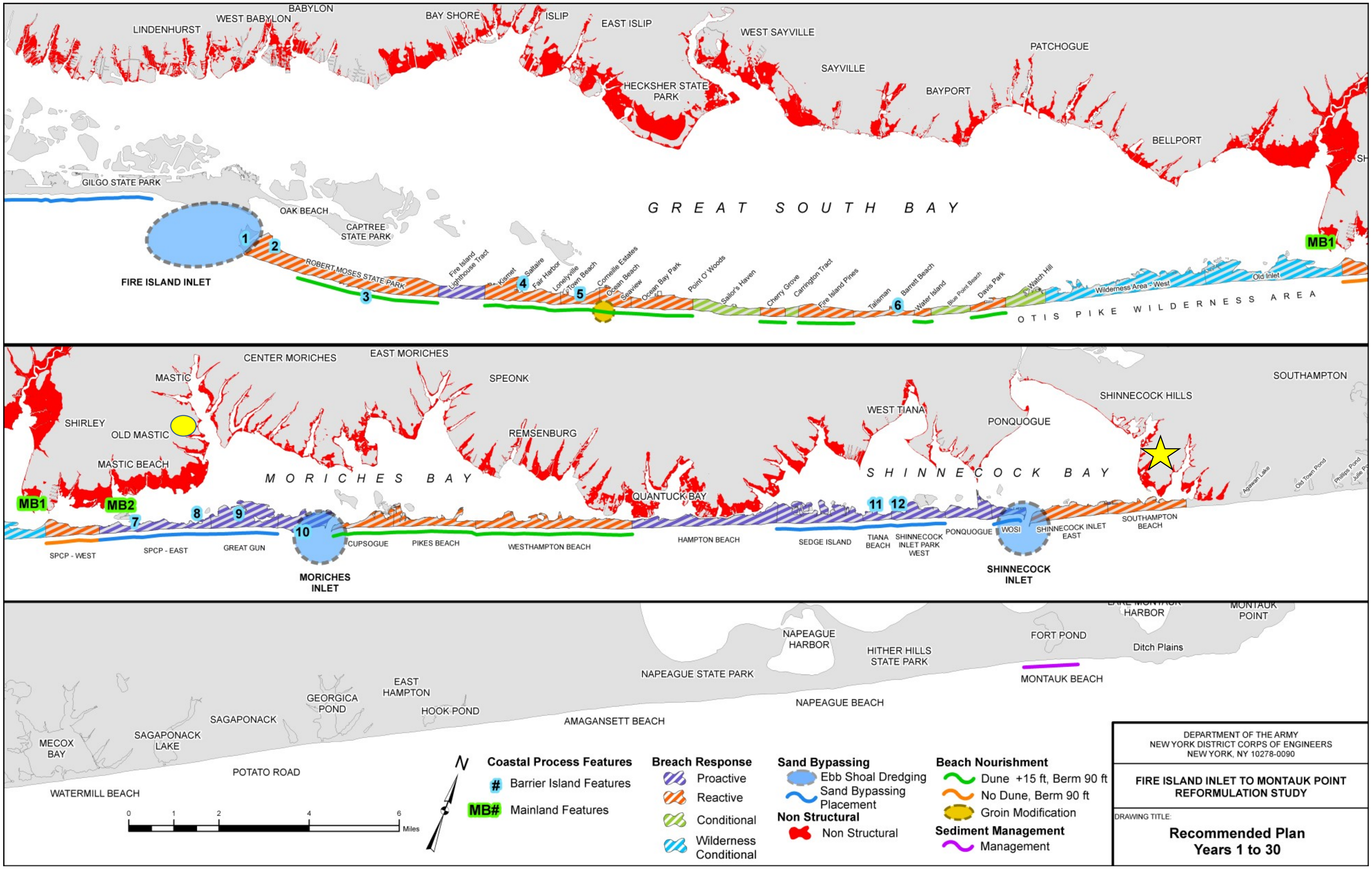
________________________________	____________________
Alex Romero Superintendent Fire Island National Seashore	Date

PROGRAMMATIC AGREEMENT - APPENDIX A

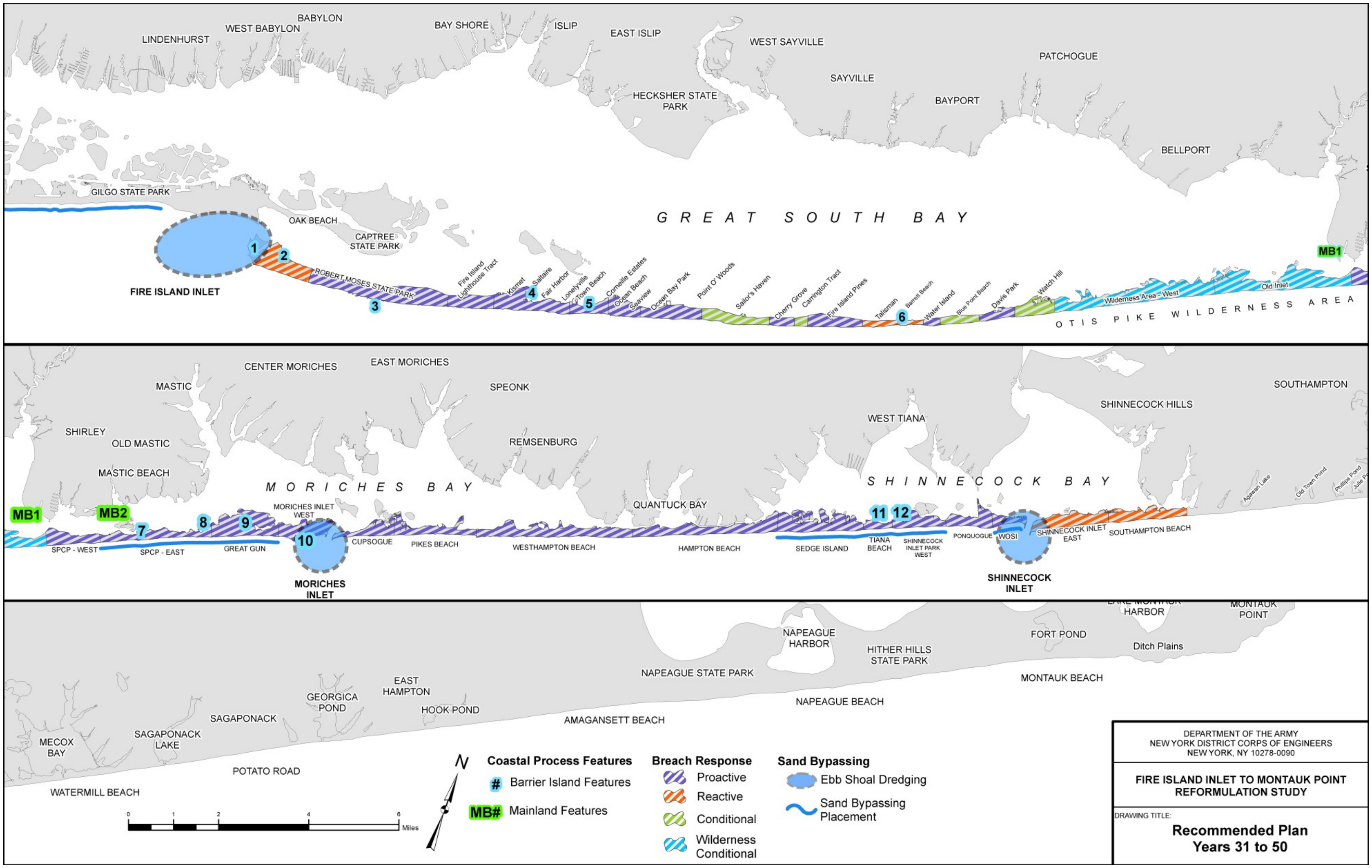
FIRE ISLAND TO MONTAUK POINT, SUFFOLK COUNTY, NEW YORK



Area of Potential Effect for Fire Island to Montauk Point (not including borrow areas) and showing the location of the Fire Island National Seashore, the Shinnecock Indian Nation and the Unkechaug Indian Nation.



Recommended Plan Measures (Near Shore, Sand Placement, Measures for Residential and Non-Residential Structures and Coastal Process Features) and the measures' Areas of Potential Effect. Fire Island National Seashore extends from Fire Island Inlet to Moriches Inlet.



Recommended Plan (Near shore, sand placement, and coastal process features) and these measures' Areas of Potential Effect.

APPENDIX B

FIRE ISLAND TO MONTAUK POINT, SUFFOLK COUNTY, NEW YORK

OFFICE OF PARKS · RECREATION · HISTORIC PRESERVATION
NEW YORK STATE

Bernadette Castro
Commissioner

New York State Office of Parks, Recreation and Historic Preservation
Historic Preservation Field Services Bureau
Peebles Island, PO Box 189, Waterford, New York 12188-0189 518-237-8643

April 5, 1999

Frank Santomauro
Chief, Planning Division
Department of the Army
New York District, Corp of Engineers
Jacob K. Javits Federal Building
New York, NY 10278-0090

Dear Mr. Santomauro:

RE: CORPS
Storm Damage Protection
Islip/Brookhaven, Suffolk County
96PR1724

Thank you for requesting the comments of the State Historic Preservation Office (SHPO). We are reviewing the recent submission in accordance with Section 106 of the National Historic Preservation Act of 1966.

We concur with the survey plan and look forward to reviewing the resulting report.

If you have any questions, feel free to contact Ellen Cesarski at (518) 237-8643 ext. 281. Please be sure to refer to the SHPO Project Review (PR) number noted above.

Sincerely,

Ruth L. Pierpont

Ruth L. Pierpont
Director, Historic Preservation
Field Services Bureau

RLP:bsd

OFFICE OF PARKS, RECREATION, HISTORIC PRESERVATION
NEW YORK STATE
Bernadette Castro
Commissioner

New York State Office of Parks, Recreation and Historic Preservation
Historic Preservation Field Services Bureau
Peebles Island, PO Box 189, Waterford, New York 12188-0189 518-237-8643

March 17, 2003

Chris Ricciardi
U.S. Army Corps of Engineers
Planning Division
26 Federal Plaza
21st Floor
New York, New York 10278

Re: FIMP Reformulation Project

Chris,

I have just a few thoughts on the scope of the survey:

Contexts:

I think it should be emphasized to the bidders that sufficient research should be done prior to field work to develop the contexts needed for the evaluation of properties and, in particular, historic districts. The development of the south shore took several directions in several waves, such as initial settlement, agriculture and fisheries, venue for wealthy New Yorkers to establish their country estates, expansion of the railroads, summering by the middle class – this especially in the Hamptons in the late 19th century when many private residences were converted to boarding houses to cater to the summer folk.

State-Wide Survey

As stated in the NHPA, Sec. 101:

(b)(3) It shall be the responsibility of the State Historic Preservation Officer to administer the State Historic Preservation Program and to —

> *(A) in cooperation with Federal and State agencies, local governments, and private organizations and individuals, direct and conduct a comprehensive statewide survey of historic properties and maintain inventories of such properties;*

I guess, then, that it behooves us to find a way to make the survey product something that we can use to enhance our state-wide survey. Much of the FIMP area was surveyed in the late 1970s and early 1980s, but the inventory forms generated are out of date. The surveys were also not as comprehensive as hoped; those doing the field work tended to ignore newer structures in favor of 18th & 19th century buildings that appeared to their eyes as "historic." The surveyor should contact our office regarding prior surveys and evaluation, but many inventoried buildings were not evaluated at the time of survey and will likely have been altered.

Let's keep thinking about a format that can be used by USCOE & our office. The Town of Islip has borrowed all our inventory forms so that they can scan them for their own use. They will be providing us with copies of the forms as .tif files with a resolution of 150 v. the 300 you specify.

<u>Scope</u>

...Both time & space. Since the project was authorized over 40 years ago, I think we can assume at least 10 years to completion of the "non-structural" solution. In this case the 50 year guideline for NRHP eligibility should be liberalized; perhaps structures constructed prior to 1963 should be evaluated. The description of the project area as just south of the Montauk Highway would seem larger than needed, particularly in the Mastic beach area. Will the 10 year flood plain maps be provided for bidding purposes ?

The Draft Scope/RFP notes that the survey will be of approximately 1600 structures. This seems low. Is this the total number in the survey area or only those that may be NRHP eligible by being 50 (40?) years old?

<u>Misc.</u>

OPRHP should probably SHPO, given that this is a federal undertaking.

I'm sure your doing this already, but just to make sure...the project should be coordinated with the NYS Department of State as well as DEC.

Steve Resler
New York State Department of State
Division of Coastal Resources
41 State Street, Albany, NY 12231-0001
Phone: (518) 473-2470; Fax: (518) 473-2464
E-mail: sresler@dos.state.ny.us

We have a new database that is in most ways an improvement over the old except in printing reports from our survey database. This needs more programming time which, at the moment, is an expense we would be able to fund. We can generate tables of listed properties and eligible properties, but they would be in HTML format with a rather amateurish appearance. I'm not even that certain all data was "migrated" successfully from the old system to the new.

Keep me posted on your thoughts regarding format, scope & methodology. Call me at (518) 237-8643, x3283 if useful, or james.warren@oprhp.state.ny.us.

Sincerely,

Jim W.

James Warren
H.P. Program Analyst

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO
ATTENTION OF

15 June 2003

Environmental Analysis Branch

Re: Cultural Resources Technical Management Group meeting for the US Army Corps of Engineers – Fire Island to Montauk Point Storm Damage Reduction Project

The United States Army Corps of Engineers, New York District, (Corps) is currently undertaking a Reformulation Study of the Fire Island to Montauk Point (FIMP) area. As part of this study, an Environmental Impact Statement (EIS) is being prepared. Not only focusing on the natural environmental, the EIS will take into consideration cultural resource issues such as, but not limited to, archaeological remains both on land and under water, the landscape and how it has changed over time and the current built environment (i.e. standing structures). The Corps invites you, and other members of your organization with expertise in these areas to attend and participate in this data gathering process.

Aside from providing those in attendance with an update on the FIMP Project, the main goal will be to devise a plan of action that will allow for the identification and data collection of the various standing structures and landscapes within the project area. A sampling of standing structures/landscapes within the project area is beginning this summer. As part of this inventory, the Corps will be looking to identify structures that are currently located on the National Register of Historic Places, State and local landmarks, historic districts, as well as to identify structures, districts and/or landscapes that may be eligible for the National Register, State or local landmarks. This is a daunting task that is going to require the corporation and involvement of many groups.

We have scheduled a workshop meeting for Friday, August 8, 2003 between the hours of 10am and 1pm. Thanks to the generosity of the National Parks Service the meeting will be held at the Fire Island National Seashore Headquarters in Patchogue, New York in the River Room. Directions from Sunrise Highway are:

Sunrise Highway to the Waverly Avenue (South) Exit
Follow the bend to the left – to West Avenue (also called Holbrook at this point)
Go through the first traffic light (Main Street) and then through the second traffic light (the Rail Road tracks) and continue down West Avenue.
Look for the signs that say to the ferry terminal. The Fire Island National Seashore Headquarters is on the right just at the corner of West Avenue and Laurel Street)

Fire Island to Montauk Point Reformulation Study Mailing List – June 2003

Federal/State/Local Officials:

Cynthia Blakemore, Robert Kuhn,
Douglas Mackey, Mark Peckham
New York State Office of Parks, Recreation
and Historic Preservation
Historic Preservation Field Service Bureau
Peebles Island - P.O. Box 189
Waterford, New York 12188-0189
(518) 237-8643

Jim Warren
New York State Office of Parks, Recreation
and Historic Preservation
Historic Preservation Field Service Bureau
Peebles, Island - P.O. Box 189
Waterford, New York 12188-0189
Phone: (518) 237-8643 x 3283

Richard Martin, Director
Division of Cultural and Historic Services
Suffolk County Parks Department
P.O. Box 144
West Sayville, New York 11796
(631) 854-4949

Michael S. Bilecki,
Chief Resource Management
Fire Island National Seashore
Department of the Interior –
National Park Service
120 Laurel Street
Patchogue, New York 11773
(631) 289-4810 (ext. 234)

Richard Stavdal
Fire Island National Seashore
Department of the Interior –
National Park Service
120 Laurel Street
Patchogue, New York 11773
(631) 399-2030

Daniel J. Lenihan
Submerged Cultural Resources Unit
Department of the Interior –
National Park Service
P.O. Box 728
Sante Fe, New Mexico 87504-0728

Steve Pendry, Archaeology Branch
Northeast Cultural Resources Center
Department of the Interior –
National Park Service
400 Foot of John Street
Lowell, Massachusetts 01852

Gary Gentile
Regional Cultural Resource Coordinator
NYS Department of Transportation
State Office Building
250 Veterans Memorial Highway
Hauppauge, NY 11788-5518
(631) 952-6219

Tom Oelerich, Acting Regional Director
NYS Department of Transportation
State Office Building
250 Veterans Memorial Highway
Hauppauge, NY 11788-5518

Jeanmarie Brennan
Town of Islip - Dept. of Planning
655 Main Street
Islip, NY 11751
(631) 224-5450
Fax: (631) 224-5444
Jeanmarie-brennan@hotmail.com

Native American Groups:

Peter E. Smith, Sr., Chairman
Trustees of the Shinnecock Indian Nation
P.O. Box 5006
Southampton, New York 11969-5006

Individuals:

Mr. Bellows, Chairperson
Landmarks and Historic Districts Board
52 Lewis Street
Southampton, New York 11968
(631) 283-2282

David J. Bernstein and Daria Merwin
Long Island Institute of Archaeology
Department of Anthropology
S-549 Social and Behavioral Studies
SUNY-Stony Brook
Stony Brook, New York 11794-4364
(631) 632-7615

Robert Hefner
18 Sag Harbor Road
East Hampton, New York 11937

Lynne C. Maher, President
Long Island Divers Association
P.O. Box 56
Brookhaven, New York 119719-9540
(631) 286-3505
lynmermaid@aol.com

Gary Nilsen, President
Institute for Marine Archaeology
P.O. Box 770
Deer Park, New York 11729

Nancy Solomon, Director
Long Island Traditions
382 Main Street
Port Washington, New York 11050
(516) 767-8803 or (516) 767-8805 (fax)
litrad@i2000.com

Dr. Gaynell Stone
2322 North Wading River Road
Wading River, New York 11792
(631) 929-8725

Dr. John Strong
Suffolk County Archaeological Association
54 Harthorne Road
Southampton, New York 11968
(631) 283-4338 or (631) 287-8203
jstrong1@optonline.net

Museums:

East End Seaport Maritime Museum
P.O. Box 624 – Third Street
Greenport, New York 11944
(631) 477-2100

East Hampton Historical Society Marine Museum
Bluff Road
East Hampton, New York
(631) 267-6544

Doug Shaw, Administrator
Long Island Maritime Museum
P.O. Box 184
West Sayville, New York 11796
(631) 447-8679

Montauk Point Lighthouse Museum
P.O. Box 943
Montauk, New York 11954
(631) 668-2544

Robert MacKay, Director and Sharla Bolton
Society for the Preservation of
Long Island Antiquities (SPLIA)
161 Main Street - P.O. Box 148
Cold Spring Harbor, New York 11724
(631) 692-4664 (631-692-5265 - fax)

Helen Watkin, Director
South Street Seaport Museum
Long Island Marine Education Center
202 Woodcleft Avenue
Freeport, New York 11520
(516) 771-0399

Elaine Barcel, President
Southold Indian Museum
P.O. Box 268
Southold, New York 11971
(631) 765-5577

Historical Society – Town Historians:

Amagansett Historical Association
Montauk Highway at Windmill Lane
P.O. Box 7077
Amagansett, New York 11930
(631) 267-3020

Alice Zaruka, President
Village of Babylon Historical and
Preservation Society
P.O. Box 484
Bablyon, New York 11702
(631) 669-7086

Bay Shore Historical Society
22 Maple Avenue
Bay Shore, New York 11706

Bayport Heritage Association
P.O. Box 4
Bayport, New York 11705
(631) 472-4625

Bellport-Brookhaven Historic Society
12 Bell Street
Bellport, New York 11713
(631) 286-0888

Geoffrey Fleming
Bridgehampton Historical Society
P.O. Box 977
Bridgehampton, New York 11932
(631) 537-1088 or (631) 537-4225 (fax)
bhhs@hamptons.com

David Overton, Office of the Historian
Town of Brookhaven
Brookhaven Town Hall
205 S. Ocean Avenue
Patchogue, New York 11772
(631) 654-7897

East Hampton Historical Society
101 Main Street
East Hampton, New York
(631) 324-6850 or x9885 (fax)

Fire Island Lighthouse Preservation Society
4640 Captree Island
Captree Island, New York 11702
(631) 661-4876

Hampton Bays Historical Society
P.O. Box 588
Hampton Bays, New York 11946-0588
(631) 728-9325

Carl Starace, Community Historian
Town of Islip
214 Tahulah Lane
West Islip, New York 11795
(631) 661-0137

Central Islip Historical Society
490 Irving Street
Central Islip, New York 11795

Thomas Curr, President
East Islip Historical Society
P.O. Box 389
Great River, New York 11739-0389
(631) 581-9085

Al Chiesa
East Islip Historical Society
P.O. Box 389
Great River, New York 11739-0389
(631) 581-9085

Islip Hamlet Historical Society
P.O. Box 601
Islip, New York 11751

Friends for Long Island's Heritage
1864 Muttontown Road
Syosset, New York 11791

Mary and Warren Seeley
Manorville Historical Society
P.O. Box 4
Manorville, New York 11949-0004

Montauk Historical Society
RFD#2 – P.O. Box 112
Montauk, New York 11954

Moriches Bay Historical Society
P.O. Box 31
Center Moriches, New York 11934
(631) 878-1776

Ocean Beach Historical Society
P.O. Box 701
Ocean Beach, New York 11770

Ann Swezey, Village Historian
Greater Patchogue Historical Society
P.O. Box 102
Patchogue, New York 11772

Sag Harbor Historical Society
P.O. Box 1709
Sag Harbor, New York 11963-1709
(631) 725-5092

Nancy Donohue
Sagtikos Manor Historical Society
179 Anchorage Drive
West Islip, New York 11795
(631) 661-8348 or (631) 661-1256 (fax)

Charles Webber, President
Sayville Historical Society
P.O. Box 41
Sayville, New York 11782
(631) 563-0186

Emily Oster, Historian
Town of Southampton
116 Hampton Road
Southampton, New York 11968
(631) 283-1612

Adele Cramer, Curator
Southampton Colonial Society and
Historical Museum
P.O. Box 303
Southampton, New York 11968

Southampton Historical Society
17 Meeting House Lane
Southampton, New York 11968
(631) 283-2494

Southold Historical Society
P.O. Box 1
Southold, New York 11971
(631) 765-5500

Stony Brook Historical Society
P.O. Box 802
Stony Brook, New York 11790

Suffolk County Archaeological Association
P.O. Box Drawer AR
Stony Brook, New York 11790

Bob Muller
United States Lighthouse Society –
Long Island Chapter
P. O. Box 744
Patchogue, New York 11772
(631) 207-4331 or (631) 645-5230 (fax)
BobMuller@LILighthouseSociety.org

Wally Broege, Director
Suffolk County Historical Society
300 West Main Street
Riverhead, New York 11901
(631) 727-2881 or (631) 727-3467 (fax)
histsoc@suffolk.lib.ny.us

Marsha Hamilton
Suffolk County Historical Society
300 West Main Street
Riverhead, New York 11901
(631) 727-2881 or (631) 727-3467 (fax)
histsoc@suffolk.lib.ny.us

Westhampton Beach Historical Society
Mill Road - P.O. Box 686
Westhampton Beach, New York 11978
(631) 288-1139

Fire Island National Seashore Headquarters
River Room
120 Laurel Street
Patchogue, NY 11772
Park Headquarters
Phone: (631) 289-4810
Fax: (631) 289-4898

We hope that you, or a representative of your organization, will be able to attend this working session. Any information that your organization can provide with regard to known or eligible National Register structures, districts or landscapes will be greatly appreciated. Without the help of your organization this project will not work as effectively and efficiently as it should.

It is important to know who will be attending the meeting prior to August 8th.Please, Please RSVP to:

Christopher Ricciardi, Archaeologist
U.S. Army Corps of Engineers - Planning Division
Jacob K. Javits Federal Building
26 Federal Plaza – Room 2131
New York, New York 10278-0090
Phone: (212) 264-0204
Fax: (212) 264-0961
E-mail: christopher.g.ricciardi@usace.army.mil

by phone, fax or e-mail no later than August 1, 2003.

Thank you very much for your consideration and your participation in our meeting as well as your continued interest in the Reformulation Study. Whether you or a representative from your organization can attend or not, we will continue to keep informed as to the progress of the Study.

Sincerely,

L. Houston

Leonard Houston

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO
ATTENTION OF

11 July 2003

Environmental Analysis Branch

Dave Spirtes, Superintendent
Fire Island National Seashore
120 Laurel Street
Patchogue, New York 11772

Dear Mr. Spirtes:

On behalf of the U.S. Army Corps of Engineers, New York District, I would like to request that we use the facilities at the Fire Island National Seashore for a meeting with regard to the Fire Island to Montauk Point (FIMP) Project.

As part of the ongoing Environmental Impact Statement (EIS), the Corps is conducting a Cultural Resource – Buildings Survey of the project area. The Project's Archaeologist, Chris Ricciardi, has been working with Michael Bilecki and Richard Stavadal to coordinate on this effort.

Mr. Bilecki suggested that we contact to with regard to using the NPS's facility to hold a meeting relating to this project. The meeting date would be Friday, August 8, 2003 at 10am. The meeting should last till approximately 1pm. Aside from our State partner, the Department of Environmental Conservation, other State, Federal and local agencies and institutions are to be invited. We expect anywhere from 10 to 30 people to attend.

I hope that we can secure your approval for this meeting. Please let us know as soon as possible. If you have any questions with regard to this request please contact Chris Ricciardi at (212) 264-0204.

Thank you very much.

Sincerely,

Leonard Houston
Chief, Environmental Analysis Branch

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
250 VETERANS MEMORIAL HIGHWAY
HAUPPAUGE, N.Y. 11788-5518

SUBIMAL CHAKRABORTI, P.E.
REGIONAL DIRECTOR

JOSEPH H. BOARDMAN
COMMISSIONER

July 30, 2003

Mr. Christopher Ricciardi, Archaeologist
U.S. Army Corps of Engineers - Planning Division
Jacob K. Javits Federal Building
26 Federal Plaza - Room 2131
New York, NY 10278-0090

Dear Mr. Ricciardi:

This letter is in reply to your request that the NYSDOT send a representative from its Long Island (Region 10) office to your planned workshop on August 8, 2003. The subject of the workshop is the "Fire Island to Montauk Point Storm Damage Reduction Project."

Mr. Gary Gentile, Sr. Landscape Architect, will attend this workshop and will be our contact person for items relating to Cultural Resources and Landscape Archeology.

Should you have any questions regarding this matter, please contact Gary at (631) 952-6210.

Very truly yours,

Christopher Cotter, R.L.A.
Regional Landscape Architect

AMAGANSETT HISTORICAL ASSOCIATION
P.O. BOX 7077, AMAGANSETT, NY 11930 (631) 267-3020

September 13, 2003

Christopher Ricciardi, Archaeologist
U.S. Army Corps of Engineers – Planning Division
Jacob K. Javits Federal Building
26 Federal Plaza – Room 2131
New York, NY 10278-0090

Re.: Reformulation Study – Fire Island to Montauk Point Storm Damage Reduction Project – Cultural Resource Historic Structure Survey

Dear Mr. Ricciardi:

With reference to the above-captioned study, please see the enclosed maps of two Historic Districts in Amagansett.

The Main Street Historic District contains three properties already listed on the National and State Registers of Historic Places. This and the Bluff Road Historic Districts contain many structures that are eligible for inclusion on these registers. A survey of these structures, and the preliminary National Register nomination forms, has been prepared by Robert Hefner, an architectural historian under contract as a consultant to the East Hampton Town Board.

Additional information about these districts, and the details of the eligible structures within them, may be obtained from:

Planning Department
Town of East Hampton
300 Pantigo Place
East Hampton, NY 11937.

Please feel free to contact us if we may of further assistance.

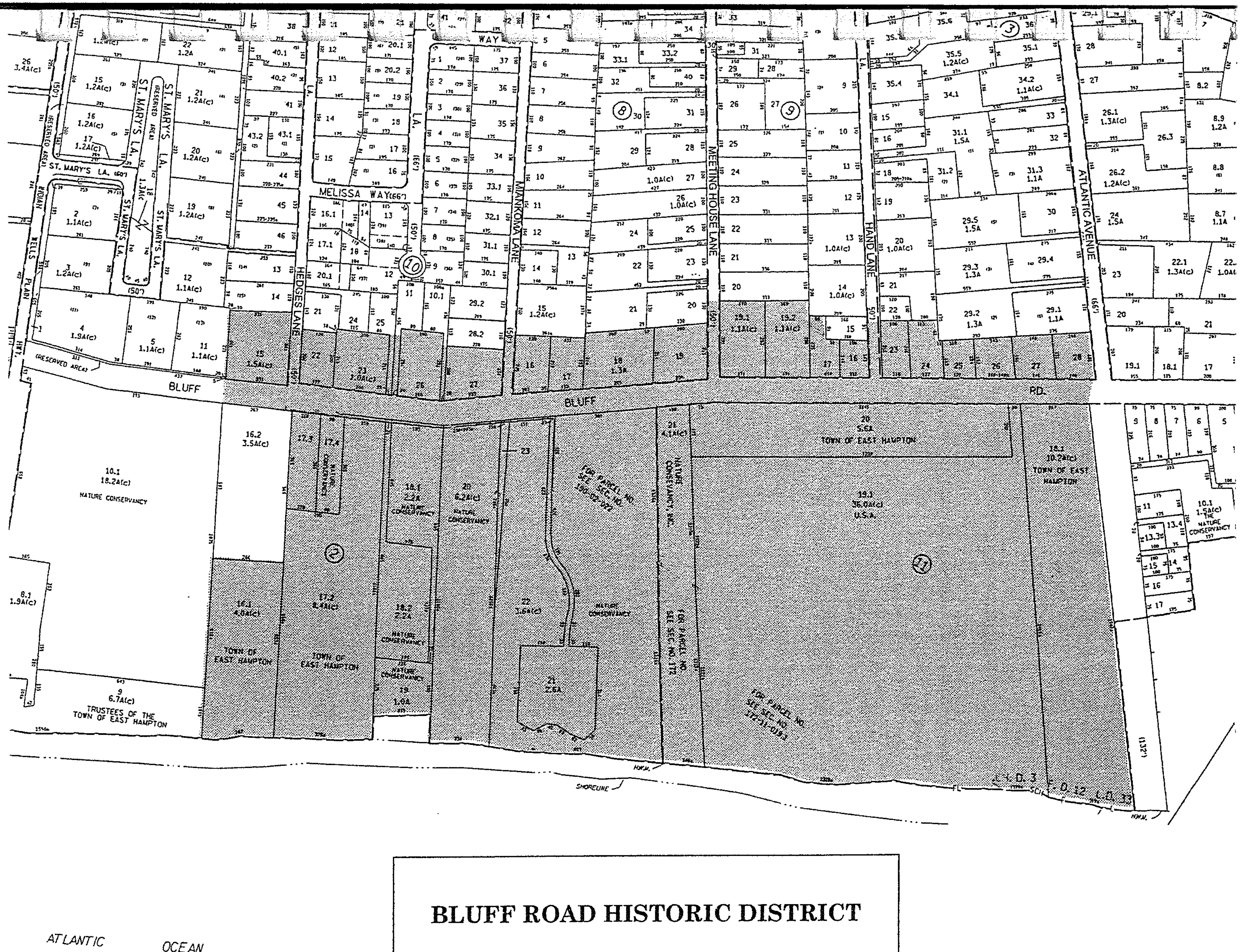
Sincerely,

Peter Garnham

Peter Garnham
President, Board of Trustees

Prepared by
TOWN OF EAST HAMPTON
Planning Department
EAST HAMPTON, NEW YORK

AMAGANSETT HISTORIC DISTRICT



BLUFF ROAD HISTORIC DISTRICT

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO
ATTENTION OF

September 24, 2003

Environmental Analysis Branch

Ms. Ruth L. Pierpont, Director –
Bureau of Field Services
NYS Office of Parks, Recreation & Historic Preservation
Peebles Island – P. O. Box 189
Waterford, New York 12188-0189

Re: CORPS
Fire Island to Montauk Point (FIMP) Reformulation Project
Suffolk County, New York

Dear Ms. Pierpont:

The New York District of the United States Army Corps of Engineers (USACE) is undertaking a Reformulation Study of an extended hazard-prone corridor along the south shore of Long Island. The purpose of the ongoing Fire Island to Montauk Point (FIMP) Reformulation Study is to identify, evaluate and recommend long-term solutions for hurricane and storm damage reduction for homes and businesses within the floodplain extending along 83-miles of ocean and bay shorelines from Fire Island Inlet to Montauk Point. The study considers all areas within the maximum estimated limit of flooding, and is located entirely within Suffolk County. The objective of this study is to evaluate and recommend a long-term, comprehensive plan for storm damage reduction, which maintains, preserves or enhances the natural resources. The New York State Department of Environmental Conservation (DEC) is the USACE non-Federal partner.

The USACE has retained URS Corporation to undertake a Cultural Resource Historic Structural Survey of the project area. This historic resource survey, combined with earlier studies, will allow for the identification and evaluation of historic properties, the assessment of effects as related to multiple project alternatives, and the opportunity for ongoing consultation regarding alternatives which avoid, minimize or mitigate adverse effects to historic resources. Due to the large size of the project area and the early nature of project alternative planning, this survey will be part of a phased identification and evaluation, per 36 CFR 800(4)(b)(2).

The information from this historic resource survey will also be useful in the preparation of an Environmental Impact Statement (EIS). As part of this process, the USACE will coordinate review of this project under Section 106 of the National Historic Preservation Act (16USC470) and its implementing regulations 36 CFR Part 800 with the New York State Office of Parks, Recreation & Historic Preservation (NYSOPRHP). Information from the historic resource survey will also be used by Allee, King, Rosen and Fleming (AKRF), a consulting firm, which is assisting the USACE in undertaking the EIS.

This letter is to inform your agency that URS will be assisting the USACE with this project and in carrying out Section 106 consultation responsibilities.

Please find enclosed a work plan for this project. The work plan provides detailed information regarding the project goals, methodology and approach. We welcome input and comments from the NYSOPRHP regarding this work plan.

Unless otherwise directed, further consultation will be conducted directly with James Warren of your office, the Regional Coordinator for Nassau and Suffolk Counties.

If you have any questions, please contact the Project Archaeologist, Chris Ricciardi, at (212) 264-0204. Thank you for your time and cooperation.

Sincerely,

L. Houston

Leonard Houston
Chief, Environmental Analysis Branch

Enclosure

cc:

James Warren, NYSOPRHP
Steve Tull, URS
Brian Beckenbaugh, URS
Anne Locke, AKRF

Work Plan

Project Scope

URS Group (URS) has been contracted by the United States Army Corp of Engineers (USACE) to conduct a Historic Resource Survey identifying historic properties listed, eligible for, or potentially eligible for listing on the National Register of Historic Places within the area for the Fire Island to Montauk Point (FIMP) Reformulation Project. The project is being conducted in support of a large-scale study of non-structural coastal flood mitigation alternatives (elevation, demolition, acquisition, flood proofing, etc.) across an approximately 240 square-mile project area in Long Island (from Fire Island to Montauk Point.)

URS will undertake a Historic Structures Survey for the areas lying along the south shore of Long Island from Fire Island Inlet to Montauk Point, New York. Given the large project area this project will be part of a phased identification and evaluation, per 36 CFR 800(4)(b)(2). This project will provide a comprehensive view of historic resources within the project area, but will also employ a sampling methodology in which representative resources are documented. This project will also identify areas where further research, evaluation or consultation may be undertaken as particular USACE non-structural projects become better defined. USACE has given a target number of 1600 field forms to be produced.

Project Objectives

The objectives of the project are based on the assumption that there are at least 1600 properties/resources within the area of potential effect which may be fifty years of age or older. With that understanding, the objectives for the Historic Properties Survey of Fire Island to Montauk Point Reformulation Project Area are to:

- Identify above-ground historic resources (inclusive of landscapes, landscape features, structures, sites, districts, and objects) that could be considered eligible for listing on the National Register of Historic Places in accordance with the criteria established in the National Historic Preservation Act of 1966, as amended, sections 60.1-60.4 within the area of potential effects.
- Provide the USACE with a discussion of a sample decision-making process to minimize adverse effects of coastal flooding to historic properties, potential mitigation measures which offset adverse effects to historic properties, and other future project initiatives (including items for future programmatic consultation).

Project Methodology and Approach

I. Initial Coordination

A. *Identification of SHPO/THPO*
On behalf of USACE, URS will coordinate the Historic Resource Survey in consultation with the State Historic Preservation Office, known as the New York Office of Parks, Recreation and Historic Preservation (OPRHP). URS will consult with OPRHP regarding the work plan and methodology, research design, identification, evaluation and assessment of effects for historic properties within the project area. Although state-recognized tribal groups may have historic ties to the

project area, none has formally designated a Tribal Preservation Officer. Consultation with tribal groups will occur as outlined in 36 CFR 800.2(c)(2).

B. *Consulting Parties.*
USACE and URS have created a preliminary list of groups and individuals who may have historic ties or a specialized knowledge of the project area's historic resources. This list includes members of historical societies, advocacy organizations and local government officials. USACE and URS will refine this list in consultation with OPRHP, have taken initial steps to communicate and consult with these groups, and will continue to communicate with them throughout the Historic Resource Study, as described in 36 CFR 800.3(f).

C. *SHPO Coordination*
URS has made initial informal contact with the OPRHP.
URS, on behalf of USACE, will initiate formal and continue written and informal consultation with OPRHP, as described in 36 CFR 800.3(c)(3).

URS will work closely and consistently with the OPRHP throughout the project. URS will make every effort to make data compatible with that which is housed in the OPRHP's collection. URS, with USACE, will also consult with OPRHP through the review of project deliverables (including the work plan, research design, survey data and conclusions, and report).

D. *Coordination with other reviews*
This Historic Resource Survey will provide information for use in an ongoing separate Environmental Impact Statement (EIS) being conducted in support of the National Environmental Policy Act, as described in 36 CFR 800.3(b).

Although this Historic Resource Survey will demonstrate an appropriate level of involvement by the OPRHP, consulting parties, and the public, it is also assumed that the separate ongoing EIS effort will provide ongoing consultation as well as adequate opportunities for public involvement, as described in 36 CFR 800.2(d)(3).

II. Area of Potential Effects

A. The Reformulation Project area is defined by the USACE, is the area falling within the ten year flood plan between Fire Island Inlet and Montauk Point, roughly bordered by the Montauk Highway to the area's north. The specific initial project area, and the focus of the Historic Resource Study, will be within or proximate to the ten-year flood plain.

B. The Area of Potential Effects, as defined in 36 CFR 800.16(d) as "the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist." In consultation with OPRHP, URS will further define the APE to include areas within or proximate to the specific initial project area. The inclusion and level of appropriate documentation for historic districts partially within the APE will be discussed.

III. Research & Historic Context Development

A. *Goals:*
With the goal of aiding research efforts, URS will produce a research design utilizing historic maps, information provided by local historical organizations, and other background research resources which will outline important thematic topics, expected associated property types a preliminary bibliography and significant questions. The research design will be developed in consultation with OPRHP.

The research design will be used as the basis for conducting a detailed research program utilizing primary and secondary information sources. This research will establish the foundation for the development of a historic context.

The historic context include a narrative history of the project area, a detailed analysis of historic and architectural contextual themes associated with the project area, a detailed description of typical property types associated with each contextual theme, and specific evaluation criteria (including character-defining features) for each property type. The historic context will serve as a project tool in the identification and evaluation of historic properties.

B. Anticipated Topics:
It is anticipated that, at a minimum, the following themes will be discussed within the research design: farming, maritime industries, duck hunting, Native American populations, extension of railroad services and roadways from New York City and the boroughs, resort development, post WWI and WWII residential and commercial developments, and the advent of storms impacting the project area.

C. *Identifying Previous Research:*
URS will review all information on identified historic properties and information on potentially significant properties that have not yet been officially identified through survey for the purpose of determining the property's eligibility for the Register.

D. *Stakeholder Involvement*
Additionally, through the assistance of the USACE, URS will seek public involvement in identifying properties holding significance for particular communities.

URS will also contact the *Shinnecock* Tribal Council in attempt to gather information allowing for the identification of properties on and off tribal lands that may be of religious and cultural significance to the tribal nation, and potentially are eligible for listing on the Register. URS will work with USACE to identify other social groups with historic ties to the project area.

E. *Level of Research Required to Develop the Historic Contexts of the Area of Potential Effect:*
In accordance with 36 CFR 800.4(b)(1), URS will in good faith carry an appropriate level of investigation to identify historic properties within the area of potential effect including background research, oral history interviews, sample field investigation, and field survey.

The level of research necessary for a survey of this type is limited to the identification and description of historic general trends, groups, and events occurring in the communities within the area of potential effect and how the development of the communities was impacted by these factors. This information will set up a framework for future identification and evaluation efforts for the SHPO and USACE. URS will use the Secretary of Interior's *Standards and Guidelines for Identification of Historic Properties* as a yardstick by which to measure efforts against.

F. *Anticipated Sources to be Utilized:*

i. Primary sources
   1. Back issues of local Long Island and New York City newspapers and magazines
   2. Family papers and records
   3. Accounts of travelers
   4. Church Histories
   5. Maps-plat, tax, fire, insurance, historic, and land survey
   6. Photographs

ii. Secondary sources
   1. Historic Preservation Plan formulated and updated by the New York Office of Recreation, Parks, and Historic Preservation
   2. Inventories of previously identified historic properties and archeological sites
   3. Local and regional histories compiled in files, monographs, and pamphlets held in the local historical societies and public libraries
   4. HABS/HAER Reports and the National Register of Historic Places
   5. The *American Guide Series*
   6. Various other available resources produced from other studies and inquiries regarding the history of physical development of Long Island more specifically the southeastern section of the island within the project area

G. *Research Methods*

In researching the historic contexts associated with the area of potential effect, URS will use the following methods:

1. Identify sources and relevant bodies of data in existing information using the bibliographies and citations.
2. Assess the reliability of the information:
   a. Determine if any potential biases by the author may affect the accuracy and impartiality of their retelling of an event or occurrence
   b. Identify any major gaps in data
3. Synthesize the information gathered into a narrative with reference to the issues important to the historic contexts identified.
4. Identify those properties emblematic or associated with the appropriate historic context
5. Determine areas within the area of potential effect with a high probability for significant properties associated with the historic contexts utilizing historic maps, atlases, plats, and survey information from other studies

6. Create hypotheses based on preceding research and establish the likely condition and type properties to be investigated
7. Identify the information necessary to be obtained through the survey (allow this to inform the type questions asked on the survey/field form)

H. *Repositories to be Utilized:*

i. United States Army Corp of Engineers New York District Archives
ii. New York State Office of Parks, Recreation, and Historic Preservation
iii. New York State Museum
iv. Fire Island National Seashore (National Park Service)
v. Suffolk County Planning Commission
vi. Suffolk County Historical Society
vii. Shinnecock Tribal Council
viii. State University of New York at Stony Brook
ix. Long Island University
x. Hofstra University-Long Island Studies
xi. United State Library of Congress-HABS/HAER Surveys & Map Collections
xii. Queensboro Public Library
xiii. New York Public Library
xiv. Local town historical societies
xv. Local town public libraries

IV. Field Survey

A. *Strategies for Surveying Project Area*

The project area approximately encompasses 249 square miles. As previously mentioned, clearer and more precise boundaries for the project area will be necessary prior to the initiation of the field survey. URS will divide 1600 field forms across the geographic range prior to beginning the fieldwork, based upon population levels, potential for historic properties, and other information from the historic context. URS will produce a Historic Resource Survey providing baseline locations for concentration of resources within the Area of Potential Effect; this will be the basis of a phased identification and evaluation effort, which will identify areas for future evaluation, and may be used as USACE project alternatives become more specifically defined.

B. *Field Form Production*

URS will produce 1600 field forms for properties which are approximately fifty years of age or older within the area of potential effect. Resources identified through the research design, and/or fieldwork, which may be considered to meet the threshold of "exceptional significance" but which may be less than fifty years of age or older, will be recorded. The fieldwork will identify various classes of properties, important resources, representative resources-those typical within in a large district, and those resources requiring further investigation.

C. *Flexibility of Field Forms*

Field forms will be based on the basic historic resource form (known as the "blue form") used by OPRHP with augmentation to better accommodate the particular needs of this project. URS will produce variations of forms that may be used for broad property categories, such as buildings, landscape features, districts, and traditional cultural properties. The forms will also contain basic evaluative information for determining a property's integrity.

The field form will relate each surveyed site to a developed context and specific property type; however the field form will not contain individual written building descriptions or statements of significance.

The form will also contain basic construction information for buildings to be used in confirming data needed for USACE non-structural alternatives.

D. *Documentation Standards*
Those properties surveyed will occur typically in areas determined to have a high probability of historic properties. In effort to not miss any historic properties, a cursory windshield investigation will occur in areas thought to have a lesser probability of historic properties. Identifying areas with high probability of historic properties will be accomplished through various means:

- Windshield survey
- Existing survey information
- Historic map research

URS may undertake representative documentation of districts and/or collections of similar resources in which representative character-defining features are documented (including streetscapes) and approximate boundaries are noted. More specific information, such as the documentation of contributing and non-contributing resources, and precise boundary delineation, would not be included as part of this initial Historic Resource Survey, but could be determined at a later date as USACE alternatives become better defined.

As outlined in 36 CFR 800.11(a), URS will ensure that a determination, finding, or agreement under the procedures is supported by sufficient documentation to enable any reviewing parties, including OPHRP, to understand its basis. During a phased identification or evaluation project, the documentation standards regarding description of historic properties may be applied flexibly, as described in this work plan.

E. *Strategy for Surveying Properties Dating Circa 1954*
A resource is typically fifty years of age or older to be considered eligible for listing in the National Register of Historic Places. Some surveyed resources within a larger district may have portions that were constructed after 1954. In addition, field identification of properties built in the early to mid 1950s (as opposed to the mid to late 1950s), is difficult even with a trained eye; for these reasons the survey may include some properties which are slightly less than fifty years old.

However, URS will make reasonable efforts to ensure that those properties surveyed meet this basic age criterion through the use of maps, aerial photography, and other sources that will help determine the stages of post WW II development.

Additionally, URS will set up a general framework for evaluating post-1954 building types in accordance with the National Register Multiple Property Documentation Form and accompanying National Register Bulletin, "Historic Residential Suburbs in the Unites States 1830-1960."

F. *Survey Methodology*

Sixteen hundred (1600) historic sites will be surveyed from a public right-of-way, at a reconnaissance level. The Survey information is intended to identify properties potentially eligible for listing in the National Register of Historic Places, as part of a phased identification and evaluation.

Although the survey will focus on resources not previously surveyed, some update of previously surveyed sites may be needed if this information is inaccurate or in need of update.

Survey information will be entered directly into a handheld computer that will later be synchronized with a MS Access database. The database will allow querying and GIS mapping, in accordance with section 112 (a)(2) of the *National Historic Preservation Act*.

Geographic information, including UTM numbers, will be identified for each property with a commercial handheld GPS (Global Position System) unit. Property addresses will also be recorded when clearly visible from the right-of-way.

Each of the 1600 sites will be digitally photographed, with a minimum of one photograph per property. The images will have a resolution of no less than 300 dpi and will be in tiff format. Representative photographs will be integrated into the final report, but the entire survey product will also be made available as an appendix.

URS will conduct survey documentation according to the standards defined by the Secretary of Interior in the *Standards and Guidelines for Identification* of historic properties.

V. Evaluation

A. URS will, on behalf of USACE and in consultation with OPRHP, apply the National Register criteria to each surveyed property, as outlined in 36 CFR 800(4)(c). Rather than individualized written determinations of eligibility, URS will rely upon the application of detailed evaluation criteria developed for specific property types (developed in the project historic context) as well as general standards described in National Register Bulletin 15, "How to Apply the National Register Criteria for Evaluation." This approach is consistent with 36 CFR 800.11, in which documentation standards for a phased identification and evaluation project may be applied flexibly, as described in this work plan.

B. The passage of time, changing perceptions of significance, or incomplete prior evaluations may require URS, on behalf of USACE, to reevaluate properties previously determined eligible or ineligible, in consultation with OPRHP.

C. URS acknowledges that Native American tribes and certain other traditional social groups may possess special expertise in assessing the eligibility of historic properties that may possess religious and cultural significance to them. Traditional Cultural Properties will be identified and evaluated using National Register Bulletin #38 "Guidelines for Evaluating and Documenting Traditional Cultural Properties"

VI. Assessment of Effects

A. Adverse effects, as described in 36 CFR 800.5(2), are actions which may impair character-defining features which qualify a property for listing in the National Register of Historic Places. In consultation with the OPRHP, URS (on behalf of USACE) will undertake an application of the criteria of adverse effect to those resources that URS (on behalf of USACE and in consultation with OPRHP) has found to be listed in, eligible for or potentially eligible for listing in the National Register of Historic Places.

B. This is a flexible application of the criteria of adverse effect, in which typical and representative adverse effects are described and evaluated for specific property types; as the exact project alternatives for each historic resource within the project area has not been determined. Different project alternatives, such as retrofitting or relocation, may have different effects upon different property types.

The flexible approach will allow this Historic Resource Survey to be an important decision-making tool later in the USACE planning process. Where alternatives under consideration consist of corridors or large land areas (such as this project), or where access to properties is restricted, URS may use a phased process in applying the criteria of adverse effect consistent with phased identification and evaluation efforts conducted pursuant to Sec. 800.4(b)(2).

VII. Further consultation

A. URS will discuss, in broad terms, measures allowing USACE to minimize adverse effects to historic properties, eligible, potentially eligible for, or listed in the National Register of Historic Places.

Specifically, this decision-aiding process will allow USACE to consider the application of the least intrusive alternatives for the most historic properties, while achieving cost-effective non-structural project alternatives. This decision-aiding process will be discussed only for broad planning purposes.

B. URS will also discuss multiple project alternatives mitigating adverse effects to historic properties, eligible, potentially eligible for, or listed in the National Register of Historic Places. Approximate project costs and details will be discussed, although only for broad planning purposes.

C. URS will also outline broad programmatic interagency procedures scaled for future phases, if any, of the USACE project. These may allow for ongoing, phased identification, evaluation, and decision-making for historic properties. These items will be discussed only for broad planning purposes.

i. These alternatives will be discussed in consultation with OPRHP.

D. It is anticipated that additional consideration of project alternatives, including avoidance, will be included as part of the separate, ongoing EIS effort. It is anticipated that additional public involvement and consultation with OPRHP and consulting parties will be conducted in support of the EIS.

VIII. Report

An illustrated final survey report will be produced with an introduction stating the purpose and goals of the report and summarizing all pertinent section of the report.

Section 1, will be concerned with research design and historic context. It will be divided into sub categories: objectives, properties investigated and recorded, and methodology for how data was collected for both the historical context and for the surveys.

Section 2 will be dedicated to the description of the physical setting of the identified significant properties. This section will include photography, maps, site context, and pertinent environmental data.

Section 3, will be a brief summary of the other studies and surveys that have been conducted within the project site or adjacent to it.

Section 4 will be a description of field methods used and the rationale for the methods in gathering data during the survey. The section will explicitly describe how information was gathered and analyzed.

Section 5 will focus on the analysis and synthesis of the information gathered in the background research and surveys. This section will show how the properties surveyed are a part of, and contribute to the Historical Context of the project area. Additionally, this section will identify the types of historic properties found.

Section 6 will contain the conclusions and recommendations ascertained through the survey. The conclusions will focus on what properties were identified as being potentially eligible for the National Register. The section will discuss recommendations for areas and properties requiring additional study.

Section 7 will be citations for references used for the project.

Appendices:

a. Log of Persons/Institutions contacted as part of the project.
b. Supporting documentation
c. Resumes of key personnel
d. Scope of work

* All reports will be produced in accordance with the format specifications described in the Scope of Work developed by the USACE.

IX. Public Participation

As described in 36 CFR 800(2)(d) the public will be given the opportunity to participate and voice their views in a manner that reflects the nature and complexity of the undertaking.

The public has been asked by USACE for their assistance in identifying historic resources and themes through their local historical societies, town historians, or tribal councils.

Notices and information about the Historic Resource Survey will be established through a media campaign including brief announcements in local newspapers and mailings to local public libraries and historical societies, and summarized information placed on USACE's web site, with an opportunity to contact USACE with input.

It is also assumed that the separate ongoing EIS effort will provide adequate opportunities for public involvement, including formal public comment, as described in 36 CFR 800.2(d)(3).

These efforts for public involvement are in keeping with requirements of Section 106 of the National Historic Preservation Act of 1966, as amended, as well as 36 CFR 800.3 (e) 36 CFR 800.3 (f), and 36 CFR 800.2 (d).

X. Qualifications

As described in 36 CFR 800.2(a)(1), all key URS project staff will meet or exceed relevant Secretary of the Interior's Professional Qualification Standards (36 CFR 61), including Historian, Architectural Historian, Folklorist, Historic Preservationist and/or Cultural Anthropologist, as required by project conditions.

VII. Project Timeline

Attached Excel Spreadsheet

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278–0090

REPLY TO
ATTENTION OF

September 26, 2003

Environmental Analysis Branch

Re: U.S. Army Corps of Engineers – New York District
Fire Island to Montauk Point (FIMP) Reformulation Project
Phase I Structural Building's Survey – Draft Work Plan

To Whom It May Concern:

The New York District of the United States Army Corps of Engineers (USACE) is undertaking a Reformulation Study of an extended flood hazard-prone corridor along the south shore of Long Island. The purpose of the ongoing Fire Island to Montauk Point (FIMP) Reformulation Study is to identify, evaluate and recommend long-term solutions for storm damage reduction for homes and businesses within the floodplain extending along 83-miles of ocean and bay shorelines from Fire Island Inlet to Montauk Point.

The USACE has retained URS Corporation to undertake a Cultural Resource Historic Structural Survey of the project area. This historic resource survey, combined with earlier studies, will allow for the identification and evaluation of historic properties, the assessment of effects as related to multiple project alternatives, and the opportunity for ongoing consultation regarding alternatives which avoid, minimize or mitigate adverse effects to historic resources.

In August of 2003, you, or representatives from your organization, attended an information meeting held at the National Park Service's headquarters in Patchogue. At that time you expressed interest in reviewing the Scope of Work that was being developed to best undertake this daunting task.

Enclosed, please find enclosed a work plan for this project. The work plan provides detailed information regarding the project goals, methodology and approach. We welcome input and comments from you with regard to this work plan.

If you have any questions, please contact the Project Archaeologist, Chris Ricciardi, at (212) 264-0204. Comments on the Draft Work should also be addressed to Mr. Ricciardi christopher.g.ricciardi@usace.army.mil. Thank you for your time and cooperation.

Sincerely,
L Houston
Leonard Houston
Chief, Environmental Analysis Branch

Enclosure

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO
ATTENTION OF

14 November 2003

Environmental Analysis Branch

Mr. Frank Manhardt, President
Bay Shore Historical Society
40 Hiawatha Drive
Brightwaters, New York 11718

Dear Mr. Manhardt:

On behalf of the U.S. Army Corps of Engineers, New York District (District), I want to thank you, and Ms. Priscilla Hancock, Research Librarian, for the information you provided to the District with regard to historical properties within the area of Bay Shore and Brightwaters.

The data collected from the various historical societies within Fire Island to Montauk Point (FIMP) Storm Damage Reduction Project Reformulation Study area will be used in the Environmental Impact Statement. The information gathered will assist the District in acting as a responsible steward of historic resources within the project area.

If you have any questions, please contact:

Christopher Ricciardi, Archaeologist
U.S. Army Corps of Engineers - Planning Division
Jacob K. Javits Federal Building
26 Federal Plaza – Room 2151
New York, New York 10278-0090
Phone: (212) 264-0204
Fax: (212) 264-0961
E-mail: christopher.g.ricciardi@usace.army.mil

Once again, thank you for assisting the District with the project.

Sincerely,

Nancy J Brighton

Leonard Houston
Chief, Environmental Analysis Branch

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278–0090

REPLY TO
ATTENTION OF

29 December 2003

Environmental Analysis Branch

Orla M. Smyth
Town of Islip –
Department of Planning and Development
One Manitton Court
Islip, New York 11751

Re: Fire Island to Montauk Point (FIMP) Project – Historical Structures Survey

Dear Ms. Smyth:

On behalf of the U.S. Army Corps of Engineers, New York District (District) I want to thank you for assistance with regard to the District's Fire Island to Montauk Point (FIMP) – Historical Structures Survey Project. The information you provided will greatly help us in our endeavor to identify as many of the historic structures within the project area as possible.

Upon completion and review of the report, the District will be happy to send you a copy of the report for the Town's files.

Once again, thank you for your assistance. If you have any questions, please contact the Project Archaeologist, Chris Ricciardi, at (212) 264-0204 or at christopher.g.ricciardi@usace.army.mil(.)

Sincerely,

Josephine Axt

Josephine Axt, Acting Chief,
Environmental Analysis Branch

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278–0090

REPLY TO
ATTENTION OF

16 June 2004

Environmental Analysis Branch

Re: Cultural Resources Technical Management Group Request for the US Army Corps of Engineers – Fire Island to Montauk Point Storm Damage Reduction Project

The United States Army Corps of Engineers, New York District, (District) is currently undertaking a Reformulation Study of the Fire Island to Montauk Point (FIMP) area. As part of this study, an Environmental Impact Statement (EIS) is being prepared. Not only focusing on the natural environmental, the EIS will take into consideration cultural resource issues such as, but not limited to, archaeological remains both on land and under water, the landscape and how it has changed over time and the current built environment (i.e. standing structures).

Last year you, or representatives from your office, participated in the FIMP Cultural Resources Technical Management Group (CRTMG) to discuss the upcoming Historic Structures Building Survey Project. This fieldwork for this work has been completed and the draft report is in production. We would like to send you a draft of the report for your comments and review.

The document is large, approximately 4500 pages. We will not be sending the entire document but rather the text chapters only. The full report contains a large appendix with the various recording forms, databases and photographs. The entire draft document can be reviewed, if you wish, on CD-ROM. The document comprises at least four CDs. As this is a draft only, no portion of the report can/should be released and/or discussed with the general public. The information in this report will be made public, and available for comment, along with the FIMP DEIS. The New York State Office of Parks, Recreation and Historic Preservation will be concurrently reviewing the complete draft report as well.

If you would rather not participate in the review of this document please let us know. We anticipate that the draft document will be ready for review by the end of July. A meeting of the CRTMG will be scheduled for September to discuss the draft report and to update you on other developments within the Project.

If you have any questions please contact the Project, Archaeologist, Christopher Ricciardi:

Christopher Ricciardi, Ph.D., R.P.A., Project Archaeologist
U.S. Army Corps of Engineers - Planning Division - Environmental Branch
Jacob K. Javits Federal Building
26 Federal Plaza – Room 2151
New York, New York 10278-0090
Phone: (212) 264-0204
Fax: (212) 264-0961
E-mail: christopher.g.ricciardi@usace.army.mil

Thank you very much for your consideration and your participation in the FIMP Reformulation Study.

Sincerely,

for Leonard Houston

cc: FIMP Cultural Resources Technical Management Team

Ron and Marilyn Abrams – Representatives – Shinnecock Native American Nation
Fred Anders – NYS Department of State – Division of Coastal Resources
Amy Balaban – Town of Brookhaven – Division of Environmental Protection
David Bernstein and Daria Merwin – Long Island Institute of Archaeology – SUNY Stony Brook
Michael Bilecki – National Parks Service
Jeanmarie Brennan – Town Of Islip – Department of Planning
Wally Broege – Suffolk County Historical Society
Mollie Frerichs – Mastic-Shirley Historic Society
Jeffrey Fullmer, NYS Department of State – South Shore Estuary Reserve
Gary Gentile – NYS Department of Transportation – Cultural Resource Coordinator
David Griese – Fire Island Lighthouse Preservation Society
Thomas Isles – Suffolk County Division Office – County Planning
Randy King –Shinnecock Native American Tribal Council
Robert MacKay and Sharla Bolton – Society for the Preservation of Long Island Antiquities
Richard Martin – Suffolk County Parks Department
Tom Oelerich – NYS Department of Transportation
Bertram Seides – Ketcham Inn Foundation
Orla Smith – Town of Islip Planning Division
Nancy Solomon – Long Island Traditions
Georege Stafford – NYS Department of State – Division of Coastal Resources
Richard Stavdal – National Parks Service
Dr. Gaynell Stone – Suffolk County Archaeological Association
Paula Valentine – National Parks Service
Margrete Wolfson – Town of Easthampton

Preserving America's Heritage

December 17, 2019

Nancy J. Brighton
Deputy FPO
Cultural Resources Community of Practice Lead HQ
US Army Corps of Engineers
441 G Street NW
Washington, DC 20314-1000

Ref: *Fire Island to Montauk Point Reformulation Study*
Suffolk County, New York

Dear Ms. Brighton:

The Advisory Council on Historic Preservation (ACHP) has received your notification of adverse effect for the referenced undertaking that was submitted in accordance with Section 800.6(a)(1) of our regulations, "Protection of Historic Properties" (36 CFR Part 800). The background documentation included with your submission does not meet the specifications in Section 800.11(e) of the ACHP's regulations. We, therefore, are unable to determine whether Appendix A of the regulations, *Criteria for Council Involvement in Reviewing Individual Section 106* Cases, applies to this undertaking. Accordingly, we request that you submit the following additional information so that we can determine whether our participation in the consultation to resolve adverse effects is warranted.

- Copies or summaries of any views provided by consulting parties, the public, and the New York State Historic Preservation Officer.
- Copies or summaries of any views or comments provided by any affected Indian tribe.

Upon receipt of the additional information, we will notify you within 15 days of our decision.

If you have any questions, please contact Christopher Daniel at 202-517-0223 or via e-mail at cdaniel@achp.gov.

Sincerely,

Artisha Thompson

Historic Preservation Technician
Office of Federal Agency Programs

Preserving America's Heritage

January 29, 2020

Nancy J. Brighton
Deputy Federal Preservation Officer and Cultural
Resources Community of Practice Lead
U.S. Army Corps of Engineers
441 G Street NW
Washington, DC 20314-1000

Ref: *Proposed Fire Island to Montauk Point Reformulation Study*
Suffolk County, New York

Dear Ms. Brighton:

The Advisory Council on Historic Preservation (ACHP) has received your notification and supporting documentation regarding the adverse effects of the referenced undertaking on a property or properties listed or eligible for listing in the National Register of Historic Places. Based upon the information you provided, we have concluded that Appendix A, *Criteria for Council Involvement in Reviewing Individual Section 106 Cases*, of our regulations, "Protection of Historic Properties" (36 CFR Part 800), does not apply to this undertaking. Accordingly, we do not believe that our participation in the consultation to resolve adverse effects is needed. However, if we receive a request for participation from the State Historic Preservation Officer (SHPO), Tribal Historic Preservation Officer, affected Indian tribe, a consulting party, or other party, we may reconsider this decision. Additionally, should circumstances change, and you determine that our participation is needed to conclude the consultation process, please notify us.

Pursuant to 36 CFR §800.6(b)(1)(iv), you will need to file the final Programmatic Agreement (PA), developed in consultation with the New York State Historic Preservation Office (SHPO) and any other consulting parties, and related documentation with the ACHP at the conclusion of the consultation process. The filing of the PA and supporting documentation with the ACHP is required in order to complete the requirements of Section 106 of the National Historic Preservation Act.

Thank you for providing us with your notification of adverse effect. If you have any questions or require further assistance, please contact Christopher Daniel at 202 517-0223 or via e-mail at cdaniel@achp.gov.

Sincerely,

Artisha Thompson
Historic Preservation Technician
Office of Federal Agency Programs

February 6, 2020

Nancy Brighton
Supervisory Archaeologist
US Army Corps of Engineers, HQ
441 G Street NW, 3G71
Washington, DC 20001
(via email)

Re: USACE
Fire Island to Montauk Point Reformulation Study
19PR08164

Dear Ms. Brighton:

Thank you for requesting the comments of the State Historic Preservation Office (SHPO). We have reviewed the proposal in accordance with Section 106 of the National Historic Preservation Act of 1966. These comments are those of the SHPO and relate only to Historic/Cultural resources.

Our comments do not include potential environmental impacts to New York State Parkland that may be involved in or near your project. Such impacts must be considered as part of the environmental review of the project pursuant to the National Environmental Policy Act and/or the State Environmental Quality Review Act (New York Environmental Conservation Law Article 8). Comments relating to impacts to NYS parkland should be sought directly from the New York State Office of Parks, Recreation and Historic Preservation.

We have reviewed the revised document and have only one additional change. Please update Mr. Mackay's signature block to read: R. Daniel Mackay, Deputy Commissioner for Historic Preservation/SHPO, NYS Office of Parks, Recreation and Historic Preservation.

Thank you again for this opportunity to comment on this agreement. If I can be of any further assistance, please do not hesitate to contact me at john.bonafide@parks.ny.gov or (518) 268-2166.

Sincerely,

John A. Bonafide
Director,
Technical Preservation Services Bureau
Agency Historic Preservation Officer

cc: Carissa Scarpa, ACE (via CRIS email)

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

16 January 2020

Planning Division

Mr. John Bonafide
Director
Technical Preservation Bureau and
Agency Preservation Officer
New York State Division for Historic Preservation
PO Box 189
Waterford, New York 12188-0189

RE: USACE
Fire Island to Montauk Point Reformulation Study
19PR08164

Dear Mr. Bonafide;

Thank you for providing comments on the proposed Programmatic Agreement for the Fire Island to Montauk Point Reformulation Study (Enclosure 1). The Programmatic Agreement has been revised to address your comments as follows:

- Sections IV and XI now includes specific reference to updating the research for each of the resource types; and
- Appendix D has been corrected;

In addition, a 'Whereas' clause (new no. 11) has been added to include the acknowledgement of the 'Sugar Loaf Hill Shinnecock Indian Burial Ground Critical Environmental Area' within the Area of Potential Effect (Enclosure 2).

The District will ensure that the information from the existing reports are included in CRIS, in addition to those from future investigations. Please review the attached and provide any additional comments. If the Agreement is acceptable, the District will route it for signature. The District has not received any additional comments.

If you have any questions or need additional information, please contact Nancy J. Brighton at Nancy.J.Brighton@usace.army.mil or Carissa Scarpa at Carissa.A.Scarpa@usace.army.mil. Thank you for your assistance with this project.

Sincerely,

Peter Weppler
Chief, Environmental Analysis Branch

Enclosures

January 2, 2020

Nancy Brighton
Supervisory Archaeologist
US Army Corps of Engineers, HQ
441 G Street NW, 3G71
Washington, DC 20001
(via email)

Re: USACE
Fire Island to Montauk Point Reformulation Study
19PR08164

Dear Ms. Brighton:

Thank you for requesting the comments of the State Historic Preservation Office (SHPO). We have reviewed the proposal in accordance with Section 106 of the National Historic Preservation Act of 1966. These comments are those of the SHPO and relate only to Historic/Cultural resources.

Our comments do not include potential environmental impacts to New York State Parkland that may be involved in or near your project. Such impacts must be considered as part of the environmental review of the project pursuant to the National Environmental Policy Act and/or the State Environmental Quality Review Act (New York Environmental Conservation Law Article 8). Comments relating to impacts to NYS parkland should be sought directly from the New York State Office of Parks, Recreation and Historic Preservation.

Based upon our review, the New York SHPO offers the following comments on the DRAFT Programmatic Agreement for this undertaking:

1. Whereas clauses 9 and 10 lists a series of properties and sites identified as being National Register listed or eligible. The NYSHPO is familiar with some but not all the identified properties. We note that the survey methodology was developed 17 years ago. We also note that the survey data found in Appendix C does not appear to have been submitted to this office. It does not appear that records for most of the resources were entered into our previous database (SPHINX) or the current CRIS application. Thus, we have little in house information on many of these properties.

   Please also be aware that our office, in consultation with the National Park Service, is now completing a significant multi-year post superstorm Sandy grant funded resilience survey of much of your project area. We would suggest working with our office to find an appropriate means to move the Appendix C data into CRIS and to then cross reference it with the ongoing Sandy survey work.

2. We support the general language of Sections IV and XI as they relate to Whereas clauses 9 and 10. These sections appear to allow for updating survey data and additional information gathering on resources (both above and below ground) if deemed relevant by the parties. As

you know, survey data is not static and must be updated and renewed in order to be relevant for decision making.

3. The NYSHPO notes that the language used in Appendix D relating to Unanticipated Discoveries and the Discovery of Human Remains is an older version of what our office is now using. We have included our current language for your review and possible insertion in the document.

If I can be of any further assistance, please do not hesitate to contact me at (518) 268-2166 or john.bonafide@parks.ny.gov.

Sincerely,

John A. Bonafide
Director,
Technical Preservation Services Bureau
Agency Historic Preservation Officer

att: NYSHPO Discovery of Human Remains Protocol (2018)

State Historic Preservation Office/
New York State Office of Parks, Recreation and Historic Preservation
Human Remains Discovery Protocol
(August 2018)

If human remains are encountered during construction or archaeological investigations, the New York State Historic Preservation Office (SHPO) recommends that the following protocol is implemented:

- Human remains must be treated with dignity and respect at all times. Should human remains or suspected human remains be encountered, work in the general area of the discovery will stop immediately and the location will be secured and protected from damage and disturbance.

- If skeletal remains are identified and the archaeologist is not able to conclusively determine whether they are human, the remains and any associated materials must be left in place. A qualified forensic anthropologist, bioarchaeologist or physical anthropologist will assess the remains in situ to help determine if they are human.

- No skeletal remains or associated materials will be collected or removed until appropriate consultation has taken place and a plan of action has been developed.

- The SHPO, the appropriate Indian Nations, the involved state and federal agencies, the coroner, and local law enforcement will be notified immediately. Requirements of the corner and local law enforcement will be adhered to. A qualified forensic anthropologist, bioarchaeologist or physical anthropologist will assess the remains in situ to help determine if the remains are Native American or non-Native American.

- If human remains are determined to be Native American, they will be left in place and protected from further disturbance until a plan for their avoidance or removal can be generated. Please note that avoidance is the preferred option of the SHPO and the Indian Nations. The involved agency will consult SHPO and the appropriate Indian Nations to develop a plan of action that is consistent with the Native American Graves Protection and Repatriation Act (NAGPRA) guidance. Photographs of Native American human remains and associated funerary objects should not be taken without consulting with the involved Indian Nations.

- If human remains are determined to be non-Native American, the remains will be left in place and protected from further disturbance until a plan for their avoidance or removal can be generated. Please note that avoidance is the preferred option of the SHPO. Consultation with the SHPO and other appropriate parties will be required to determine a plan of action.

- To protect human remains from possible damage, the SHPO recommends that burial information not be released to the public.

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

20 November 2019

Planning Division

Mr. John Bonafide
Director
Technical Preservation Bureau and
Agency Preservation Officer
New York State Division for Historic Preservation
PO Box 189
Waterford, New York 12188-0189

Dear Mr. Bonafide;

The U.S. Army Corps of Engineers, New York District (Corps) has prepared the Fire Island to Montauk Point, Suffolk County, New York, Reformulation Study Final Integrated Feasibility Report and Environmental Impact Statement. The study looked at a variety of alternatives for coastal storm risk management along the Atlantic coast of Long Island in Suffolk County. The cultural resources investigation completed for this study consisted of the review of previous surveys within the files of the New York State Historic Preservation Office (Cultural Resources Information System), and the New York State Museum as well as the completion of two cultural resources studies including a historic structures survey.

The proposed plan includes: 1) inlet sand bypassing across Fire Island, Moriches and Shinnecock Inlets; 2) residential building and commercial structural measures, such as elevations, flood-proofing or the construction of ringwalls around groups of buildings and structures within the 10-year floodplain; 3) the breach response plan; 4) beach and dune fill along the barrier island, the removal of groins at Ocean Beach, and 5) the construction of coastal process features at location on the barrier island and the mainland. The proposed plan would include: portions of the Towns of Babylon, Islip, Brookhaven, Southampton, and East Hampton; 12 incorporated villages; and the Fire Island National Seashore. The area is bounded by the Montauk Highway to the north, Montauk Point to the east, the Nassau County border to the west, and the Atlantic Ocean to the south within Suffolk County (Enclosure 1).

The Area of Potential Effect for historic properties includes the footprint of each set of measures. Within the Area of Potential Effect there are a number of cultural resources and historic properties including more than 70 archaeological sites dating from the Early Archaic period through the early 20th Century. There are more than 150 eligible or listed structures, including several historic districts and three cemeteries. The proposed plan has the potential to have an adverse effect on archaeological sites, historic sites and underwater sites through 1) the construction of the coastal process features; 2) residential building and commercial structural measures; and 3) use of the offshore borrow sites.

The Fire Island to Montauk Point Reformulation Study has been in development since the early 2000s. The Corps had conducted public meetings related to cultural resources and the development of the historic structures survey and context in 2006. After Hurricane Sandy, the study reformulation included the effects of the storm on the south shore in Suffolk County. Most recently, the Corps, in coordination with the New York State Department of Environmental Conservation, made the draft Hurricane Sandy General Re-evaluation Report with Draft Environmental Impact Statement for the Fire Island to Montauk Point Reformulation Study on July 2016. It was available for public comment through October 2016. Four public meetings were held in Suffolk County in September 2016.

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The revised programmatic agreement is being sent for a final review to the Fire Island National Seashore, the Shinnecock Indian Nation and the Delaware Tribe of Indians, who are federally-recognized tribes, and Unkechaug Indian Nation, a New York state-recognized tribe, and a number of historical societies and organizations in Suffolk County (Enclosure 3).

Please review the attached and provide any additional comments by December 31, 2019. If you have any questions or need additional information, please contact Nancy J. Brighton at Nancy.J.Brighton@usace.army.mil or 202-761-4618. Thank you for your assistance with this project.

Sincerely,

Peter Weppler
Chief, Environmental Analysis Branch

Enclosures

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

Planning Division November 22 2019

Harry Wallace
Chief
Unkechaug Nation
151 Poospatuck Lane
Mastic, New York 11950

Dear Mr. Wallace;

The U.S. Army Corps of Engineers, New York District (Corps) has prepared the Fire Island to Montauk Point, Suffolk County, New York, Reformulation Study Final Integrated Feasibility Report and Environmental Impact Statement. The study looked at a variety of alternatives for coastal storm risk management along the Atlantic coast of Long Island in Suffolk County. The cultural resources investigation completed for this study consisted of the review of previous surveys within the files of the New York State Historic Preservation Office (Cultural Resources Information System), and the New York State Museum as well as the completion of two cultural resources studies including a historic structures survey.

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Sincerely,

Peter Weppler
Chief, Environmental Analysis Branch

Enclosures

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

November 21, 2019

Planning Division

Barry R. Dlouhy
Bay Shore Historical Society
22 Maple Avenue
Bay Shore, New York 11706

Dear Mr. Dlouhy;

The U.S. Army Corps of Engineers, New York District (Corps) has prepared the Fire Island to Montauk Point, Suffolk County, New York, Reformulation Study Final Integrated Feasibility Report and Environmental Impact Statement. The study looked at a variety of alternatives for coastal storm risk management along the Atlantic coast of Long Island in Suffolk County. The cultural resources investigation completed for this study consisted of the review of previous surveys within the files of the New York State Historic Preservation Office (Cultural Resources Information System), and the New York State Museum as well as the completion of two cultural resources studies including a historic structures survey.

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Sincerely,

Peter Weppler
Chief, Environmental Analysis Branch

Enclosures

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

November 21, 2019

Planning Division

Mary Bailey
President
Bayport-Blue Point Heritage Association
PO Box 4
Bayport, New York 11705

Dear Ms. Bailey;

The U.S. Army Corps of Engineers, New York District (Corps) has prepared the Fire Island to Montauk Point, Suffolk County, New York, Reformulation Study Final Integrated Feasibility Report and Environmental Impact Statement. The study looked at a variety of alternatives for coastal storm risk management along the Atlantic coast of Long Island in Suffolk County. The cultural resources investigation completed for this study consisted of the review of previous surveys within the files of the New York State Historic Preservation Office (Cultural Resources Information System), and the New York State Museum as well as the completion of two cultural resources studies including a historic structures survey.

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Please review the attached and provide any additional comments by December 31, 2019. If you have any questions or need additional information, please contact Nancy J. Brighton at Nancy.J.Brighton@usace.army.mil or 202-761-4618. Thank you for your assistance with this project.

Sincerely,

Peter Weppler
Chief, Environmental Analysis Branch

Enclosures

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

November 21, 2019

Planning Division

Joan Kaelin
Bellport-Brookhaven Historical Society
31 Bellport Lane
Bellport, New York 11713

Dear Ms. Kaeling;

The U.S. Army Corps of Engineers, New York District (Corps) has prepared the Fire Island to Montauk Point, Suffolk County, New York, Reformulation Study Final Integrated Feasibility Report and Environmental Impact Statement. The study looked at a variety of alternatives for coastal storm risk management along the Atlantic coast of Long Island in Suffolk County. The cultural resources investigation completed for this study consisted of the review of previous surveys within the files of the New York State Historic Preservation Office (Cultural Resources Information System), and the New York State Museum as well as the completion of two cultural resources studies including a historic structures survey.

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Please review the attached and provide any additional comments by December 31, 2019. If you have any questions or need additional information, please contact Nancy J. Brighton at Nancy.J.Brighton@usace.army.mil or 202-761-4618. Thank you for your assistance with this project.

Sincerely,

Peter Weppler
Chief, Environmental Analysis Branch

Enclosures

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

November 21, 2019

Planning Division

Barbara M. Russell
Town Historian
Town of Brookhaven
1 Independence Hill
Farmingville, New York 11738

Dear Ms. Russell;

The U.S. Army Corps of Engineers, New York District (Corps) has prepared the Fire Island to Montauk Point, Suffolk County, New York, Reformulation Study Final Integrated Feasibility Report and Environmental Impact Statement. The study looked at a variety of alternatives for coastal storm risk management along the Atlantic coast of Long Island in Suffolk County. The cultural resources investigation completed for this study consisted of the review of previous surveys within the files of the New York State Historic Preservation Office (Cultural Resources Information System), and the New York State Museum as well as the completion of two cultural resources studies including a historic structures survey.

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Sincerely,

Peter Weppler
Chief, Environmental Analysis Branch

Enclosures

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

20 November 2019

Planning Division

Susan Bachor
Historic Preservation Representative
Delaware Tribe of Indians
Special Assistant Eastern Office
PO Box 64
Pocono Lake, Pennsylvania 18347

Dear Ms. Bachor;

The U.S. Army Corps of Engineers, New York District (Corps) has prepared the Fire Island to Montauk Point, Suffolk County, New York, Reformulation Study Final Integrated Feasibility Report and Environmental Impact Statement. The study looked at a variety of alternatives for coastal storm risk management along the Atlantic Coast of Long Island in Suffolk County. The cultural resources investigation completed for this study consisted of the review of previous surveys within the files of the New York State Historic Preservation Office (Cultural Resources Information System), and the New York State Museum as well as the completion of two cultural resources studies including a historic structures survey.

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Sincerely,

Peter Weppler
Chief, Environmental Analysis Branch

Enclosures

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

November 22, 2019

Planning Division

East Islip Historical Society
PO Box 8
East Islip, New York 11730

Dear Society Chair;

The U.S. Army Corps of Engineers, New York District (Corps) has prepared the Fire Island to Montauk Point, Suffolk County, New York, Reformulation Study Final Integrated Feasibility Report and Environmental Impact Statement. The study looked at a variety of alternatives for coastal storm risk management along the Atlantic coast of Long Island in Suffolk County. The cultural resources investigation completed for this study consisted of the review of previous surveys within the files of the New York State Historic Preservation Office (Cultural Resources Information System), and the New York State Museum as well as the completion of two cultural resources studies including a historic structures survey.

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Sincerely,

Peter Weppler
Chief, Environmental Analysis Branch

Enclosures

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

November 22, 2019

Planning Division

Sarah Medenhall Luhmer
President
East Quogue Historical Society
PO Box 174
East Quogue, New York 11942

Dear Ms. Luhmer;

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The proposed plan includes: 1) inlet sand bypassing across Fire Island, Moriches and Shinnecock Inlets; 2) residential building and commercial structural measures, such as elevations, flood-proofing or the construction of ringwalls, around groups of buildings and structures, within the 10-year floodplain; 3) the breach response plan; 4) beach and dune fill along the barrier island, the removal of groins at Ocean Beach, and 5) the construction of coastal process features at location on the barrier island and the mainland. The proposed plan would include: portions of the Towns of Babylon, Islip, Brookhaven, Southampton, and East Hampton; 12 incorporated villages; and the Fire Island National Seashore. The area is bounded by the Montauk Highway to the north, Montauk Point to the east, the Nassau County border to the west, and the Atlantic Ocean to the south within Suffolk County (Enclosure 1).

The Area of Potential Effect for historic properties includes the footprint of each set of measures. Within the Area of Potential Effect there are a number of cultural resources and historic properties, more than 70 archaeological sites dating from the Early Archaic period through the early 20th Century. There are more than 150 eligible or listed structures, including several historic districts and three cemeteries. The proposed plan has the potential to have an adverse effect on archaeological sites, historic sites and underwater sites through 1) the construction of the coastal process features; 2) residential building and commercial structural measures; and 3) use of the offshore borrow sites.

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Please review the attached and provide any additional comments by December 31, 2019. If you have any questions or need additional information, please contact Nancy J. Brighton at Nancy.J.Brighton@usace.army.mil or 202-761-4618. Thank you for your assistance with this project.

Sincerely,

Peter Weppler
Chief, Environmental Analysis Branch

Enclosures

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

November 21, 2019

Planning Division

Fire Island Lighthouse Preservation Society
4640 Captree Island
Captree Island, New York 11702

Dear Society President;

The U.S. Army Corps of Engineers, New York District (Corps) has prepared the Fire Island to Montauk Point, Suffolk County, New York, Reformulation Study Final Integrated Feasibility Report and Environmental Impact Statement. The study looked at a variety of alternatives for coastal storm risk management along the Atlantic coast of Long Island in Suffolk County. The cultural resources investigation completed for this study consisted of the review of previous surveys within the files of the New York State Historic Preservation Office (Cultural Resources Information System), and the New York State Museum as well as the completion of two cultural resources studies including a historic structures survey.

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Sincerely,

Peter Weppler
Chief, Environmental Analysis Branch

Enclosures

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

20 November 2019

Planning Division

Alex Romero
Superintendent
Fire Island National Seashore
120 Laurel Street
Patchogue, New York 11722

Dear Mr. Romero;

The U.S. Army Corps of Engineers, New York District (Corps) has prepared the Fire Island to Montauk Point, Suffolk County, New York, Reformulation Study Final Integrated Feasibility Report and Environmental Impact Statement. The study looked at a variety of alternatives for coastal storm risk management along the Atlantic Coast of Long Island in Suffolk County. The cultural resources investigation completed for this study consisted of the review of previous surveys within the files of the New York State Historic Preservation Office (Cultural Resources Information System), and the New York State Museum as well as the completion of two cultural resources studies including a historic structures survey.

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The District would like to invite the Fire Island National Seashore, National Park Service, to be a signatory to this agreement. Please review the attached and provide any additional comments by December 31, 2019. If you have any questions or need additional information, please contact Nancy J. Brighton at Nancy.J.Brighton@usace.army.mil or 202-761-4618. Thank you for your assistance with this project.

Sincerely,

Peter Weppler
Chief, Environmental Analysis Branch

Enclosures

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

November 22, 2019

Planning Division

Brenda Sinclair Berntson
President
Hampton Bays Historical and Preservation Society
116 West Montauk Highway
Hampton Bays, New York 11946

Dear Ms. Berntson;

The U.S. Army Corps of Engineers, New York District (Corps) has prepared the Fire Island to Montauk Point, Suffolk County, New York, Reformulation Study Final Integrated Feasibility Report and Environmental Impact Statement. The study looked at a variety of alternatives for coastal storm risk management along the Atlantic coast of Long Island in Suffolk County. The cultural resources investigation completed for this study consisted of the review of previous surveys within the files of the New York State Historic Preservation Office (Cultural Resources Information System), and the New York State Museum as well as the completion of two cultural resources studies including a historic structures survey.

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Sincerely,

Peter Weppler
Chief, Environmental Analysis Branch

Enclosures

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

November 22, 2019

Planning Division

Historical Society of Islip Hamlet
PO Box 601
Islip, New York 11751

Dear Society President;

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Peter Weppler
Chief, Environmental Analysis Branch

Enclosures

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

November 22, 2019

Planning Division

Nancy Solomon
Executive Director
Long Island Traditions
382 Main Street
Port Washington, New York 11050

Dear Ms. Solomon;

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Peter Weppler
Chief, Environmental Analysis Branch

Enclosures

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

November 22, 2019

Planning Division

Edward DeGennaro
President
Mastic Peninsula Historical Society
PO Box 333
Mastic, New York 11950

Dear Mr. DeGennaro;

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Peter Weppler
Chief, Environmental Analysis Branch

Enclosures

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

November 21, 2019

Planning Division

Bert Seides
President
Moriches Bay Historical Society
15 Montauk Hwy
Center Moriches, New York 11934

Dear Mr. Seides

The U.S. Army Corps of Engineers, New York District (Corps) has prepared the Fire Island to Montauk Point, Suffolk County, New York, Reformulation Study Final Integrated Feasibility Report and Environmental Impact Statement. The study looked at a variety of alternatives for coastal storm risk management along the Atlantic coast of Long Island in Suffolk County. The cultural resources investigation completed for this study consisted of the review of previous surveys within the files of the New York State Historic Preservation Office (Cultural Resources Information System), and the New York State Museum as well as the completion of two cultural resources studies including a historic structures survey.

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Peter Weppler
Chief, Environmental Analysis Branch

Enclosures

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

20 November 2019

Planning Division

Mr. John Bonafide
Director
Technical Preservation Bureau and
Agency Preservation Officer
New York State Division for Historic Preservation
PO Box 189
Waterford, New York 12188-0189

Dear Mr. Bonafide;

The U.S. Army Corps of Engineers, New York District (Corps) has prepared the Fire Island to Montauk Point, Suffolk County, New York, Reformulation Study Final Integrated Feasibility Report and Environmental Impact Statement. The study looked at a variety of alternatives for coastal storm risk management along the Atlantic coast of Long Island in Suffolk County. The cultural resources investigation completed for this study consisted of the review of previous surveys within the files of the New York State Historic Preservation Office (Cultural Resources Information System), and the New York State Museum as well as the completion of two cultural resources studies including a historic structures survey.

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The Fire Island to Montauk Point Reformulation Study has been in development since the early 2000s. The Corps had conducted public meetings related to cultural resources and the development of the historic structures survey and context in 2006. After Hurricane Sandy, the study reformulation included the effects of the storm on the south shore in Suffolk County. Most recently, the Corps, in coordination with the New York State Department of Environmental Conservation, made the draft Hurricane Sandy General Re-evaluation Report with Draft Environmental Impact Statement for the Fire Island to Montauk Point Reformulation Study on July 2016. It was available for public comment through October 2016. Four public meetings were held in Suffolk County in September 2016.

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The revised programmatic agreement is being sent for a final review to the Fire Island National Seashore, the Shinnecock Indian Nation and the Delaware Tribe of Indians, who are federally-recognized tribes, and Unkechaug Indian Nation, a New York state-recognized tribe, and a number of historical societies and organizations in Suffolk County (Enclosure 3).

Please review the attached and provide any additional comments by December 31, 2019. If you have any questions or need additional information, please contact Nancy J. Brighton at Nancy.J.Brighton@usace.army.mil or 202-761-4618. Thank you for your assistance with this project.

Sincerely,

Peter Weppler
Chief, Environmental Analysis Branch

Enclosures

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

November 21, 2019

Planning Division

Carol Kushner
President
Ocean Beach Historical Society
PO Box 701
Ocean Beach, New York 11770

Dear Ms. Kushner

The U.S. Army Corps of Engineers, New York District (Corps) has prepared the Fire Island to Montauk Point, Suffolk County, New York, Reformulation Study Final Integrated Feasibility Report and Environmental Impact Statement. The study looked at a variety of alternatives for coastal storm risk management along the Atlantic coast of Long Island in Suffolk County. The cultural resources investigation completed for this study consisted of the review of previous surveys within the files of the New York State Historic Preservation Office (Cultural Resources Information System), and the New York State Museum as well as the completion of two cultural resources studies including a historic structures survey.

The proposed plan includes: 1) inlet sand bypassing across Fire Island, Moriches and Shinnecock Inlets; 2) residential building and commercial structural measures such as elevations, flood-proofing, or the construction of ringwalls around groups of buildings and structures, within the 10-year floodplain; 3) the breach response plan; 4) beach and dune fill along the barrier island, the removal of groins at Ocean Beach, and 5) the construction of coastal process features at location on the barrier island and the mainland. The proposed plan would include: portions of the Towns of Babylon, Islip, Brookhaven, Southampton, and East Hampton; 12 incorporated villages; and the Fire Island National Seashore. The area is bounded by the Montauk Highway to the north, Montauk Point to the east, the Nassau County border to the west, and the Atlantic Ocean to the south within Suffolk County (Enclosure 1).

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Sincerely,

Peter Weppler
Chief, Environmental Analysis Branch

Enclosures

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

November 21, 2019

Planning Division

Greater Patchogue Historical Society
PO Box 102
Patchogue, New York 11772

Dear Society President;

The U.S. Army Corps of Engineers, New York District (Corps) has prepared the Fire Island to Montauk Point, Suffolk County, New York, Reformulation Study Final Integrated Feasibility Report and Environmental Impact Statement. The study looked at a variety of alternatives for coastal storm risk management along the Atlantic coast of Long Island in Suffolk County. The cultural resources investigation completed for this study consisted of the review of previous surveys within the files of the New York State Historic Preservation Office (Cultural Resources Information System), and the New York State Museum as well as the completion of two cultural resources studies including a historic structures survey.

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Peter Weppler
Chief, Environmental Analysis Branch

Enclosures

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

November 22, 2019

Planning Division

Alexandra Parsons Wolfe
Executive Director
Preservation Long Island
16 Main Street
PO Box 148
Cold Spring Harbor, New York 11724

Dear Ms. Wolfe;

The U.S. Army Corps of Engineers, New York District (Corps) has prepared the Fire Island to Montauk Point, Suffolk County, New York, Reformulation Study Final Integrated Feasibility Report and Environmental Impact Statement. The study looked at a variety of alternatives for coastal storm risk management along the Atlantic coast of Long Island in Suffolk County. The cultural resources investigation completed for this study consisted of the review of previous surveys within the files of the New York State Historic Preservation Office (Cultural Resources Information System), and the New York State Museum as well as the completion of two cultural resources studies including a historic structures survey.

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Sincerely,

Peter Weppler
Chief, Environmental Analysis Branch

Enclosures

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

November 22, 2019

Planning Division

Chester Murray and Peter J. Rothenberg
Co-Chairs
Quogue Historical Society
114 Jessup Avenue
PO Box 1207
Quogue, New York 11959

Dear Sirs;

The U.S. Army Corps of Engineers, New York District (Corps) has prepared the Fire Island to Montauk Point, Suffolk County, New York, Reformulation Study Final Integrated Feasibility Report and Environmental Impact Statement. The study looked at a variety of alternatives for coastal storm risk management along the Atlantic coast of Long Island in Suffolk County. The cultural resources investigation completed for this study consisted of the review of previous surveys within the files of the New York State Historic Preservation Office (Cultural Resources Information System), and the New York State Museum as well as the completion of two cultural resources studies including a historic structures survey.

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Sincerely,

Peter Weppler
Chief, Environmental Analysis Branch

Enclosures

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

November 22, 2019

Planning Division

Christine Gottsch
President
Sagtikos Manor Historical Society
PO Box 5344
Bay Shore, New York 11706

Dear Ms. Gottsch;

The U.S. Army Corps of Engineers, New York District (Corps) has prepared the Fire Island to Montauk Point, Suffolk County, New York, Reformulation Study Final Integrated Feasibility Report and Environmental Impact Statement. The study looked at a variety of alternatives for coastal storm risk management along the Atlantic coast of Long Island in Suffolk County. The cultural resources investigation completed for this study consisted of the review of previous surveys within the files of the New York State Historic Preservation Office (Cultural Resources Information System), and the New York State Museum as well as the completion of two cultural resources studies including a historic structures survey.

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Sincerely,

Peter Weppler
Chief, Environmental Analysis Branch

Enclosures

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

November 21, 2019

Planning Division

Sayville Historical Society
39 Edwards St
Sayville, New York 11782

Dear Society President;

The U.S. Army Corps of Engineers, New York District (Corps) has prepared the Fire Island to Montauk Point, Suffolk County, New York, Reformulation Study Final Integrated Feasibility Report and Environmental Impact Statement. The study looked at a variety of alternatives for coastal storm risk management along the Atlantic coast of Long Island in Suffolk County. The cultural resources investigation completed for this study consisted of the review of previous surveys within the files of the New York State Historic Preservation Office (Cultural Resources Information System), and the New York State Museum as well as the completion of two cultural resources studies including a historic structures survey.

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Peter Weppler
Chief, Environmental Analysis Branch

Enclosures

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

20 November 2019

Planning Division

Bryan A. Polite
Chairman
Shinnecock Indian Nation
PO Box 5006
Southampton, New York 11968

Dear Chairman Polite;

The U.S. Army Corps of Engineers, New York District (Corps) has prepared the Fire Island to Montauk Point, Suffolk County, New York, Reformulation Study Final Integrated Feasibility Report and Environmental Impact Statement. The study looked at a variety of alternatives for coastal storm risk management along the Atlantic Coast of Long Island in Suffolk County. The cultural resources investigation completed for this study consisted of the review of previous surveys within the files of the New York State Historic Preservation Office (Cultural Resources Information System), and the New York State Museum as well as the completion of two cultural resources studies including a historic structures survey.

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Sincerely,

Peter Weppler
Chief, Environmental Analysis Branch

Enclosures

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

November 21, 2019

Planning Division

Tom Edwards
Executive Director
Southampton History Museum
PO Box 303
Southampton, New York 11969

Dear Mr. Edwards;

The U.S. Army Corps of Engineers, New York District (Corps) has prepared the Fire Island to Montauk Point, Suffolk County, New York, Reformulation Study Final Integrated Feasibility Report and Environmental Impact Statement. The study looked at a variety of alternatives for coastal storm risk management along the Atlantic coast of Long Island in Suffolk County. The cultural resources investigation completed for this study consisted of the review of previous surveys within the files of the New York State Historic Preservation Office (Cultural Resources Information System), and the New York State Museum as well as the completion of two cultural resources studies including a historic structures survey.

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Please review the attached and provide any additional comments by December 31, 2019. If you have any questions or need additional information, please contact Nancy J. Brighton at Nancy.J.Brighton@usace.army.mil or 202-761-4618. Thank you for your assistance with this project.

Sincerely,

Peter Weppler
Chief, Environmental Analysis Branch

Enclosures

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

November 21, 2019

Planning Division

Dr. Gaynell Stone
Suffolk County Archaeological Association
2322 North Wading River Road
Stony Brook, New York 11790

Dear Dr. Stone;

The U.S. Army Corps of Engineers, New York District (Corps) has prepared the Fire Island to Montauk Point, Suffolk County, New York, Reformulation Study Final Integrated Feasibility Report and Environmental Impact Statement. The study looked at a variety of alternatives for coastal storm risk management along the Atlantic coast of Long Island in Suffolk County. The cultural resources investigation completed for this study consisted of the review of previous surveys within the files of the New York State Historic Preservation Office (Cultural Resources Information System), and the New York State Museum as well as the completion of two cultural resources studies including a historic structures survey.

The proposed plan includes: 1) inlet sand bypassing across Fire Island, Moriches and Shinnecock Inlets; 2) residential building and commercial structural measures such as elevations, flood-proofing, or the construction of ringwalls around groups of buildings and structures, within the 10-year floodplain; 3) the breach response plan; 4) beach and dune fill along the barrier island, the removal of groins at Ocean Beach, and 5) the construction of coastal process features at location on the barrier island and the mainland. The proposed plan would include: portions of the Towns of Babylon, Islip, Brookhaven, Southampton, and East Hampton; 12 incorporated villages; and the Fire Island National Seashore. The area is bounded by the Montauk Highway to the north, Montauk Point to the east, the Nassau County border to the west, and the Atlantic Ocean to the south within Suffolk County (Enclosure 1).

The Area of Potential Effect for historic properties includes the footprint of each set of measures. Within the Area of Potential Effect there are a number of cultural resources and historic properties including more than 70 archaeological sites dating from the Early Archaic period through the early 20th Century. There are more than 150 eligible or listed structures, including several historic districts and three cemeteries. The proposed plan has the potential to have an adverse effect on archaeological sites, historic sites and underwater sites through 1) the construction of the coastal process features; 2) residential building and commercial structural measures; and 3) use of the offshore borrow sites.

The Fire Island to Montauk Point Reformulation Study has been in development since the early 2000s. The Corps had conducted public meetings related to cultural resources and the development of the historic structures survey and context in 2006. After Hurricane Sandy, the study reformulation included the effects of the storm on the south shore in Suffolk County. Most recently, the Corps, in coordination with the New York State Department of Environmental Conservation, made the draft Hurricane Sandy General Re-evaluation Report with Draft Environmental Impact Statement for the Fire Island to Montauk Point Reformulation Study on July 2016. It was available for public comment through October 2016. Four public meetings were held in Suffolk County in September 2016.

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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

November 21, 2019

Planning Division

Victoria Berger
Executive Director
Suffolk County Historical Society
300 West Main Street
Riverhead, New York 11901

Dear Ms. Berger;

The U.S. Army Corps of Engineers, New York District (Corps) has prepared the Fire Island to Montauk Point, Suffolk County, New York, Reformulation Study Final Integrated Feasibility Report and Environmental Impact Statement. The study looked at a variety of alternatives for coastal storm risk management along the Atlantic coast of Long Island in Suffolk County. The cultural resources investigation completed for this study consisted of the review of previous surveys within the files of the New York State Historic Preservation Office (Cultural Resources Information System), and the New York State Museum as well as the completion of two cultural resources studies including a historic structures survey.

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Sincerely,

Peter Weppler
Chief, Environmental Analysis Branch

Enclosures

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

November 21, 2019

Planning Division

Village of Babylon
Historical and Preservation Society
PO Box 484
Babylon, New York 11702

Dear Society Chair;

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Sincerely,

Peter Weppler
Chief, Environmental Analysis Branch

Enclosures

APPENDIX C

FIRE ISLAND TO MONTAUK POINT, SUFFOLK COUNTY, NEW YORK

VI. INDIVIDUAL PROPERTIES ELIGIBLE FOR LISTING IN THE NATIONAL REGISTER: PRELIMINARY STUDY LIST

The historic resources surveyed within the APE were intended to represent the full spectrum of existing types and styles in aboveground resources, 50 years old or older, associated with the historical contexts of the project area. One thousand four hundred and ninety historic resources were surveyed; of those, 49 were identified as being potentially eligible for the National Register of Historic Places as individual resources.

The majority of the 49 properties were located in the easternmost parts of the APE; 11 are in Quogue and eight in West Hampton Bays. Only one resource of those surveyed was identified as being built prior to 1840; this property is in Babylon. The prevailing primary context of the potentially eligible resources was early suburbanization, for which the period of significance falls between 1890 and 1920. More than half of the individual resources on the potentially eligible list are residential properties.

These properties have been identified through fieldwork and general contextual research as retaining sufficient integrity and demonstrating significance as outlined in both this report and *National Register Bulletin 15: How to Apply the Criteria for National Register Evaluation* (Andrus 2002). These properties may be further evaluated (based upon more intensive research and/or fieldwork) as the FIMP's proposed actions and priority areas are further developed and refined. Other properties not inventoried and/or not included below may also exhibit potential for listing in the National Register. This list is intended as a baseline collection of significant properties. As part of the phased approach to Section 106 compliance, this list is intended to serve as a preliminary decision-aiding tool rather than as a definitive authority. The following list of properties have been determined to be associated with one or more the relevant historical contexts of the APE and are thought to fulfill at least one of the Secretary of Interior's established criteria necessary for listing on the National Register.

SURVEY_ID	STREET_NAM	STREET_SUF	Village/Hamlet:	Original Use:	Current Use:	Primary Context:	Secondary Context:	Period of Significance	PHOTO	Building Type/Style:	Subarea	USACEID
44_SA1f	Cedar		babylon	residence	residence	early suburban	residential	1890-1920	DSCN0221.jpg	Folk Victorian	SA1f	105_671.00

SURVEY_ID	STREET_NAM	STREET_SUF	Village/Hamlet:	Original Use:	Current Use:	Primary Context:	Secondary Context:	Period of Significance	PHOTO	Building Type/Style:	Subarea	USACEID
23_SA1f	Willow	St	babylon	residence	residence	early nationhood	residential	1800-1840	DSCN0197.jpg	Colonial Revival	SA1f	105_569.00

SURVEY_ID	STREET_NAM	STREET_SUF	Village/Hamlet:	Original Use:	Current Use:	Primary Context:	Secondary Context:	Period of Significance	PHOTO	Building Type/Style:	Subarea	USACEID
111_SA1f	yacht club	Rd	babylon	commercial	institutional	postwar suburban	Resort	1945-1960	DSCN0307.jpg	Hotels / Motels	SA1f	106_764.10

SURVEY_ID	STREET_NAM	STREET_SUF	Village/Hamlet	Original Use:	Current Use:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID
138_SA1f	sequams lane east		islip	institutional	institutional	early suburban	Resort	1890-1920	DSCN0342.jpg	Landscape features /	SA1f	105_1084.00
137_SA1f	sequams lane east		islip	maritime	maritime	early suburban	Resort	1890-1920	DSCN0343.jpg	Recreation	SA1f	105_1085.00

SURVEY_ID	STREET_NAM	STREET_SUF	Village/Hamlet	Original Use:	Current Use:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID
29_SA1f	fire island	Ave	babylon	institutional	institutional	postwar suburban	institutional	1945-1960	DSCN0205.j	Modern	SA1f	106_731.00

SURVEY_ID	STREET_NAM	STREET_SUF	Village/Hamlet	Original Use:	Current Use:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID
161_SA1f	Eaton		islip	residence	residence	early suburban	Residential	1920-1945	DSCN0371.jpg	Colonial Revival	SA1f	109_1110.00

SURVEY_ID	Address or Street Location:	STREET_NAM	STREET_SUF	Village/Hamlet:	Original Use:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID
65_SA2a		mowbray		bay shore	residence	early suburban	Resort	1890-1920	DSCN0508.jpg	Vacation home - Cott	SA2a	

SURVEY_ID	Address or Street Location:	STREET_NAM	STREET_SUF	Village/Hamlet:	Original Use:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID
64_SA2a		mowbray		bay shore	residence	early suburban	Residential	1920-1945	DSCN0510.jpg	Craftsman	SA2a	116_390.00

SURVEY_ID	Address or Street Location:	STREET_NAM	STREET_SUF	Village/Hamlet:	Original Use:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID
16_SA2a		cottage		bay shore	residence	early suburban	Residential	1920-1945	DSCN0452.jpg	Folk Victorian	SA2a	117_289.00

SURVEY_ID	Address or Street Location:	STREET_NAM	STREET_SUF	Village/Hamlet:	Original Use:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID
49_SA2a		homan		bay shore	residence	industrialization	Maritime/ind	1865-1890	DSCN0488.jpg	Folk Victorian	SA2a	116_179.00

SURVEY_ID	Address or Street Location:	STREET_NAM	STREET_SUF	Village/Hamlet:	Original Use:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID
76_SA3d	4	leo		patchogue	residence	early suburban	Residential	1920-1945	DSCN0632.jpg	Craftsman	SA3d	153_984.00

SURVEY_ID	Address or Street Location:	STREET_NAM	STREET_SUF	Village/Hamlet:	Original Use:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID
36_SA3d		maiden	la	patchogue	residence	industrialization	Residential	1865-1890	DSCN055	Italianate/2nd empir	SA3d	153_1009.00

SURVEY_ID	Address or Street Location:	STREET_NAM	STREET_SUF	Village/Hamlet:	Original Use:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID
29_SA3d	41	maiden	la	patchogue	residence	early suburban	Residential	1890-1920	DSCN0544.jpg	Folk Victorian	SA3d	153_655.00
SURVEY_ID	Address or Street Location:	STREET_NAM	STREET_SUF	Village/Hamlet:	Original Use:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID
39_SA3d	556	ocean		patchogue	commercial	early suburbanizatio	commercial	1865-1890	DSCN0554.jpg	19th c Commercial	SA3d	
SURVEY_ID	Address or Street Location:	STREET_NAM	STREET_SUF	Village/Hamlet:	Original Use:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID
25_SA3d		brightwood	St	patchogue	residence	early suburban	Residential	1890-1920	DSCN0540.jpg	Colonial Revival	SA3d	153_642.00
SURVEY_ID	Address or Street Location:	STREET_NAM	STREET_SUF	Village/Hamlet:	Original Use:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID
26_SA3d		brightwood	St	patchogue	residence	early suburban	Residential	1890-1920	DSCN0539.jpg	Craftsman	SA3d	153_648.00
SURVEY_ID	Address or Street Location:	STREET_NAM	STREET_SUF	Village/Hamlet:	Original Use:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID
33_SA3d	23	maiden	la	patchogue	residence	early suburban	Residential	1890-1920	DSCN0548.jpg	Colonial Revival	SA3d	153_659.00
SURVEY_ID	Address or Street Location:	STREET_NAM	STREET_SUF	Village/Hamlet:	Original Use:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID
147_SA4e		riviera		mastic beach	residence	early suburban	Residential	1920-1945	DSCN0618.jpg	Vacation home - Cott	SA4e	186_1119.00
SURVEY_ID	Address or Street Location:	STREET_NAM	STREET_SUF	Village/Hamlet:	Original Use:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID
235_SA4e		huntington		mastic beach	residence	early suburban	residential/resort	1920-1945	DSCN0713.jpg	Vacation home - Cott	SA4e	179_1071.00
SURVEY_ID	Address or Street Location:	STREET_NAM	STREET_SUF	Village/Hamlet:	Original Use:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID
225_SA4e	16	astoria	Rd	mastic beach	residence	early suburban	Residential	1920-1945	DSCN0701.jpg	Vacation home - Cott	SA4e	179_1200.00
SURVEY_ID	Address or Street Location:	STREET_NAM	STREET_SUF	Village/Hamlet:	Original Use:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID
36_SA4f		laffayette		mastic	residence	early suburban	Residential	1920-1945	DSCN0423.jpg	Modern	SA4f	185_230.00
SURVEY_ID	Address or Street Location:	STREET_NAM	STREET_SUF	Village/Hamlet:	Original Use:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID
34_SA5b	112	senix		moriches	residence	early suburban	Residential	1890-1920	DSCN0835.jpg	Colonial Revival	SA5b	189_300.00
SURVEY_ID	Address or Street Location:	STREET_NAM	STREET_SUF	Village/Hamlet:	Original Use:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID
63_SA5b		bay		moriches	residence	early suburban	Resort	1920-1945	DSCN0871.jpg	Vacation - Cottage	SA5b	194_480.00
SURVEY_ID	Address or Street Location:	STREET_NAM	STREET_SUF	Village/Hamlet:	Original Use:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID

50_SA5b				moriches	institutional	early suburban	Resort	1890-1920	DSCN0855.jpg	Shingle / Stick	SA5b	194_156.00
SURVEY_ID	Address or Street Location:	STREET_NAM	STREET_SUF	Village/Hamlet:	Original Use:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID
46_SA5b	11	convent	la	moriches	institutional	early suburban	institutional	1890-1920	DSCN0850.jpg	Shingle / Stick	SA5b	194_362.00
SURVEY_ID	Address or Street Location:	STREET_NAM	STREET_SUF	Village/Hamlet:	Original Use:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID
18_SA5c	70	watchogue		east moriches	residence	early suburban	Residential	1890-1920	DSCN0897.jpg	Folk Victorian	SA5c	200_84.00
SURVEY_ID	Address or Street Location:	STREET_NAM	STREET_SUF	Village/Hamlet:	Original Use:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID
9_SA6a		jagger	la	westhampton beach	residence	early suburban	Residential	1920-1945	DSCN0130.jpg	Colonial Revival	SA6a	207_176.00
SURVEY_ID	Address or Street Location:	STREET_NAM	STREET_SUF	Village/Hamlet:	Original Use:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID
30_SA6a	10	lott	Ave	westhampton beach	residence	early suburban	Residential	1890-1920	DSCN0161.jpg	Shingle / Stick	SA6a	210_112.00
SURVEY_ID	Address or Street Location:	STREET_NAM	STREET_SUF	Village/Hamlet:	Original Use:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID
31_SA6a	24	lott	Ave	westhampton beach	residence	early suburban	Residential	1890-1920	DSCN0162.jpg	Colonial Revival	SA6a	210_110.00
SURVEY_ID	Address or Street Location:	STREET_NAM	STREET_SUF	Village/Hamlet:	Original Use:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID
28_SA6a	8	lott	Ave	westhampton beach	residence	early suburban	Residential	1920-1945	DSCN0157.jpg	Beaux Arts	SA6a	210_106.00
SURVEY_ID	Address or Street Location:	STREET_NAM	STREET_SUF	Village/Hamlet:	Original Use:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID
29_SA6a	5	lott	Ave	westhampton beach	residence	early suburban	Residential	1920-1945	DSCN0158.jpg	Colonial Revival	SA6a	210_109.00
SURVEY_ID	Address or Street Location:	STREET_NAM	STREET_SUF	Village/Hamlet:	Original Use:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID
12_SA6a		jagger	la	westhampton beach	residence	early suburban	Residential	1890-1920	DSCN0133.jpg	Colonial Revival	SA6a	207_181.00
SURVEY_ID	Address or Street Location:	STREET_NAM	STREET_SUF	Village/Hamlet:	Original Use:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID
24_SA6b	35	beach	la	quogue	residence	early suburban	Resort	1890-1920	DSCN0265.jpg	Shingle / Stick	SA6b	215_21.00
SURVEY_ID	Address or Street Location:	STREET_NAM	STREET_SUF	Village/Hamlet:	Original Use:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID
54_SA6b		sunswyck		west hampton	residence	early suburban	Residential	1865-1890	DSCN0985.jpg	Colonial Revival	SA6b	
SURVEY_ID	Address or Street Location:	STREET_NAM	STREET_SUF	Village/Hamlet:	Original Use:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID
16_SA6b		ocean	Ave	quogue	residence	early suburban	Resort	1890-1920	DSCN0255.jpg	Folk Victorian	SA6b	219_23.00

SURVEY_ID	Address or Street Location:	STREET_NAM	STREET_SUF	Village/Hamlet:	Original Use:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID
941_SA6b		library		west hampton	residence	early suburban	Residential	1890-1920	DSCN0941.jpg	Folk Victorian	SA6b	213_191.00
SURVEY_ID	Address or Street Location:	STREET_NAM	STREET_SUF	Village/Hamlet:	Original Use:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID
17_SA6b	21	quogo neck	la	quogue	residence	early suburban	Resort	1920-1945	DSCN0258.jpg	Vacation home - esta	SA6b	215_112.00
SURVEY_ID	Address or Street Location:	STREET_NAM	STREET_SUF	Village/Hamlet:	Original Use:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID
15_SA6b	40	odean	Ave	quogue	residence	postwar suburban	Resort	1945-1960	DSCN0254.jpg	Modern	SA6b	
SURVEY_ID	Address or Street Location:	STREET_NAM	STREET_SUF	Village/Hamlet:	Original Use:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID
27_SA6b	28	beach	la	quogue	residence	postwar suburban	Residential	1945-1960	DSCN0269.jpg	Modern	SA6b	215_26.00
SURVEY_ID	Address or Street Location:	STREET_NAM	STREET_SUF	Village/Hamlet:	Original Use:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID
24_SA6c		sunset	Ave	east quogue	residence	early suburban	Residential	1890-1920	DSCN0228.jpg	Shingle / Stick	SA6c	218_101.00
SURVEY_ID	Address or Street Location:	STREET_NAM	STREET_SUF	Village/Hamlet:	Original Use:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID
999_SA6c	29	shinnecock	Rd	quogue	residence	early suburban	Resort	1890-1920	DSCN0238.jpg	Vacation - estate	SA6c	219_80.00
SURVEY_ID	Address or Street Location:	STREET_NAM	STREET_SUF	Village/Hamlet:	Original Use:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID
986_SA6c		shinnecock	Rd	quogue	residence	early suburban	Resort	1890-1920	DSCN0243.jpg	Vacation estate	SA6c	219_76.00
SURVEY_ID	Address or Street Location:	STREET_NAM	STREET_SUF	Village/Hamlet:	Original Use:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID
969_SA6c	31	shinnecock		quogue	residence	early suburban	Resort	1890-1920	DSCN0244.jpg	Colonial Revival	SA6c	219_59.00
SURVEY_ID	Address or Street Location:	STREET_NAM	STREET_SUF	Village/Hamlet:	Original Use:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID
752_SA6c		bayside		east quogue	residence	early suburban	Residential	1945-1960	DSCN0215.jpg	Minimal Traditional	SA6c	222_178.00
SURVEY_ID	Address or Street Location:	STREET_NAM	STREET_SUF	Village/Hamlet:	Original Use:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID
998_SA6c	26	shinnecock	Rd	quogue	residence	early suburban	Resort	1890-1920	DSCN0239.jpg	Colonial Revival	SA6c	
SURVEY_ID	Address or Street Location:	STREET_NAM	STREET_SUF	Village/Hamlet:	Original Use:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID
9_SA7b	296	mountauk hwy		hampton bays	residence	early suburban	Resort	1920-1945	DSCN0191.jpg	Colonial Revival	SA7b	230_115.00
SURVEY_ID	Address or Street Location:	STREET_NAM	STREET_SUF	Village/Hamlet:	Original Use:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID

SURVEY_ID	Address or Street Location:	STREET_NAM	STREET_SUF	Village/Hamlet:	Original Use:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID
5_SA7b		tepee		hampton bays	residence	early suburban	Residential	1920-1945	DSCN0186.jpg	Vacation home - Cott	SA7b	230_105.00
16_SA4f	118	riveria	Rd	mastic	residence	early suburban	Residential	1920-1945	DSCN0400.jpg	Split Level	SA4f	185_747.00

DISTRICTS ELIGIBLE FOR LISTING IN THE NATIONAL REGISTER: PRELIMINARY STUDY LISTS

According to *National Register Bulletin 15: How to Apply the Criteria for National Register Evaluation* (Andrus 2002), a district "results from the interrelationship of its resources, which can convey a visual sense of the overall historic environment or be an arrangement of historically or functionally related properties." In addition, the bulletin notes that a district "may even be considered eligible if all of the components lack individual distinction, provided that the grouping achieves significance as a whole within its historic context."

Within the APE, 10 historic districts were identified. The districts are primarily residential; however, one in Lindenhurst is associated with the maritime and fishing industry. The majority of the residential districts are associated with the primary contexts of early or postwar suburbanization, spanning almost 70 years in history. The district identified in Mastic has a considerable number of vacation or seasonal homes, and the West Hampton district has 13 properties of the 31 associated with the secondary context of resort development. Although resort and vacation community construction historically occurred in the western portion of Suffolk County along the South Shore, today it seems as though more properties associated with seasonal use and resort activities are located further east.

The following study areas feature districts that are likely to be eligible for listing in the National Register of Historic Places. Within the APE, 10 areas stood out as being potentially eligible historic districts. These properties have been identified through fieldwork and general contextual research as retaining sufficient integrity and demonstrating significance as outlined in both this report and *National Register Bulletin 15*. These properties may be further evaluated (based upon more intensive research and/or fieldwork) as the FIMP's proposed actions and priority areas are further developed and refined. Other properties not inventoried and/or not included below may also exhibit potential for listing in the National Register. However, this list is intended as a baseline collection of significant properties. As part of the phased approach to Section 106 compliance, this list is intended to serve as a preliminary decision-aiding tool rather than as a definitive authority; accordingly, some of the properties below may be later determined as non-contributing properties. This list is intended primarily to show the probability for eligible districts, and includes portions of subarea 1C and 1E, as well as subareas 1F, 3D, 4A, 4F, 5B, 6A, 6C, and 7B. The following individual properties are located within the above district areas.

Maritime/Fishing District Area – 1C

SURVEY_ID	Village/Hamlet:	Original Use:	Current Use:	Primary Context:	Secondary Context:	Period of Significance	PHOTO	Building Type/Style:	Subarea	USACEID	Setting
98_SA1c	Lindenhurst	maritime	maritime	early suburban	maritime/ind	1920-1945	DSCN0167.jpg	Maritime - Fishing p	SA1c	99_1126.00	1
90_SA1c	Lindenhurst	maritime	residence	early suburban	maritime/ind	1920-1945	DSCN0156.jpg	Maritime - Fishing p	SA1c	99_1128.90	1
97_SA1c	Lindenhurst	maritime	maritime	early suburban	maritime/ind	1920-1945	DSCN0163.jpg	Maritime - Fishing p	SA1c	99_1128.20	1
93_SA1c	Lindenhurst	maritime	maritime	early suburban	maritime/ind	1920-1945	DSCN0159.jpg	Maritime - Fishing p	SA1c	99_1128.60	1
94_SA1c	Lindenhurst	maritime	maritime	early suburban	maritime/ind	1920-1945	DSCN0160.jpg		SA1c		1
95_SA1c	Lindenhurst	maritime	maritime	early suburban	maritime/ind	1920-1945	DSCN0161.jpg		SA1c		1

Residential District Area – 1E

SURVEY_ID	STREET_NAM	STREET_SUF	Village/Hamlet:	Original Use:	Current Use:	Primary Context:	Secondary Context:	Period of Significance	PHOTO	Subarea	USACEID
26_SA1e	Venetian	Rd	babylon	residence	residence	early suburban	residential	1920-1945	DSCN0014.jpg	SA1e	

Residential District Area – 1F

SURVEY_ID	Address or Street Location:	STREET_NAM	STREET_SUF	Village/Hamlet:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID
25_SA1f	129	prospect	St	babylon	early nationhood	residential	1800-1840	DSCN0200.jpg	Colonial / Vernacula	SA1f	105_502.00
165_SA1f	188	eaton		islip	postwar suburban	residential	1945-1960	DSCN0375.jpg	Split Level	SA1f	109_1105.00
140_SA1f		sequams lane east		islip	postwar suburban	residential	1945-1960	DSCN0345.jpg	Colonial Revival	SA1f	105_1081.00
182_SA1f	9	hiawatha	Rd	babylon	early suburban	residential	1920-1945	DSCN0398.jpg	Vacation - Cottage	SA1f	106_632.00
79_SA1f	162	araca	Rd	babylon	early suburban	residential	1920-1945	DSCN0268.jpg	Colonial Revival	SA1f	106_589.40
19_SA1f	6	shore	Rd	babylon	early nationhood	residential	1800-1840	DSCN0189.jpg	Folk Victorian	SA1f	105_531.00
181_SA1f		hiawatha		babylon	early suburban	residential	1920-1945	DSCN0397.jpg	Folk Victorian	SA1f	106_631.00
116_SA1f	19	lewis		babylon	postwar suburban	residential	1945-1960	DSCN0315.jpg	Cape Cod Revival	SA1f	105_833.00
170_SA1f	254	sequams lane cntr		islip	early suburban	residential	1920-1945	DSCN0385.jpg	Cape Cod Revival	SA1f	
120_SA1f	4	lewis		babylon	postwar suburban	residential	1945-1960	DSCN0319.jpg	Ranch	SA1f	105_823.00
121_SA1f	5	lewis		babylon	postwar suburban	residential	1945-1960	DSCN0320.jpg	Ranch	SA1f	105_824.00
196_SA1f		fire island	Ave	babylon	early suburban	commercial	1890-1920	DSCN0413.jpg	20th c Commercial	SA1f	105_684.00

14_SA1f	18	shore	Rd	babylon	industrialization	residential	1865-1890	DSCN0185.jpg	Colonial / Vernacula	SA1f	105_534.00
180_SA1f	1	hiawatha	Rd	babylon	early suburban	residential	1920-1945	DSCN0396.jpg	Queen Anne	SA1f	106_630.00
94_SA1f	100	araca	Rd	babylon	early suburban	residential	1920-1945	DSCN0284.jpg	Bungalow	SA1f	106_580.00
134_SA1f		fire island		babylon	postwar suburban	commercial	1945-1960	DSCN0336.jpg	20th c Commercial	SA1f	105_768.00
160_SA1f	179	sequams lane cntr		islip	early suburban	residential	1920-1945	DSCN0370.jpg	Cape Cod Revival	SA1f	105_1050.00
98_SA1f	76	araca	Rd	babylon	early suburban	residential	1920-1945	DSCN0290.jpg	Bungalow	SA1f	106_576.00
101_SA1f	64	araca	Rd	babylon	early suburban	residential	1920-1945	DSCN0294.jpg	Folk Victorian	SA1f	106_573.00
128_SA1f	450	fire island	Ave	babylon	early suburban	commercial	1920-1945	DSCN0331.jpg	20th c Commercial	SA1f	105_786.10
93_SA1f	102	araca	Rd	babylon	postwar suburban	residential	1945-1960	DSCN0283.jpg	Cape Cod Revival	SA1f	106_581.00
41_SA1f		annuskemunncia		babylon	postwar suburban	residential	1945-1960	DSCN0218.jpg	Bungalow	SA1f	106_655.00
38_SA1f	69	annuskemunncia		babylon	postwar suburban	residential	1945-1960	DSCN0215.jpg	Minimal Traditional	SA1f	106_658.00
127_SA1f	447	fire island	Ave	babylon	early suburban	residential	1920-1945	DSCN0329.jpg	Craftsman	SA1f	105_785.00
131_SA1f		post	Pl	babylon	early suburban	maritime/ind	1920-1945	DSCN0337.jpg	Maritime - Fishing p	SA1f	105_771.00
3_SA1f	173	sumpwams	Rd	babylon	early suburban	residential	1920-1945	DSCN0175.jpg	Bungalow	SA1f	105_318.00
177_SA1f	241	eaton		islip	early suburban	residential	1920-1945	DSCN0393.jpg	Colonial Revival	SA1f	109_1090.00
16_SA1f	1	shore	Rd	babylon	early nationhood	maritime/ind	1800-1840	DSCN0187.jpg	Maritime - Fishing p	SA1f	105_565.00
39_SA1f	83	annuskemunncia		bagylon	postwar suburban	residential	1945-1960	DSCN0216.jpg	Cape Cod Revival	SA1f	106_657.00
52_SA1f	145	the crescent		babylon	postwar suburban	residential	1945-1960	DSCN0236.jpg	Cape Cod Revival	SA1f	105_597.00
104_SA1f		araca	Rd	babylon				DSCN0297.jpg	Minimal Traditional	SA1f	106_591.40
78_SA1f		araca		babylon	early suburban	residential	1890-1920	DSCN0267.jpg	Craftsman	SA1f	106_589.50
184_SA1f		hiawatha	Rd	babylon	early suburban	residential	1920-1945	DSCN0400.jpg	Vacation home - Cott	SA1f	106_634.00
103_SA1f		araca	Rd	babylon	early suburban	residential	1920-1945	DSCN0297.jpg	Minimal Traditional	SA1f	106_572.00
168_SA1f		sequams lane cntr		islip	early suburban	residential	1920-1945	DSCN0383.jpg	Folk Victorian	SA1f	105_1037.00
84_SA1f	146	araca	Rd	babylon	early suburban	residential	1920-1945	DSCN0273.jpg	Cape Cod Revival	SA1f	106_589.10
183_SA1f		hiawatha		babylon	early suburban	residential	1920-1945	DSCN0399.jpg	Folk Victorian	SA1f	106_633.00
80_SA1f	159	araca	Rd	babylon	early suburban	residential	1920-1945	DSCN0269.jpg	Minimal Traditional	SA1f	106_589.80
91_SA1f	108	araca	Rd	babylon	postwar suburban	residential	1945-1960	DSCN0281.jpg	Cape Cod Revival	SA1f	106_582.00
54_SA1f		the crescent		babylon	postwar suburban	residential	1945-1960	DSCN0234.jpg	Minimal Traditional	SA1f	105_803.00
88_SA1f	120	araca	Rd	babylon	postwar suburban	residential	1945-1960	DSCN0278.jpg	Split Level	SA1f	106_585.00
147_SA1f	115	sequams lane east		islip	postwar suburban	residential	1945-1960	DSCN0353.jpg	Ranch	SA1f	105_1074.00
145_SA1f		sequams lane east		islip	postwar suburban	residential	1945-1960	DSCN0350.jpg	Minimal Traditional	SA1f	105_1078.00
136_SA1f		sequams lane east		islip	early suburban	resort	1890-1920	DSCN0338.jpg	Recreation	SA1f	105_1086.00
87_SA1f	124	araca	Rd	babylon	early suburban	residential	1920-1945	DSCN0277.jpg	Bungalow	SA1f	106_586.00
31_SA1f		annuskemunncia		babylon	postwar suburban	residential	1945-1960	DSCN0207.jpg	Split Level	SA1f	105_670.00
205_SA1f	575	fire island	Ave	babylon	early suburban	residential	1920-1945	DSCN0419.jpg	Vacation home - Cott	SA1f	106_718.00

221_SA1f		bay view	Ave	babylon	postwar suburban	residential	1945-1960	DSCN0441.jpg	Vacation - Cottage	SA1f	106_436.00
148_SA1f	104	sequams lane east		islip	postwar suburban	residential	1945-1960	DSCN0355.jpg	Ranch	SA1f	105_1073.00
85_SA1f	138	araca	Rd	babylon	early suburban	residential	1920-1945	DSCN0275.jpg	Cape Cod Revival	SA1f	106_589.00
53_SA1f	141	the crescent		babylon	postwar suburban	residential	1945-1960	DSCN0235.jpg	Cape Cod Revival	SA1f	105_596.00
220_SA1f	80	bay view	Ave	babylon	postwar suburban	residential	1945-1960	DSCN0440.jpg	Minimal Traditional	SA1f	106_438.00
66_SA1f		sumpwams	Pl	babylon	postwar suburban	residential	1945-1960	DSCN0246.jpg	Modern	SA1f	105_334.00
144_SA1f	132	hsequams lane east		islip	postwar suburban	residential	1945-1960	DSCN0349.jpg	Split Level	SA1f	105_1077.00
89_SA1f	119	araca	Rd	babylon	early suburban	residential	1920-1945	DSCN0279.jpg	Cape Cod Revival	SA1f	106_590.50
209_SA1f	15	bay view	Ave	babylon	postwar suburban	residential	1945-1960	DSCN0428.jpg	Split Level	SA1f	106_471.00
100_SA1f	68	araca	Rd	babylon	early suburban	residential	1920-1945	DSCN0293.jpg	Minimal Traditional	SA1f	106_574.00
33_SA1f	19	annuskemunncia		babylon	postwar suburban	residential	1945-1960	DSCN0209.jpg	Cape Cod Revival	SA1f	105_668.00
217_SA1f	101	bay view	Ave	babylon	postwar suburban	residential	1945-1960	DSCN0437.jpg	Cape Cod Revival	SA1f	106_456.00
216_SA1f	105	bay view	Ave	babylon	postwar suburban	residential	1945-1960	DSCN0435.jpg	Minimal Traditional	SA1f	106_455.00
35_SA1f		annuskemunncia		babylon	postwar suburban	residential	1945-1960	DSCN0211.jpg	Split Level	SA1f	105_663.00
213_SA1f	21	bay view	Ave	babylon	early suburban	residential	1920-1945	DSCN0432.jpg	Colonial Revival	SA1f	106_469.00
92_SA1f	97	araca	Rd	babylon	postwar suburban	residential	1945-1960	DSCN0282.jpg	Colonial Revival	SA1f	106_590.90
214_SA1f		bay view	Ave	babylon	early suburban	residential	1920-1945	DSCN0433.jpg	Vacation - Cottage	SA1f	106_442.00
34_SA1f	27	annuskemunncia		babylon	early suburban	residential	1920-1945	DSCN0210.jpg	Folk Victorian	SA1f	105_666.00
42_SA1f	107	annuskemunncia		babylon	early suburban	residential	1920-1945	DSCN0219.jpg	Minimal Traditional	SA1f	106_652.00
212_SA1f	18	bay view	Ave	babylon	early suburban	residential	1920-1945	DSCN0431.jpg	Bungalow	SA1f	106_428.00
15_SA1f	45	willow	St	babylon	industrialization	maritime/ind	1865-1890	DSCN0186.jpg	Maritime - Fishing p	SA1f	105_566.00
109_SA1f	45	araca	Rd	babylon	postwar suburban	residential	1945-1960	DSCN0304.jpg	Cape Cod Revival	SA1f	105_591.80
211_SA1f	2	bay view	Ave	babylon	postwar suburban	residential	1945-1960	DSCN0430.jpg	Split Level	SA1f	106_424.00
188_SA1f	165	annuskemunncia		babylon	early suburban	residential	1890-1920	DSCN0404.jpg	Colonial Revival	SA1f	106_639.00
194_SA1f	416	fire island	Ave	babylon	postwar suburban	residential	1945-1960	DSCN0411.jpg	Split Level	SA1f	105_682.00
218_SA1f	88	bay view	Ave	babylon	early suburban	residential	1920-1945	DSCN0438.jpg	Bungalow	SA1f	106_439.00
36_SA1f	59	annuskemunncia		babylon	early suburban	residential	1920-1945	DSCN0212.jpg	Minimal Traditional	SA1f	105_662.00
37_SA1f	61	annuskemunncia		babylon	postwar suburban	residential	1945-1960	DSCN0214.jpg	Minimal Traditional	SA1f	106_659.00
115_SA1f	21	lewis		babylon	postwar suburban	residential	1945-1960	DSCN0314.jpg	Ranch	SA1f	105_834.00
40_SA1f	87	annuskemunncia		babylon	postwar suburban	residential	1945-1960	DSCN0217.jpg	Minimal Traditional	SA1f	106_656.00
82_SA1f	154	araca	Rd	babylon	early suburban	residential	1920-1945	DSCN0271.jpg	Colonial Revival	SA1f	106_589.30
201_SA1f	524	fire island	Ave	babylon	early suburban	residential	1890-1920	DSCN0415.jpg	Colonial Revival	SA1f	106_689.00
189_SA1f	161	annuskemunncia		babylon	early suburban	residential	1890-1920	DSCN0405.jpg	Cape Cod Revival	SA1f	106_640.00
4_SA1f		sumpwams	Rd	babylon	early suburban	residential	1920-1945	DSCN0174.jpg	Folk Victorian	SA1f	105_317.00
187_SA1f	167	annuskemunncia		babylon	early suburban	residential	1890-1920	DSCN0403.jpg	Colonial Revival	SA1f	106_638.00

186_SA1f	171	annuskemunncia		babylon	early suburban	residential	1890-1920	DSCN0402.jpg	Colonial Revival	SA1f	106_637.00
81_SA1f	165	araca	Rd	babylon	early suburban	residential	1920-1945	DSCN0270.jpg	Colonial Revival	SA1f	106_589.90
156_SA1f		sequams lane cntr		islip	early suburban	residential	1920-1945	DSCN0366.jpg	Colonial Revival	SA1f	105_1055.00
179_SA1f	2	annuskemunncia		babylon	early suburban	residential	1920-1945	DSCN0395.jpg	Minimal Traditional	SA1f	106_636.00
185_SA1f		hiawatha		babylon	early suburban	residential	1920-1945	DSCN0401.jpg	Vacation home - Cott	SA1f	106_635.00
167_SA1f		sequams lane cntr		islip	postwar suburban	residential	1945-1960	DSCN0381.jpg	Colonial Revival	SA1f	105_1038.00
159_SA1f		sequams lane cntr		islip	early suburban	residential	1920-1945	DSCN0369.jpg	Colonial Revival	SA1f	105_1051.00
6_SA1f		sumpwams		babylon	early suburban	residential	1920-1945	DSCN0171.jpg	Folk Victorian	SA1f	105_325.00
5_SA1f		sumpwams	Rd	babylon	postwar suburban	residential	1945-1960	DSCN0173.jpg	Minimal Traditional	SA1f	105_327.00
219_SA1f		bay view	Ave		early suburban	residential	1920-1945	DSCN0439.jpg	Colonial Revival	SA1f	
215_SA1f	108	bay view	Ave	babylon	postwar suburban	residential	1945-1960	DSCN0434.jpg	Minimal Traditional	SA1f	
117_SA1f	17	lewis		babylon	postwar suburban	residential	1945-1960	DSCN0316.jpg	Split Level	SA1f	105_832.00
129_SA1f	475	post	Pl	babylon	early suburban	residential	1920-1945	DSCN0332.jpg	Craftsman	SA1f	105_770.00
202_SA1f	526	fire island	Ave	babylon	postwar suburban	residential	1945-1960	DSCN0416.jpg	Cape Cod Revival	SA1f	106_691.00
203_SA1f	530	fire island	Ave	babylon	early suburban	residential	1920-1945	DSCN0417.jpg	Vacation home - Cott	SA1f	106_697.00
193_SA1f	410	fire island	Ave	babylon	postwar suburban	residential	1945-1960	DSCN0410.jpg	Minimal Traditional	SA1f	105_681.00
8_SA1f	38	shore	Rd	babylon	early suburban	residential	1890-1920	DSCN0178.jpg	Craftsman	SA1f	105_561.00
27_SA1f	134	prospect	St	babylon	early suburban	residential	1890-1920	DSCN0204.jpg	Folk Victorian	SA1f	105_529.00
155_SA1f		sequams lane cntr		islip	early suburban	residential	1920-1945	DSCN0365.jpg	Craftsman	SA1f	105_1020.00
166_SA1f	249	sequams lane cntr		islip	postwar suburban	residential	1945-1960	DSCN0380.jpg	Colonial Revival	SA1f	105_1039.00
173_SA1f	200	sequams lane cntr		islip	postwar suburban	residential	1945-1960	DSCN0388.jpg	Ranch	SA1f	105_1029.00
9_SA1f	28	shore	Rd	babylon	early suburban	residential	1890-1920	DSCN0179.jpg	Folk Victorian	SA1f	105_536.00
59_SA1f		lighthouse		babylon	early suburban	residential	1920-1945	DSCN0239.jpg	Craftsman	SA1f	106_532.00
143_SA1f	138	sequams lane east		islip				DSCN0348.jpg	Ranch	SA1f	105_1079.00
206_SA1f	579	fire island	Ave	babylon	postwar suburban	residential	1945-1960	DSCN0420.jpg	Split Level	SA1f	106_721.00
65_SA1f		sumpwams	Pl	babylon	early suburban	residential	1920-1945	DSCN0247.jpg	Colonial Revival	SA1f	105_282.00
141_SA1f		sequams lane east		islip	postwar suburban	residential	1945-1960	DSCN0347.jpg	Minimal Traditional	SA1f	105_1080.00
68_SA1f		shore		babylon	early suburban	residential	1890-1920	DSCN0250.jpg	Colonial Revival	SA1f	105_562.00
118_SA1f	13	lewis		babylon	postwar suburban	residential	1945-1960	DSCN0317.jpg	Ranch	SA1f	105_830.00
157_SA1f	153	sequams lane cntr		islip	early suburban	residential	1920-1945	DSCN0367.jpg	Cape Cod Revival	SA1f	105_1054.00
139_SA1f		sequams lane east		islip	early suburban	resort	1920-1945	DSCN0344.jpg	Agricultural - farms	SA1f	105_1083.00
28_SA1f		prospect	St	bab7lon	early nationhood	residential	1800-1840	DSCN0203.jpg	Colonial / Vernacula	SA1f	105_530.00
208_SA1f	1	bay view	Ave	babylon	early suburban	residential	1920-1945	DSCN0427.jpg	Cape Cod Revival	SA1f	106_472.00
96_SA1f	88	araca	St	babylon	early suburban	residential	1920-1945	DSCN0288.jpg	Bungalow	SA1f	106_578.00
130_SA1f		post	Pl	babylon	early suburban	maritime/ind	1920-1945	DSCN0333.jpg	Maritime - Fishing p	SA1f	
1_SA1f		sumpwams	Rd	babylon	post wwii	maritime/ind	1945-1960	DSCN0170.jpg	Maritime - Fishing p	SA1f	
222_SA1f	58	bay view	Ave	babylon	early suburban	residential	1920-1945	DSCN0442.jpg	Vacation - Cottage	SA1f	106_434.00

106_SA1f	52	araca	Rd	babylon	early suburban	residential	1920-1945	DSCN0300.jpg	Minimal Traditional	SA1f	106_570.00
56_SA1f	142	the crescent		babylon	postwar suburban	residential	1945-1960	DSCN0229.jpg	Ranch	SA1f	105_595.00
171_SA1f		sequams lane cntr		islip				DSCN0386.jpg	Split Level	SA1f	105_1031.00
86_SA1f	160	araca	Rd	babylon	early suburban	residential	1920-1945	DSCN0276.jpg	Craftsman	SA1f	106_587.00
32_SA1f	15	annuskemunncia		babylon	postwar suburban	residential	1945-1960	DSCN0208.jpg	Minimal Traditional	SA1f	105_669.00
132_SA1f		post	Pl	babylon	postwar suburban	maritime/ind	1945-1960	DSCN0334.jpg	Maritime - Fishing p	SA1f	105_773.00
114_SA1f		sumpwams		babylon	postwar suburban	residential	1945-1960	DSCN0313.jpg	Cape Cod Revival	SA1f	105_792.00
204_SA1f	571	fire island	Ave	babylon	early suburban	residential	1920-1945	DSCN0418.jpg	Vacation home - Cott	SA1f	106_716.00
125_SA1f	48	robbins	Ave	babylon	early suburban	residential	1890-1920	DSCN0327.jp.jpg	Folk Victorian	SA1f	105_837.00
55_SA1f		the crescent		babylon	early suburban	residential	1890-1920	DSCN0230.jpg	Folk Victorian	SA1f	105_804.00
153_SA1f		sequams lane cntr		islip	early suburban	residential	1920-1945	DSCN0362.jpg	Colonial Revival	SA1f	105_1056.00
146_SA1f	134	sequams lane east		islip	postwar suburban	residential	1945-1960	DSCN0351.jpg	Minimal Traditional	SA1f	105_1075.00
43_SA1f		annuskemunncia		babylon	postwar suburban	residential	1945-1960	DSCN0220.jpg	Split Level	SA1f	106_650.00
191_SA1f	147	annuskemunncia		babylon	postwar suburban	residential	1945-1960	DSCN0407.jpg	Cape Cod Revival	SA1f	106_643.00
192_SA1f		annuskemunncia		babylon	postwar suburban	residential	1945-1960	DSCN0409.jpg	Modern	SA1f	106_627.00
178_SA1f		eaton		islip	early suburban	residential	1920-1945	DSCN0394.jpg	Colonial Revival	SA1f	109_1092.00
169_SA1f	258	sequams lane cntr		islip	early suburban	residential	1920-1945	DSCN0384.jpg	Cape Cod Revival	SA1f	105_1036.00
105_SA1f		araca	Rd	babylon	early suburban	residential	1920-1945	DSCN0298.jpg	Bungalow	SA1f	106_591.50
83_SA1f	150	araca	Rd	babylon	early suburban	residential	1920-1945	DSCN0272.jpg	Craftsman	SA1f	106_589.20
154_SA1f	128	sequams lane cntr		islip	industrialization	residential	1920-1945	DSCN0363.jpg	Colonial Revival	SA1f	105_1019.00
12_SA1f	10	shore	Rd	babylon	early nationhood	residential	1800-1840	DSCN0183.jpg	Colonial / Vernacula	SA1f	105_532.00
24_SA1f	30	willow	St	babylon	industrialization	residential	1865-1890	DSCN0198.jpg	Folk Victorian	SA1f	105_498.00
99_SA1f	72	araca	Rd	babylon	early suburban	residential	1920-1945	DSCN0291.jpg	Bungalow	SA1f	106_575.00
20_SA1f		prospect	St	babylon	early nationhood	residential	1800-1840	DSCN0191.jpg	Colonial / Vernacula	SA1f	105_501.00
17_SA1f	3	shore	Rd	babylon	early suburban	maritime/ind	1865-1890	DSCN0188.jpg	Maritime - Fishing p	SA1f	105_564.00
21_SA1f	31	willow	St	babylon	early nationhood	residential	1800-1840	DSCN0194.jpg	Colonial / Vernacula	SA1f	105_568.00
107_SA1f		araca	Rd	babylon	early suburban	residential	1945-1960	DSCN0301.jpg	Ranch	SA1f	105_569.00
2_SA1f		sumpwams	Rd	babylon	early suburban	residential	1920-1945	DSCN0176.jpg	Bungalow	SA1f	105_319.00
90_SA1f		araca	Rd	babylon	postwar suburban	residential	1945-1960	DSCN0280.jpg	Bungalow	SA1f	106_590.70
13_SA1f		shore	Rd	babylon	early nationhood	residential	1800-1840	DSCN0184.jpg	Colonial / Vernacula	SA1f	105_533.00
63_SA1f	84	sumpwams	Pl	babylon	early suburban	residential	1920-1945	DSCN0244.jpg	Colonial Revival	SA1f	105_281.00
22_SA1f	36	willow	St	babylon	early nationhood	residential	1800-1840	DSCN0199.jpg	Colonial / Vernacula	SA1f	105_499.00
51_SA1f	148	the crescent		babylon	postwar suburban	residential	1945-1960	DSCN0228.jpg	Modern	SA1f	105_594.00
48_SA1f	187	cedar	la	babylon				DSCN0225.jpg	Ranch	SA1f	105_561.00
60_SA1f	116	the crescent		babylon	early suburban	residential	1920-1945	DSCN0240.jpg	Colonial Revival	SA1f	105_805.00
61_SA1f	110	the crescent		babylon	early suburban	residential	1920-1945	DSCN0241.jpg	Colonial Revival	SA1f	105_807.00
47_SA1f		cedar	la	babylon	postwar suburban	residential	1945-1960	DSCN0224.jpg	Modern	SA1f	105_560.00

46_SA1f	179	cedar	la	babylon	postwar suburban	residential	1945-1960	DSCN0223.jpg	Modern	SA1f	105_559.00
45_SA1f		cedar	la	babylon	postwar suburban	residential	1945-1960	DSCN0222.jpg	Modern	SA1f	105_337.00
50_SA1f	149	the crescent		babylon	postwar suburban	residential	1945-1960	DSCN0227.jpg	Minimal Traditional	SA1f	105_598.00
64_SA1f	83	sumpwams	Pl	babylon	postwar suburban	residential	1945-1960	DSCN0245.jpg	Modern	SA1f	105_280.00
44_SA1f	222	cedar		babylon	early suburban	residential	1890-1920	DSCN0221.jpg	Folk Victorian	SA1f	105_671.00
67_SA1f		overton	Pl	babylon	early suburban	residential	1920-1945	DSCN0248.jpg	Cape Cod Revival	SA1f	105_283.00
49_SA1f	191	cedar	la	babylon	postwar suburban	residential	1945-1960	DSCN0226.jpg	Modern	SA1f	105_593.00
172_SA1f		sequams lane cntr		islip	early suburban	residential	1920-1945	DSCN0387.jpg	Cape Cod Revival	SA1f	105_1043.00
163_SA1f	146	eaton		islip	early suburban	residential	1920-1945	DSCN0373.jpg	Colonial Revival	SA1f	109_1112.00
23_SA1f	25	willow	St	babylon	early nationhood	residential	1800-1840	DSCN0197.jpg	Colonial Revival	SA1f	105_569.00
11_SA1f	22	shore	Rd	babylon	industrialization	residential	1890-1920	DSCN0181.jpg	Folk Victorian	SA1f	105_535.00
69_SA1f	15	sumpwams	Pl	babylon	early suburban	residential	1920-1945	DSCN0251.jpg	Colonial Revival	SA1f	105_539.00
26_SA1f	122	prospect	St	babylon	early nationhood	residential	1800-1840	DSCN0201.jpg	Colonial / Vernacula	SA1f	105_528.00
111_SA1f		yacht club	Rd	babylon	postwar suburban	resort	1945-1960	DSCN0307.jpg	Hotels / Motels	SA1f	106_764.10
175_SA1f	188	sequams lane cntr		islip	postwar suburban	residential	1945-1960	DSCN0390.jpg	Minimal Traditional	SA1f	105_1026.00
119_SA1f	8	lewis		babylon	postwar suburban	residential	1945-1960	DSCN0318.jpg	Split Level	SA1f	105_829.00
164_SA1f	165	eaton		islip	postwar suburban	residential	1945-1960	DSCN0374.jpg	Ranch	SA1f	109_1106.00
176_SA1f	174	sequams lane cntr		islip	postwar suburban	residential	1945-1960	DSCN0391.jpg	Minimal Traditional	SA1f	105_1025.00
158_SA1f	157	sequams lane cntr		islip	early suburban	residential	1920-1945	DSCN0368.jpg	Colonial Revival	SA1f	105_1053.00
138_SA1f		sequams lane east		islip	early suburban	resort	1890-1920	DSCN0342.jpg	Landscape features /	SA1f	105_1084.00
137_SA1f		sequams lane east		islip	early suburban	resort	1890-1920	DSCN0343.jpg	Recreation	SA1f	105_1085.00
161_SA1f	247	eaton		islip	early suburban	residential	1920-1945	DSCN0371.jpg	Colonial Revival	SA1f	109_1110.00
162_SA1f		eaton		islip	early suburban	residential	1920-1945	DSCN0372.jpg	Colonial Revival	SA1f	109_1108.00
75_SA1f		sumpwams		babylon	early suburban	residential	1890-1920	DSCN0261.jpg	Colonial Revival	SA1f	105_543.00
74_SA1f		cormack		babylon				DSCN0260.jpg	Folk Victorian	SA1f	105_422.00
29_SA1f		fire island	Ave	babylon	postwar suburban	institutional	1945-1960	DSCN0205.jpg	Modern	SA1f	106_731.00
200_SA1f	523	fire island	Ave	babylon	early suburban	resort	1920-1945	DSCN0414.jpg	Vacation home - Cott	SA1f	105_688.00
108_SA1f	49	araca	Rd	babylon	postwar suburban	residential	1945-1960	DSCN0302.jpg	Minimal Traditional	SA1f	105_591.70
97_SA1f	82	araca	St	babylon	postwar suburban	residential	1945-1960	DSCN0289.jpg	Ranch	SA1f	106_577.00
95_SA1f	96	araca	Rd	babylon	early suburban	residential	1920-1945	DSCN0285.jpg	Bungalow	SA1f	106_579.00
7_SA1f				islip	early suburban	maritime/ind	1890-1920	DSCN0177.jpg	Recreation-boat hous	SA1f	
190_SA1f	150	annuskemunncia		babylon	postwar suburban	residential	1945-1960	DSCN0406.jpg	Ranch	SA1f	106_628.00
195_SA1f	420	fire island	Ave	babylon	postwar suburban	residential	1945-1960	DSCN0412.jpg	Ranch	SA1f	105_683.00
142_SA1f		sequams lane east		islip	postwar suburban	resort	1920-1945	DSCN0347.jpg	Maritime - one room	SA1f	
62_SA1f	111	the crescent		babylon	early suburban	residential	1890-1920	DSCN0242.jpg	Georgian revival	SA1f	105_806.00
124_SA1f	266	fire island	Ave	babylon				DSCN0323.jpg	Folk Victorian	SA1f	105_848.00
57_SA1f		lighthouse		babylon	early suburban	resort	1920-1945	DSCN0237.jpg		SA1f	

30_SA1f				babylon	early suburban	resort	1890-1920	DSCN0206.jpg		SA1f	
123_SA1f		Fire Isld & Virginia	AVE	babylon	early suburban	transportation	1890-1920	DSCN0322.jpg		SA1f	
102_SA1f		araca	Rd	babylon	early suburban	residential	1890-1920	DSCN0295.jpg		SA1f	
58_SA1f		lighthouse		babylon	early suburban	resort	1920-1945	DSCN0238.jpg		SA1f	
135_SA1f		eaton		islip	early suburban	resort	1890-1920	DSCN0339.jpg		SA1f	
77_SA1f		araca		babylon	early suburban	resort	1920-1945	DSCN0265.jpg		SA1f	
10_SA1f				babylon/islip	early nationhood	maritime/ind	1800-1840	DSCN0180.jpg	SA1f		
18_SA1f		willow	St	babylon/islip	early nationhood	maritime/ind	1800-1840	DSCN0190.jpg	SA1f		
110_SA1f				babylon	early suburban	residential	1920-1945	DSCN0305.jpg	SA1f		
70_SA1f		sumpwams	Pl	babylon	early suburban	residential	1920-1945	DSCN0252.jpg	SA1f		
152_SA1f		sequams way		islip	early suburban	residential	1920-1945	DSCN0361.jpg	SA1f		
151_SA1f		sequams way		islip	early suburban	maritime/ind	1920-1945	DSCN0359.jpg	SA1f		
133_SA1f		post	Pl	babylon	POST WWII	maritime/ind	1945-1960	DSCN0337.jpg	SA1f		
149_SA1f		sequams lane east		islip	postwar suburban	residential	1945-1960	DSCN0356.jpg	SA1f		
72_SA1f		hewlett		babylon	early suburban	residential	1890-1920	DSCN0255.jpg	SA1f		
126_SA1f		robbins - west of fi		babylon	early suburban	suburb/resort	1890-1920	DSCN0324.jpg	SA1f		
73_SA1f		cormack		babylon	early suburban	residential	1890-1920	DSCN0257.jpg	SA1f		
71_SA1f		hewlett		babylon	early suburban	residential		DSCN0254.jpg	SA1f		

Residential District Area – 3D

SURVEY_ID	Address or Street Location	STREET_NAM	STREET_SUF	Village/Hamlet :	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID
15_SA3d	5	beach		patchogue	early suburban	residential	1920-1945	DSCN0527.jpg	Bungalow	SA3d	153_609.00
27_SA3d		ocean	Ave	patchogue	early suburban	residential	1890-1920	DSCN0542.jpg	Folk Victorian	SA3d	153_651.00
97_SA3d		west		patchogue	early suburban	residential	1890-1920	DSCN0656.jpg	Colonial Revival	SA3d	152_341.00
76_SA3d	4	leo		patchogue	early suburban	residential	1920-1945	DSCN0632.jpg	Craftsman	SA3d	153_984.00
36_SA3d		maiden	la	patchogue	industrialization	residential	1865-1890	DSCN0551.jpg	Italianate/2nd empir	SA3d	153_1009.00
70_SA3d		rider		patchogue	postwar suburban	residential	1945-1960	DSCN0625.jpg	Colonial Revival	SA3d	153_997.00
90_SA3d		laurel		patchogue	early suburban	residential	1920-1945	DSCN0649.jpg	Bungalow	SA3d	153_373.00
91_SA3d	107	laurel		patchogue	early suburban	residential	1920-1945	DSCN0650.jpg	Minimal Traditional	SA3d	153_372.00
49_SA3d	13	sunset	la	patchogue				DSCN0601.jpg	Bungalow	SA3d	153_160.00
62_SA3d	32	smith	St	patchogue	early suburban	resort	1920-1945	DSCN0616.jpg	Vacation home - Cott	SA3d	153_1023.00
60_SA3d	47	smith	St	patchogue	early suburban	resort	1920-1945	DSCN0614.jpg	Vacation home - Cott	SA3d	153_1029.00
68_SA3d		rider		patchogue	early suburban	residential	1920-1945	DSCN0623.jpg	Colonial Revival	SA3d	153_1026.00
57_SA3d		smith	St	patchogue	early suburban	resort	1920-1945	DSCN0611.jpg	Vacation home - Cott	SA3d	153_1024.00
71_SA3d	388	rider		patchogue	early suburban	residential	1945-1960	DSCN0626.jpg	Ranch	SA3d	153_996.00
42_SA3d		smith		patchogue	early suburban	residential	1890-1920	DSCN0558.jpg	Folk Victorian	SA3d	153_1001.00

37_SA3d	575	ocean		patchogue	industrialization	residential	1840-1865	DSCN0553.jpg	Greek Revival	SA3d	153_1014.00
58_SA3d	43	smith	St	patchogue	early suburban	resort	1920-1945	DSCN0612.jpg	Vacation home - Cott	SA3d	153_1027.00
96_SA3d				patchogue	early suburban	maritime/ind	1890-1920	DSCN0655.jpg	Maritime - Fishing p	SA3d	152_315.00
19_SA3d		pine		patchogue	early suburban	resort	1920-1945	DSCN0531.jpg	Vacation home - Cott	SA3d	153_590.00
72_SA3d		rider		patchogue	postwar suburban	residential	1945-1960	DSCN0627.jpg	Minimal Traditional	SA3d	153_995.00
32_SA3d	29	maiden	la	patchogue	early suburban	residential	1890-1920	DSCN0547.jpg	Queen Anne	SA3d	153_660.00
78_SA3d		ocean	Ave	patchogue	early suburban	resort	1890-1920	DSCN0635.jpg	Hotels / Motels	SA3d	153_975.00
77_SA3d	3	leo		patchogue	early suburban	residential	1920-1945	DSCN0633.jpg	Craftsman	SA3d	153_983.00
61_SA3d	49	smith	St	patchogue	early suburban	residential	1920-1945	DSCN0615.jpg	Vacation home - Cott	SA3d	
56_SA3d		crescent		patchogue	early suburban	maritime/ind	1920-1945	DSCN0610.jpg	Maritime - Fishing p	SA3d	
98_SA3d	250	west		patchogue	early suburban	residential	1920-1945	DSCN0657.jpg	Colonial Revival	SA3d	152_349.00
16_SA3d	1	beach		patchogue	early suburban	residential	1920-1945	DSCN0528.jpg	Tudor	SA3d	153_602.00
83_SA3d		dock	St	patchogue	early suburban	residential	1920-1945	DSCN0641.jpg	Vacation home - Cott	SA3d	153_628.00
81_SA3d	39	brightwood		patchogue	early suburban	residential	1920-1945	DSCN0639.jpg	Vacation home - Cott	SA3d	153_632.00
82_SA3d	37	brightwood		patchogue	early suburban	residential	1920-1945	DSCN0638.jpg	Vacation home - Cott	SA3d	153_634.00
23_SA3d		beach		patchogue	early suburban	residential	1920-1945	DSCN0537.jpg	Vacation home - Cott	SA3d	153_594.00
22_SA3d		willow		patchogue	early suburban	residential	1920-1945	DSCN0536.jpg	Vacation home - Cott	SA3d	153_591.00
55_SA3d		crescent		patchogue	postwar suburban	maritime/ind	1945-1960	DSCN0609.jpg	Recreation	SA3d	153_202.00
86_SA3d		argyle		patchogue	early suburban	residential	1920-1945	DSCN0644.jpg	Colonial Revival	SA3d	153_378.00
80_SA3d	43	brightwood		patchogue	early suburban	residential	1920-1945	DSCN0640.jpg	Bungalow	SA3d	153_631.00
93_SA3d	100	laurel		patchogue	early suburban	residential	1920-1945	DSCN0652.jpg	Minimal Traditional	SA3d	153_378.00
63_SA3d	30	smith	St	patchogue	early suburban	resort	1920-1945	DSCN0617.jpg	Vacation home - Cott	SA3d	153_1022.00
59_SA3d	45	smith	St	patchogue	early suburban	resort	1920-1945	DSCN0613.jpg	Vacation home - Cott	SA3d	153_1028.00
65_SA3d		smith	St	patchogue	early suburban	residential	1920-1945	DSCN0619.jpg	Vacation home - Cott	SA3d	153_1019.00
48_SA3d	11	sunset	la	patchogue	postwar suburban	residential	1945-1960	DSCN0600.jpg	Minimal Traditional	SA3d	153_158.00
52_SA3d	37	mapes	Ave	patchogue	postwar suburban	residential	1945-1960	DSCN0604.jpg	Ranch	SA3d	153_174.00
46_SA3d	14	sunset	la	patchogue	postwar suburban	resort	1945-1960	DSCN0598.jpg	Minimal Traditional	SA3d	153_157.00
47_SA3d	16	sunset	la	patchogue	postwar suburban	residential	1945-1960	DSCN0599.jpg	Minimal Traditional	SA3d	153_159.00
53_SA3d	20	mapes	Ave	patchogue	postwar suburban	residential	1945-1960	DSCN0606.jpg	Minimal Traditional	SA3d	153_173.00
88_SA3d		argyle		patchogue	early suburban	residential	1920-1945	DSCN0647.jpg	Folk Victorian	SA3d	153_518.00
89_SA3d	111	laurel		patchogue	early suburban	residential	1920-1945	DSCN0648.jpg	Bungalow	SA3d	153_374.00
67_SA3d	18	smith	St	patchogue	early suburban	residential	1920-1945	DSCN0621.jpg	Vacation home - Cott	SA3d	153_1016.00
64_SA3d	25	smith	St	patchogue	early suburban	residential	1920-1945	DSCN0618.jpg	Colonial / Vernacu	SA3d	153_999.00
92_SA3d	105	laurel		patchogue	early suburban	residential	1920-1945	DSCN0651.jpg	Bungalow	SA3d	153_371.00
40_SA3d		ocean	Ave	patchogue	early nationhood	residential	1840-1865	DSCN0562.jpg	Colonial Revival	SA3d	
45_SA3d	12	sunset	la	patchogue	postwar suburban	resort	1945-1960	DSCN0597.jpg	Vacation home - Cott	SA3d	153_156.00
79_SA3d		roosevelt		patchogue	early suburban	residential	1920-1945	DSCN0637.jpg	Bungalow	SA3d	153_640.00

21_SA3d		willow		patchogue	early suburban	residential	1920-1945	DSCN0534.jpg	Vacation home - Cott	SA3d	153_587.00
14_SA3d	17	beach		patchogue	early suburban	residential	1920-1945	DSCN0526.jpg	Bungalow	SA3d	153_617.00
41_SA3d		ocean		patchogue	early suburban	residential	1865-1890	DSCN0559.jpg	Folk Victorian	SA3d	153_1003.00
75_SA3d	5	leo		patchogue	early suburban	residential	1920-1945	DSCN0634.jpg	Craftsman	SA3d	153_985.00
30_SA3d		maiden	la	patchogue	early suburban	residential	1890-1920	DSCN0545.jpg	Folk Victorian	SA3d	153_654.00
87_SA3d	20	argyle		patchogue	early suburban	residential	1890-1920	DSCN0645.jpg	Bungalow	SA3d	153_521.00
13_SA3d	83	brightwood		patchogue	early suburban	residential	1890-1920	DSCN0525.jpg	Folk Victorian	SA3d	153_619.00
95_SA3d				patchogue	early suburban	residential	1920-1945	DSCN0654.jpg	Bungalow	SA3d	152_345.00
66_SA3d	15	smith	St	patchogue	early suburban	resort	1920-1945	DSCN0622.jpg	Vacation home - Cott	SA3d	153_1000.00
43_SA3d	564	ocean		patchogue	early suburban	residential	1890-1920	DSCN0557.jpg	Bungalow	SA3d	153_1008.00
39_SA3d	556	ocean		patchogue	early	commercial	1865-1890	DSCN0554.jpg	19th c Commercial	SA3d	
34_SA3d	17	maiden	la	patchogue	early suburban	residential	1890-1920	DSCN0549.jpg	Bungalow	SA3d	153_1011.00
29_SA3d	41	maiden	la	patchogue	early suburban	residential	1890-1920	DSCN0544.jpg	Folk Victorian	SA3d	153_655.00
73_SA3d	10	leo		patchogue	postwar suburban	residential	1945-1960	DSCN0629.jpg	Minimal Traditional	SA3d	153_990.00
35_SA3d		maiden	la	patchogue	industrialization	residential	1865-1890	DSCN0550.jpg	Italianate	SA3d	
85_SA3d		laurel		patchogue	early suburban	residential	1920-1945	DSCN0643.jpg	Colonial Revival	SA3d	153_377.00
44_SA3d	10	sunset	la	patchogue	postwar suburban	resort	1945-1960	DSCN0596.jpg	Minimal Traditional	SA3d	153_155.00
51_SA3d	84	sunset	Ave	patchogue	early suburban	residential	1945-1960	DSCN0605.jpg	Ranch	SA3d	153_172.00
74_SA3d	7	leo		patchogue	postwar suburban	residential	1945-1960	DSCN0630.jpg	Minimal Traditional	SA3d	153_987.00
25_SA3d		brightwood	St	patchogue	early suburban	residential	1890-1920	DSCN0540.jpg	Colonial Revival	SA3d	153_642.00
26_SA3d		brightwood	St	patchogue	early suburban	residential	1890-1920	DSCN0539.jpg	Craftsman	SA3d	153_648.00
33_SA3d	23	maiden	la	patchogue	early suburban	residential	1890-1920	DSCN0548.jpg	Colonial Revival	SA3d	153_659.00
28_SA3d		cedar	Ave	patchogue	early suburban	residential	1890-1920	DSCN0543.jpg	Craftsman	SA3d	153_650.00
69_SA3d		rider		patchogue	postwar suburban		1945-1960	DSCN0624.jpg		SA3d	
31_SA3d		maiden	la	patchogue	early suburban	residential	1890-1920	DSCN0546.jpg		SA3d	
24_SA3d				patchogue	early suburban	resort	1890-1920	DSCN0538.jpg		SA3d	
18_SA3d		pine		patchogue	early suburban	resort	1920-1945	DSCN0530.jpg		SA3d	
54_SA3d				patchogue				DSCN0608.jpg		SA3d	153_611.00
20_SA3d		willow		patchogue	early suburban	resort	1920-1945	DSCN0533.jpg		SA3d	
50_SA3d		sunset + price		patchogue	early suburban	residential	1945-1960	DSCN0602.jpg		SA3d	
94_SA3d		laurel fom ocean		patchogue	early suburban	residential	1920-1945	DSCN0653.jpg		SA3d	
84_SA3d		south of laurel to		patchogue	early suburban	residential	1890-1920	DSCN0642.jpg		SA3d	

Residential District Area – 4A

SURVEY_ ID	Address or Street Location:	STREET_NAM	STREET_ SUF	Village/ Hamlet:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID
22_SA4a				bellport	postwar suburban	residential	1945-1960	DSCN0770.jpg	Ranch	SA4a	161_46.00
20_SA4a		williams		bellport	postwar suburban	residential	1945-1960	DSCN0766.jpg	Ranch	SA4a	
5_SA4a	39	reels			early suburban	residential	1920-1945	DSCN0750.jpg	Bungalow	SA4a	161_377.00
19_SA4a	17	williams		bellport	postwar suburban	residential	1945-1960	DSCN0765.jpg	Minimal Traditional	SA4a	161_51.00
2_SA4a								DSCN0747.jpg	Modern	SA4a	161_368.00
39_SA4a		shore	Rd	bellport	postwar suburban	residential	1945-1960	DSCN0796.jpg	Minimal Traditional	SA4a	161_112.00
10_SA4a		s. dunton	Ave	bellport	early suburban	residential	1920-1945	DSCN0756.jpg	Bungalow	SA4a	161_383.00
38_SA4a		elgin	Pl	bellport	early suburban	residential	1920-1945	DSCN0793.jpg	Minimal Traditional	SA4a	161_114.00
8_SA4a	12	yacht	Rd	bellport	early suburban	residential	1920-1945	DSCN0755.jpg	Vacation - Cottage	SA4a	161_379.00
1_SA4a					early suburban	residential	1920-1945	DSCN0745.jpg	Colonial Revival	SA4a	161_369.00
3_SA4a		s. dunton	Ave		early suburban	residential	1920-1945	DSCN0748.jpg	Bungalow	SA4a	161_367.00
33_SA4a		ocean	Ave	bellport	early suburban	institutional	1920-1945	DSCN0785.jpg	Institutional - Cult	SA4a	161_99.00
7_SA4a		s. dunton		bellport	early suburban	residential	1920-1945	DSCN0753.jpg	Bungalow	SA4a	161_366.00
13_SA4a		s. dunton		bellport	early suburban	residential	1920-1945	DSCN0760.jpg	Cape Cod Revival	SA4a	161_384.00
40_SA4a		shore	Rd	bellport	early suburban	residential	1920-1945	DSCN0798.jpg	Vacation home - Cott	SA4a	161_103.00
11_SA4a		s. dunton	Ave	bellport	early suburban	residential	1945-1960	DSCN0757.jpg	Ranch	SA4a	
4_SA4a	305	s. dunton			early suburban	residential	1920-1945	DSCN0749.jpg	Bungalow	SA4a	
17_SA4a		williams		bellport	early suburban	residential	1920-1945	DSCN0763.jpg	Minimal Traditional	SA4a	161_48.00
28_SA4a		wall	St	bellport	postwar suburban	residential	1945-1960	DSCN0777.jpg	Ranch	SA4a	161_58.00
6_SA4a	37	reels			early suburban	residential	1920-1945	DSCN0751.jpg	Bungalow	SA4a	161_375.00
24_SA4a		summit		bellport	early suburban	residential	1920-1945	DSCN0772.jpg	Colonial Revival	SA4a	161_35.00
31_SA4a		summit		bellport	postwar suburban	residential	1945-1960	DSCN0781.jpg	Minimal Traditional	SA4a	161_68.00
21_SA4a		summit		bellport	early suburban	residential	1920-1945	DSCN0768.jpg	Cape Cod Revival	SA4a	
23_SA4a	22	williams		bellport	postwar suburban	residential	1945-1960	DSCN0771.jpg	Ranch	SA4a	161_45.00
15_SA4a	247	s. dunton	Ave	bellport	early suburban	residential	1920-1945	DSCN0761.jpg	Colonial Revival	SA4a	161_385.00
29_SA4a	4	brown		bellport	postwar suburban	residential	1945-1960	DSCN0777.jpg	Ranch	SA4a	161_54.00
27_SA4a		wall	St	bellport	postwar suburban	residential	1945-1960	DSCN0776.jpg	Ranch	SA4a	161_59.00
26_SA4a		roosevelt	Blvd	bellport	early suburban	residential	1945-1960	DSCN0774.jpg	Ranch	SA4a	161_39.00
12_SA4a	266	s. dunton	Ave	bellport				DSCN0759.jpg	Minimal Traditional	SA4a	
18_SA4a		williams		bellport	early suburban	residential	1920-1945	DSCN0764.jpg	Cape Cod Revival	SA4a	161_49.00
37_SA4a		shore	Rd	bellport	postwar suburban	residential	1945-1960	DSCN0792.jpg	Modern	SA4a	161_113.00
32_SA4a		summit		bellport	postwar suburban	residential	1945-1960	DSCN0782.jpg	Minimal Traditional	SA4a	
30_SA4a		summit		bellport	early suburban	transportation	1920-1945	DSCN0780.jpg		SA4a	
35_SA4a		ocean	Ave	bellport	early suburban	institutional	1920-1945	DSCN0788.jpg		SA4a	

34_SA4a		ocean	Ave	bellport	early suburban	resort	1920-1945	DSCN0787.jpg		SA4a	
36_SA4a				bellport	early suburban	maritime/ind	1920-1945	DSCN0790.jpg		SA4a	
9_SA4a				bellport	early suburban	residential	1920-1945	DSCN0754.jpg		SA4a	
16_SA4a		s. dunton	Ave	bellport	early suburban	residential	1920-1945	DSCN0762.jpg		SA4a	
41_SA4a		roosevelt, shore, su		bellport	early suburban	residential	1920-1945	DSCN0800.jpg		SA4a	

Residential District Area – 4F

SURVEY_ ID	Addres s or Street	STREET_ NAM	STREE T_SUF	Village/Hamlet :	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID
33_SA4f		laffayette		mastic	early suburban	residential	1920-1945	DSCN0420.jpg	Vac home - Cottage	SA4f	186_235.00
36_SA4f		laffayette		mastic	early suburban	residential	1920-1945	DSCN0423.jpg	Modern	SA4f	185_230.00
22_SA4f	66	longfellow	Rd	mastic	early suburban	residential	1920-1945	DSCN0409.jpg	Vacation home - Cott	SA4f	185_738.00
57_SA4f	17	west	dr	mastic	early suburban	residential	1920-1945	DSCN0460.jpg	Vacation home - Cott	SA4f	
43_SA4f				mastic	early suburban	residential	1920-1945	DSCN0430.jpg	Vacation home - Cott	SA4f	185_240.00
23_SA4f		beaver		mastic	early suburban	residential	1920-1945	DSCN0410.jpg	Vacation home - Cott	SA4f	185_269.00
42_SA4f				mastic	post WWII	residential	1945-60	DSCN0429.jpg	Ranch	SA4f	185_238.00
2_SA4f	9	riveria		mastic	early suburban	residential	1920-1945	DSCN0381.jpg	Vacation home - Cott	SA4f	191_852.00
37_SA4f		laffayette		mastic	early suburban	residential	1920-1945	DSCN0424.jpg	Vacation home - Cott	SA4f	185_229.00
1_SA4f		park		mastic	early suburban	residential	1920-1945	DSCN0380.jpg	Ranch	SA4f	191_854.00
54_SA4f				mastic	early suburban	residential	1920-1945	DSCN0444.jpg	Vacation home - Cott	SA4f	185_187.00
28_SA4f		laffayette		mastic	early suburban	residential	1920-1945	DSCN0415.jpg	Vacation home - Cott	SA4f	185_258.00
11_SA4f		riveria		mastic	early suburban	commercial	1920-1945	DSCN0391.jpg	20th c Commercial	SA4f	185_832.00
31_SA4f	80	laffayette		mastic	early suburban	residential	1920-1945	DSCN0418.jpg	Vacation home - Cott	SA4f	185_260.00
16_SA4f	118	riveria	Rd	mastic	early suburban	residential	1920-1945	DSCN0400.jpg	Split Level	SA4f	185_747.00
35_SA4f		laffayette		mastic	early suburban	residential	1920-1945	DSCN0422.jpg	Vacation home - Cott	SA4f	185_231.00
30_SA4f		laffayette		mastic	early suburban	residential	1920-1945	DSCN0418.jpg	Vacation home - Cott	SA4f	185_259.00
27_SA4f		elm		mastic	early suburban	residential	1920-1945	DSCN0414.jpg	Vacation home - Cott	SA4f	185_257.00
24_SA4f	19	beaver		mastic	early suburban	residential	1920-1945	DSCN0411.jpg	Vacation home - Cott	SA4f	185_268.00
7_SA4f		riveria		mastic	early suburban	residential	1920-1945	DSCN0387.jpg	Ranch	SA4f	185_835.00
50_SA4f		forest		mastic	early suburban	residential	1945-1960	DSCN0440.jpg	Vacation home - Cott	SA4f	185_212.00
49_SA4f		forest			early suburban	residential	1920-1945	DSCN0439.jpg	Vacation home - Cott	SA4f	185_213.00
38_SA4f		laffayette		mastic	early suburban	residential	1920-1945	DSCN0425.jpg	Vacation home - Cott	SA4f	185_199.00
34_SA4f		laffayette		mastic	early suburban	residential	1920-1945	DSCN0421.jpg	Minimal Traditional	SA4f	185_233.00
48_SA4f	164	forest		mastic	early suburban	residential	1920-1945	DSCN0438.jpg	Cape Cod Revival	SA4f	185_210.00
47_SA4f		forest		mastic	early suburban	residential	1920-1945	DSCN0437.jpg	Cape Cod Revival	SA4f	185_220.00
41_SA4f		grove		mastic	early suburban	residential	1920-1945	DSCN0428.jpg	Vacation home - Cott	SA4f	185_228.00
39_SA4f		laffayette		mastic	early suburban	residential	1920-1945	DSCN0426.jpg	Minimal Traditional	SA4f	185_200.00

13_SA4f		elm	Rd	mastic	early suburban	residential	1920-1945	DSCN0393.jpg	Cape Cod Revival	SA4f	185_826.00
21_SA4f	62	longfellow	Rd	mastic	early suburban	residential	1920-1945	DSCN0408.jpg	Split Level	SA4f	185_739.00
4_SA4f		riveria		mastic	early suburban	residential	1920-1945	DSCN0383.jpg	Vacation home - Cott	SA4f	191_846.00
9_SA4f	79	riveria		mastic	early suburban	residential	1920-1945	DSCN0389.jpg	Vacation home - Cott	SA4f	185_834.00
3_SA4f	8	riveria		mastic	early suburban	residential	1920-1945	DSCN0382.jpg	Vacation home - Cott	SA4f	191_853.00
6_SA4f	39	washington		mastic	early suburban	residential	1920-1945	DSCN0386.jpg	Vacation home - Cott	SA4f	185_844.00
5_SA4f		riveria		mastic	early suburban	residential	1920-1945	DSCN0385.jpg	Vacation home - Cott	SA4f	191_845.00
14_SA4f	67	elm	Rd	mastic	postwar suburban	residential	1945-1960	DSCN0394.jpg	Split Level	SA4f	185_749.00
12_SA4f		riveria		mastic	early suburban	residential	1920-1945	DSCN0392.jpg	Ranch	SA4f	
15_SA4f	72	riveria		mastic	early suburban	residential	1920-1945	DSCN0398.jpg	Vacation home - Cott	SA4f	185_748.00
17_SA4f		riveria	Rd	mastic	early suburban	residential	1920-1945	DSCN0401.jpg	Minimal Traditional	SA4f	185_746.00
18_SA4f	45	longfellow	Rd	mastic	early suburban	residential	1920-1945	DSCN0404.jpg	Ranch	SA4f	185_743.00
59_SA4f	33	magnolia		mastic	e. suburban	residential	1900-1945	DSCN0464.jpg	Minimal Traditional	SA4f	
19_SA4f	37	longfellow	Rd	mastic	postwar suburban	residential	1945-1960	DSCN0406.jpg	Vacation home - Cott	SA4f	185_744.00
20_SA4f	56	longfellow	Pl	mastic	early suburban	residential	1920-1945	DSCN0407.jpg	Vacation home - Cott	SA4f	185_740.00
32_SA4f	15	laffayette		mastic	postwar suburban	residential	1945-1960	DSCN0419.jpg	Vacation home - Cott	SA4f	186_236.00
25_SA4f	53	beaver		mastic	early suburban	residential	1920-1945	DSCN0412.jpg	Colonial Revival	SA4f	185_560.00
40_SA4f		grove		mastic	early suburban	residential	1920-1945	DSCN0427.jpg	Vacation home - Cott	SA4f	185_227.00
46_SA4f		forest		mastic	early suburban	residential	1920-1945	DSCN0436.jpg	Cape Cod Revival	SA4f	185_244.00
44_SA4f				mastic	early suburban	residential	1920-1945	DSCN0431.jpg	Vacation home - Cott	SA4f	185_241.00
55_SA4f				mastic	early suburban	residential	1920-1945	DSCN0445.jpg	Vacation - Cottage	SA4f	185_110.00
53_SA4f		riviera		mastic	postwar suburban	residential	1945-1960	DSCN0443.jpg	Modern	SA4f	185_196.00
51_SA4f		hemlock		mastic	early suburban	residential	1920-1945	DSCN0441.jpg	Minimal Traditional	SA4f	185_193.00
56_SA4f				mastic	early suburban	residential	1920-1945	DSCN0446.jpg	Vacation home - Cott	SA4f	185_106.00
52_SA4f		hemlock		mastic	postwar suburban	residential	1920-1945	DSCN0442.jpg	Minimal Traditional	SA4f	185_197.00
29_SA4f		laffayette/elm		mastic	early suburban	residential	1920-1945	DSCN0416.jpg		SA4f	
45_SA4f		forest		mastic	early suburban	residential	1920-1945	DSCN0435.jpg		SA4f	185_243.00

Residential District Area – 5B

SURVEY_ID	Address or Street	STREET_NAM	STREET_SUF	Village/Hamlet:	Primary Context:	Secondary Context:	Period of Significanc	PHOTO	Building Type/Style:	Subarea	USACEID
34_SA5b	112	senix		moriches	early suburban	residential	1890-1920	DSCN0835.jpg	Colonial Revival	SA5b	189_300.00
44_SA5b		union	Ave	moriches	postwar suburban	commercial	1945-1960	DSCN0846.jpg	Maritime - Fishing p	SA5b	194_137.00
6_SA5b	5	merritt	la	moriches	early suburban	residential	1920-1945	DSCN0804.jpg	Colonial Revival	SA5b	193_324.00
65_SA5b		bay		moriches	postwar suburban	residential	1945-1960	DSCN0873.jpg	Minimal Traditional	SA5b	194_492.00
53_SA5b		inlet view	dr	moriches	postwar suburban	residential	1945-1960	DSCN0860.jpg	Cape Cod Revival	SA5b	194_168.00
22_SA5b		orchard neck		moriches	early suburban	residential	1920-1945	DSCN0823.jpg	Minimal Traditional	SA5b	193_378.00

68_SA5b	30	laura lee		moriches	early suburban	residential	1920-1945	DSCN0876.jpg	Bungalow	SA5b	194_3.00
57_SA5b		bayview		moriches	early suburban	residential	1920-1945	DSCN0865.jpg	Cape Cod Revival	SA5b	194_185.00
70_SA5b	28	laura lee		moriches	postwar suburban	residential	1945-1960	DSCN0878.jpg	Colonial Revival	SA5b	194_4.00
16_SA5b	30	orchard neck	Rd	moriches	early suburban	residential	1920-1945	DSCN0816.jpg	Minimal Traditional	SA5b	193_364.00
12_SA5b	16	orchard neck	Rd	moriches	early suburban	residential	1920-1945	DSCN0812.jpg	Minimal Traditional	SA5b	193_354.00
60_SA5b	9	laura lee		moriches	early suburban	residential	1920-1945	DSCN0868.jpg	Ranch	SA5b	194_14.00
5_SA5b		merritt	la	moriches	early suburban	residential	1920-1945	DSCN0802.jpg	Colonial Revival	SA5b	193_322.00
69_SA5b		winnie	Rd	moriches	early suburban	residential	1945-1960	DSCN0877.jpg	Minimal Traditional	SA5b	194_499.00
48_SA5b	129	union	Ave	moriches	early suburban	residential	1920-1945	DSCN0852.jpg	Minimal Traditional	SA5b	194_142.00
51_SA5b		inlet view	dr	moriches	postwar suburban	resort	1945-1960	DSCN0857.jpg	Cape Cod Revival	SA5b	194_170.00
62_SA5b	17	laura lee		moriches	postwar suburban	residential	1945-1960	DSCN0870.jpg	Ranch	SA5b	194_11.00
25_SA5b		south	St	moriches	early suburban	residential	1920-1945	DSCN0826.jpg	Minimal Traditional	SA5b	194_24.00
66_SA5b		laura lee		moriches	postwar suburban	residential	1945-1960	DSCN0874.jpg	Minimal Traditional	SA5b	194_495.00
30_SA5b	142	senix		moriches	early suburban	residential	1890-1920	DSCN0831.jpg	Italianate	SA5b	189_307.00
14_SA5b	24	orchard neck	Rd	moriches	early suburban	residential	1920-1945	DSCN0814.jpg	Cape Cod Revival	SA5b	193_359.00
32_SA5b	120	senix		moriches	early suburban	residential	1890-1920	DSCN0833.jpg	Italianate	SA5b	189_302.00
15_SA5b		orchard neck		moriches	early suburban	residential	1920-1945	DSCN0815.jpg	Cape Cod Revival	SA5b	193_361.00
27_SA5b		south	St	moriches	early suburban	resort	1920-1945	DSCN0828.jpg	Colonial Revival	SA5b	194_22.00
67_SA5b	32	laura lee		moriches	early suburban	resort	1920-1945	DSCN0875.jpg	Vacation home - Cott	SA5b	194_2.00
58_SA5b	6	bayview		moriches	early suburban	residential	1945-1960	DSCN0866.jpg	Minimal Traditional	SA5b	194_184.00
47_SA5b	131	union	Ave	moriches	early suburban	residential	1920-1945	DSCN0851.jpg	Cape Cod Revival	SA5b	194_141.00
41_SA5b		union	Ave	moriches	early suburban	institutional	1890-1920	DSCN0843.jpg	Recreation	SA5b	194_136.00
54_SA5b		ocean	Ave	moriches	postwar suburban	residential	1945-1960	DSCN0861.jpg	Minimal Traditional	SA5b	194_172.00
38_SA5b		old south neck	Rd	moriches	postwar suburban	residential	1945-1960	DSCN0840.jpg	Minimal Traditional	SA5b	189_274.00
23_SA5b	48	orchard neck		moriches	postwar suburban	residential	1920-1945	DSCN0824.jpg	Bungalow	SA5b	193_379.00
29_SA5b	207	belleview	St	moriches	postwar suburban	residential	1945-1960	DSCN0830.jpg	Split Level	SA5b	194_16.00
9_SA5b		orchard neck	Rd	moriches	early suburban	residential	1920-1945	DSCN0807.jpg	Colonial Revival	SA5b	193_344.00
43_SA5b		union	Ave	moriches	early suburban	maritime/ind	1890-1920	DSCN0844.jpg	Maritime - Fishing p	SA5b	194_138.00
33_SA5b	6	grove	St	moriches	early suburban	residential	1920-1945	DSCN0834.jpg	Minimal Traditional	SA5b	189_301.00
45_SA5b		union	Ave	moriches	early suburban	resort	1920-1945	DSCN0847.jpg	Bungalow	SA5b	194_139.00
55_SA5b	9	bayview		moriches	early suburban	residential	1920-1945	DSCN0862.jpg	Colonial / Verna	SA5b	194_186.00
31_SA5b	130	senix		moriches	early suburban	residential	1920-1945	DSCN0832.jpg	Craftsman	SA5b	189_305.00
64_SA5b	10	bay		moriches	postwar suburban	residential	1945-1960	DSCN0872.jpg	Minimal Traditional	SA5b	194_489.00
49_SA5b				moriches	postwar suburban	resort	1945-1960	DSCN0853.jpg	Hotels / Motels	SA5b	194_158.00
63_SA5b		bay		moriches	early suburban	resort	1920-1945	DSCN0871.jpg	Vacation - Cottage	SA5b	194_480.00
59_SA5b	7	laura lee		moriches	postwar suburban	resort	1945-1960	DSCN0867.jpg	Minimal Traditional	SA5b	194_15.00
26_SA5b		south	St	moriches	postwar suburban	resort	1945-1960	DSCN0827.jpg	Vacation home - Cott	SA5b	194_23.00

61_SA5b	15	laura lee		moriches	postwar suburban	residential	1945-1960	DSCN0869.jpg	Ranch	SA5b	194_12.00
52_SA5b		inlet view	dr	moriches	postwar suburban	residential	1945-1960	DSCN0856.jpg	Minimal Traditional	SA5b	194_169.00
50_SA5b				moriches	early suburban	resort	1890-1920	DSCN0855.jpg	Shingle / Stick	SA5b	194_156.00
11_SA5b		orchard neck		moriches	postwar suburban	residential	1945-1960	DSCN0811.jpg	Ranch	SA5b	193_348.00
17_SA5b		orchard neck	Rd	moriches	early suburban	residential	1920-1945	DSCN0818.jpg	Vacation - Cottage	SA5b	193_365.00
13_SA5b	18	orchard neck	Rd	moriches	early suburban	residential	1945-1960	DSCN0813.jpg	Minimal Traditional	SA5b	193_355.00
10_SA5b		orchard neck	Rd	moriches	early suburban	residential	1920-1945	DSCN0808.jpg	Minimal Traditional	SA5b	193_345.00
39_SA5b	6	old south neck	Rd	moriches	postwar suburban	residential	1945-1960	DSCN0841.jpg	Colonial Revival	SA5b	189_276.00
7_SA5b	7	merritt	la	moriches	early suburban	residential	1920-1945	DSCN0803.jpg	Colonial Revival	SA5b	193_323.00
21_SA5b		orchard neck	Rd	moriches	early suburban	residential	1920-1945	DSCN0822.jpg	Cape Cod Revival	SA5b	193_377.00
20_SA5b	43	orchard neck	Rd	moriches	postwar suburban	residential	1920-1945	DSCN0821.jpg	Minimal Traditional	SA5b	193_376.00
46_SA5b	11	convent	la	moriches	early suburban	institutional	1890-1920	DSCN0850.jpg	Shingle / Stick	SA5b	194_362.00
42_SA5b		union	Ave	moriches	early suburban	maritime/ind		DSCN0845.jpg		SA5b	
4_SA5b		red bridge + bellevi		moriches	postwar suburban	residential	1945-1960	DSCN0801.jpg		SA5b	
8_SA5b		orchard neck	Rd	moriches	early suburban	residential	1920-1945	DSCN0805.jpg		SA5b	
56_SA5b				moriches				DSCN0864.jpg		SA5b	
37_SA5b				moriches	industrialization	maritime/ind		DSCN0839.jpg		SA5b	
36_SA5b		old south neck	Rd	moriches	early suburban	resort	1890-1920	DSCN0838.jpg		SA5b	
18_SA5b				moriches	industrialization	maritime/ind	1890-1920	DSCN0819.jpg		SA5b	
28_SA5b		south	St	moriches	early suburban	resort	1920-1945	DSCN0829.jpg		SA5b	
24_SA5b				moriches	early suburban	residential	1890-1920	DSCN0825.jpg		SA5b	

Residential District Area – 6A

SURVEY_ ID	Address or Street Location:	STREET_NAM	STREET_SUF	Village/Hamlet:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID
20_SA6a	285	oneck	language	westhampton beach	early suburban	resort	1890-1920	DSCN0143.jpg	Vacation home - esta	SA6a	210_120.00
21_SA6a	285	oneck	la	westhampton beach	early suburban	resort	1890-1920	DSCN0144.jpg	Vacation home - esta	SA6a	210_119.00
8_SA6a		jagger		westhampton beach	postwar suburban	residential	1945-1960	DSCN0128.jpg	Cape Cod Revival	SA6a	207_175.00
18_SA6a		fiske	Ave	westhampton beach	early suburban	residential	1920-1945	DSCN0139.jpg	Colonial Revival	SA6a	210_113.00
27_SA6a	14	halsey	Ave	westhampton beach	early suburban	residential	1890-1920	DSCN0155.jpg	Shingle / Stick	SA6a	210_105.00
26_SA6a		halsey	Ave	westhampton beach	early suburban	resort	1890-1920	DSCN0154.jpg	Colonial Revival	SA6a	210_104.00
16_SA6a		fiske	Ave	westhampton beach	early suburban	resort	1890-1920	DSCN0138.jpg	Vacation home - esta	SA6a	210_114.00
17_SA6a	29	fiske	Ave	westhampton beach	early suburban	resort	1890-1920	DSCN0140.jpg	Colonial Revival	SA6a	210_115.00
7_SA6a		jagger	St	westhampton beach	postwar suburban	residential	1945-1960	DSCN0127.jpg	Cape Cod Revival	SA6a	207_172.00
22_SA6a		oneck	la	westhampton beach	early nationhood	residential	1750-1800	DSCN0149.jpg	Colonial Revival	SA6a	210_121.00
34_SA6a	32d	honeysuckle	la	westhampton beach	industrialization	residential	1890-1920	DSCN0166.jpg	Folk Victorian	SA6a	210_2.00

1_SA6a	9	potters neck	la	westhampton beach	postwar suburban	resort	1945-1960	DSCN0121.jpg	Modern	SA6a	210_264.00
4_SA6a	10	sandpiper		westhampton beach	postwar suburban	resort	1945-1960	DSCN0124.jpg	Ranch	SA6a	210_254.00
19_SA6a	15	fiske	Ave	westhampton beach	early suburban	resort	1890-1920	DSCN0142.jpg	Shingle / Stick	SA6a	210_117.00
24_SA6a	264	oneck		westhampton beach	early suburban	residential	1920-1945	DSCN0152.jpg	Colonial Revival	SA6a	210_102.00
23_SA6a		oneck		westhampton beach	early suburban	resort	1920-1945	DSCN0150.jpg	Vacation home - Cott	SA6a	210_118.00
6_SA6a		sandpiper		westhampton beach	postwar suburban	resort	1945-1960	DSCN0126.jpg	Ranch	SA6a	207_240.00
9_SA6a		jagger	la	westhampton beach	early suburban	residential	1920-1945	DSCN0130.jpg	Colonial Revival	SA6a	207_176.00
30_SA6a	10	lott	Ave	westhampton beach	early suburban	residential	1890-1920	DSCN0161.jpg	Shingle / Stick	SA6a	210_112.00
3_SA6a	15	tanners neck	lq	westhampton beach	postwar suburban	residential	1945-1960	DSCN0123.jpg	Colonial Revival	SA6a	210_262.00
2_SA6a	4	tanners neck		westhampton beach	postwar suburban	resort	1945-1960	DSCN0122.jpg	Ranch	SA6a	210_263.00
5_SA6a		sandpiper		westhampton beach	postwar suburban	resort	1945-1960	DSCN0125.jpg	Ranch	SA6a	210_255.00
10_SA6a	14	jagger	la	westhampton beach	early suburban	residential	1890-1920	DSCN0131.jpg	Colonial Revival	SA6a	207_180.00
25_SA6a	232	oneck	la	westhampton beach	postwar suburban	residential	1945-1960	DSCN0153.jpg	Ranch	SA6a	210_98.00
31_SA6a	24	lott	Ave	westhampton beach	early suburban	residential	1890-1920	DSCN0162.jpg	Colonial Revival	SA6a	210_110.00
28_SA6a	8	lott	Ave	westhampton beach	early suburban	residential	1920-1945	DSCN0157.jpg	Beaux Arts	SA6a	210_106.00
29_SA6a	5	lott	Ave	westhampton beach	early suburban	residential	1920-1945	DSCN0158.jpg	Colonial Revival	SA6a	210_109.00
12_SA6a		jagger	la	westhampton beach	early suburban	residential	1890-1920	DSCN0133.jpg	Colonial Revival	SA6a	207_181.00
35_SA6a		shore	Rd	westhampton beach	early suburban	institutional	1890-1920	DSCN0167.jpg		SA6a	
11_SA6a		jagger	la	westhampton beach	early suburban	residential	1890-1920	DSCN0132.jpg		SA6a	
32_SA6a		lott, halsey, fiske		westhampton beach	early suburban	resort	1890-1920	DSCN0164.jpg		SA6a	

Residential District Area – 6C

SURVEY_ ID	Address or Street Location:	STREET_NAM	STREET_SUF	Village/Hamlet:	Primary Context:	Secondary Context:	Period of Significance:	PHOTO	Building Type/Style:	Subarea	USACEID	A Events/Patterns	B Important Persons
14_SA6c		west end		east quogue	postwar suburban	residential	1945-1960	DSCN0217.jpg	Ranch	SA6c	222_197.00	0	0
18_SA6c		sunset	Ave	east quogue	early suburban	residential	1920-1945	DSCN0222.jpg	Bungalow	SA6c	222_95.00	0	0
20_SA6c	51	sunset	Ave	east quogue	postwar suburban	residential	1945-1960	DSCN0224.jpg	Ranch	SA6c	222_97.00	0	0
10_SA6c		bayside	Ave	east quogue	early suburban	residential	1920-1945	DSCN0213.jpg	Minimal Traditional	SA6c	222_183.00	0	0
6_SA6c		bayside	Ave	east quogue	early suburban	resort	1920-1945	DSCN0210.jpg	Minimal Traditional	SA6c	222_188.00	0	0
11_SA6c		bayside	Ave	east quogue	early suburban	residential	1920-1945	DSCN0214.jpg	Vacation home - Cott	SA6c	222_179.00	0	0
15_SA6c		bayshore		east quogue	postwar suburban	residential	1945-1960	DSCN0220.jpg	Minimal Traditional	SA6c	222_196.00	0	0
19_SA6c	53	sunset	Ave	east quogue	postwar suburban	residential	1945-1960	DSCN0223.jpg	Ranch	SA6c	222_96.00	0	0
760_SA6c	65	west end		east quogue	postwar suburban	residential	1945-1960	DSCN0216.jpg	Ranch	SA6c	222_198.00	0	0
102_SA6c	5	bayside		hampton bays	postwar suburban	residential	1945-1960	DSCN0200.jpg	Minimal Traditional	SA6c	222_189.00	0	0
3_SA6c		bayside		hampton bays	postwar suburban	residential	1945-1960	DSCN0201.jpg	Minimal Traditional	SA6c	222_169.00	0	0
8_SA6c		bayside	Ave	east quogue	early suburban	residential	1920-1945	DSCN0212.jpg	Minimal Traditional	SA6c	222_185.00	0	0
750_SA6c	42	shinnecock	Rd	quogue	early suburban	resort	1890-1920	DSCN0247.jpg	Shingle / Stick	SA6c	219_68.00	0	0

5_SA6c		bayside	Ave	east quiogue	early suburban	resort	1920-1945	DSCN0211.jpg	Minimal Traditional	SA6c	222_187.00	0	0
2_SA6c	38	shinnecock	Rd	quogue	early suburban	resort	1890-1920	DSCN0237.jpg	Vacation - estate	SA6c		0	0
23_SA6c	45	sunset	Ave	east quogue	early suburban	residential	1920-1945	DSCN0227.jpg	Bungalow	SA6c	218_100.00	0	0
24_SA6c		sunset	Ave	east quogue	early suburban	residential	1890-1920	DSCN0228.jpg	Shingle / Stick	SA6c	218_101.00	0	0
21_SA6c	49	sunset	Ave	east quogue	postwar suburban	residential	1945-1960	DSCN0225.jpg	Minimal Traditional	SA6c	222_98.00	0	0
999_SA6c	29	shinnecock	Rd	quogue	early suburban	resort	1890-1920	DSCN0238.jpg	Vacation - estate	SA6c	219_80.00	0	0
986_SA6c		shinnecock	Rd	quogue	early suburban	resort	1890-1920	DSCN0243.jpg	Vacation estate	SA6c	219_76.00	0	0
28_SA6c		stone	la	east quogue	early suburban	resort	1890-1920	DSCN0236.jpg	Shingle / Stick	SA6c	218_58.00	-1	0
918_SA6c		shinnecock	Rd	quogue	early suburban	resort	1920-1945	DSCN0242.jpg	Colonial Revival	SA6c	219_58.00	0	0
969_SA6c	31	shinnecock		quogue	early suburban	resort	1890-1920	DSCN0244.jpg	Colonial Revival	SA6c	219_59.00	0	0
995_SA6c		shinnecock	la	quogue	early suburban	resort	1890-1920	DSCN0241.jpg	Vacation home - esta	SA6c	219_77.00	0	0
752_SA6c		bayside		east quogue	early suburban	residential	1945-1960	DSCN0215.jpg	Minimal Traditional	SA6c	222_178.00	0	0
998_SA6c	26	shinnecock	Rd	quogue	early suburban	resort	1890-1920	DSCN0239.jpg	Colonial Revival	SA6c		0	0
751_SA6c	36	niamaug		quogue	early suburban	resort	1890-1920	DSCN0249.jpg	Vacation home - esta	SA6c		-1	0
12_SA6c		niamaug		quogue	early suburban	residential	1920-1945	DSCN0250.jpg	Vacation home - esta	SA6c		-1	0
25_SA6c		sunset	Ave	east quogue	postwar suburban	residential	1945-1960	DSCN0231.jpg	Ranch	SA6c	218_86.00	0	0
26_SA6c		sunset	Ave	east quogue	early suburban	residential	1945-1960	DSCN0232.jpg	Colonial Revival	SA6c	218_85.00	0	0
4_SA6c		bayside	Ave	east quogue	early suburban	residential	1920-1945	DSCN0202.jpg	Minimal Traditional	SA6c	222_170.00	0	0
9_SA6c		bayside	Ave	east quogue	early suburban	residential	1920-1945	DSCN0207.jpg	Minimal Traditional	SA6c	222_171.00	0	0
22_SA6c		sunset	Ave	east quogue	early suburban	residential	1920-1945	DSCN0226.jpg	Bungalow	SA6c	218_99.00	0	0
7_SA6c		bayside	Ave	east quogue	early suburban	residential	1920-1945	DSCN0205.jpg		SA6c		0	0
997_SA6c		quaquanantuck	la	quogue	industrialization	maritime/ind	1865-1890	DSCN0240.jpg		SA6c		0	0
1_SA6c		bayside	Ave	east queoge	postwar suburban	residential	1945-1960	DSCN199.jpg		SA6c		0	0
16_SA6c				east quogue	early suburban	maritime/ind	1890-1920	DSCN219.jpg		SA6c		0	0
27_SA6c		sunset	Ave	east quogue	early suburban	residential	1920-1945	DSCN0233.jpg		SA6c		0	0
13_SA6c		shinnecock-niamaug		quogue	early suburban	resort	1890-1920	DSCN0251.jpg		SA6c		-1	0
17_SA6c		west end - hallock		east quogue	early suburban	residential	1920-1945	DSCN0221.jpg		SA6c		0	0

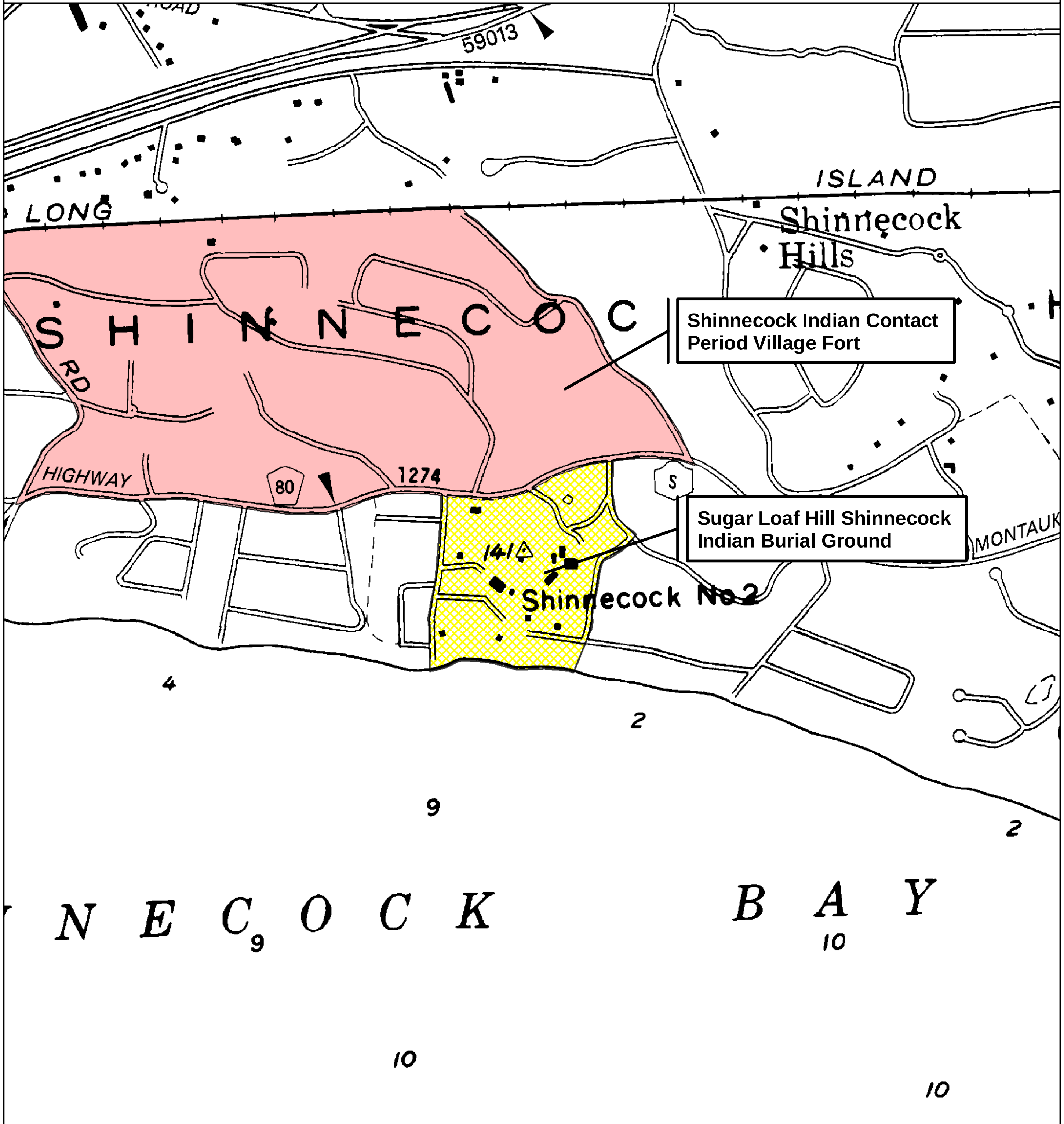
Residential District Area – 7B

SURVEY_ID	Address or Street Location:	STREET_NAM	Village/Hamlet:	Original Use:	Current Use:	Primary Context:	Secondary Context:	Period of Significance	PHOTO	Subarea	USACEID
13_SA7b	294-6	montauk hwy	hampton bays	residence	residence	early suburban	resort	1920-1945	DSCN0196.jpg	SA7b	

Sugar Loaf Hill Shinnecock Indian Burial Ground Critical Environmental Area (CEA)

Effective Date of Designation: 11-15-90

Designating Agency: Town of Southampton



Legend

Adjacent CEAs

Sugar Loaf Hill Hinnecock Indian Burial Ground CEA

0 500 1,000 2,000 3,000 Feet

1 inch equals 1,000 feet

Base Map: DOT 1:24,000 Planimetric Images

Disclaimer: This map was prepared by the New York State Department of Environmental Conservation using the most current data available. It is deemed accurate but is not guaranteed. NYS DEC is not responsible for any inaccuracies in the data. Please contact the designating authority for additional information regarding legal boundary descriptions.

APPENDIX D

FIRE ISLAND TO MONTAUK POINT, SUFFOLK COUNTY, NEW YORK

State Historic Preservation Office/
New York State Office of Parks, Recreation and Historic Preservation
Human Remains Discovery Protocol
(August 2018)

If human remains are encountered during construction or archaeological investigations, the New York State Historic Preservation Office (SHPO) recommends that the following protocol is implemented:

- Human remains must be treated with dignity and respect at all times. Should human remains or suspected human remains be encountered, work in the general area of the discovery will stop immediately and the location will be secured and protected from damage and disturbance.

- If skeletal remains are identified and the archaeologist is not able to conclusively determine whether they are human, the remains and any associated materials must be left in place. A qualified forensic anthropologist, bioarchaeologist or physical anthropologist will assess the remains in situ to help determine if they are human.

- No skeletal remains or associated materials will be collected or removed until appropriate consultation has taken place and a plan of action has been developed.

- The SHPO, the appropriate Indian Nations, the involved state and federal agencies, the coroner, and local law enforcement will be notified immediately. Requirements of the corner and local law enforcement will be adhered to. A qualified forensic anthropologist, bioarchaeologist or physical anthropologist will assess the remains in situ to help determine if the remains are Native American or non-Native American.

- If human remains are determined to be Native American, they will be left in place and protected from further disturbance until a plan for their avoidance or removal can be generated. Please note that avoidance is the preferred option of the SHPO and the Indian Nations. The involved agency will consult SHPO and the appropriate Indian Nations to develop a plan of action that is consistent with the Native American Graves Protection and Repatriation Act (NAGPRA) guidance. Photographs of Native American human remains and associated funerary objects should not be taken without consulting with the involved Indian Nations.

- If human remains are determined to be non-Native American, the remains will be left in place and protected from further disturbance until a plan for their avoidance or removal can be generated. Please note that avoidance is the preferred option of the SHPO. Consultation with the SHPO and other appropriate parties will be required to determine a plan of action.

- To protect human remains from possible damage, the SHPO recommends that burial information not be released to the public.

APPENDIX E

FIRE ISLAND TO MONTAUK POINT, SUFFOLK COUNTY, NEW YORK

February 2020

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On February 14, 2019 the USACE NYD sent letters to the following agencies:

- NOAA/NMFS/Habitat Conservation Division (portions also included in Appendix D)
- USEPA Region 2
- U.S. Fish and Wildlife Service – FWCAR coordination (also included in Appendix J)
- New York State Department of State (also included in Appendix G)
- U.S. Fish and Wildlife Service – CBRA coordination (also included in Appendix O)
- East Hampton Planning (also included in Appendix G)
- Village of Ocean Beach (also included in Appendix G)

All seven of these letters included the FIMP Project Description as Enclosure 1.
Four of these letters included the FIMP Monitoring and Adaptive Management Plan as Enclosure 2. Refer to the FEIS and FGRR main text for the final Project Description. Refer to Appendix J of the FGRR for the final Monitoring and Adaptive Management Plan.

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

Environmental Analysis Branch

February 14, 2019

Mr. David Stilwell
Field Supervisor
U.S. Fish and Wildlife Service
3817 Luker Road
Cortland, New York 13045

Subject: Atlantic Coast of Long Island, Fire Island Inlet to Montauk Point (FIMP), New York Coastal Storm Risk Management Project, Coastal Barrier Resource Act (CBRA)

Dear Mr. Stilwell:

The U.S. Army Corps of Engineers, New York District (District) is pleased to provide the final project description for the FIMP General Reevaluation Report (GRR) and Environmental Impact Statement (EIS) (Enclosure 1).

The District, New York State Department of Environmental Conservation (NYSDEC) and their local partners, and other agencies, including the U.S. Fish and Wildlife Service (Service) have participated in extensive coordination to finalize the project description, in particular the details of the Coastal Process Features (CPFs) which are designed to achieve no net loss of sediment into the back bay system as part of the mutually acceptable plan as well as for compliance with Section 7 of the Endangered Species Act by creating early successional habitat for piping plovers (*Charadrius melodus*).

The following updates have been made to the project based on the extensive sponsor, local partner, resource agency and public coordination since the release of the July 2016 Draft GRR and EIS:

1. Updated sand quantities in tables and text
2. Additional language regarding "no net loss" of sediment (how to achieve the goal of approximately 4.2 million cubic yards of sand)CY
3. Additional section on proactive breach response triggers (ex: Southampton transitioned from Proactive to Reactive for Real Estate purposes)
4. Updated discussion of Downtown Montauk related to beach nourishment
5. Additional language describing that vacant land will be acquired as part of mainland nonstructural plan
6. Updated description of current list of CPFs, including renumbering sites and the removal of sites that do not have landowner support and are no longer included (Cupsogue, Sunken Forest, Point of Woods, Carrington, Regan Property)

7. Incorporated an updated CPF table with quantities to achieve the approximate 4.2 MCY. The quantity in the table alone will not achieve the 4.2 MCY quantity and therefore Adaptive Management will be utilized to reach the overall total
8. Included a description of mainland CPF's.

The purpose of this letter is to reaffirm and supplement the District's March 29, 2017 request for Service concurrence for the FIMP project exception determination under Section 6 of CBRA (16 U.S.C. § 3505). The Project falls within portions of three Coastal Barrier Resource System (CBRS) units.

Please refer to attached completed CBRA Determination Template provided by the Service's CBRA website (Enclosure 2).

Based on this review, the District has concluded that the Project meets the above-referenced exceptions and therefore is consistent with the purposes of CBRA. The District request that the Service notify us if you do not concur with this determination. To facilitate your review, please find enclosed maps that overlay the Project on each of the respective CBRA zones (Enclosure 3) to illustrate where the Project overlaps into these zones. If you should have any questions, please contact Mr. Robert J. Smith of my staff at 917-790-8729.

Sincerely,

Peter Weppler
Chief, Environmental Analysis Branch

cc
USFWS-LIFO

Enclosure 1 FIMP Final Project Description
Enclosure 2 CBRA Determination Template
Enclosure 3 Maps that overlay the Project on each of the respective CBRA zones

USFWS CBRA PROJECT INFORMATION
(per Template)

Project Location

The action or project is located in Suffolk county, New York within (or partially within) Unit(s) NY-59/59P, F-12 and F-13/13P of the Coastal Barrier Resources System (CBRS).

Description of the Proposed Action or Project

The Recommended Plan for the Fire Island to Montauk Point New York Hurricane Sandy project area provides a systems approach for Coastal Storm Risk Management (CSRM) that balances the risks to human life and property, while maintaining and restoring the natural coastal processes and ecosystem integrity. The Second Interim Report of the Disaster Relief Appropriations Act, 2013 designates that the Fire Island Inlet to Montauk Point, NY, Coastal Risk Management Study meets the criteria for an “Authorized But Unconstructed” project and therefore, this study is being completed at full federal expense. The initial construction will be 100% federally funded, if constructed using the authority of PL113-2.

Applicable Exception(s) under 16 U.S.C. 3505(a)
Identify the appropriate exception(s) for the action or project under the CBRA (16 U.S.C. 3505(a)).

General Exceptions

☐ 16 U.S.C. 3505(a)(1): Any use or facility necessary for the **exploration, extraction, or transportation of energy resources** which can be carried out only on, in, or adjacent to a coastal water area because the use or facility requires access to the coastal water body.

☒ 16 U.S.C. 3505(a)(2): The **maintenance or construction of improvements of existing Federal navigation channels** (including the Intracoastal Waterway) and related structures (such as jetties), including the disposal of dredge materials related to such maintenance or construction. A Federal navigation channel or a related structure is an existing channel or structure, respectively, if it was authorized before the date on which the relevant System unit or portion of the System Unit was included within the CBRS.

☐ 16 U.S.C. 3505(a)(3): The maintenance, replacement, reconstruction, or repair, but not the expansion, of **publicly owned or publicly operated roads, structures, or facilities that are essential links** in a larger network or system.

☐ 16 U.S.C. 3505(a)(4): **Military activities** essential to national security.

☐ 16 U.S.C. 3505(a)(5): The construction, operation, maintenance, and rehabilitation of **Coast Guard facilities** and access thereto.

USFWS CBRA PROJECT INFORMATION
(per Template)

Specific Exceptions
These exceptions must also be consistent with all three purposes of the CBRA (see "Justification" section below).

☒ 16 U.S.C. 3505(a)(6)(A): **Projects for the study, management, protection, and enhancement of fish and wildlife resources and habitats**, including acquisition of fish and wildlife habitats, and related lands, stabilization projects for fish and wildlife habitats, and recreational projects.

☐ 16 U.S.C. 3505(a)(6)(B): Establishment, operation, and maintenance of **air and water navigation aids** and devices, and for access thereto.

☐ 16 U.S.C. 3505(a)(6)(C): Projects under the **Land and Water Conservation Fund Act** of 1965 (16 U.S.C. 4601-4 through 11) and the **Coastal Zone Management Act** of 1972 (16 U.S.C. 1451 et seq.).

☐ 16 U.S.C. 3505(a)(6)(D): **Scientific research**, including aeronautical, atmospheric, space, geologic, marine, fish and wildlife, and other research, development, and applications.

☐ 16 U.S.C. 3505(a)(6)(E): Assistance for **emergency actions essential to the saving of lives and the protection of property and the public health and safety**, if such actions are performed pursuant to sections 5170a, 5170b, and 5192 of title 42 **and are limited to actions that are necessary to alleviate the emergency.**

☐ 16 U.S.C. 3505(a)(6)(F): Maintenance, replacement, reconstruction, or repair, but not the expansion (except with respect to United States route 1 in the Florida Keys), of **publicly owned or publicly operated roads, structures, and facilities.**

☒ 16 U.S.C. 3505(a)(6)(G): **Nonstructural projects for shoreline stabilization** that are designed to mimic, enhance, or restore a natural stabilization system.

<u>Justification for Exception(s)</u>

Based on the District's review, going east to west, the project affects the following units: F12 Southampton, F-13/F-13P Tiana Beach and NY-59/59P Fire Island, NY 59P, but meets the exceptions provisions under Section 6 of the CBRA. The purpose of the Project is to strengthen the natural protective features of the south shore of Long Island's barrier system for coastal storm damage protection. It does not seek to encourage encroachment of development or alterations to the coastal barriers.

For units F-12 and F-13/13P, the District determined that the Project meets the following additional conditions under 16 U.S.C. § 3505 which provides rationale that the project be exempt "if the expenditure is for the maintenance or construction of improvements of existing Federal navigation channels (including the Intracoastal Waterway) and related structures (such as jetties), including the placement of dredge material related to such maintenance or construction." The Project's proposed improvements to inlet sediment management will provide navigation benefits to three inlets (Shinnecock, Moriches and Fire Island Inlet) by decreasing the frequency of maintenance dredging and affording safer passage through the inlets and will allow for better retention of sediment which will decrease shoaling within the navigation channel maintaining critical access to U.S. Coast Guard Stations at Moriches and Shinnecock Inlets. The project includes sand bypassing at the inlets within units F-12 and F13/13P. These activities include dredging of sand from the inlet and placing sand on the down drift beach. These actions are designed to mimic the natural movement of sand that would occur in the absence of the inlet. Both the dredging and placement fall within this category.

For the parts of the project affecting NY-59/59P, this activity falls under the CBRA's exception for "nonstructural projects for shoreline stabilization…designed to mimic, enhance, or restore a natural stabilization system." 16 U.S.C. §3505(a) (6)(G). The Project meets §505(a) (6) (G)'s precondition that it be consistent with the CBRA's purposes. The Project minimizes the loss of human life by replacing the beach to its original pre-Sandy condition in order to avoid further erosion and loss of Fire Island, and to reestablish the functionality of these beaches as part of the coastal barriers that contribute to the resiliency of upland communities. Additional loss of the beach could result in the damage to structures on Fire Island, damage and loss to structures within the backbay communities of the mainland of Long Island and potentially resulting in the loss of life. The Project involves renourishing a beach with sand and not the development of buildings or structures that the CBRA seeks to avoid. By keeping Fire Island National Seashore, Robert Moses State Park and Smith Point County Park as a public beach. These beaches are popular summer recreational destinations within the New York City area and provides much needed comfort to persons of all ages and socioeconomic backgrounds during hot summer days. The beach nourishment activities at these areas are protective of life, safety and the environment (without the Project, the beach can continue to erode, impacting the wildlife and natural resources of the project area). Federal funding is not being used for commercial or residential development that CBRA construes as wasteful. Rather the federal funding is being used for a beneficial purpose that is consistent with the CBRA's purpose.

It is noted that for the units designated at "P", known as otherwise protected areas, the only Federal funding prohibition is Federal flood insurance.

The legislative history of the CBRA supports the finding that the project falls within the exemptions. See S. REP. NO. 419, 97th Cong., 2d Sess. 8 (Oct. 1, 1982) (listing, as an exemption from the CBRA,"[n]onstructural projects such as the planting of dune grass or beach nourishment which mimic, enhance, or restore natural stabilization systems would be permitted for shoreline stabilization"); H.R. REP. NO. 841, 97th Cong., 2d Sess. 17 (Oct. 18, 1982) ("Nonstructural projects for shoreline stabilization, such as the planting of dune grass or other beach nourishment which mimic, enhance, or restore natural stabilization systems would be permitted [under the CBRA].”); Coastal Barrier Resources Act Advisory Guidelines, 48 Fed. Reg. 45,664, 45,667 (Oct. 6, 1983) (noting that “[t]he legislative history cites the planting of dune grass or other beach nourishment activities as examples of these projects”). See also 127 Cong. Rec. 7572 (Apr 28, 1981) (remarks of Sen. John Chafee, the CBRA’s sponsor) (specifically naming “dredge and fill activities” as an exception to the CBRA’s prohibition on federal assistance).

<ins>Contact Information</ins>

Include contact information and where the response should be sent.

Peter Weppler
Chief, Environmental Analysis Branch
U.S. Army Corps of Engineers - Planning
26 Federal Plaza - Room 2151
New York, NY 10278-0090

<ins>U.S. Fish and Wildlife Service Response</ins>

Below is the Service's response to Army Corps of Engineers request for a consultation under the CBRA for the Fire Island to Montauk Point New York Hurricane Sandy project for Coastal Storm Risk Management (CSRM) This response represents the Service’s opinion. **The final decision regarding the expenditure of funds for this action or project rests with the Federal funding agency.** The Army Corps of Engineers has fulfilled its obligation to consult with the Service under the CBRA for this particular action or project within the CBRS. Please note that any new commitment of Federal funds associated with this action or project, or change in the project design and/or scope, is subject to the CBRA’s consultation requirement.

The Service has reviewed the information provided by The Army Corps of Engineers , and believes the referenced action/project is:

- ☐ Not located within a System Unit of the CBRS and the CBRA does not apply (except with respect to the restrictions on Federal flood insurance)
- ☐ Located within a System Unit of the CBRS and meets the exception(s) to the CBRA selected above
- ☐ Located within a System Unit of the CBRS and meets different exception(s) than the one(s) selected above (see additional information/comments below)
- ☐ Located within a System Unit of the CBRS and does not meet an exception to the CBRA (see additional information/comments below)

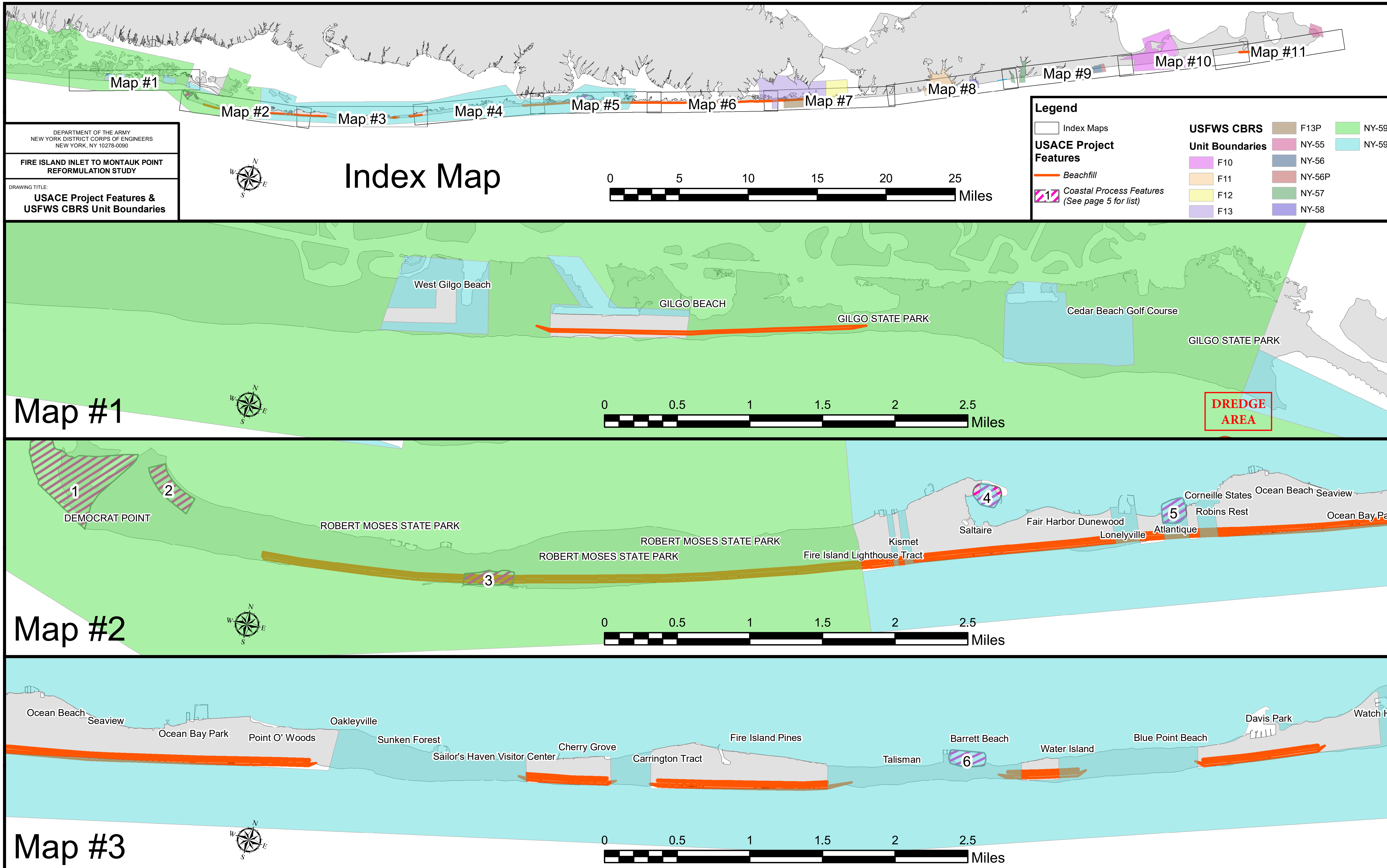
USFWS CBRA PROJECT INFORMATION
(per Template)

☐ Due to many competing priorities, the Service is unable to provide an opinion on the applicability of the CBRA's exceptions to this action/project at this time. The Army Corps of Engineers may elect to proceed with the action/project if it has determined that the action/project is allowable under the CBRA. Please note that any new commitment of Federal funds associated with this action/project or a related future project is subject to the CBRA's consultation requirement.

Additional Information/Comments
Include any additional information/comments.

This response does not constitute consultation for any project pursuant to section 7 of the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) or comments afforded by the Fish and Wildlife Coordination Act (48 Stat. 401; 16 U.S.C. 661 *et seq.*); nor does it preclude comment on any forthcoming environmental documents pursuant to the National Environmental Policy Act (83 Stat. 852; 42 U.S.C. 4321 *et seq.*).

SERVICE FIELD OFFICE SIGNATORY AND TITLE DATE



DEPARTMENT OF THE ARMY
NEW YORK DISTRICT CORPS OF ENGINEERS
NEW YORK, NY 10278-0090
FIRE ISLAND INLET TO MONTAUK POINT REFORMULATION STUDY
DRAWING TITLE:
USACE Project Features & USFWS CBRS Unit Boundaries
Index Map
Map #1
Map #2
Map #3
Map #4
Map #5
Map #6
Map #7
Map #8
Map #9
Map #10
Map #11
0 5 10 15 20 25 Miles
Legend
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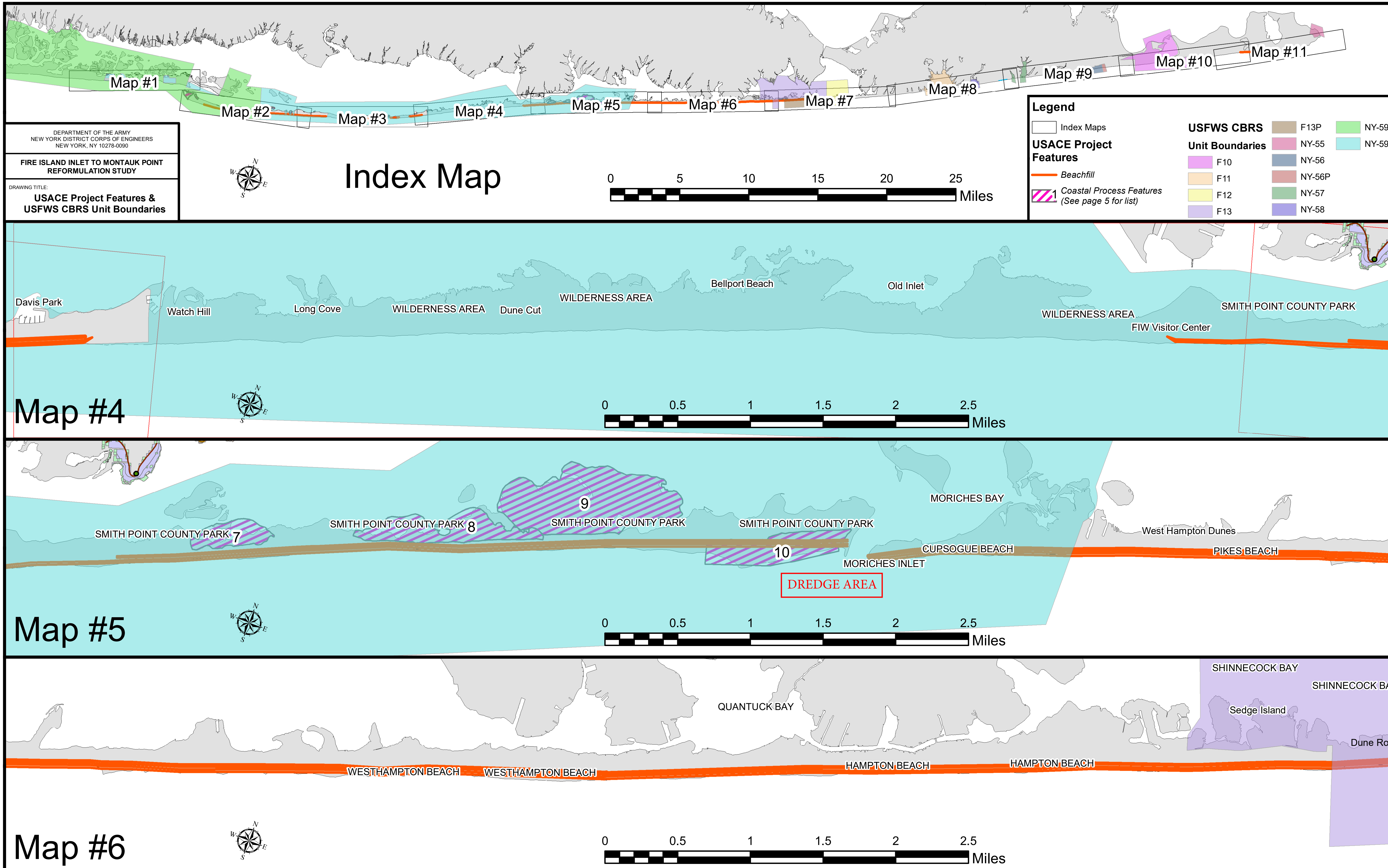
Beachfill
Coastal Process Features (See page 5 for list)
USFWS CBRS Unit Boundaries
F10
F11
F12
F13
F13P
NY-55
NY-56
NY-56P
NY-57
NY-58
NY-59
NY-59P
West Gilgo Beach
GILGO BEACH
GILGO STATE PARK
Cedar Beach Golf Course
GILGO STATE PARK
DREDGE AREA
0 0.5 1 1.5 2 2.5 Miles
DEMOCRAT POINT
ROBERT MOSES STATE PARK
ROBERT MOSES STATE PARK
ROBERT MOSES STATE PARK
Fire Island Lighthouse Tract
Kismet
Saltaire
Fair Harbor Dunewood
Lonelyville
Atlantique
Robins Rest
Corneille States
Ocean Beach
Seaview
Ocean Bay Park
Ocean Beach
Seaview
Ocean Bay Park
Point O' Woods
Oakleyville
Sunken Forest
Sailor's Haven Visitor Center
Cherry Grove
Carrington Tract
Fire Island Pines
Talisman
Barrett Beach
Water Island
Blue Point Beach
Davis Park
Watch Hill



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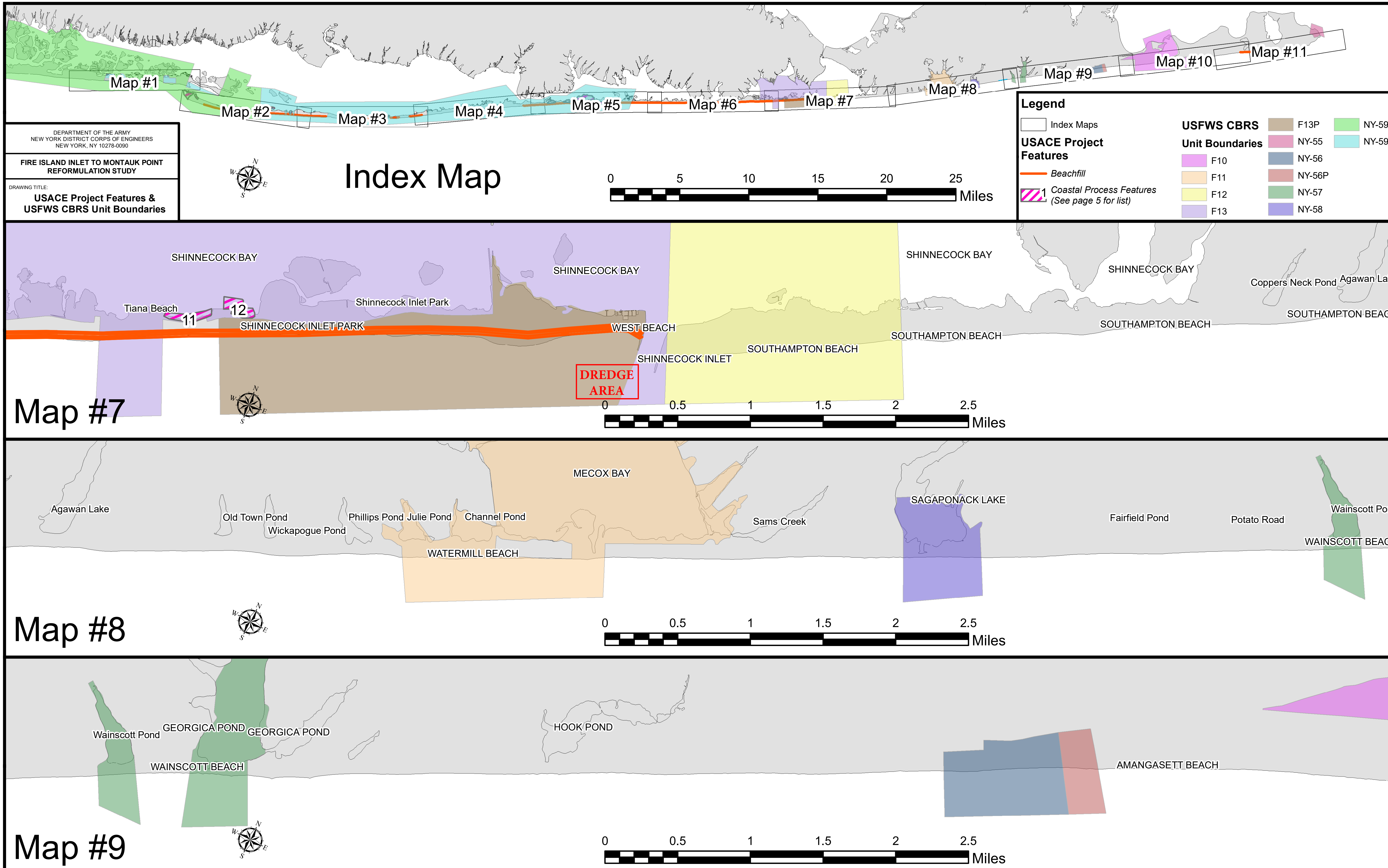
NY-55
NY-56
NY-56P
NY-57
NY-58
NY-59
NY-59P
Map #4
Davis Park
Watch Hill
Long Cove
WILDERNESS AREA
Dune Cut
WILDERNESS AREA
Bellport Beach
Old Inlet
WILDERNESS AREA
FIW Visitor Center
SMITH POINT COUNTY PARK
0 0.5 1 1.5 2 2.5 Miles
Map #5
SMITH POINT COUNTY PARK
7
SMITH POINT COUNTY PARK
8
9
SMITH POINT COUNTY PARK
SMITH POINT COUNTY PARK
10
MORICHES BAY
West Hampton Dunes
CUPSOGUE BEACH
PIKES BEACH
MORICHES INLET
DREDGE AREA
0 0.5 1 1.5 2 2.5 Miles
Map #6
QUANTUCK BAY
SHINNECOCK BAY
SHINNECOCK BAY
Sedge Island
Dune Road
WESTHAMPTON BEACH
WESTHAMPTON BEACH
HAMPTON BEACH
HAMPTON BEACH
0 0.5 1 1.5 2 2.5 Miles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F13P
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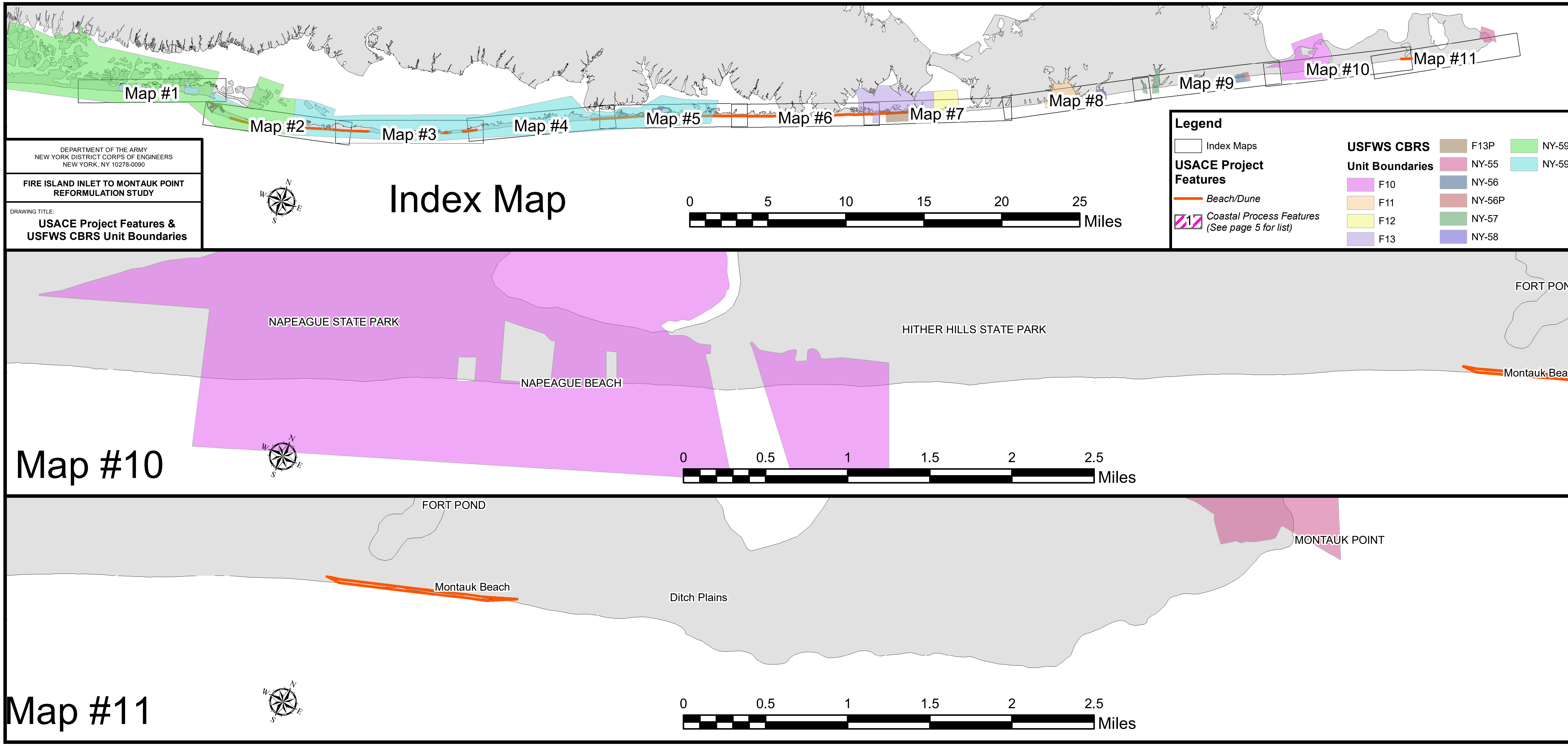
NY-56
NY-56P
NY-57
NY-58
NY-59
NY-59P
Map #7
SHINNECOCK BAY
SHINNECOCK BAY
SHINNECOCK BAY
SHINNECOCK BAY
Tiana Beach
11
12
Shinnecock Inlet Park
SHINNECOCK INLET PARK
WEST BEACH
SHINNECOCK INLET
DREDGE AREA
SOUTHAMPTON BEACH
SOUTHAMPTON BEACH
SOUTHAMPTON BEACH
SOUTHAMPTON BEACH
Coppers Neck Pond
Agawan Lake
0 0.5 1 1.5 2 2.5 Miles
Map #8
Agawan Lake
Old Town Pond
Wickapogue Pond
Phillips Pond
Julie Pond
Channel Pond
MECOX BAY
WATERMILL BEACH
Sams Creek
SAGAPONACK LAKE
Fairfield Pond
Potato Road
Wainscott Pond
WAINSCOTT BEACH
0 0.5 1 1.5 2 2.5 Miles
Map #9
Wainscott Pond
GEORGICA POND
GEORGICA POND
WAINSCOTT BEACH
HOOK POND
AMANGASETT BEACH
0 0.5 1 1.5 2 2.5 Miles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F12
F13
F13P
NY-55
NY-56
NY-56P
NY-57
NY-58
NY-59
NY-59P
NAPEAGUE STATE PARK
NAPEAGUE BEACH
HITHER HILLS STATE PARK
FORT POND
Montauk Beach
Map #10
0 0.5 1 1.5 2 2.5 Miles
FORT POND
Montauk Beach
Ditch Plains
MONTAUK POINT
Map #11
0 0.5 1 1.5 2 2.5 Miles

CPF Number	CPF Name	CPF Purpose	CPF Description
1	Democrat Point West	ESA	Regrade and devegetate; modify pond to improve functionality of existing wetland/create new foraging habitat; conserve on site sand volume.
2	Democrat Point East	ESA	Regrade and devegetate bay side; modify sand stockpiles to form barrier between recreation and ESA areas; conserve on site sand volume.
3	Dunefield West of Field 4	ESA	Devegetate ocean side; maintain vegetation buffer with road on north side.
4	Clam Pond	CSRM	Bay side fill placement to simulate cross island transport; possible living shoreline on north side per adaptive management plan.
5	Atlantique to Corneille	CSRM	Bay side fill placement to simulate cross island transport.
6	Talisman	CSRM	Bay side fill placement to simulate cross island transport.
7	Pattersquash Reach	CSRM/ESA	Devegetate bay side; shallow water bay side fill placement; south boundary follows Burma Rd alignment, includes physical barrier.
8	New Made Island Reach	CSRM/ESA	Devegetate bay side; shallow water bay side fill placement; south boundary follows Burma Rd alignment, includes physical barrier.
9	Smith Point County Park Marsh	CSRM	Bay side marsh restoration; fill placement to simulate cross island transport; regrade marsh elevation filling ditches and creating channels for tidal exchange.
10	Great Gun	ESA	Devegetate ocean side parcel.
11	Dune Rd Bayside Shoreline	CSRM	Bay side fill placement; bulkhead/groin removal; possible additional fill within offshore channel.
12	Tiana Bayside Park	CSRM	Bay side fill placement at east side of site; PED will determine fate of existing gabions.

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

February 14, 2019

Mr. Matthew Maraglio
Consistency Review
NYS Department of State
Office of Planning, Development & Community Infrastructure
99 Washington Avenue
One Commerce Plaza - Suite 1010
Albany, New York 12231

Subject: Atlantic Coast of Long Island, Fire Island Inlet to Montauk Point (FIMP), New York Coastal Storm Risk Management Project, Coastal Zone Consistency Determination (CZM)

Mr. Maraglio:

The U.S. Army Corps of Engineers, New York District (District) is pleased to provide the final project description for the FIMP General Reevaluation Report (GRR) and Environmental Impact Statement (EIS) (Enclosure 1), the final Monitoring and Adaptive Management Plan (Enclosure 2), District's Final Coastal Zone Consistency Determination as well as local Waterfront Revitalization Program Policy Statements and Waterfront Assessment Forms (Enclosure 3) and District Final Responses to the New York State's comments (Enclosure 4) on the July 2016 Draft GRR and EIS received via letter dated October 28 2016.

The District, New York State Department of Environmental Conservation (NYSDEC) and local partners, and other agencies including the New York State Department of State (NYSDOS), have participated in extensive coordination to finalize the project description, in particular the details of the Coastal Process Features (CPFs) which are designed to achieve no net loss of sediment into the back bay system as part of the mutually acceptable plan as well as for compliance with Section 7 of the Endangered Species Act by creating early successional habitat for piping plovers (*Charadrius melodus*).

The following updates have been made to the project based on the extensive sponsor, local partner, resource agency and public coordination since the release of the July 2016 Draft GRR and EIS:

1. Updated sand quantities in tables and text
2. Additional language regarding "no net loss" of sediment (how to achieve the goal of approximately 4.2 million cubic yards of sand)
3. Additional section on proactive breach response triggers (ex: Southampton transitioned from Proactive to Reactive for Real Estate purposes)

4. Updated discussion of Downtown Montauk related to beach nourishment
5. Additional language describing that vacant land will be acquired as part of mainland nonstructural plan
6. Updated description of current list of CPFs, including renumbering sites and the removal of sites that do not have landowner support and are no longer included (Cupsogue, Sunken Forest, Point of Woods, Carrington, Regan Property)
7. Incorporated an updated CPF table with quantities to achieve the approximate 4.2 MCY. The quantity in the table alone will not achieve the 4.2 MCY quantity and therefore Adaptive Management will be utilized to reach the overall total
8. Included a description of mainland CPF's.

The District has carefully considered and responded to all New York State comments (Enclosure 4) and has incorporated the comments where appropriate in the GRR and EIS. These documents will be available in mid-February for each agency to back check and then finalize their respective environmental coordination. The District requests that NYSDOS please provide concurrence on the District's CZM Determination no later than April 15, 2019 in order to be included in the Final EIS and maintain the overall project schedule for project approval

The District looks forward to working with your office to complete the Feasibility phase and throughout the Pre-Engineering and Design and Construction phases and thanks you for your continued assistance and input to this process which helps to advance the execution of this regionally-significant project.

If you require any additional information, please feel free to contact Mr. Robert Smith, Project Biologist at 917-790-8726.

Sincerely,

Peter Weppler
Chief, Environmental section

Enclosure 1 FIMP Final Project Description
Enclosure 2 FIMP Final Monitoring and Adaptive Management Plan
Enclosure 3 Final Coastal Zone Consistency Determination
Enclosure 4 District Response to NYS comments on July 2016 Draft GRR and EIS

cc: Town of East Hampton-Frank
Village of Ocean Beach-Brautigam

NEW YORK STATE DEPARTMENT OF
STATE COASTAL ZONE MANAGEMENT PROGRAM

Policy Statement Supplement to Federal Consistency Assessment Form

Project: Fire Island to Montauk Point (FIMP) Reformulation Project

Applicant: U.S. Army Corps of Engineers, New York District

Applicable Policies: In accordance with the Coastal Management Program (CMP) policies of New York State (NYDOS 2006), 26 policies were identified as potentially applicable to the proposed Project. These policies are presented below, followed by an explanation of Project consistency. Policies that are clearly not applicable are not discussed.

Policy 1 Restore, revitalize and redevelop deteriorated and underutilized waterfront areas for commercial, industrial, cultural, recreational and other compatible uses.

Determination – The New York District is proposing measures to provide shore protection and reduce storm damage reduction for the south shore of Long Island, New York, from Fire Island to Montauk Point. The majority of Fire Island lies within the legislative boundaries of the Fire Island National Seashore (FIIS). The study area includes the barrier island chain from Fire Island Inlet to Southampton inclusive of the Atlantic Ocean shorelines, and adjacent back-bay areas along Great South, Moriches, and Shinnecock Bays. The study area also includes portions of the Towns of Babylon, Islip, Brookhaven, Southampton and Easthampton, as well as 12 incorporated Villages, the entirety of FIIS, the Poospatuck Indian Reservation, and the Shinnecock Indian Reservation. The area/land supports a variety of commercial, industrial, cultural, recreational and other compatible uses. The Project will help to stabilize the south shore of Long Island, protecting it from storm damage, and protecting these uses. The without Project condition would eventually impact commercial, industrial, cultural, recreational and other compatible uses. CENAN has determined that the Recommended Plan would be consistent with, and would advance, this policy.

Policy 2 Facilitate the siting of water dependent uses and facilities on or adjacent to coastal waters.

Determination – The Project area supports a variety of public recreational activities. Numerous water dependent uses, such as marinas, beaches, parks and small business which support the summer tourism industry are located within the Project area. The Project will help to stabilize the south shore of Long Island, protecting it from storm damage, and protecting these uses. The without Project condition would eventually impact public recreational activities. CENAN has determined that the Recommended Plan would be consistent with, and would advance, this policy.

Policy 4 Strengthen the economic base by encouraging the development and enhancement of those traditional uses and activities that have provided such areas with their unique maritime identity.

Determination – The Recommended Plan would insure that traditional uses of the south shore of Long Island would be enhanced and preserved. The Recommended Plan would stabilize the shoreline and manage the risk from coastal storm damage to the surrounding area, thus encouraging the development and enhancement of those traditional uses and activities that have provided the Project area with its unique maritime identity. Therefore, the District has determined that the Recommended Plan would be consistent with this policy.

Policy 5 Encourage the location of development in areas where public services and facilities essential to such development are adequate.

Determination – The Recommended Plan would manage the risk of coastal storm damage to existing infrastructure along the south shore of Long Island from hurricane and storm surge flooding. Risk management would provide stability and enhancement to existing and future development Projects. The without Project condition would eventually impact development as contractors would be hesitant to develop in an unstable, unprotected environment. Therefore, CENAN has determined that the Recommended Plan would be consistent with this policy.

Policy 7 Significant coastal fish and wildlife habitat will be protected, preserved, and where practicable, restored so as to maintain their viability as habitats.

Determination - All of Great South Bay and many adjoining marshes and natural areas are designated as Significant Coastal Fish and Wildlife Habitat (SCFWH). Policy 7 states that filling of shallows, grading, shoreline alteration and dredging are among generic activities most likely to affect protected habitats. These activities are integral to the proposed Project which consists of dredging sand from offshore borrow areas for placement on the Atlantic shoreline of Fire Island to create enhanced beach area and dunes for coastal storm risk management. No dredging will occur within State-designated SCFWH. No filling or grading will occur within marshes or wetlands; beach and dune fill will be focused on the Atlantic shoreline; material placement on the bay side of the barrier island would reestablish coastal processes associated with breaching and overwash.. Fill placement along the Atlantic shoreline of Fire Island in the Project area will create wider beaches and dunes to minimize breaching and overwashing. The Coastal Process Feature (CPF) aspects of the Recommended Plan would offset the corresponding reduction in early successional sandy habitat to yield no net loss of habitat for sensitive species. There will be no change in existing tidal exchange patterns, only a continuation of the non-storm induced conditions.

A comprehensive assessment of potential Project impacts to threatened and endangered species and habitats was conducted and is presented in Chapter 4 of the Environmental Impact Statement (EIS) prepared for the Project and the Biological Assessment (BA) (see Appendix B). The proposed activities would be undertaken in a manner consistent with this policy.

Policy 8 Protect fish and wildlife resources in the coastal area from the introduction of hazardous wastes and other pollutants which bio-accumulate in the food chain or which cause significant sub-lethal or lethal effect on those resources.

Determination – The material that may be obtained from the offshore borrow areas, consists primarily of clean, coarse-grained sand. The material that would be dredged and used for beach nourishment on the down drift beaches would not contain hazardous wastes or other pollutants that would bio-accumulate in the food chain or cause significant sub-lethal or lethal effects on those resources. Sediment re-suspension is likely to cause temporary increases in turbidity; however, these increases would be limited in duration and spatial extent and are not expected to significantly affect fish or aquatic wildlife in the Project areas. The proposed activities would not adversely affect fish and wildlife resources and would be undertaken in a manner consistent with this policy.

Policy 12 Activities or development in the coastal area will be undertaken so as to minimize damage to natural resources and property from flooding and erosion by protecting natural protective features including beaches, dunes, barrier islands and bluffs.

Determination – The Long Island south shore barriers, inlets, and associated beaches, dunes, and nearshore areas are natural "defenses" that help preserve coastal lands and property from damage and reduce the danger to resources and property resulting from flooding and erosion. The proposed activities would be conducted in the inlets, mainland (10-year floodplain non-structural building retrofits, floodproofing, relocation, and acquisition, and road raising in 4 locations), and barrier islands. These properties and their associated coastal processes ordinarily provide varying levels of risk management measures to the barrier island upland areas, the south shore bays, and Long Island south shore mainland. The purpose of the Project is to implement measures that will augment and restore the natural protective capabilities of the barrier islands, inlets, and mainland.

The nourishment of beaches and dunes with appropriate material is an allowable activity pursuant to the coastal erosion hazard area regulations contained in 6 NYCRR Part 505 (see also Policy 35), and is a non-structural erosion control measure preferred over structural measures by the State in its tidal wetlands, erosion hazards, and coastal management program statutes and regulations (see Policies 17, 35, and 44). Restoring the natural protective characteristics of the barrier island, inlets, and associated beaches, dunes, and nearshore areas (resulting in the protection of the barrier island itself, the bay-system and the mainland of Long Island) would be consistent with and further promote Policy 12, which is to minimize damage to natural resources and property by protecting the naturally occurring protective characteristics and the associated physical processes.

Policy 13 The construction or reconstruction of erosion protection structures shall be undertaken only if they have a reasonable probability of controlling erosion for at least thirty years as demonstrated in design or construction standards and or assured maintenance or replacement programs.

The proposed Project is a long-term (50-year) plan for storm damage reduction.

Policy 14 Activities and development, including the construction or reconstruction of erosion protection structures, shall be undertaken so that there will be no measurable increase in erosion or flooding at the site of such activities or development, or at other locations.

Determination – The proposed Project consists of beach fill, breach response plans, groin removal, inlet maintenance and sand bypassing, coastal process features (CPFs), and non-structural measures (10-year floodplain non-structural building retrofits, flood proofing, relocation, and acquisition,), as well as periodic renourishment for coastal storm risk management for the south shore of Long Island. No structures that would generate increases in erosion or flooding will be constructed. The Project is consistent with and would advance this policy.

Policy 15 Mining, excavation or dredging in coastal waters shall not significantly interfere with the natural coastal processes which supply beach materials to land adjacent to such waters and shall be undertaken in a manner which will not cause an increase in erosion of such land.

Determination – The Recommended Plan includes the removal of material from offshore borrow sources. The borrow areas are located more than 1 mile offshore, where excavation and dredging has been demonstrated to have a negligible impact on the nearshore coastal processes, and will not cause an increase in coastal erosion. Best management practices will be followed during all dredging activities and the proposed dredging depth in the borrow areas will not reduce the flow of sediments to adjacent areas. Coastal processes along the shoreline sand placement areas will not be interfered with as only natural sands will be placed; no structures or shoreline hardening is proposed. Monitoring and Adaptive Management will be conducted throughout the project 30 year life to confirm these expectations. The proposed activities are consistent with this policy.

Policy 16 Public funds shall only be used for erosion protective structures where necessary to protect human life, and new development which requires a location within or adjacent to an erosion hazard area to be able to function, or existing development; and only where the public benefits outweigh the long-term monetary and other costs including the potential for increasing erosion and adverse effects on natural protective features.

Determination – The Project will minimize breaching and overwashing of the barrier islands and is a necessary measure for storm damage reduction on the barrier islands as well as the south shore of Long Island. The Project will enhance and recreate natural protective features of the barrier islands through beach renourishment and berm construction and coastal process features. Benefits to the human and natural environments outweigh the expenditures of public funds. This has been demonstrated through the completion of a comprehensive economic assessment of the Reformulation Plan. The Project is consistent with this policy.

Policy 17 Non-structural measures to minimize damage to natural resources and property from flooding and erosion shall be used whenever possible.

Determination – The proposed use of suitable dredged sand for beach nourishment and dune creation is a non-structural measure. The beach nourishment minimizes damage to natural resources and property from flooding and erosion by strengthening natural protective characteristics and providing the sediments necessary for these characteristics to function (see also Policies 12 and 15). Non structural measures will also be utilized to protect buildings on the mainland. The policy explanation states that consistency with this policy requires the use of such non-structural measures when they are appropriate and available. The Project is consistent with this policy.

Policy 18 To safeguard the vital economic, social and environmental interests of the State and of its citizens, proposed major actions in the coastal area must give full consideration to those interests, and to the safeguards which the State has established to protect valuable coastal resource areas.

Determination – The Project will reduce the frequency and degree of breaches and overwashes of the barrier islands and mainland and thereby afford coastal storm risk management to the barrier as well as communities on the south shore of Long Island. In addition, several of the inlets (such as Fire Island Inlet and Moriches Inlet) are regionally important navigation inlets that must be stabilized and maintained. The areas adjacent to the inlet support regionally important water-dependent and water-related uses, including commercial fishing and recreational boating facilities, public parklands, and other uses. The physical character of the barriers must be maintained to protect these uses.

The south shore of Long Island also supports a variety of public recreational and commercial activities. The south shore of Staten Island's coastline must be maintained to protect these uses. The without Project condition would eventually impact public recreational and commercial activities. The Project would provide coastal storm risk management to an important public recreational area and adjacent commercial and residential properties with minimal short-term impacts to economic, social, and environmental resources. Therefore, the District has determined that the Recommended Plan would be consistent with and advance this policy.

Policy 19 Protect, maintain, and increase the level and types of access to public water related recreation resources and facilities.

Determination – The beach areas in the proposed Project area support a variety of public recreational activities (see also Policies 18 and 20). The Recommended Plan would result in positive impacts on recreation as a result of better coastal storm risk management in the Project area. The without Project alternative would result in increased flood risks and increased erosion, thereby decreasing recreational potential in the area.

Buffer areas approximately 1,000 feet in length will be closed during construction activities for safety reasons. Although a reduction in public access to the work site during construction would occur, this impact would be temporary. As beach placement activities are completed within each 1,000-foot compartment, the buffer is shifted accordingly. Public use of the beach area would be restored at that time. The proposed activities would be undertaken in a manner consistent with this policy. Also, over the 50-year Project life the proposed activities would advance the policy to protect, maintain, and increase public access to and use of public water-related recreation resources and facilities.

Policy 20 Access to publicly-owned foreshore and to lands immediately adjacent to the foreshore or the water's edge that are publicly-owned shall be provided and it shall be provided in a manner compatible with adjoining uses.

Determination – Many of the lands and waters adjacent to and at the sites of the proposed activities are publicly-owned and accessible underwater lands and parklands that support a variety of public uses are present in the area (see also Policies 18 and 19). Based on the Policy 19 analysis above, the proposed activities would be undertaken in a manner consistent with and would advance this policy.

Policy 21 Water dependent and water enhanced recreation will be encouraged and facilitated, and will be given priority over non-water-related uses along the coast.

Determination – Many of the lands and waters within the Project area are publicly-owned and currently support a variety of public water dependent uses such as fishing, boating and beaching. The Project will protect and enhance these uses in the long-term, with only staggered short-term loss of use during construction, as described under Policy 19. The proposed Project is consistent with and will advance this policy.

Policy 22 Development when located adjacent to the shore will provide for water-related recreation whenever such use is compatible with reasonably anticipated demand for such activities, and is compatible with the primary purpose of the development.

Determination – The Project is not "development" per se, but is a coastal storm risk management measure. Water-related recreation is a primary land use in the Project area and will remain as such. The Project will protect and enhance these water-dependent recreational uses in the long-term, with only staggered short-term loss of use during construction, as described under Policy 19. The proposed Project is consistent with and will advance this policy.

Policy 23 Protect, enhance and restore structures, districts, areas or sites that are of significance in the history, architecture, archeology or culture of the State, its communities, or the Nation.

Determination – The Fire Island Light Station (Town of Islip) and the Beach Road Historic District (Village of Southampton) are the only properties within the study area that are listed on the National Register. A number of other structures, each more than 50 years of age, which may possess the requisite characteristics and integrity to be eligible for the National Register are visible from the beach (JMA 2000), including: the Robert Moses State Park Tower; the former Point O' Woods Life Saving Station (presently the Fire Island Hotel and Resort), and houses in various communities in the study area (see Table 3.10-1 of the EIS). The Project will afford additional coastal storm risk management to existing properties on the National Register, as well as the other identified structures. The Project will not affect archaeological site or marine resources, such as shipwrecks. The Project will protect cultural resources and is consistent with this policy.

Policy 24 Prevent impairment of scenic resources of statewide significance.

Determination – Portions of East Hampton have been designated as scenic resources of statewide significance (NYSDOS 2010). Although some of these portions of East Hampton are within the Project area, CENAN is not proposing any actions in these areas that will impact these scenic resources of statewide significance. Consequently, the Project will not impair scenic resources of statewide significance.

Policy 25 Protect, restore, or enhance natural and man-made resources which are not identified as being of statewide significance, but which contribute to the overall scenic quality of the coastal area.

Determination – Implementation of the Recommended Plan would require the use of large construction equipment, such as dredge barges and excavators that would visually interrupt the natural landscape during construction activities. These short-term impacts would be similar to visual impacts that currently occur and would not be significant. Long-term, the Recommended Plan would reduce the impacts from storm and flooding events that may cause significant erosion or breaching of beaches, dunes, and shorelines. By reducing these types of impacts, the Recommended Plan will contribute positively to the overall scenic quality of the coastal area.

Policy 30 Municipal, industrial, and commercial discharge of pollutants, including but not limited to, toxic and hazardous substances, into coastal waters will conform to State and National water quality standards.

Determination – The Project will not discharge pollutants. The Project is likely to result in sediment re-suspension and associated increases in turbidity during dredging in the borrow areas and during sand placement along the shoreline. These turbidity increases will be temporary and will not result in a violation of this policy.

Policy 35 Dredging and dredge spoil disposal in coastal waters will be undertaken in a manner that meets existing State dredging permit requirements and protects significant fish and wildlife habitats, scenic resources, natural protective features, important agricultural lands and wetlands.

The proposed dredging of clean, relatively coarse-grained accumulated sand from offshore borrow areas will not adversely affect significant coastal fish and wildlife habitats (see Policy 7), natural protective characteristics (see Policies 12, 14, 15, 17, and 18), or wetlands (see Policy 44).

The proposed dredging activities would take place in waters greater than 6 feet deep, and are therefore not required to meet the regulatory standards contained in the State's tidal wetlands land use regulations in 6 NYCRR Part 661. However, the use of the dredged material for beach nourishment in the areas adjacent to the Atlantic Ocean tidal wetland littoral zone would require a tidal wetlands permit (see Policy 44). The sand placement area is within state designated significant fish and wildlife habitats. The State tidal wetlands regulations in 6 NYCRR Part 661 indicate that the use of the dredge material for beach nourishment in an area adjacent to tidal wetlands is a generally compatible use; however, such a use is dependent on several character and resource values and the effects of such nourishment and its associated dredged materials might have on intertidal wetlands and adjacent areas. The material to be dredged and used to nourish the beaches is compatible with the material currently on the beaches. The nourishment of beaches and dunes where necessary and appropriate is an activity that may be authorized pursuant to the coastal erosion hazard area regulations in 6 NYCRR Part 505 (see also Policy 12).

The Project will be implemented in such a manner as to avoid adverse impacts to these habitats during construction to the extent practicable. Along with the twelve barrier island CPF sites that will serve to reestablish coastal processes and create bayside early successional habitat, long-term benefits to significant fish and wildlife habitats are anticipated as the placement of the beach fill would lead to larger and wider beach areas that could be used for breeding and nesting by shorebirds.

There is an overriding need to maintain the physical character of the barrier island and its associated natural protective characteristics, as well as the natural resource values of these characteristics. An EIS has been prepared for the Project which details the potential impacts to natural and cultural resources. In addition, all required permits, such as a NYSDEC Tidal Wetlands Permit, Section 401 Water Quality Certificate, Clean Water Act Section 404 permit, will be acquired and all permit conditions will be complied with.

Consultation and coordination with State and Federal resource agencies (US Fish &Wildlife Service, NOAA Fisheries, National Park Service and State Natural Resource agencies) will be conducted and species specific seasonal restrictions and mitigation measures will be put in place. The proposed activities will be conducted in a manner consistent with this policy.

Policy 38 The quality and quantity of surface water and groundwater supplies will be conserved and protected, particularly where such waters constitute the primary or sole source of water supply.

Determination – The Project will not affect water supply sources. Temporary increases in turbidity may occur during dredging and sand placement activities; however, these will be limited to construction periods and will be limited in spatial extent and duration. Best management practices will be implemented to minimize impacts. The Project is consistent with this policy.

Policy 41 Land use or development in the coastal area will not cause national or State air quality standards to be violated.

Determination – The Project will result in mobile air emissions sources during construction only. No stationary sources are proposed. A conformity analysis is being conducted for the Project and any required mitigation measures to offset temporary emissions increases will be implemented. A detailed air impact analysis is included with the EIS prepared for the Recommended Plan. The Project is consistent with this policy.

Policy 43 Land use or development in the coastal area must not cause the generation of significant amounts of the acid rain precursors: nitrates and sulfates.

Determination – Refer to the response to Policy 41; the Project is consistent with this policy.

Policy 44 Preserve and protect tidal and freshwater wetlands and preserve the benefits derived from these areas.

Determination – As demonstrated above in the Policy 35 analysis, the proposed activities would take place areas adjacent to the Atlantic Ocean littoral zone and intertidal wetland areas. The proposed activities are compatible uses according to the tidal wetlands land use regulations in 6 NYCRR Part 661. The proposed activities include one of the preferred non-structural erosion control measures identified in the State erosion hazard area regulations, the Coastal Policies contained in the State's Coastal Management Program document, the State tidal wetlands land use regulations, and Article 42 of the Executive Law and its implementing regulations in 19 NYCRR Part 600. The beach nourishment activities will result in physical changes to the intertidal area that will adversely affect some invertebrates at the site of the beach nourishment activities while the Project is being undertaken (see Policy 35 analysis). However, these adverse effects would not be significant, would be temporary, and would not result in significant adverse effects nor significantly impair the benefits derived from the tidal wetland areas. The barrier island bayside CPFs would also result in placement of material into estuarine littoral zone wetlands; placement would avoid vegetated wetlands and SAV and would serve to reestablish coastal processes and benefits to the ecosystem associated with breaches and overwashing. The proposed activities would be undertaken in a manner consistent with this policy.

References

JMA 2000	John Milner Associates, Inc. (JMA). 2000. Cultural Resources Baseline Study Fire Island Inlet to Montauk Point. Suffolk County, New York Reformulation Study. Prepared for The Greeley-Polhemus Group and the U.S. Army Corps of Engineers New York District.
NYSDOS 2006	New York State Department of State (NYSDOS). "Coastal Management Program, State Coastal Policies (Including Program changes from 1982-2006)." 2006.
NYSDOS 2010	NYSDOS, Division of Coastal Resources. "East Hampton Scenic Areas of Statewide Significance." January 2010.

FIRE ISLAND TO MONTAUK POINT, NY COASTAL STORM RISK MANAGEMENT STUDY - DRAFT GENERAL REEVAULATION REPORT AND DRAFT ENVIRONMENTAL IMPACT STATEMENT (JULY 2016)

This document presents a summary of NYS' review comments for the subject reports, and the USACE's response to comments.

NYS' comments were documented in an October 28, 2016 letter from Mr. Alan A. Fuchs, P.E. (Director, NYSDEC Bureau of Flood Protection and Dam Safety) to Mr. Robert Smith (Planning Division, USACE New York District).

The comments in the letter and this document are organized by NYS Office: NYSDEC and NYSDOS.

Comments are abridged for clarity and space. Comment ID numbers were assigned by USACE in order to organize this document.

Referenced page numbers are those from either NYS' letter, or the USACE's reports.

Key to Terms

BLC = baseline condition. BRP = breach response plan. CEHA = Coastal Erosion Hazard Area. DEC = New York State Department of Environmental Conservation. DOS = New York State Department of State. FEIS = Final Environmental Impact Statement.

FEMA = Federal Emergency Management Agency. FGRR = Final General Reevaluation Report. FIMI = Fire Island to Moriches Inlet. FVC = future vulnerable condition. LWRP = Local Waterfront Revitalization Programs. NYS = New York State.

NYS CMP = NYS Coastal Management Program. NYSDEC = New York State Department of Environmental Conservation. NYSDOS = New York State Department of State. OMRR&R = Operation, Maintenance, Repair, Replacement and Rehabilitation.

TSP = Tenatively Selected Plan. USACE = U.S. Army Corps of Engineers. PED = Pre-construction Engineering Design. USGS = U.S. Geological Survey. WQC = water quality certificate. WOSI = West of Shinnecock Inlet.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
NYSDEC				
NYSDEC 001	General		Coastal Process Features	The plans for the Coastal Process Features have been revised based on extensive coordination with NYS, DOI, and other partners. The FGRR and FEIS include updated descriptions of the plan.
NYSDEC 002	General		Sunken Forest Bay Shoreline Process Restoration	
NYSDEC 003	General		Reagan Property	
NYSDEC 004	General		Great Gun Wetland Restoration	
NYSDEC 005	General		Tiana Marsh Restoration, Upland Enhancement and SAV	
NYSDEC 006	General		WOSI Bay Shoreline and Wetland Restoration	
NYSDEC 007	General		Atlantique	
			Bay Side of Barrier Islands in Great South Bay	
NYSDEC 008	General		Robert Moses State Park- To offset the impact of the loss of overwash habitat at the Lighthouse Tract, enhance shorebird habitat at Democrat Point by establishing a better, more reliable connection between the existing tidal pond just west of the jetty and Fire Island Inlet. The minimization of dune height at the Lighthouse Tract is not a sufficient offset for the loss of overwash habitat which will result from the project.	
NYSDEC 009	General		Robert Moses State Park - Landward of Field 5. In order to compensate for the loss of cross island and other coastal process features which will occur as a result of the proposed beach fill, remove Phragmites and restore Spartina sp. in the tidal marsh which exists in the northern portion of the barrier island at this location. Re-establishing a fully functioning tidal marsh will provide coastal storm risk reduction benefits.	
NYSDEC 010	General		Village of Saltaire - Clam Pond should be included in the report for further evaluation and potential inclusion in the subset of appropriate sites chosen to move forward for design consideration.	
NYSDEC 011	General		Carrington Tract - Bay Shoreline Between Cherry Grove & Fire Island Pines should be included in the report for further evaluation and potential inclusion in the subset of appropriate sites chosen to move forward for design consideration.	
NYSDEC 012	General		Bay Shoreline Between Regan Property & Talisman Beach should be included in the report for further evaluation and potential inclusion in the subset of appropriate sites chosen to move forward for design consideration.	
NYSDEC 013	General		Talisman Beach should be included in the report for further evaluation and potential inclusion in the subset of appropriate sites chosen to move forward for design consideration.	
NYSDEC 014	General		Point 'O Woods should be included in the report for further evaluation and potential inclusion in the subset of appropriate sites chosen to move forward for design consideration.	
			Great South Bay wetland properties on mainland in towns of Islip and Brookhaven	
NYSDEC 015	General		Islip Meadows (USACE Identifier T-22) should be considered for nonstructural acquisition, structure removal, and subsequent wetland restoration (Why was this site removed from the report?)	
NYSDEC 016	General		Timber Point Tidal Wetland should be considered for nonstructural acquisition, structure removal, and subsequent wetland restoration.	
NYSDEC 017	General		Pepperidge Hall Tidal Wetland site should be considered for nonstructural acquisition, structure removal, and subsequent wetland restoration.	
NYSDEC 018	General		Bellport Bay Tidal Wetlands should be considered for nonstructural acquisition, structure removal, and subsequent wetland restoration.	
NYSDEC 019	General		Fireplace Neck Tidal Wetlands should be considered for nonstructural acquisition, structure removal, and subsequent wetland restoration.	
			Great South Bay Islands	
NYSDEC 020	General		Why was John Boyle Island (USACE Designator T-11) removed from the report? DEC believes this site should be considered as a potential site for modification/enhancement to provide habitat for several types of sensitive bird-species. This could include roosting/rookery habitat for wading birds; sparsely vegetated, sandy areas for tern species and expanded tidal flat habitat to benefit multiple species.	
			Moriches bay - Barrier Island Bayside shoreline	
NYSDEC 021	General		Smith Point County Park - In the area west of the existing dredged material disposal site and near West Inlet and New Made Islands, evaluate the potential and feasibility of restoring the extensive, mosquito-ditched tidal marsh to offset the loss of coastal processes such as overwash and cross island sand movement which will occur due to the FIMP beach fill. This will enhance the resiliency of the marsh and this section of the barrier island.	

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
NYSDEC 022	General		Spit at Westhampton. Real estate-related legal issues will prevent FIMP-related activities from being developed here at this time.	
NYSDEC 023	General		Bayside of Cupsogue Beach County Park should be included in the report for further evaluation (plovers?) and potential inclusion in the subset of appropriate sites chosen to move forward for design consideration.	
			Moriches Bay - Mainland Bayside shoreline	
NYSDEC 024	General		Coastal process restoration may also be done on the mainland in this area in conjunction with the 4,100 homes which will be elevated as part of the FIMP action. As mentioned above, functioning tidal marshes can provide significant coastal storm risk reduction capacity. Acquisition of Certain Mainland Properties (Southeast corner of Mastic peninsula; mouth of Forge River) The acquisition of homes in very low density areas in proximity to significant marsh areas should be explored because such situations provide the opportunity for the restoration, expansion or sea-level-rise-related migration of large tracts of wetland with the minimal effort of removing a few houses and simple roads.	
			Moriches Bay Islands	
NYSDEC 025	General		New Made Island. This island is in close proximity to Smith Point County Park, which received extensive beachfill via the Fire Island to Moriches Inlet (FIMI) project and is proposed to continue to receive beachfill as needed for 30 years under FIMP. This island appears to have the potential to be relatively easily modified to improve its habitat potential for such listed species as least terns and potentially other listed shorebirds which may not be benefitting from the large scale beachfill taking place on the barrier island.	
NYSDEC 026	General			
			Shinnecock Bay - Bayside of Barrier Islands	
NYSDEC 027	General		Overwash Fan at Mermaid Lane. This site should be investigated to determine the feasibility of filling the relic dredged channel to match the bathymetry of the surrounding, undisturbed areas as a way of improving the stability of the barrier island and potentially developing an overwash feature or wetland..	
NYSDEC 028	General		The East Quogue Overwash should be evaluated for potential inclusion in the subset of appropriate sites chosen to move forward for design consideration.	
NYSDEC 029	General		The Overwash Site Immediately East of Tiana Pavilion Parking Lot should be evaluated for potential inclusion in the subset of appropriate sites chosen to move forward for design consideration.	
NYSDEC 030	General		Ocean Beach Between Roads K & L should be included in the report for further evaluation and potential inclusion in the subset of appropriate sites chosen to move forward for design consideration.	
			Shinnecock Bay - Islands	
NYSDEC 031	General		Evaluate the feasibility of modifying one or more of the Warner Islands to compensate for the barrier island processes interrupted by the project and to maintain and enhance habitat for endangered and threatened species of shorebirds.	
NYSDEC 032	General		Water quality is integral to habitat quality. Mainland house raising should provide for the ability to upgrade septic systems where appropriate. The elevation of upland housing provides the majority of the benefits for the FIMP project. How does the USACE propose to assure these benefits are acquired through the house raising program in FIMP?	
			Groin Modifications	
NYSDEC 033	General		Westhampton Groin Field DEC has no objection to the concept of the modification of this existing groin field. On beach construction work will be subject to the familiar April 1 through August 31 no work activity window to protect listed species of nesting shorebirds. The optimum work sequence from the coastal processes perspective should also be determined, IE: should the groin modification proceed from east to west, or from west to east?	Modification of the Westhampton groin field is no longer a feature of the Recommended Plan. The FGRR and FEIS include updated descriptions of the plan.
NYSDEC 034	General		Ocean Beach Groins. While DEC has no objection to the concept of the shortening of the Ocean Beach groins, there does not appear to be a compelling justification to remove them completely. This work will also be subject to the spring/summer no work window to protect shorebird nesting.	The full extent of modification and/or removal of the Ocean Beach groins will be determined in the project design phase. USACE will continue coordinating with NYS about this project feature. The FGRR and FEIS state that final design will be determined during Pre-construction Engineering Design, and that the project cost estimate assumes complete removal of the groins. USACE concurs that project construction may be subject to no-work windows to protect shorebird nesting.
NYSDEC 035	General		Georgica Groins. It does not appear that significant justification exists to remove these structures at this time.	Modification of the Georgica Pond groins is no longer a feature of the Recommended Plan. The FGRR and FEIS include updated descriptions of the plan.
			Inlet Modifications	
NYSDEC 036	General		DEC is concerned that ebb shoal dredging has the potential to impact the storm resiliency functions of downdrift areas by interrupting the movement of material in the littoral system. We suspect that the ebb shoal is the feature by which material from the updrift side of the inlet can bypass to the downdrift side. Using the ebb shoal as a borrow source will result in it behaving as a deposition basin. The impact of conducting such dredging has not been provided in any assessments provided to date. Before undertaking any actions to impact ebb shoal locations, USACE must model and provide data that evaluates the potential impact of such actions. In addition, any proposal to remove material from inlet ebb shoals must be preceded by complete benthic physical and biological characterizations of the proposed dredging area. If use of an ebb shoal is authorized, the Water Quality Certification will include requirements for post dredging physical and biological sampling and monitoring of the dredge area.	The purpose of dredging the ebb shoal is to restore littoral transport by placing sand that accumulate in the Inlet ebb shoals directly on the downdrift beach. USACE concurs with requirements for post-dredging physical and biological sampling if requested per Water Quality Certificate conditions. Further investigations of the impacts of ebb shoal dredging will take place during Pre-construction Engineering Design.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
NYSDEC 037	General		What is the project life for the sediment bypass areas? Are they tied to the 30/50 year renourishment? Or are they tied to inlet navigation authorization to continue past year 30? Additionally, what happens if the volume of sand is inadequate the fill the sediment management areas to design? Will offshore or upland fill be used to fill in any shortfalls (both for initial construction and renourishment)?	Inlet bypassing from the navigation channel and ebb shoal is expected to take place during the entire 50 year period of analysis. While It is expected that a sufficient volume of sand is available from the navigation channels and ebb shoals for the needed inlet bypassing, offshore or upland fill will be used to meet any shortfalls. The FGRR and FEIS include text that clarifies this matter.
NYSDEC 038	General		Fire Island Inlet. Please note that the subaerial spit west of the Democrat Point jetty is prime piping plover habitat which cannot be disturbed or removed by dredging or related activities.	Dredging of the subaerial spit west of the Democrat Point jetty is not a feature of the Recommended Plan.
			Sediment Management	
NYSDEC 039	General		From a permitting perspective, DEC has no objection to the concept of sand placement at the Downtown Montauk or Sagaponack (Potato Road) sites to restore or enhance the movement of sand in the longshore transport system. The standard windows restricting on-beach work to protect nesting shorebirds will apply.	Sand placement at Sagaponack (Potato Road) is no longer a feature of the Recommended Plan. The FGRR and FEIS include updated descriptions of the plan. USACE acknowledges that the standing windows restricting on-beach work to protect nesting shorebirds will apply to the Montauk Beach sand placement action.
NYSDEC 040	General		From a logistical standpoint, DEC would like to understand the rational for choosing the Sagaponack site due to the anticipated high cost of real estate, and current existence of a private erosion control district	Sand placement at Sagaponack (Potato Road) is no longer a feature of the Recommended Plan. The FGRR and FEIS include updated descriptions of the plan.
			Traditional Dune & Beach Fill	
NYSDEC 041	General		DEC has already authorized the dune alignments for the three FIMI contract areas, so the landward toe or baseline of the fill areas are essentially fixed already. These locations are considerably landward of the pre-Sandy proposed alignment. Can the baseline be allowed to migrate landward in areas without infrastructure? In a scenario in which a major storm hits the area 15 to 16 years after FIMP is approved and implemented, will the green baseline depicted on the project map be moved landward?	In the major NPS Federal tracts (including the Otis Pike Wilderness area), the baseline would be allowed to migrate landward. Outside the Federal tracts, the established FIMP dune alignment will generally be maintained within the adaptive management framework detailed in FGRR Appendix J "Monitoring and Adaptive Management Plan." The FGRR includes information to clarify this point.
NYSDEC 042	General		The reports must spell out very clearly the beach/dune maintenance or restoration activities local interests/municipalities would be allowed to undertake on the beach with their own resources.	FGRR Appendix F "Real Estate Plan" and FGRR Appendix K "OMRR&R Requirements" specify the beach/dune maintenance or restoration activities that local interests/municipalities would be allowed to undertake on the beach with their own resources. The project OMRR&R manual will also include this information; it will be finalized during Pre-Construction Engineering Design. Project modifications can be requested post-construction and would be considered as part of a permit process.
NYSDEC 043	General		What level of protection do the three proposed cross-section templates provide? When (what frequency storm) would one expect some overwash to occur with each template?	The design alternatives were not specifically designed to provide a particular level of protection; instead, a reasonable range of alternatives were developed to provide a range of protection to allow for optimization. The life-cycle economics model is ultimately the tool which was used to identify the benefits afforded by the various alternatives now and in the future. That said, modeling results suggest that the Annual Exceedance Probability of overwash (defined as start of dune lowering) for the Small, Medium and Large beachfill templates would be approximately 0.2%, 0.1% and 0.03% along the barrier islands from Fire Island Inlet to Southhampton Beach.
NYSDEC 044	General		A monitoring plan template for the offshore borrow areas was agreed upon, approved, and included in the WQCs for the FIMI, WOSI and Rockaway projects. Please provide the required post-dredging monitoring reports/assessments for these projects as soon as possible.	Post-dredging monitoring reports/ assessments for the FIMI, WOSI, and Rockaway projects will be provided under separate cover.
NYSDEC 045	General		Borrow area monitoring will be an essential requirement for the use of offshore borrow areas under the FIMP. We must have this information in order to assess impacts from the dredging on the biological and sediment resources of the borrow areas. Information such as pre and post dredging bathymetry, sedimentation rates and recovery rates along with a characterization of any changes to the benthic biota of the borrow sites after dredging should be provided. A borrow area monitoring plan which sets forth the above information for the proposed borrow sites and a selection of undredged control sites must be included in the final FIMP document. The plan must also speak to the necessity for final reporting with conclusions on the project's impact to borrow area resources. The post dredging study provided for one of the borrow areas used for WOSI described a completely different benthic community populating the borrow site. This demonstrates the importance of pre and post dredging monitoring.	FGRR Appendix J "Monitoring and Adaptive Management Plan" includes a description of borrow area monitoring requirements. The plan includes Information including pre- and post-dredging bathymetry, sedimentation rates, recovery rates, benthic community monitoring requirements.
			Mainland Nonstructural	
NYSDEC 046	General		The reports should recognize and note that every road raising undertaken as part of The FIMP essentially creates a small levy. What is the level of protection of the road raisings?	Road raisings are no longer a feature of the Recommended Plan. The FGRR and FEIS include updated descriptions of the plan.
NYSDEC 047	GRR,Formulation (Section C)	P.121	How were the floodplains used for the non-structural analysis determined? When was the data derived? Are the elevations stillwater or do they include wave runup? Do they include SLR? Will any additional analysis be done during PED to further refine the locations of buyouts?	The floodplains for the nonstructural analysis were determined by the modeled stillwater elevations, which has recently been updated and provides the basis for the revised recommended nonstructural plan. Since it is site specific, wave run-up was not considered in the stillwater elevation model. Sea level change was been included. Additional analysis to further refine the locations of buyouts will be completed during Pre-construction Engineering Design.
NYSDEC 048			The fill placement associated with the road raisings / levy construction has the potential to fill wetland areas. In such cases, the wetland fill will require mitigation.	Road raisings are no longer a feature of the Recommended Plan. The FGRR and FEIS include updated descriptions of the plan.
NYSDEC 049			One of the places where significant road elevation is proposed is Mastic Beach, a location containing extensive areas of both tidal and freshwater wetlands. The report should include an explanation of how the road elevation projects, through the placement of fill to create levees or berms, will affect the hydrology of the freshwater wetland areas "captured" within the limits of the berm areas. Will the freshwater wetlands survive as freshwater features, will they be converted to Phragmites-dominated basins, or somehow become tidally influenced?	Road raisings are no longer a feature of the Recommended Plan. The FGRR and FEIS include updated descriptions of the plan.
NYSDEC 050			How will stormwater drainage be handled in the areas circumscribed by the elevated roadways? Pump stations, other?	Road raisings are no longer a feature of the Recommended Plan. The FGRR and FEIS include updated descriptions of the plan.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
NYSDEC 051			As proposed, FEMA will not remap the floodplain after the road raising work is completed. Homes protected by the elevated roads / levees will continue to be located in Zone AE and will not be eligible for the same flood insurance premium reduction available to homes which are elevated in the same AE Zone. Can the USACE design, construct, and provide the necessary analysis to FEMA to allow the road raisings to qualify for FEMA levee certification? This would remove the protected 1020 structures from the FP, eliminating the need for flood insurance.	Road raisings are no longer a feature of the Recommended Plan. The FGRR and FEIS include updated descriptions of the plan.
NYSDEC 052			There appear to be some locations where the acquisition of only a few properties in a very low density area would allow the removal of the buildings and the roadway servicing the parcels, providing the opportunity to expand the existing wetlands in the area or allow for their natural migration in response to sea level rise. There are locations, such as the southeastern corner of the Mastic peninsula and the mouth of the Forge River, where the acquisition of a few houses would allow for the connection of large tracts of wetland acreage which could provide substantial storm damage reduction for the nearby residential areas.	Consistent with the Assistant Secretary of the Army (Civil Works) policy waiver (October 11, 2017), buyouts in the Mastic peninsula are included in the Recommended Plan. The FGRR and FEIS include updated descriptions of the plan.
NYSDEC 053			Home raisings must include all associated work necessary to achieve a safe and sanitary condition. This includes sanitary hookups, state and local freeboard requirements, and any other items the construction might necessitate to get a certificate of occupancy.	USACE concurs and acknowledges that home elevations must include all associated work necessary to achieve a safe and sanitary condition. USACE will continue coordination with NYS, local municipalities, and homeowners to ensure compliance with safety standards that are required for a certificate of occupancy.
			Breach Response Plan	
NYSDEC 054			The premise of the tentative federal selected plan (TSP) is that all breaches will be closed at some point, by either human action or nature. This approach is understood, but the timing of such should be more nuanced to include the ability to assess an open breach in the Otis Pike Wilderness or other large publicly owned tracts before the decision is taken as to when to actively close it. For example, the breach currently open at Old Inlet has not to date caused significant loss of life or property based on the storms experienced, and actually has been shown to be responsible for an improvement in overall water quality in eastern Great South Bay with associated positive effects on marine habitats and fishery resources. Based on the breach size and location it may be beneficial to monitor the breach over a longer period of time.	The primary reason that the current breach at Old Inlet has not caused significant loss of life or property is because the area has not been impacted by a major hurricane since Hurricane Sandy (2012). Modeling has shown that with the Old Inlet Breach open, additional flooding would occur that could exacerbate damages (see Appendix A Sub-Appendix 1 "Storm Surge Modeling Stage Frequency," Plates I-1 through I-27). Specifically, post-Hurricane Sandy numerical modeling efforts detailed in Appendix A Sub-Appendix 4 "Numerical Modeling of Breach Open at Old Inlet" show that although the breach open conditions at Old Inlet have a very small effect (up to 1 inch) on daily tidal fluctuations and small storm tides, they could have a large effect (up to 22 inches) on storm tides during severe hurricanes and nor'easters. USACE and partner agencies have a coordinated breach response process and the identification of a Bayesian protocol as a means to satisfy multiple agency priorities. The process was proposed and agreed upon in concept in several working level meetings. The USACE anticipates further development in Pre-construction Engineering Design, and anticipates a collaborative approach to identifying the substantive detail. Participants from DOI have been in general agreement with this approach in these workshops. USACE and DOI have identified the need for separate contingency criteria for the Otis Pike Wilderness Area versus other Federal tracts. The FGRR includes an updated description of the breach response plan.
NYSDEC 055			The wording of the Conditional Breach Response Plan should be corrected or clarified with regard to the conditions under which action will be taken to close an open breach. It should state that action will be taken if the breach is not closing naturally within 45 days of opening or modeling indicates the breach will not close.	The FGRR, FEIS, and their appendices clarify the wording for each of the four breach response plans: Proactive, Reactive, Conditional and Wildness Response Plans. The FGRR includes a table that identifies the applicable breach response plan for each project reach. For areas identified for Conditional breach closure, the Breach Closure Team, which includes representatives from NPS, USACE, and USGS, would evaluate whether the breach is likely to close naturally, with action initiated by day 60 to close the beach if it has not closed naturally. For areas identified for "Wilderness" breach closure, the breach would only be closed if if is determined that leaving the breach open would have an significant adverse effect.
NYSDEC 056			The report indicates that the Proactive zone· of the Breach Response Plan is predicated on maintaining a 25 year level of protection. How will this 25 year level of protection be measured: shoreface damages only, or must the barrier island itself drop below the 25 year level before action is taken? According to the last bullet under "beach and dune fill", for years 31-50, any areas that had been renourished will be switched to proactive breach response. Please provide details on this. Does this mean that the dune height will be built back to +13 instead of +15? Does this include the sediment bypass and sediment management areas?	The FEIS includes a desription of the thresholds and methods used for determining project performance.
NYSDEC 057			Once a breach has been closed mechanically, what does it mean to 'maintain' the closure elevation to +9 feet? Is that a minimum elevation, a maximum elevation or both?	Breach closures in areas where beachfill is proposed will be maintained according to the corresponding beachfill design template. Breach closures in Conditional Breach Response areas will not be maintained. Breach closures in Proactive Breach Response areas would be maintained according to the Proactive Breach Response protocols.
NYSDEC 058			Once it has been determined that a breach will be closed mechanically, can local interests, with their own resources (money), add additional sand or snow fence to try to increase ground elevations above the Breach Response Plan design template? The plan must be very explicit and clear in describing the types of activities state and local entities can undertake with their own funds on FIMP-breach closure sites.	Generally, state and local entities can undertake with their own funds on FIMP-breach closure sites if and as permitted by USACE and other agencies. All activities proposed by local interests would be considered as part of a permit process. FGRR Appendix K "OMRR&R Requirements" summarizes this point.
			Beyond Year 30	
NYSDEC 059			The TSP indicates that after year 30 the Traditional Beachfill component is discontinued, leaving only the Breach Response Plan (BRP). The rationale for the assignment of a particular reach of shoreline to one of the Proactive, Reactive or Conditional Response categories depends upon whether the BRP is, or isn't in effect along with Traditional Beachfill activities. The report fails to recognize or explain this distinction. For example; the infrastructure surrounding the pavilion in Smith Point County Park will receive a lower BRP level of protection than the undeveloped portion of the park serviced by Burma Road to the east. This only makes sense when the pavilion is receiving periodic traditional beachfill.	The FEIS includes a table that clarifies by sub-reach which actions are included in the initial construction, and also the specific lifecycle management for years 1-30 and 31-50.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
NYSDEC 060			The plan must be very explicit and clear in describing the types of activities state and local entities can undertake with their own funds within the Project footprint after year 30. The report is unclear as to whether or not the TSP imposes a prohibition of beach fill by local efforts for the final 20 years of the project. For example, if the state and local agencies must strictly adhere to this plan, after year 30, Robert Moses State Park would have to allow much of its beach to erode away and stand by as the park is reduced to some critical level before action can be taken. Furthermore, since USACE projects are ineligible for FEMA disaster assistance, RMSP will no longer be able to seek disaster assistance funding from FEMA.	FGRR Appendix K "OMRR&R Requirements" includes a statement that local interests could supplement the beachfill, particularly after year 30, to maintain the design template. Such activities should be coordinated with the USACE and non-federal sponsor to ensure no violation of environmental regulations. Fill greater than the design template would be considered on a case by case basis and would be subject to the regulatory permit process. USACE will continue coordination with NYS and local municipalities about this matter.
NYSDEC 061			The mainland Non-Structural program should be evaluated to determine if the proposed Breach Response Plan continues to provide sufficient risk reduction after year 30.	The plan for the mainland provides for coastal storm risk management for a total of 4,432 structures that are located within the existing 0.1% exceedance floodplain. Of these, 3,675 would be elevated, 650 would receive flood proofing, 93 would receive ringwalls, and 14 would be bought out. The FGRR and FEIS include updated descriptions of the plan.
NYSDEC 062			Stockpiles. The plan should consider the creation of strategically placed sand stockpiles throughout the project area to provide a material source for state and local entities to act in response to non-declared storm events.	The Recommended Plan does not currently include the creation of stockpiles, but assumes that sand could be trucked-in from available quarries. Historically, stockpiles have been constructed on an ad-hoc basis, but there have been limited opportunities given available real estate. Stockpiles could be considered during Pre-construction Engineering Design.
NYSDEC 063			Adaptive Management. Given the low level of detail included in the reports for most features and activities, the few recommendations for adaptive management we were able to develop have been incorporated into our comments under the previous sections.	Acknowledged. Please note that FGRR Appendix J "Monitoring and Adaptive Management Plan" includes an updated description of monitoring and adaptive management activities.
NYSDEC 064			Public Access Plan. The USACE needs to provide feedback on the public access plan submitted by NYDEC, and confirm that the plan meets USACE requirements for public access.	Acknowledged. Once all plan details have been finalized, the USACE will provide feedback on the Public Access Plan to ensure that it meets USACE requirements.
NYSDEC 065			Damages Summary. Executive Summary Page 6: The inclusion of this chart is confusing to include without also including more of the descriptions of the categories (Appendix D section 7.1), specifically the difference in tidal inundation and breach damages categories. At the least Appendix D should be referenced to provide additional information. The summary should also break out damages caused by backbay inundation by future breaches.	The referenced table has been revised to indicate the breakout of damage categories, future breaches, and references to Appendix D "Benefits."
NYSDEC 066			Project Area. What type of projects will local communities and residents be able to undertake within the project area following project completion (such as private beach nourishment projects)? This needs to be explicitly described in the GRR, along with what the process is for approvals.	FGRR Appendix K "OMRR&R Requirements" includes a statement that local interests could supplement the beachfill, particularly after year 30, to maintain the design template. Such activities should be coordinated with the USACE and non-federal sponsor to ensure no violation of environmental regulations. Fill greater than the design template would be considered on a case by case basis and would be subject to the regulatory permit process. USACE will continue coordination with NYS and local municipalities about this matter.
			Specific Comments - GRR	
NYSDEC 067	DGRR	ES P.18 Economics	Please provide definition of "fully funded".	"Fully funded" refers to the anticipated total project cost when taking into account future inflation. A footnote to be added defining "fully funded" in the FGRR Executive Summary.
NYSDEC 068	DGRR	ES P. 6, Tab. 1 .	Expected Average Annual Damages in Without Project Future Condition. The table presents $4,732,600 damage inundation from open Wilderness Breach, and $3,578,400 damage inundation from future breaches; less damages from future breaches than from the existing Wilderness Breach? What are the assumptions? The same comment on p. 15, Tab. 3 and p. 75, Tab. 25.	The Wilderness Breach breach is considered a permanent feature and impacts flood levels throughout the project lifecycle. Future breach damages are a comparatively infrequent occurrence and are limited to a 9-12 month duration. The short duration of future breaches relative to the permanent opening at the Wilderness Breach results in lower damages over the lifecycle. The FGRR includes a description of the assumptions used in this determination.
NYSDEC 069	DGRR	ES P. 6, Tab. 1	It reads that, "Tidal inundation occurring due to inlet conditions, wave setup, storm-related breaching and overwash in back bay is $115,398,800." Do we know what the tidal inundation is occurring due to breaching only? Do we know what the tidal inundation is occurring due to inlet condition only?	The impact and damages of a breach forming during a storm cannot be separated from other the impacts of overwash. Damages from a breach remaining open have been evaluated separately. The FGRR provides estimates for damages for flow through the inlet only (a no breach or overwash scenario).
NYSDEC 070	DGRR	ES P. 6, Tab. 1	Executive Summary Page 6: The inclusion of this chart is confusing to include without also including more of the descriptions of the categories (Appendix D section 7.1), specifically the difference in tidal inundation and breach damages categories. At the least Appendix D should be referenced to provide additional information. The summary should also break out damages caused by backbay inundation by future breaches.	The referenced table has been revised to indicate the breakout of damage categories, future breaches, and references to Appendix D "Benefits." In addition, text was added to clarify this matter.
NYSDEC 071	DGRR	ES P. 11,	Inlet Modifications (Continuation of authorized project+ ebb shoal dredging). Will the continuation of maintenance dredging of the authorized channel (that we have existing agreements for) be part of the FIMP project cost now or just the ebb shoal dredging?	While future maintenance dredging of the authorized channel is not a project cost, dredging of the authorized channel to the authorized depths and dredging of the ebb shoal is included in the initial project cost, since the area is being used as a borrow source The borrow source for future periodic nourishment/sand bypassing could come from a combination of the navigation channel, ebb shoal, or another borrow site.
NYSDEC 072	DGRR	ES P. 12, Reactive Breach Response	Please add what elevation this provides.	The referenced table clarifies by sub-reach the specific plan for both the initial construction and actions to be undertaken over the project life cycle.
NYSDEC 073	DGRR	P. 20, Coastal Process Features	Coastal Process Features. What are the ramifications of inlet management now being considered as coastal process features? Does this have any impact on the funding available to complete other coastal process features?	The inlet management actions included as part of the Coastal Process Features would not have any impact on Federal funding available to construct other coastal process features.
NYSDEC 074	DGRR	P. 40, Closing Breaches	Closing Breaches. It reads that closure would take between 9 and 12 months, as was the case in 1980 and 1992. Was not the existing Breach Contingency Plan, 1996, developed to respond more quickly to any breaches (much quicker than closing the Westhampton breach) to avoid significant damages and additional cost for closure? The typical response was up to 11 months, so the Breach Contingency Plan called for up to 2.5 - 3 months (?).	Text in the FGRR clarifies that the 1996 Breach Contingency Plan is no longer applicable. The FGRR states that for the without-project condition, closure was estimated for 9-12 months. For the with-project condition, clssure was determined to take between 2.5 to 3 months.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
NYSDEC 075	DGRR	P. 109,	What type of projects will local communities and residents be able to undertake within the project area following project completion (such as private beach nourishment projects)? This needs to be explicitly described in the GRR, along with what the process is for approvals.	The FGRR includes a statement that local interests could supplement the beachfill, particularly after year 30, to maintain the design template. Such activities should be coordinated with the USACE and non-federal sponsor to ensure no violation of environmental regulations. Fill greater than the design template would be considered on a case by case basis and would be subject to the regulatory permit process. USACE will continue coordination with NYS and local municipalities about this matter.
NYSDEC 076	DGRR	P. 109,	Barrier Island Breach Response, Proactive Breach Response. Please be clear that areas that will receive re-nourishment for 30-y, will receive Reactive Breach Response for 31 through 50 years, after re-nourishment will end.	The FEIS clarifies that areas that will receive renourishment for 30 years will receive Proactie Breach Response for 31 through 50 years, after re-nourishment is scheduled to end.
NYSDEC 077	DGRR	P. 112	Will the Cupsogue receive beach and dune fill, as the Westhampton Interim project area? There was a breach at Cupsogue in 2012 that was closed per existing Breach Contingency Plan to +9.5 ft (no dune allowed). The TSP calls for +15ft dune in this location, but Reactive Breach Response +9ft. - Is that correct?	The FEIS includes text summarizing that the Recommended Plan for Cupsogue Park area includes a 15 ft. dune and 9.5 ft berm, 30 years of periodic nourishment, and a proactive beach response after 30 years.
NYSDEC 078	DGRR	P. 113, Tab. 31	OK to locals putting fill on the beach within the design template and will be included in OMRR&R. However, please note that all activities that any local interests may conduct would be coordinated by the USACE prior to any implementation to ensure no violation of NEPA is recommended. Each activity would be reviewed on a case by case basis. All activities will be identified in the OMRR&R manual which will also be coordinated with the nonfederal sponsor and local interests. Fill greater than the design template would be considered on a case by case basis and may be subject for application for permit (408).	FGRR Appendix K "OMRR&R Requirements" includes a statement that local interests could supplement the beachfill, particularly after year 30, to maintain the design template. Such activities should be coordinated with the USACE and non-federal sponsor to ensure no violation of environmental regulations. Fill greater than the design template would be considered on a case by case basis and would be subject to the regulatory permit process. USACE will continue coordination with NYS and local municipalities about this matter.
NYSDEC 079	DGRR	P. 113, Tab. 31	Please revise "Contingent Breach Response" to "Conditional..." to be consistent throughout the Report.	The FGRR consistency uses the phrase "Conditional Breach Response."
NYSDEC 080	DGRR	P. 113, Tab. 31	It reads that Smith Point County Park West will receive beach, dune and re-nourishment. According to Fig. 22. Overall Plan, there will be no dune. Please clarify.	The referenced table clarifies that only a berm (no dune) will be provided in the Smith Point County Park West reach.
NYSDEC 081	DGRR	P. 113, Tab. 31	It reads that Sediment Management at Potato Rd and Montauk Beach will be for 50-years. - Is that correct?	The FEIS states that sediment management will be provided for Montauk Beach for 30 years after project construction. Action at Potato Road is no longer included in the Recommended Plan. The FGRR and FEIS include updated descriptions of the plan.
NYSDEC 082	DGRR		Will there be any Breach Response for Gilgo Beach?	The Recommended Plan does not include a breach response plan for Gilgo Beach.
NYSDEC 083	DGRR	P. 138, Borrow Area	It reads that NYSDEC will provide the USACE with authorization to use the Borrow Area as sand source through a New York State Department of Environmental Conservation Law Section 401 WQC. - How about the OGS permit for borrow area?	The FGRR clarifies that USACE will coordinate with NYSDEC about an OGS permit prior to construction.
			Engineering Appendix	
NYSDEC 084	Engineering	Section 4.6.5	Section 4.6.5 discusses the breach open condition, and states several instances where multiple breaches within the same reach cannot co-exist. How was this assumption developed? Did the analysis include the inlets?	Historical evidence, hydrodynamic modeling, and inlet/breach stability analyses do not support the existence of two breaches within the same reach. The tidal prism of one breach would become dominant, and the other breach would naturally close. Text has been included in FGRR Appendix A "Engineering" to explain why adjacent breaches would not remain.
NYSDEC 085	Plates (Appendix A1)		Westhampton groins not shown on plans.	Modification of the Westhampton groins is no longer a features of the Recommended Plan. The FGRR and FEIS include updated descriptions of the plan.
NYSDEC 086	Plates (Appendix A1)		What proactive areas are getting sand during initial construction? These areas need to be identified on the plans, and included in the report (and exec. summary).	With recent construction of the FIMI project, it is assumed that the FIMI and Westhampton template (based on erosion rates and sediment modelling) are already at the FIMP template and won't require additional sand during initial construction. There are five proactive subreaches that are anticipated to receive sand during initial construction: Shinnecock Park West (2 locations), Sedge, Tiana, and WOSI. All proactive breach areas will be surveyed prior to initial nourishment. The FGRR includes information about sand nourishment areas during initial construction.
NYSDEC 087	Appendix D Benefits	P. 39, Tab. 16 Summary of Without Project Annual Damages	There is less inundation damage from future breaches versus an open breach at Wilderness Area. What are the assumptions?	The Wilderness Area breach is considered a permanent feature and impacts flood levels throughout the project lifecycle. The future breach damages are a comparatively infrequent occurrence and are limited to a 12 month duration. The short duration of future breaches relative to the permanent opening at Old Inlet results in lower damages over the lifecycle.
NYSDEC 088	Appendix D Benefits	P. 40	It reads that "The modified TSP includes +15 ft dune at Lighthouse Tract" According to Fig. 2. TSP from the GRR, there is only Proactive Breach Response proposed at the Lighthouse Tract. See below on p. 41, Proactive Breach Response- +13 ft. Please clarify.	FGRR Appendix D "Benefits" clarifies that Proactive Breach Response with 13 ft. dune (no planting) will be provided in the Lighthouse Tract.
NYSDEC 089	Appendix D Benefits	P. 41	It reads "Shortening of 1-15 groins at Westhampton", is that correct? In some portion of the Report it reads 1-13 groins.	Modification of the Westhampton groins is no longer a features of the Recommended Plan. The FGRR and FEIS include updated descriptions of the plan.
NYSDEC 090	Appendix D Benefits	P. 41	Need to add Reactive Breach Response to the Breach Response Plan. Is future re-nourishment included in the TSP for Potato Road and Montauk Beach?	Reference to Reactive Breach Response information is included in FGRR Appendix D "Benefits." The Recommended Plan for the Montauk Beach feeder beach provides for about 450,000 cy per 4-year renourishment cycle for 30 years. The feeder beach at Potato Road is no longer a feature of the Recommended Plan.
NYSDEC 091	Appendix D Benefits		Under Inlet Modification Plan (Continuation of authorized project + ebb shoal dredging), will the continuation of maintenance dredging of the authorized channel (that we have existing agreements for) be part of the FIMP project cost now/just the ebb shoal dredging?	Maintenance dredging of the authorized channel is not a feature of the Recommended Plan. However, dredging of the ebb shoal is a project feature. Some additional volume from the channel may be utilized for initial construction as a project cost. After initial construction, only ebb shoal dredging or dredging from the inlet in excess of amount needed for channel maintenance would be a project feature/cost. FGRR Appendix A "Engineering" (Table 7-9-3), and Table 35 of the FGRR main report now match the policy waiver approved by the Assistant Secretary of the Army (Civil Works) (October 11, 2017).
NYSDEC 092	Appendix D Benefits	P. 45	It may be good to revise "Responsive BRP" to "Reactive BRP" to stay consistent.	Reference to "Responsive BRP" has been revised to "Reactive BRP" in FGRR Appendix D "Benefits."

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
NYSDEC 093	Appendix D Benefits	P. 46, Tab. 18-Breach Closure Cost	Why closure cost is higher Without the Project versus With the Project? Will the breach be closed quicker with the Project versus per Breach Contingency Plan? Quicker than 3 months?	Breach Response Plans provide for rapid closure of breaches. With their absense in the future-without project condition, it is likely that closure would take at least 9-12 months to close because of the need to obtain funding and regulatory approvals. Because the breach is likely to grow bigger over time, it requires more quantities of sand to fill the breach and higher overall costs vs. in the with-project condition.
NYSDEC 094	Appendix I Physical Monitoring	P. I-2, Project Description	Report reads that the project has a planned re-nourishment life of 50 years. - This needs to be revised to "30-years".	The renourishment period is stated as 30 years in FGRR Appendix J "Monitoring and Adaptive Management Plan."
NYSDEC 095	Appendix I Physical Monitoring	P. I-2, Project Description	Modification of Westhampton groin field - Please add that the plan also includes modification to Ocean Beach groins.	Modification of the Westhampton groins is no longer a features of the Recommended Plan. The FGRR and FEIS include updated descriptions of the plan, including reference to modification/removal of the Ocean Beach groins.
NYSDEC 096	Appendix I Physical Monitoring	P. I-2	Report reads that "Interim sediment management projects have been initiated along Fire Island ... " - Please specify what projects have been initiated.	FGRR Appendix J "Monitoring and Adaptive Management Plan" includes a statement that the Fire Island to Moriches Inlet (FIMI) and Downtown Montauk stabilization projects have been initiated along Fire Island.
NYSDEC 097	Appendix I Physical Monitoring	P. I-3	Report reads under project layout that the beach fill plan will be maintained for 50-y? Does it mean that the project will be re-nourished for 50-years or required to be maintained for 50-y? Please clarify.	FGRR Appendix J "Monitoring and Adaptive Management Plan" clarifies that the renourishment period is 30 years, and the OMRR&R period is 50 years.
NYSDEC 098	Appendix I Physical Monitoring	P. I-3, Breach Response Plan	Please list all three Breach Response Plans, provide description and breach closure templates for Reactive and Conditional Breach Response.	FGRR Appendix J "Monitoring and Adaptive Management Plan" includes a description and breach closure templates for Reactive and Conditional Breach Response plans.
NYSDEC 099	Appendix I Physical Monitoring	P. I-9, par. d. Groin Modification	Please add Ocean Beach groin Modification.	FGRR Appendix J "Monitoring and Adaptive Management Plan" includes reference to modification/removal of the Ocean Beach groins.
NYSDEC 100	Appendix I Physical Monitoring	P. I-13, Tab. D-1	The table includes 50-y re-nourishment. Please revise the renourishment cycle. It should only be 8, if nourishment will only be for 30-years.	The referenced table in FGRR Appendix J "Monitoring and Adaptive Management Plan" includes information about the 30 year period of renourishment, and additional monitoring actions requested by USGS. Certain monitoring will be required for 50 years, such as site visits, structure inspections, long range beach profiles, LIDAR surveys, overwash/breach bay profiles, post-storm LIDAR topography, web server maintenance, and data analysis. Breach Profiles and Post-storm LIDAR data collection has been increased to 5 rather than 4, since USACE projects 5 breaches will occur during the 50 year period (vs. 8 in the without-project condition).
NYSDEC 101	Appendix I Physical Monitoring	P. 1-15, Fig. D-1	Project Plan - Please replace with the most current plan.	FGRR Appendix J "Monitoring and Adaptive Management Plan" includes a description of the Recommended Plan.
NYSDEC 102	Appendix I Physical Monitoring	P. 1-21, Tab. DA-3	Beach Profile Inventory- Should not Gilgo Beach be included in the monitoring (beach profiles, shoreline change monitoring)?	Gilgo Beach receives by-passed sand under the Fire Island Inlet and Shores Westerly to Jones Inlet Beach Erosion Control and Navigation Project replenishment. When bypass sand placement is put at Gilgo Beach as part of the FIMP project, such placement will be monitored under the FIMP project.
NYSDEC 103	Appendix J Operation, Maintenance, Repair, Replacement and Rehabilitation	P. 1	Report reads "50-year nourishment life" - needs to revise to 30-y.	The renourishment period is stated as 30 years in FGRR Appendix K "OMRR&R Requirements."
NYSDEC 104	Appendix J Operation, Maintenance, Repair, Replacement and Rehabilitation	P. 2, Tab. 1	Initial Beachfill Quantities includes only initial fill volume at Fire Island. Should not this table include initial sand quantity for the entire project area?	Reference to initial beachfill quantities has been removed from FGRR Appendix K "OMRR&R Requirements." This information will be included in the OMRR&R manual, which will be developed in consultation with the project sponsor during Pre-construction Engineering Design. The OMRR&R Manual will be formally adopted upon completion of initial construction.
NYSDEC 105	Appendix J Operation, Maintenance, Repair, Replacement and Rehabilitation	P. 3, par. a	Report reads that Maintenance Repair, Replacement & Rehabilitation is grading and reshaping the beach using sand beyond the project design section. - What does that mean? Would this require bringing sand from outside of the project area? If so, who will be responsible for it? The USACE? On other projects, the locals are usually responsible only for grading and reshaping the beach to original elevation by bringing sand from areas of excessive accumulation to areas of depletion within the project area only. If sufficient accreted material beyond the design section is not available within the project limits, beach nourishment should be initiated, which is cost-shared between the partners. Please be clear about that in this paragraph. The same comment in the Westhampton Manual, p.4, par. a.	Information about federal and local responsibilities for grading and reshaping, and technical details about these actions will be included in the OMRR&R manual, which will be developed in consultation with the project sponsor during Pre-construction Engineering Design. The OMRR&R Manual will be formally adopted upon completion of initial construction.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
NYSDEC 106	Appendix J Operation, Maintenance, Repair, Replacement and Rehabilitation	P. 4	It looks like Tab.3 includes re-nourishment quantities for 50-y project life. Please revise to reflect quantity for 30-y of re-nourishment.	Table 3 was removed from FGRR Appendix K "OMRR&R Requirements."
NYSDEC 107	Appendix J Operation, Maintenance, Repair, Replacement and Rehabilitation	P. 4	Report reads that "while reaches GSB-3A require initial fill, re-nourishment is not expected in the future" Is that correct? According to Fig. 2. TSP from GRR, it looks like this area will be included under re-nourishment. Please clarify.	The referenced statement has been removed from FGRR Appendix K "OMRR&R Requirements."
NYSDEC 108	Appendix J Operation, Maintenance, Repair, Replacement and Rehabilitation		Please specify what are the OMRR&R responsibilities for areas that will receive new beaches and dunes, sand from Inlet Management (sand bypassing); and Breach Response.	Information about federal and local responsibilities will be included in the OMRR&R manual, which will be developed in consultation with the project sponsor during Pre-construction Engineering Design. The OMRR&R Manual will be formally adopted upon completion of initial construction.
NYSDEC 109	Appendix J Operation, Maintenance, Repair, Replacement and Rehabilitation	P. 6, Tab. 4	Initial Dune Quantities includes sand quantities only for Fire Island. The table would need to be updated to include other area such as Cupsogue, Pikes Beach where sand will be placed during initial construction.	The referenced statement has been removed from FGRR Appendix K "OMRR&R Requirements."
NYSDEC 110	Appendix J Operation, Maintenance, Repair, Replacement and Rehabilitation	P. 8, par. F	Report reads that "Any major repair, replacement, or rehabilitation design shall be approved by the District Engineer prior to execution, and inspected afterward for satisfactory accomplishment of the design." - Should not the USACE be responsible for major repair and replacement? See Tab. 6. Summary of Responsibilities, p. 17.	Major rehabilitation, replace, and repair is generally a non-Federal responsibility. Exceptions include actions taken as part of post-disaster recovery and repair projects. Table 6 has been removed from FGRR Appendix K "OMRR&R Requirements."
NYSDEC 111	Appendix J Operation, Maintenance, Repair, Replacement and Rehabilitation	P. 12, Tab. 5	Coordinates of Profile Origin Points - Gilgo Beach should be added to the monitoring, Tab. 5 should be updated.	Table 5 has been removed from FGRR Appendix K "OMRR&R Requirements."
NYSDEC 112	Appendix J Operation, Maintenance, Repair, Replacement and Rehabilitation	P. 15, par. 3	Report reads that the number of profiles to be surveyed over the 30-y project life ... " -Should not the project life be 50-y and 30-y for re-nourishment; and beach profile survey should be done over 50-y?	Breach profile surveys will be conducted for the 50 yr project life to ensure proactive project thresholds are being met from years 31-50. Text in FGRR Appendix K "OMRR&R Requirements" has been corrected.
NYSDEC 113	Appendix A to Appendix J Operation, Maintenance, Repair, Replacement and Rehabilitation	P. A-6, Tab. A 1	Construction Activities from 1996 to the present - Please update the table to include all of the constriction activities; it only includes years 1996-2009.	Table A.1 has been removed from FGRR Appendix K "OMRR&R Requirements."

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
NYSDEC 114	Attachment E (Westhampton Interim OMRR&R Manual) to Appendix J Operation, Maintenance, Repair, Replacement and Rehabilitation	P. 3, Tab. 1	Construction Activities - Please update to include last PL 84-99 repairs.	Attachment E has been removed from FGRR Appendix K "OMRR&R Requirements." Information about construction activities at Westhampton, including the last PL 84-99 repairs, are included in the FGRR main report.
NYSDEC 115	Attachment E (Westhampton Interim OMRR&R Manual) to Appendix J Operation, Maintenance, Repair, Replacement and Rehabilitation	P. 4, par. a. Maintenance, Repair, Replacement and Rehabilitation	Report reads that " ... maintenance, repair, replacement and rehabilitation are used interchangeably. These are defined collectively as (a) Grading and reshaping the beach using sand beyond the project design section." What does that mean? Would this require bringing sand from outside of the project area? If so, who will be responsible for it? The USACE? On other projects, the locals are usually responsible only for grading and reshaping the beach to original elevation by bringing sand from areas of excessive accumulation to areas of depletion within the project area only; not beyond the project design section (?) Please clarify. On p. 8, par. 18. Maintenance Responsibilities, it reads that" ... the Superintendent will be responsible only for maintaining the dune and berm cross-section in the most effective condition, but will not be responsible for replacing lost material from offsite sources."	Attachment E has been removed from FGRR Appendix K "OMRR&R Requirements."
NYSDEC 116	Appendix A to Westhampton Interim OMRR&R Manual	P. 8, Table A 1	Construction Activities - Please update the table to include PL 84-99 repairs for Westhampton.	Appendix A has been removed from FGRR Appendix K "OMRR&R Requirements." All construction activities from 1996 to present are described in the FGRR main body.
NYSDEC 117	Appendix A to Westhampton Interim OMRR&R Manual		Will the Westhampton Interim OMRR&R Manual be replaced by the FIMP OMRR&R Manual that would cover the entire project area?	The FIMP project supersedes the Westhampton project. Information about how all or some of the Westhampton OMRR&R manual is superceeded by FIMP will be included in the OMRR&R manual, which will be developed in consultation with the project sponsor during Pre-construction Engineering Design. The OMRR&R Manual will be formally adopted upon completion of initial construction.
NYSDEC 118	Appendix K Adaptive Management Plan Outline	P. 5	Please spell out O&M.	FGRR Appendix J "Monitoring and Adaptive Management Plan" includes a definition of O&M.
NYSDEC 119	Appendix K Adaptive Management Plan Outline	P. 6	"breach" needs to be revised to "beach" in first par. Breach Response. "Proactive Breach Response is a plan where action is triggered when the breach and dune ... " to" ..... the beach and dune ... ".	FGRR Appendix J "Monitoring and Adaptive Management Plan" includes the word "beach" instead of "breach."
NYSDEC 120	Appendix K Adaptive Management Plan Outline	P. 6	Please present "Breach Response" and "Beach and Dune Fill" as separate project features, as the remaining ones ...... , and delete "Barrier Island" or present them as "Barrier Island Breach Response" and "Barrier Island Beach and Dune Fill".	FGRR Appendix J "Monitoring and Adaptive Management Plan" includes “breach response” and “beach and dune fill” as separate project features. The phrase "Barrier Island" has been deleted from the text.
NYSDEC 121	Appendix K Adaptive Management Plan Outline	P. 6	At what dune and berm elevation would the Proactive Breach Response be initiated?	FGRR Appendix J "Monitoring and Adaptive Management Plan" includes a description of Proaction Beach Response triggers.
NYSDEC 122	Appendix K Adaptive Management Plan Outline	P. 6	What design level does the Proactive Breach Response provide for?	The Proactive Breach Eesponse template provides for approximately a 4% Annual Exceedance Probability.
NYSDEC 123	Appendix K Adaptive Management Plan Outline	P. 6	What design level does the Reactive Breach Response will provide for?	Reactive Breach Response actions vary based on site-specific characteristics.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
NYSDEC 124	Appendix A Breach Response Protocol to Appendix K Adaptive Management Plan		Will a Conditional Breach Response Plan apply to all publicly owned tracts on Fire Island? or just to Federally owned tracts? Will Conditional Breach Response Plan apply to Smith Point County Park/part of? According to Fig. 2.TSP from the GRR, Proactive and Reactive Breach Response Plan apply to Smith Point County Park. Please clarify. If the Conditional applies only to Wilderness Area, please change "publicly owned tracts" to "Federally owned tracts". See comments below:	Conditional Breach Response will apply to Federally owned tracts except for Talisman (Reactive) and the Lighthouse Tract (Proactive). A separate Conditional Breach Response Plan exists in the Wilderness Area. Other publicly-owned tracts include Robert Moses (Reactive) and Smith Point County Park (Proactive). The FGRR and FEIS include updated descriptions of the plan. Please note that a summary of the Breach Response protocol is included in the FGRR main body, and is no longer included in FGRR Appendix A "Engineering" or FGRR Appendix J "Monitoring and Adaptive Management Plan."
NYSDEC 125	Appendix A Breach Response Protocol to Appendix K Adaptive Management Plan	P. 15, par. 3	Conditional Breach Response. Please change "Publicly-owned tracks along Fire island" to "Federally owned tracks ... "	The referenced text was revised to state "Federally owned tracts." Please note that a summary of the Breach Response protocol is included in the FGRR main body, and is no longer included in FGRR Appendix A "Engineering" or FGRR Appendix J "Monitoring and Adaptive Management Plan."
NYSDEC 126	Appendix A Breach Response Protocol to Appendix K Adaptive Management Plan	P. 16, second paragraph	"Within the large, publicly owned tracts of land along Fire Island there is a desire to determine the likelihood of natural breach closure ... " Please revise "publicly owned tracks" to "Federally-owned tracks".	The referenced text was revised to state "Federally owned tracts." Please note that a summary of the Breach Response protocol is included in the FGRR main body, and is no longer included in FGRR Appendix A "Engineering" or FGRR Appendix J "Monitoring and Adaptive Management Plan."
NYSDEC 127	Appendix A Breach Response Protocol to Appendix K Adaptive Management Plan	P. 16, paragraph 6	Locations Considered for Conditional Breach Response - please revise "Publicly owned tracts" to "Federally-owned tracts". Please delete Smith Point County Park.	The referenced text was revised to state "Federally owned tracts." Please note that a summary of the Breach Response protocol is included in the FGRR main body, and is no longer included in FGRR Appendix A "Engineering" or FGRR Appendix J "Monitoring and Adaptive Management Plan."
NYSDEC 128	Appendix A Breach Response Protocol to Appendix K Adaptive Management Plan	P. 17, paragraph 8	Please revise "Publicly-owned Tracks" to "Federally-owned Tracks".	The referenced text was revised to state "Federally owned tracts." Please note that a summary of the Breach Response protocol is included in the FGRR main body, and is no longer included in FGRR Appendix A "Engineering" or FGRR Appendix J "Monitoring and Adaptive Management Plan."
NYSDEC 129	Appendix A Breach Response Protocol to Appendix K Adaptive Management Plan	P. 17, paragraph 8	Please revise "(see 5.c below)" to "(see 8.c below)".	The reference has been corrected. Please note that a summary of the Breach Response protocol is included in the FGRR main body, and is no longer included in FGRR Appendix A "Engineering" or FGRR Appendix J "Monitoring and Adaptive Management Plan."
NYSDEC 130	Appendix A Breach Response Protocol to Appendix K Adaptive Management Plan	P. 18, par. c)	Please revise "Publicly-owned Tracks" to "Federally-owned Tracts".	The referenced text was revised to state "Federally owned tracts." Please note that a summary of the Breach Response protocol is included in the FGRR main body, and is no longer included in FGRR Appendix A "Engineering" or FGRR Appendix J "Monitoring and Adaptive Management Plan."
NYSDEC 131	Appendix A Breach Response Protocol to	P. 18, par. 9	Please revise "4.b above" to "8.b above".	The reference has been corrected. Please note that a summary of the Breach Response protocol is included in the FGRR main body, and is no longer included in FGRR Appendix A "Engineering" or FGRR Appendix J "Monitoring and Adaptive Management Plan."

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
NYSDEC 132	Appendix A Breach Response Protocol to Appendix K Adaptive Management Plan	P. 18	Please revise "(see 6. below)" to "(see 10. below)".	The reference has been corrected. Please note that a summary of the Breach Response protocol is included in the FGRR main body, and is no longer included in FGRR Appendix A "Engineering" or FGRR Appendix J "Monitoring and Adaptive Management Plan."
NYSDEC 133	Appendix A Breach Response Protocol to Appendix K Adaptive Management Plan	P. 20, par. 12	Report reads that "The Science and Engineering Advisory Team will come together to exercise the probabilistic Bayesian of breach closure, to predict natural breach closure or growth within fourteen days of breach occurrence ... If a full breach does not form, no breach closure activities will be enacted" Is that correct? No Conditional Breach Closure, if a full breach does not form?	The Science and Engineering Advisory Team will determine if site conditions have degraded enough to hit thresholds that warrant breach response.
NYSDEC 134	Appendix A Breach Response Protocol to Appendix K Adaptive Management Plan	P. 21, par. 13	Revise "publicly owned tracts" to "Federally owned tracts."	The referenced text was revised to state "Federally owned tracts." Please note that a summary of the Breach Response protocol is included in the FGRR main body, and is no longer included in FGRR Appendix A "Engineering" or FGRR Appendix J "Monitoring and Adaptive Management Plan."
NYS DOS				
NYSDOS 001	Appendix A Engineering: Comment 1	p.24	Relative Level of Effort Examining Coastal Barrier Processes Versus Mainland Flood Risks: The overwhelming majority of effort has been dedicated to modeling coastal barrier processes, with scant effort to study or describe the effects of storms, tides and sea level rise on mainland communities. Since most of the damages occur in the mainland communities, more effort should have been dedicated to understanding the causes, impacts and relative geographic vulnerabilities there. If information on mainland risks is not available to be cited in the engineering reports, general statements in the introductory material concerning factors that contribute to risk (low elevation, proximity to surges, lack of protective features or vegetation), erosive fill soils, insufficient depth to groundwater, etc.) would be helpful. If available, these particular items would be helpful to support risk management.	FGRR Appendix A "Engineering" includes a discussion of hydrodynamic modeling used to produce the stage-frequency curves for the mainland. The information was used in the HEC-FDA economic modeling, the results of which are presented in FGRR Appendix D "Benefits."
NYSDOS 001a	Appendix A Engineering: Comment 1a	p.25	Which areas are most frequently affected, which are infrequently effected, and which areas are relatively secure? Which areas are effected by flooding through the navigation inlets with no breach event, and given the possible high rates of sea level rise, which additional areas might be affected or how might flood water depths increase?	FGRR Appendix A "Engineering" includes flood inundation maps that illustrate the potential impacts of relative sea level change. Because of the complexity of the system it is not possible to identify specific areas that are impacted by potential tidal surge traveling through the inlets.
NYSDOS 001b	Appendix A Engineering: Comment 1b	p.25	In the event breaches occur, estimates of areas that will experience minimal or no increased flooding, areas that will experience significant increased flooding, what are the increased areas flooding due to the breach, and what are the increased depths of flooding due to the breach?	It is not possible to say definitively which areas will experience flooding or not in the event breaches occur. Flooding depends on numerous factors such as the location of the breach and hydrodynamics.
NYSDOS 001c	Appendix A Engineering: Comment 1c	p.25	Delineate areas where there is inadequate depth to groundwater to allow septic wastewater systems under current conditions. Also, delineate areas where there would be inadequate depth to ground water given higher sea level rise projections to the end of the project life (50 years).	Analysis of groundwater conditions is not within the scope of the study. Site-specific analysis of groundwater conditions relative to septic systems will be conducted during Pre-construction Engineering Design if required for permitting of nonstructural construction.
NYSDOS 002	Appendix A Engineering: Comment 2	p.25	End of Project Life conditions: There is no estimate of change in overall risk or vulnerability in the project area at the end of the project life. There is no way to evaluate whether the proposed measures actually reduce risk of storm damages in the project area. Estimated "benefits" are reduced damages during the life of the project only. What condition will the area be in when the project is over? It would be helpful to reiterate the project goal and vision that by the end of the project the region should be less vulnerable and ecologically healthier.	Periodic nourishment/ breach response are needed in order to continue to realize project benefits. Project benefits are expected to decrease when the periodic renourishment ends after 30 years.
NYSDOS 003	Appendix A Engineering: Comment 3	p.25	Portrayal of Breach Effects: A primary goal of the project is to prevent breaches from occurring. Although breaches are a normal, albeit infrequent, event for unmanaged coastal barriers, and necessary for long-term barrier survival, management of barriers such as Fire Island, where the landscape has a long history of human use and modification, needs to recognize and incorporate other factors. Given the situation, it would be more realistic to set an objective to minimize breaches where they would have significant detrimental effects in the near term, while federal, state and local partners aim for land use change and other adaptations over the long term. An outcome of this modified approach might be that the breach response protocol include consideration of breach open conditions in Federal tracts, as well as incorporation of rigorous monitoring of the physical condition of any breach and bay water levels during normal and storm conditions such that both benefits and consequences of the breach are documented and evaluated.	The Recommended Plan includes breach response plans, monitoring, adaptive management, and land management. A specific breach response plans is identified for each of the project subreaches. A conditional breach plan would be used for the large Federal tracts managed by the NPS, that would allow up to 60 days for a breach to close naturally. There is also a Wilderness breach plan where the breach would be closed only if it is determined that it would result in a significant impact. A description of monitoring of any breach during normal and storm conditions is included in FGRR Appendix J "Monitoring and Adaptive Management Plan." Monitoring data will enable the appropriate level of response and is part of the project's adaptive management strategy. Federal land management responsibility is limited to the Federal tracts managed by the NPS, and also where permanent easements have been obtained for the construction and maintenance of the project. For all other areas, enactment and enforcement of land use regulations is a state and local responsibility.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
NYSDOS 004	Appendix A Engineering: Comment 4		Sea Level Rise (SLR): Most analyses are reported relative to historic rates of SLR. This is no longer realistic. It would be more beneficial if sections referring the SLR reported how conditions might change if higher rates (high USACE estimates) prevail. Descriptions of flood risks and coastal processes should include information on accelerating effects due to the estimated higher range of SLR, to help describe potential futures that served as the boundary for project recommendations.	A description of project performance under different relative sea level change projections is included in the FGRR.
NYSDOS 005	Appendix A Engineering: Comment 5		Major Storm Occurrence: The analyses anticipate breaches with major storms, but do not describe alternative management responses. Coastal barriers migrate landward in correlation with sea level rise. How will management activities be modified in the future to accommodate these natural processes?	Adaptive management of natural migration of the coastal barrier are not a plan feature. However, response to the breaches because of the natural migration of the coastal barrier can be adaptively managed through monitoring and appropriate responses through adaptive management.
NYSDOS 006	Appendix H Land Management Comment 1		The Appendix does not make a clear distinction between actual measures that are being recommended in the TSP and further actions for local/state/federal consideration (e.g., acquisition). We have indicated in the comments several instances where this distinction could be improved, but overall the language could be clarified. It appears that p. 14, Section VII, outlines TSP actions that contribute to improved land use management; however, they are general in nature and could be improved by indicating specific actions and locations. This information could also be placed in the introduction of the Appendix to give readers a better understanding, perhaps in the form of an executive summary.	FGRR Appendix H "Land Management Plan" includes a clear description of actions that are recommended for local consideration. Federal land management responsibility is limited to the Federal tracts managed by the NPS and also where permanent easements have been obtained for the construction and maintenance of the FIMP project. For all other areas, enactment and enforcement of land use regulations is a state and local responsibility. In conjunction with the Project's Annual Inspection with local interests, reporting of any new development within the project area to the appropriate federal, state, and local entities responsible for enforcing applicable land use regulations may occur.
NYSDOS 007	Appendix H Land Management Comment 2		Recommendations in this appendix focus on local/state/federal actions. The following language can be inserted into the appendix as an additional resource being developed for municipalities under the Community Risk and Resiliency Act (CRRA): *"As it pertains to improved local land use management, DOS, in cooperation with DEC, is preparing model local laws that include consideration of future physical climate risk due to flooding, storm surge, and sea level rise under authority of the Community Risk and Resiliency Act. These model laws, which include categories for zoning, floodplain development management, resilient constriction, and more, will be made available for use by municipalities. These model local laws can be adapted for use by municipalities that are interested in better managing risk on the local level. "*	The suggested language is included in FGRR Appendix H "Land Management Plan."
NYSDOS 008	Appendix I Physical Monitoring		Need clarification of who will be responsible for what aspects of monitoring activities, particularly where there is overlap.	FGRR Appendix J "Monitoring and Adaptive Management Plan" identifies an interagency team that will be responsible for overseeing the monitoring.
NYSDOS 004	Main GRR Report - Executive summary	P. 6, Quantification of Problem	It should be noted that damages from breaches remaining open are only 6% of the total damages in the without project condition. There is a great emphasis on damages from breach open conditions, when in fact the damages calculated are quite low. Consider similar additions to section 4.5.5, Bayside Damage Models, p. 71-72 and Damage Categories, Breach-Open Conditions, p.75	Damages from breaches remaining open are one of the damage categories identified in the FGRR.
NYSDOS 005	Main GRR Report - Executive summary	P. 16	Project Performance and Residual damages. Consider modifying the language within this section (see comment). Also, clarify which measure/combination of measures 50% of damage reductions come from.	The FGRR states that under the current condition (without-project condition), the largest source of damages is flooding in the back bays through the existing maintained inlets. The majority of the damages that are experienced are due to flooding to the mainland communities that occurs during storm events. This flooding is due to the combined effects of tidal surge through the inlets and wind and wave setup within the bays. The FEIS includes a statement that shorefront damages are reduced by 50% in the with-project condition.
NYSDOS 006	Main GRR Report - Executive summary		Language that the report "... acknowledges the continued flooding that is likely to occur with the existing breach in the wilderness area" is misrepresentative. Prior DOS comments recommend comparison of USACE breach models to those studies performed by USGS on water levels in the bay after the Wilderness breach. For this reason, we recommend the term "continued" be removed.	The word "continued" was removed from the FGRR. In addition, a better definition of the Wilderness Conditional Breach response plan is included in the FGRR.
NYSDOS 007	Main GRR Report - Section 1- Introduction, Section 1.6	P. 12	For the bullet on barrier island segments, please clarify that breaches will impact development adjacent to the breach on the island itself. The bullet on mainland areas, clarify that the portions of the mainland that are vulnerable to tidal flooding experience the majority of flooding through the maintained inlets.	The referenced bullet in the FGRR pertaining to barrier island segments is correct. The bullet pertaining to mainland areas in the FGRR is clearer about how most of the damages take place on the mainland due to storm surge through the inlets.
NYSDOS 008	Main GRR Report - Section 2- Existing Conditions, Section 2.1.5	p. 18-19	As it relates to the NYS sea level rise projections, please provide a descriptive comparison between the rates proposed by the USACE and the state projections. Are they comparable? If not, how will this project comply with the state adopted rates? As has been observed from public meetings, there is some confusion on how the USACE plans to incorporate sea level change, and at which rate (see comment)	A comparison between USACE sea level change projections and NYS sea level change projects is not required per USACE guidance. USACE will consider NYS sea level change projections as part of the climate change analysis, and may graphically show differences in the projections if possible.
NYSDOS 009	Main GRR Report - Section 2- Existing Conditions, Section 2.1.7	p. 19-20	There is reference to interruption of littoral drift that leads to erosion. Please provide an example, such as 'shore perpendicular structures, such as groins or jetties'. There should be specific reference to stabilization structures as a contributing factor to interruption of littoral drift.	The FGRR states that perpendicular structures, such as groins or jetties, along the shoreline can interrupt the littoral drift, leading to erosion.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
NYSDOS 010	Main GRR Report - Section 2- Existing Conditions, Section 2.1.9.4	p. 25	Please clarify whether separate models/efforts (i.e., USGS v. USACE) were used to reach the conclusions about tidal elevations and storm water levels. Also see Section 4.6, Damage Sensitivity and Uncertainty, p.77	The FEIS states that models utilized to determine tidal elevations storm water levels included models developed in conjunction with the North Atlantic Coast Comprehensive Study and FEMA December 2012 stage frequency curves, which includes wave set up.
NYSDOS 011	Main GRR Report - Section 2- Existing Conditions, Section 2.1.11	p. 26	First bullet, please clarify the size of a breach that "is large enough". The Wilderness breach has not increased bay tide levels.	The referenced phrase "large enough" is a relative term sine it is not possible to specifically quantify the size of breach that makes it big enough result in impacts. The FGRR includes a statement that the Wilderness Breach has not increased bay tide levels. However, closing breaches contributes to the sustainability of the barrier island, providing risk management to the communities of the island and back bay.
NYSDOS 012	Main GRR Report - Section 2- Existing Conditions, Section 2.1.12	p. 26	This section is not clear as to the main cause of mainland flooding. First it says that the topographic condition of the barrier is the cause, then it says that surge through the inlets is the main cause. Does the topographic condition of the barrier refer to its' potential to breach? Does the topographic condition of the barrier refer to its' potential to breach? The report states earlier that the flooding through the maintained inlets is the main cause of back bay flooding, and that breaching has the potential to contribute to back bay flooding. We recommend clarifying what is meant by topographic condition, and if it means the potential to breach or overwash, consider rewording this section to put the emphasis on flooding from surge through the maintained inlets. It would be helpful if the USACE could associate a percentage to the flooding from the inlets (e.g., 60% of the flood damages to the back bay occurs from surge entering the maintained inlets).	The FGRR identifies "topographic condition" as the potential to breach or overwash. The referenced section emphasizes that the existing inlets "act both as hydraulic conveyances and hydraulic constrictions which limit the storm surge entering the bays." Given the complexity of the system, associating a percentage to the flooding from the inlets may be misleading.
NYSDOS 013	Main GRR Report - Section 2- Existing Conditions, Section 2.2.5	p. 31	Please make the following changes to the description of the NYS CMP: (see comment)	The FGRR includes the requested language: "The CMP and Article 42 establish a balanced approach for managing development and providing for the protection of resources within the state's designated coastal area. The policies of New York State, reflected in the CMP, express clear preference for non-structural solutions for erosion and flooding, such as elevating or flood-proofing buildings. Municipalities are encouraged to prepare Local Waterfront Revitalization Programs (LWRPs) in order to refine the state's CMP and take local factors into account. In communities with fully approved LWRPs, federal actions must be consistent with the LWRP policies in order for a consistency determination to be issued."
NYSDOS 014	Main GRR Report - Section 3- Without Project Future Condition, Section 3.2	p. 39	There should be discussion of existing efforts such as stormwater infrastructure upgrades and home elevation or acquisition. There is reference to these efforts under Section 3.3, but there should be discussion of the local and state/federal actions beyond the USACE in the local risk management section.	The FGRR Section 3.2 includes the following language: "The WOPFC does not anticipate significant upgrades of stormwater infrastructure or coastal storm risk management measures for individual residences (eg. elevating homes) unless significant federal funding such in was case following Hurricane Sandy is provided."
NYSDOS 015	Main GRR Report - Section 3- Without Project Future Condition	p. 40	Closing Breaches- There should be the opportunity to revisit a breach open condition under the adaptive management protocol being developed for the TSP. In addition, how long did it take to close the breaches after Sandy? The USACE presents breach closure scenarios from 1980 and 1992, but there are more recent closures that could also be used as examples and which demonstrate a greater range of management scenarios.	The FGRR includes a summary of more recent breach closures. The Recommended Plan includes specific Subreaches for which conditional breach closure (and also Wildness breach closure) and adaptive management responses that allow for a breach open condition.
NYSDOS 016	Main GRR Report - Section 3- Without Project Future Condition, Section 3.4, Environmental resources	p. 42	As it relates to water quality, studies conducted within the bay after the Wilderness breach have shown positive improvements in water quality. Considering that the WOPFC leaves the Wilderness breach open, mention of the benefits to water quality should be included.	The FGRR and FEIS include descriptions of benefits to water quality.
NYSDOS 017	Main GRR Report - Section 4- Problems and Opportunities, Section 4.4.1.1		Given the proposed groin modifications at Ocean Beach, the report should reconsider the potential for breach in the area west of the Ocean Beach groins. How will these modifications change the rate of erosion, and will this action lower the vulnerability for a breach to occur there?	This matter will be considered during design of the Ocean Beach groin modifications (Pre-construction Engineering and Design).
NYSDOS 018	Main GRR Report - Section 5- Plan Formulation, Section 5.4.2.2		Sediment and Inlet management alternatives. Did the USACE undertake any modeling to show that shallowing the inlets (the minimum to maintain navigability) did not reduce back bay flooding?	All modelling assumed inlet channel maintenance to their authorized depths.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
NYSDOS 019	Main GRR Report - Section 5- Plan Formulation, Section 5.4.2.4	P. 91	Clarify that although the elevation and floodproofing options are voluntary, acquisition would be mandatory if recommended under the TSP.	The FGRR includes language to explain the difference between voluntary and mandatory nonstructural measures.
NYSDOS 020	Main GRR Report - Section 6- Identification of the Tentatively Selected Plan, Section 6.1.2	P. 117	The report states that 195 structures would be "rebuilt". Please define what this entails.	"Rebuild" refers to structures that, because their condition, are not able to be elevated and would be demolished and rebuilt above the 1% floodplain. Due to a USACE policy determination, the final nonstructural component of the Recommended Plan does include any "rebuilds." The FGRR includes a description of plan changes.
NYSDOS 021	Main GRR Report - Section 6- Identification of the Tentatively Selected Plan, Section 6.1.3.2	P. 119	Reactive and Conditional breach response, p. 119 states "The breach closure plans will include an additional quantity of sand on the bayside of the barrier island to replicate this process, to enhance the long-term stability and resiliency of the closure action." We· have not seen information elsewhere regarding this proposed measure for the reactive and conditional breach response. The EIS BCP Appendix (I), states that this additional sand on the bayside "could" be included, for the conditional breach only (p. 1-3). We recommend including this additional back bay sediment in both the conditional and reactive BCP: In addition, any coastal process features that emulate these back bay shoals in areas identified as vulnerable to breaches would be favorable.	The Recommended Plan calls for placement of 4.2 million cy of sand on bayside of barrier island to ensure no net loss of sediment band and to replicate the natural coastal processes that are impacted from both the berm and dune and breach closures.
NYSDOS 022	Main GRR Report - Section 6- Identification of the Tentatively Selected Plan, Section 6.4	Table 44	Under the environmental impact of reduction in potential for breaching/overwash, clarify that the overwash will be reduced in community areas, but will be encouraged in more natural areas.	The FGRR includes a description about how overwash will be less likely to occur in the communities, but more likely to occur in the unpopulated areas where only a conditional breach response plan is provided.
NYSDOS 023	Main GRR Report - Section 6.9 Coastal Monitoring	P. 141-42	Although the adaptive management plan will include climate change considerations, the physical monitoring plan should also consider climate change impacts. Not only should the monitoring plan understand physical processes and their interaction with project performance, but also how climate change impacts those physical processes and project performance.	The physical monitoring plan will consider climate change impacts, as detailed in FGRR Appendix J "Monitoring and Adaptive Management Plan."
NYSDOS 023	Main GRR Report - Section 8-Executive Order (EO) 11988 And Public Law 113-2 Considerations, Section 8.2.1	P. 151	The report states that the nonstructural measures do not "enhance the resiliency of the coastal system". However, nonstructural measures, such as elevation, greatly improve the resiliency of the community as a whole. Elevation measures do not try to constrict or resist the natural coastal processes and water movement; this is a preferred approach to risk reduction.	Nonstructural measures do not have the ability to adapt to changing conditions; however, they would increase the area's ability to withstand and rapidly recover from disruption due to coastal storms. Adaptability is incorporated into the nonstructural algorithm to take into account accelerated sea level change over 50 years.
NYSDOS 024	Main GRR Report - Section 8-Executive Order (EO) 11988 And Public Law 113-2 Considerations, Section 8.2.1	P. 151	The report states that "The intent is to replicate the function of beaches in areas that were once part of natural, undeveloped systems that have subsequently experienced significant human development and utilization." Trying to stabilize beaches and barrier islands in order to provide storm risk reduction fundamentally means that they can't behave as natural features. Suggest adding the following language: "It is acknowledged that the beach exists in tandem with human development, and actions to provide coastal storm risk reduction may inhibit the natural functioning of the beach. In order to truly replicate natural beach functioning, structures that encroach on the beach or interrupt coastal process, or development that relies on an artificially maintained beach template, must be moved."	The FGRR includes a clarifying statement about the Recommended Plan replicating the "function of beaches" and beaches' ability to "provide resiliency and reduce storm damages".

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
NYSDOS 025	Main GRR Report - Section 8-Executive Order (EO) 11988 And Public Law 113-2 Considerations, Section 8.2.2 Sustainability/Adaptability		The assessment in this section could be improved with more detail on how each of the three systems (environmental, social, and economic) are accounted for and maintained over the long-term. While the project is economically justified for the USACE, what are the considerations for the local responsibilities? Will the local sponsors be able to meet financial commitments in the near-term? While these answer cannot be predicted over the long-term, there should at least be consideration of the local perspective and potential hardships faced. The environmental concerns are evaluated and accounted for, but how does this pertain to sustainability over time? There should be mention of the adaptive management plan. Social accounts go beyond maintenance of recreation areas. For example, consideration of any socially vulnerable populations, such as low income or isolated populations. Finally, it should be noted that the nourishment timeline has been decreased from 50 years to 30 years. This decreases the commitment of limited resources, which is a more sustainable approach.	The FGRR includes a description about how the environmental, social, and economic systems are accounted for and maintained over the long-term.
NYSDOS 026 - Comment 1a	Appendix A Engineering, Section 1.4	A-19	The subparagraph on barrier breaches emphasizes the risk to homes but fails to point out this is a natural process that sustains the barrier over time. In order to achieve community resilience it will be necessary to understand barrier processes, so it would be helpful if this observation was included in the report. In addition, the original Breach Contingency Plan recognized the need for more study of breaches to help determine when and how they could be left unmanaged. It would be helpful if the report emphasized this need also.	The "Problem Identification" section of FGRR Appendix A "Engineering" includes a summary of problems in the study area. The two bullet points directly above the reference text discuss the need for additional data collection and scientific study.
NYSDOS 026-Comment 1b	Appendix A Engineering, Section 1.4	A-19	Back Bay segment. This subparagraph emphasizes that barrier breaches increase flooding. The existing breach at Old Inlet demonstrates no increase in bay flooding. The paragraph should be modified to indicate the potential for increased flooding due to breaching on the barrier is variable. In addition, most backbay flooding is due to water flowing in through the navigation inlets. The paragraph should add this information so that residents and local governments are properly alerted to the primary issue	The "Problem Identification" section of FGRR Appendix A "Engineering" includes a summary of problems in the study area. The two bullet points directly above the reference text discuss the need for additional data collection and scientific study.
NYSDOS 026-Comment 1c	Appendix A Engineering, Section 1.4	A-19	Atlantic Ocean Shoreline. This subparagraph refers to variable risks "...due to the nature of the existing development. ..". This should be modified to "due to the location of existing development relative to high- risk areas". It is the location, rather than the type of development that creates the risks	The referenced sentence states, "Within this area, the damages are more localized, due to the nature of the existing development and physical conditions." Within the referenced area, damages are localized due to the nature of the existing development (including elevation, type of development, population impacted, and costs associated with structures and their contents) and physical conditions (such as berm and dune size and condition, localized erosion, existing structures, etc).
NYSDOS 027	Appendix A Engineering, Section 2.0 Shoreline history	A-19	Include a chart or table describing beach construction/ repair efforts over time. The quantities of sand placed should be reported, or stated as unknown.	FGRR Appendix A "Engineering" Section 2.2 "Historical Development and Management of Project Area" includes a description of historical beach construction and repair efforts. USACE does not have a full accounting of quantities placed by all Federal, State, County, local municipality, or private interests. Qualitative descriptions of those activities are presented in the text.
NYSDOS 027	Appendix A Engineering, Section 2.0 Shoreline history	A-20	Highlight artificial landform construction in the bays, on the barriers and along the mainland shores. Identify places where fill has been placed.	FGRR Appendix A "Engineering" Section 2.2 "Historical Development and Management of Project Area" includes a description of artificial landform construction in the back bays, barrier islands, and the mainland shore.
NYSDOS 027	Appendix A Engineering, Section 2.0 Shoreline history	A-21	The storm history section should conclude with a summary that the types of storms and environmental events described are normal for the project area and can be expected to continue in the future. Adaptive management will be needed in response to future storm events.	FGRR Appendix A "Engineering" includes an improved description of storm history.
NYSDOS 028	Appendix A Engineering, Section 3.0	A-35	A sentence should be inserted in the paragraph describing the sand ridges along Fire Island indicating that the littoral sediment supply increases towards the western half of Fire Island, which may be a result of contributions from these ridges. Further study is needed to understand the physical processes in this area, along with careful management of the resource.	Text from paragraph 6 on Pages B-2 and B-3 of FGRR Appendix B "Borrow Areas" is incorporated into FGRR Appendix A "Engineering.
NYSDOS 029	Appendix A Engineering, Section 3.1.8 Sea Level Change	A-44	(No comment provided)	Noted.
NYSDOS 030	Appendix A Engineering, Section 3.4	Beginning on A-61	The paragraph at the top of page A-62 refers to inlet bypassing. Qualitative statements about how much of the incoming littoral supply bypasses would be helpful. Also, a note should be added that dredging the inlet or the ebb shoals could interrupt littoral transport, and that careful management will be needed to avoid detrimental effects.	FGRR Appendix A "Engineering" qualitatively describe the effects of the inlets, including whether the sand naturally bypasses or not. Dredging the inlet and ebb shoals and placing the material directly downdrift in the littoral system is not expected to interrupt littoral transport. Any risks would be mitigated by monitoring and adaptive management. If the shoals are stable (i.e., not accumulating sediment) then the inlet is effectively bypassing and additional dredging would not be required.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
NYSDOS 030	Appendix A Engineering, Section 3.4	Beginning on A-61	The paragraph about Shinnecock Inlet (A-62) should note that earlier efforts to dredge an outlet from the bay to the ocean contributed to formation of the inlet, which breached outward during a storm. The reference that natural bypassing forms an attachment shoal at Ponquogue is helpful. It would also be helpful to mention that sand mobilized by waves on the west side of the inlet inside the attachment shoal is drawn back into the inlet during 'flood tides. Most importantly, it should be noted that the loss of sediment on the west side of the inlet due to the jetties creates a chronic erosion site that needs to be addressed if breaching and possible destabilization of the west side barrier is to be avoided.	The suggested language is included in the FEIS.
NYSDOS 030	Appendix A Engineering, Section 3.4	Beginning on A-61	The paragraph about Moriches Inlet (A-62) should reference Jim Allen's (NPS) research that substantial natural bypassing occurs here. It should also note the east side of the inlet is prone to washovers or breaches which have occurred on several occasions.	A references to Allen (2002) is included in FGRR Appendix A Sub-Appendix 3 "Tidal Inlet Investigations."
NYSDOS 030	Appendix A Engineering, Section 3.4	Beginning on A-61	The Fire Island Inlet paragraph (A-63) should note that absent stabilization by the jetties and dredging, sand shoals would be likely to close Fire Island Inlet and attach to Jones Island, with a new inlet, more hydraulically efficient, forming further to the east. As a result, at some point in the future natural forces affecting this area may need to be addressed but additional information may be needed to guide decision making. The paragraph should also note an approximate annual amount of sand that has been dredged and placed in adjacent areas in recent years.	USACE concurs with NYSDEC's characterization of coastal processes. The referenced section in FGRR Appendix A "Engineering" is specific to describing the history and existing conditions of the inlets; language has not been added to the text.
NYSDOS 030	Appendix A Engineering, Section 3.4	Beginning on A-61	Wilderness Breach (A-63). The last sentence in this paragraph says model simulations indicate bay water levels will be significantly increased during a storm. Current records documenting multiple passing storms show no significant increase in bay water levels. Therefore, this sentence should be modified to say either that elevated water levels have not been seen in storms to date and might occur only under certain conditions, or that the model simulations are not borne out by actual breach effects and further monitoring and study is needed to understand the potential for increased flooding. It's important for future managers and local interests to understand the actual behavior of breaches as opposed to the models.	The FGRR, FEIS, and their appendices clarify the wording for each of the four breach response plans: Proactive, Reactive, Conditional and Wildness Response Plans. The FGRR includes a table that identifies the applicable breach response plan for each project reach. For areas identified for Conditional breach closure, the Breach Closure Team, which includes representatives from NPS, USACE, and USGS, would evaluate whether the breach is likely to close naturally, with action initiated by day 60 to close the beach if it has not closed naturally. For areas identified for "Wilderness" breach closure, the breach would only be closed if if is determined that leaving the breach open would have an significant adverse effect.
NYSDOS 030	Appendix A Engineering, Section 3.4	Beginning on A-61	Qualitative statements about how much of the incoming littoral supply bypasses would be helpful. A note should be added that dredging the inlet or the ebb shoals could interrupt littoral transport. There are several notes in the comment regarding the paragraphs about Shinnecock Inlet (A-62), Moriches Inlet (A-62), Fire Island Inlet (A-63), and Wilderness Breach (A-63).	FGRR Appendix A Sub-Appendix 3 "Tidal Inlet Investigations" includes Information regarding existing bypassing around the inlets based on sediment budget work. USACE respectfully disagrees with the NYSDOS's assessment that dredging the inlet or the ebb shoals could interrupt littoral transport. If sediment dredged from the inlets is placed downdrift then it is expected that there would be a net reduction in littoral transport, unless as a result of the dredging and stabilization the ebb shoal grows larger than it would otherwise. The latter scenario is the issue that the proposed inlet modifications (dredging of the ebb shoal) will address.
NYSDOS 031	Appendix A Engineering, Section 4.6.3	A-69	Future Vulnerable Conditions (FVC). As a basis for modelling the USACE speculates on an FVC with lower dune heights, smaller beach widths, and narrower barrier widths. What is the basis for assuming these conditions? Have they occurred in the past or would they be created by accelerating sea level rise?	Future Vulnerable Conditions are based on historic conditions, sediment budget, existing erosion rates, and modeling results. Some of these conditions have occurred in the past, and others could occur in the absence of beach restoration measures.
NYSDOS 031	Appendix A Engineering, Section 4.6.3	A-69	If there are historic records for when FVC-type conditions occurred, could the report say something about how frequent and extensive they were?	FGRR Appendix A "Engineering" includes a description of historic FVC-type conditions.
NYSDOS 031	Appendix A Engineering, Section 4.6.3	A-69	The report should compare current conditions to unmanaged, natural conditions and the FVC, so that managers have some awareness of how the barriers could be expected to behave with no intervention, and to help understand the reasonableness of models.	Future Vulnerable Conditions closely represent unmanaged conditions, except for the continued presence of managed inlets.
NYSDOS 032	Appendix A Engineering, Section 4.6.5	A-70	Several options state it is not possible for two breaches to be open into one bay. A little further explanation of the reason for this would be helpful. The potential for catastrophic failure of artificially maintained barriers suggests multiple breaches might occur in the future under active management programs. Is there any record of historic storm breaching suggesting only one can remain open into a bay?	Historical evidence, hydrodynamic modeling, and inlet/breach stability analyses do not support the existence of two breaches within the same reach. The tidal prism of one breach would become dominant, and the other breach would naturally close. Text has been included in the FEIS "Engineering" to explain why adjacent breaches would not remain.
NYSDOS 032	Appendix A Engineering, Section 4.6.5	A-70	Section 4 is generally intended to describe "recent" conditions. It is unclear why various speculative breach conditions are included in this section. The description of the breach alternatives is difficult to follow. A more general description of the historic frequency of breaching and the potential effects of accelerated sea level rise would be helpful, with a description of recent breach events as needed. Modelling results should be compared with those realities.	FGRR Appendix A "Engineering" Sections 2 and 3 include a description of historic and existing conditions. The referenced section is meant to present the basis for the modeling of future without-project conditions that was done in support of the lifecycle economic analysis.
NYSDOS 032	Appendix A Engineering, Section 4.6.5	A-70	Post-Sandy [beach conditions], p. A-72: "In the previous BCP analysis for Great South Bay, a maximum breach cross section of 36,200 ft2 was assumed. In order to reflect the recent observations at the Wilderness Area Breach an additional cost estimate was developed at all Great South Bay breach locations for a smaller breach with a maximum breach cross sectional area, AO, of 6,500 ft2." These sentences indicate the previous assumptions of breach size were greatly over estimated, over 5.5 times too large. There is no reporting in this section on what that means for estimated potential impacts. Does the smaller breach cross section indicate that potential damages have changed from earlier estimates? Has the revised likely breach cross section been incorporated into the damage findings on which the study recommendations are based? Have the earlier estimates based on unreasonably large breaches been replaced in the other reports and findings? These answers could be significant for the project and for subsequent management efforts by others.	Updated assumptions based on post-Hurricane Sandy data have been incorporated into the most recent damage estimates. FGRR Appendix A "Engineering" includes a summary of the updated analysis.

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NYSDOS 033	Appendix A Engineering	A-73	A sentence should be added explaining that further evaluations of borrow site sediment transport patterns based on additional data (BOEM efforts) and results of monitoring are planned, and modifications of borrow site usage or locations may be determined as a result of this information.	FGRR Appendix A "Engineering" includes text explaining that further evaluations of borrow site sediment transport patterns based on additional data (BOEM efforts) and results of monitoring are planned, and modifications of borrow site usage or locations may be determined as a result of this information.
NYSDOS 034	Appendix A Engineering, Section 6	A-74	Coastal Process Investigations (See below comments 10 a through g)	Noted.
NYSDOS 034	Appendix A Engineering, Section 6	A-74	Section 6.1: "Stations within the three bays influenced by storm-induced barrier island overwash and breaching are marked in red." No stations are marked in red in the chart.	Reference has been added to Figure 6-1 and Figure 6-4 in the cited sentence.
NYSDOS 034	Appendix A Engineering, Section 6	A-74	Section 6.1: The description should be amended to include the conditions of the inlets that were used in the models. Depths, lengths and cross sectional areas affect flows through the inlets. What size and shape of inlet was in the model? In addition, the relationship of the modeled inlets to typical conditions in the field should be described, so readers have an understanding of how well the models reflect actual conditions.	FGRR Appendix A "Engineering" includes a note that modeled inlet dimensions are representative of typical conditions.
NYSDOS 034	Appendix A Engineering, Section 6	A-74	Did the modelers examine inlets with reduced depths and/or cross sections? These factors might help reduce flooding in bay shore communities by limiting inflows. If smaller inlets were modeled, the report should describe that. If some other method was used to reach a conclusion that reducing inlet cross section or depth would not be helpful, that line of reasoning should be explained.	Inlets were not modeled with a reduced cross-section. All modelling assumed inlet channel maintenance to the authorized depth.
NYSDOS 034	Appendix A Engineering, Section 6	A-74	What size assumption was made for breaches in the modelling? The narrative indicates the system is insufficient to maintain two breaches into a single basin, but doesn't describe the size of the breaches in the models. It will be difficult for readers to understand the models without this information.	Three different breach sizes were considered. A description is included in FGRR Appendix A "Engineering."
NYSDOS 034	Appendix A Engineering, Section 6	A-74	Section 6.1.1, page A-82, Numerical Modeling: A set of models is described which presumably are intended to examine beach and dune erosion, overwash and breaching in coordination with estimated storms. The objectives of the modelling effort are not described. No modeling is described that examines the natural performance of the coastal barriers. As a result, there are questions about the overall modeling package and how well it represents actual shoreline processes.	The referenced "beach and dune erosion, overwash and breaching in coordination with estimated storms" are the natural barrier processes that are relevant to the issue of back bay flooding.
NYSDOS 034	Appendix A Engineering, Section 6	A-74	If the models reproduced coastal processes over a long period of time, would the package and assumptions produce a self- sustaining barrier system that gradually retreats in response to sea level rise, as is documented with the Fire Island barrier over the past 7,000 years? Are the models capable of producing barrier breaches with inlets that gradually migrate and fill completely over time, as is documented in the sediment record? Do the models tend to over-estimate erosion because they do not account for sand accumulating processes in the offshore bars, beaches and dunes? Do the models replicate the regional sediment budgets and littoral sand quantities increasing from the east to the west in the project area?	There are no USACE numerical models capable of simulating response to sea level rise, during the long-term geological time-scale. The models used could theoretically reproduce inlet migration and/or filling, but unfortunately runs are extremely long so these kids of simulations are not practical with available technology. The storm surge / breaching model does not overestimate erosion. In addition, the models conserve sediment, and account for all sediment movement (erosion/accretion) during storm events. All models used in the study confirm littoral transport from east to west. GENESIS (Shoreline Change Model) also confirms increasing transport from east to west.
NYSDOS 034	Appendix A Engineering, Section 6	A-74	6.1.1.3 modeling, p. A-823. The report states that an assumption in SBEACH is that all material is distributed across the profile and longshore transport can be neglected because it is uniform. Obviously beaches and sometimes dunes erode during storms. Is USACE saying that SBEACH distributes the eroded material along the profile? It would be helpful for the report to clarify this. Does SBEACH return material to the beach and nearshore when calmer conditions with long period wave swells prevail after the storm? It would be helpful to explain this so readers understand the performance of the model. Presumably the USACE modeled the Montauk area prior to construction of the interim sandbag project. Has the project performed as the model anticipated? An explanation about this would be helpful to validate the model. Did SBEACH/DELFT3D generate breaches comparable to the Hurricane Sandy breaches at Smith Point County Park, Moriches Inlet and the Fire Island Wilderness Area? What are the differences between SBEACH/DELFT3D performance and size and shape of breaches from these actual events? In Section 6.1.2 on page A-89, the abbreviations BLC and FVC are used. It would be helpful if the meaning of these abbreviations was repeated in this section because their original appearance on page A-69 is quite a bit earlier in the text.	SBEACH models distribution of eroded sand along the profile. SBEACH is not typically used to investigate periods of calm weather. A detailed assessment of project performance using models would require a significant amount of data, including nearshore wave data, that is not available. Anecdotally, however, the project has performed as expected. Despite differences in conditions prior to the storm and the storm itself, SBEACH/Delft3D generated significant overwash and breaches at those locations for large storm events. These definitions are provided in FGRR Appendix A "Engineering."
NYSDOS 034	Appendix A Engineering, Section 6	A-74	Section 6:1.5.1 Ocean Wave Setup, p. A-114, and 6.1.5.2 Bay Wave Setup, p. A-119. Does the USACE have empirical evidence or some other basis for adding estimated wave heights to estimated surge water levels to calculate total water level? It is difficult to tell whether the combined estimates result in realistic water levels. Does wave setup attributed to "all historical storms" (p. A-119) refer to estimated amounts calculated by the USACE for historical storms, or to actual empirical data. In general, are the estimates of total water height that incorporate modeled surge and modeled (or empirical) wave setup reasonable?	Wave setup is a physical fluid-dynamic process involving transfer of wave momentum to the water column as waves approach shore. This transfer of momentum results in an increasing pressure gradient directed toward shore, resulting in a sloped increase in water levels. The process is well-understood and has been thoroughly studied and documented. For more information on wave setup, refer to USACE Coastal Engineering Manual, Part II, Chapter 4, or to the FEMA Coastal Flood Hazard Analysis and Mapping Guidelines Focused Study Report on Wave Setup. Wave setup was calculated (waves, tides, storm surge) for each of the historical storms. The estimates of total water level (not height) including surge and wave setup are reasonable.
NYSDOS 035	Appendix A Engineering, Section 6.1.3	p. A-107	Stage-Frequency Methodology. As far as we can see, the modeling is based on current water levels. We suggest a subset of inundation models be run under high sea level rise assumptions, to provide an outside bound of potential conditions for the project area. This information is vital to state and regional planning. If it is available elsewhere, a note in this section would be helpful.	The FGRR includes new Section 7.4.2 "Expected and Probabilistic Values of Damage Reduced" that discusses the impacts under different USACE sea level change projections.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
NYSDOS 036	Appendix A Engineering, Section 6.1.6.1	p. A-121	It would be helpful if the project reports said something general about very long return period storms, if there are credible sources. For example, how do the 500 and 1000 year return period water levels compare with the 100 year return period levels? In some places the long term stage/frequency curves are relatively flat while in other locations they are steeper, indicating there is the potential for storm water levels well above those reflected in the project analysis and management measures. Knowing this information would be valuable to regional and local planning.	FGRR Appendix A Sub-Appendix 1 "Storm Surge Modeling Stage Frequency" includes a description of differences in stage-frequency curves.
NYSDOS 037	Appendix A Engineering, Section 6.1.6.2 Future Vulnerable Conditions (FVC)	p. A-121	Data from researchers working at the Fire Island Wilderness Area breach indicate bay water levels during recent higher frequency return period storms have not significantly increased above the no-breach condition. This suggests that the models are over-predicting storm water levels with the FVC. Please address this difference between empirical evidence and the models, and estimate how it would affect overall damage estimates in the USACE methodology. The existing paragraph identifies Western Moriches Bay as the location with the greatest increase in bay water levels under storms with the FVC. What is the additional area of flooding of upland areas, and what are the water depth increases on land due to this effect? This information is needed for planning to reduce risk and to help focus community resilience strategies. The description notes Moriches Inlet is more efficient than Fire Island Inlet at exchanging water with the ocean, and Shinnecock Inlet is most efficient. In this case the water levels in Moriches Bay and Shinnecock Bay would not differ significantly in the FVC versus the BLC, because the higher efficiency inlets already admit most or all of the water needed to reach the same elevation as the ocean. In other words, the water levels within the bays are largely a function of the navigation inlets, and levels cannot exceed the surge heights in the adjacent ocean, regardless of barrier condition. The descriptive paragraph should highlight this condition for the benefit of local and regional planning.	The primary reason that the current breach at Old Inlet has not caused significant loss of life or property is because the area has not been impacted by a major hurricane since Hurricane Sandy (2012). Modeling has shown that with the Old Inlet Breach open, additional flooding would occur that could exacerbate damages (see Appendix A Sub-Appendix 1 "Storm Surge Modeling Stage Frequency," Plates I-1 through I-27). Specifically, post-Hurricane Sandy numerical modeling efforts detailed in Appendix A Sub-Appendix 4 "Numerical Modeling of Breach Open at Old Inlet" show that although the breach open conditions at Old Inlet have a very small effect (up to 1 inch) on daily tidal fluctuations and small storm tides, they could have a large effect (up to 22 inches) on storm tides during severe hurricanes and nor'easters. USACE and partner agencies have a coordinated breach response process and the identification of a Bayesian protocol as a means to satisfy multiple agency priorities. The process was proposed and agreed upon in concept in several working level meetings. The USACE anticipates further development in Pre-construction Engineering Design, and anticipates a collaborative approach to identifying the substantive detail. Participants from DOI have been in general agreement with this approach in these workshops. USACE and DOI have identified the need for separate contingency criteria for the Otis Pike Wilderness Area versus other Federal tracts. Water levels would not differ significantly in the bays vs. the ocean.
NYSDOS 035	Appendix A Engineering, Section 6.1.6.2 Future Vulnerable Conditions (FVC)	p. A-121	Data from researchers working at the Fire Island Wilderness Area breach indicate bay water levels during recent higher frequency return period storms have not significantly increased above the no-breach condition. This suggests that the models are over-predicting storm water levels with the FVC. Please address this difference between empirical evidence and the models, and estimate how it would affect overall damage estimates in the USACE methodology. The existing paragraph identifies Western Moriches Bay as the location with the greatest increase in bay water levels under storms with the FVC. What is the additional area of flooding of upland areas, and what are the water depth increases on land due to this effect? This information is needed for planning to reduce risk and to help focus community resilience strategies. The description notes Moriches Inlet is more efficient than Fire Island Inlet at exchanging water with the ocean, and Shinnecock Inlet is most efficient. In this case the water levels in Moriches Bay and Shinnecock Bay would not differ significantly in the FVC versus the BLC, because the higher efficiency inlets already admit most or all of the water needed to reach the same elevation as the ocean. In other words, the water levels within the bays are largely a function of the navigation inlets, and levels cannot exceed the surge heights in the adjacent ocean, regardless of barrier condition. The descriptive paragraph should highlight this condition for the benefit of local and regional planning.	USACE assumes NYSDOS' comment refers to research documented in van Ormond et al. (2015) and Aretxabaleta et al. (2014). This research, which only included evaluation tidal and very small storm conditions, was reviewed as part of FIMP engineering efforts and their results generally agree with the USACE analysis summarized in FGRR Appendix A Sub-Appendix 4 "Numerical Modeling of Breach Open at Old Inlet." However, the text in Section 6.1.6.2 of FGRR Appendix A "Engineering" refers to the impacts of significantly larger storms than those considered by van Ormond et al. (2015) and Aretxabaleta et al. (2014), and which result in larger differences under existing breach open conditions (see Sub-Appendix A-4) and between BLC and FVC conditions.
NYSDOS 037	Appendix A Engineering, Section 6.1.6.4	p. A-122	Breach Open Conditions. The existing content states that water levels are higher in the bays during breach open conditions, even when the breach is small. However, Newsletter Number 2 dated October 2016, Wilderness Breach Management Plan /Environmental Impact Statement of the National Park Service, Fire Island National Seashore, says "Analysis of Great South Bay water level data indicates that the height of high tide has not changed significantly since before Hurricane Sandy." This empirical data reported by NPS/FINS differs with the USACE report in this section. Is it possible for the USACE to clarify their statement? There have been storms in the interval that the breach has been open with no significant increases in bay water levels. We recommend that the USACE investigate circumstances under which some breaches exhibit little to no effect on bay water levels. Management measures could then target these locations for modified management strategies.	The primary reason that the current breach at Old Inlet has not caused significant loss of life or property is because the area has not been impacted by a major hurricane since Hurricane Sandy (2012). Modeling has shown that with the Old Inlet Breach open, additional flooding would occur that could exacerbate damages (see Appendix A Sub-Appendix 1 "Storm Surge Modeling Stage Frequency," Plates I-1 through I-27). Specifically, post-Hurricane Sandy numerical modeling efforts detailed in Appendix A Sub-Appendix 4 "Numerical Modeling of Breach Open at Old Inlet" show that although the breach open conditions at Old Inlet have a very small effect (up to 1 inch) on daily tidal fluctuations and small storm tides, they could have a large effect (up to 22 inches) on storm tides during severe hurricanes and nor'easters. USACE and partner agencies have a coordinated breach response process and the identification of a Bayesian protocol as a means to satisfy multiple agency priorities. The process was proposed and agreed upon in concept in several working level meetings. The USACE anticipates further development in Pre-construction Engineering Design, and anticipates a collaborative approach to identifying the substantive detail. Participants from DOI have been in general agreement with this approach in these workshops. USACE and DOI have identified the need for separate contingency criteria for the Otis Pike Wilderness Area versus other Federal tracts. Water levels would not differ significantly in the bays vs. the ocean.
NYSDOS 038	Appendix A Engineering, Section 6.1.7	p. A-122	Breaching and Overwash Frequency. Please revise the paragraph to recognize positive effects of overwash	The positive effects of overwash are described in FGRR Appendix A "Engineering."
NYSDOS 039	Appendix A Engineering, Section 6.2	p. A-130	A series of theoretical erosion conditions of coastal barrier land form features are described, and the models are used to estimate the frequency of such conditions. There is no description of how or why these parameters were set or how it helps understand the coastal barrier behavior evolution over time. How do these conditions relate to the historic barrier behavior? The barriers have persisted for a long time without USACE intervention. Is the USACE predicting these parameters for the purpose of setting conditions to be maintained? Coastal barriers are highly variable land forms and the natural community is adapted to these changes. Is the USACE intending to stabilize the barrier land forms and provide fill whenever any movement occurs? Has the USACE estimated regional effects on the ecological community that could result from constant land form maintenance?	As stated in the response to the previous comment, this section pertains to Modeling. The positive effects of overwash and the concepts of natural barrier island rollover have been addressed elsewhere. The ecological effects of the Recommended Plan are addressed in the EIS and also will be summarized in the Main Report. This discussion is not appropriate for the Engineering Appendix.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
NYSDOS 040	Appendix A Engineering, Section 6.2.3	p. A-132	Section 6.2.3, Baseline Conditions Response-Frequency Relationships, p. A-132. In the Montauk reach (true for all reaches as well), the derivation of erosion and beach recession is based on historic data, which is largely under conditions without shoreline structures. This section should point out that to the extent shoreline structures like revetments, bulkheads and jetties restrict contributions of sand to adjacent beaches, erosion of downdrift shores will accelerate. In the Montauk reach in particular, revetments, sand bag dunes and other structures are proliferating. This paragraph should point out that these measures will inevitably lead to accelerated erosion down drift, reduced beach widths in front of the structures and steepening profiles offshore. Wave impacts and erosive forces will increase with additional structures in the future unless these structures are somehow mitigated. It is important to provide this information in the report to facilitate effective management.	The FEIS includes a description of localized effects of extant structural measures on downdrift erosion, and the ecological effects of the Recommended Plan.
NYSDOS 041	Appendix A Engineering, Section 6.3	p. A-152	The paragraph states there have been no modifications in the region that would change the sediment budget. This is not accurate because significant additional amounts of sediment have been added to regional beaches through the interim projects at Shinnecock Inlet and Westhampton, and some back passing of sediment from Fire Island Inlet to the Robert Moses State Park area has occurred. It would be more accurate to note these efforts and highlight the scale and location of their effects	Interim projects at Shinnecok and Westhampton, and backpassing at Robert Moses State Park are accounted for in the sediment budget.
NYSDOS 042	Appendix A Engineering, Section 6.3.1	p. A-155	We recommend discussing this section with USGS and adding relevant references and information.	A reference to the USGS work is provided in FGRR Appendix A "Engineering."
NYSDOS 042	Appendix A Engineering, Section 6.3.1	p. A-155	Page A-155 states "it was determined that future projects must maintain these nourishment rates to preserve present-day beach conditions." If the USACE is claiming the proposed measures will maintain present-day beach conditions, the report should be explicit about that commitment. We suspect such a commitment is unsustainable, but if the USACE is willing to make that promise, the report should express the guarantee sufficiently so that partners and stakeholders fully understand performance expectations	The referenced section summarizes historical and existing sediment budgets. USACE makes no commitment to provide nourishment at the nourishment rates forever. The sentence on Page A-155 qualitatively states that those are the nourishment rates needed to preserve present-day conditions. If USACE or NYS do not continue to nourish at those rates, beach conditions would degrade compared to present conditions.
NYSDOS 042	Appendix A Engineering, Section 6.3.1	p. A-158	Section 6.3.3.4, p. A-158 states the long-term average annual losses sediment loss due to sea level rise is estimated at 305,000 cu m/yr. At this rate would the coastal barrier tend to disappear over the course of time? Are the sediment budgets and modelling set up to reflect the fact that the barriers have maintained themselves without mechanical sand placement for thousands of years? If the assumptions about sediment movement and erosion don't incorporate this fact, how are they useful in estimating future without project conditions, and what are the implications for recommended management actions?	In addition to providing for periodic nourishment and OMRR&R, the Recommended Plan also provides for monitoring and adaptive management in order to best accomplish the project objectives.
NYSDOS 042	Appendix A Engineering, Section 6.3.1	p. A-155	Section 6.3.3.5 states offshore contributions are not necessary to balance the sediment budget. Discussion with USGS should be held to clarify whether this conclusion is supported across the broader scientific community	A reference to the USGS work is provided in FGRR Appendix A "Engineering."
NYSDOS 043	Appendix A Engineering, Section 6.5.1	p. A-193	The narrative states breaches at Shinnecock (1938), Cupsogue (1980) and Pikes Beach (1992) were used as references of "typical" breach behavior in the region. Two of these breaches are atypical and therefore not good references. The breach at Shinnecock occurred at a location where local interests had excavated the barrier from the bay side to try and create navigation access and a significant hole was left in the barrier. At Pikes Beach, substantial erosion due to the effects of 15 groins in Westhampton contributed to severe beach sand loss and weakening of the barrier. Absent these interventions, it is likely these breaches would have been much smaller and shorter-lived. These facts should be reported in this section, and conclusions should be modified accordingly. It should also be reported that the long-term sediment record demonstrates breaches have occurred in more than 30 locations since colonization in the 1th century, and in all cases those breaches closed naturally over periods ranging from months to about a decade.	The referenced section summarizes the evolution/growth of a breach once it opens, not what caused the breach in the first place.
NYSDOS 043	Appendix A Engineering, Section 6.5.1	p. A-193	Section 7.5.3 Breach Response measures, p. A-218. It doesn't seem reasonable to fit an equation on potential breach sizes to the 1992 Pikes Inlet breach ("Survey data for the 1980 and 1992 breaches at Cupsogue and Pikes Beach, respectively, were used to estimate breach growth characteristics."), because this breach was artificially large due to the effects of the updrift groin field. Experience from the Old Inlet/Wilderness Area breach would be more applicable. Can the report findings be modified to address these factors?	Sandy Wilderness breach data was incorporated into Great South Bay breach predictions.
NYSDOS 044	Appendix A Engineering, Section 7.0	p. A-202	A general introduction covering which management options were investigated, which were dropped and the reasons, and which were carried forward, would help support the detailed investigations described later.	FGRR Appendix E "Plan Formulation" provides a detailed discussion of the development and screening of alternatives.
NYSDOS 044	Appendix A Engineering, Section 7.0	p. A-202	Section 7.4.4, Sediment Management (Inlet Sand Modification), p. A-206, describes examination of changes in dredging practices to improve littoral transport, but does not describe options to reduce inlet cross sections to control flood flows into the bays	Reducing cross-sections to control flood is not considered compatible with safe navigation best practices.
NYSDOS 044	Appendix A Engineering, Section 7.0	p. A-202	The option of acquiring affected private land areas on the barriers where breaches occur is not mentioned. Previously the USACE agreed this was a good idea. It should be mentioned here in combination with other acquisitions to reduce damages.	This topic is addressed in FGRR Appendix H "Land Management," specifically in Section III, in identifying the land management risk associated with breach response plans, and in Section IV, Land and Development Management Opportunities in Formulation. USACE has identified that the minimum real estate necessary to construct a breach response is temporary construction easements. Acquisition of homes in breach vulnerable areas, or land management measures to address rebuilding in breach vulnerable areas should be considered as part of the local sponsor's floodplain management plan. Please note, since the Recommended Plan includes conditional breach response largely in publicly-owned tracts of land, there are limited instances where this would be a concern over the first 30 years of the project.
NYSDOS 045	Appendix A Engineering, Section 7.2.3	p. A-203	We recommend assigning reaches to bayshore areas for management purposes and making general recommendations about conditions and opportunities for restorative actions that could reduce flood risks.	Project reach designations reflect original project authorization. Study-specific physical reaches and design subreaches are provided in FGRR Appendix A "Engineering" Table 7-1.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
NYSDOS 046	Appendix A Engineering	p. A-237	When buildings and homes are removed by acquisition there is no possibility of future damages under any storm or sea level rise scenario. On the other hand, coastal barrier fills, breach management, elevations and flood proofing keep development in high risk areas, leaving a possibility for future damages. Do acquisition options receive any favorable points on this basis? If so, the outcome should be reported here. If not, the fact that acquisition permanently limits damages, while other measures have some potential to fail, should be mentioned here.	This topic is addressed in FGRR Appendix H "Land Management," specifically in Section III, in identifying the land management risk associated with breach response plans, and in Section IV, Land and Development Management Opportunities in Formulation. USACE has identified that the minimum real estate necessary to construct a breach response is temporary construction easements. Acquisition of homes in breach vulnerable areas, or land management measures to address rebuilding in breach vulnerable areas should be considered as part of the local sponsor's floodplain management plan. Please note, since the Recommended Plan includes conditional breach response largely in publicly-owned tracts of land, there are limited instances where this would be a concern over the first 30 years of the project.
NYSDOS 046	Appendix A Engineering	p. A-237	Are there other benefits from acquisitions that might improve the benefit estimates? For example, restoration of aquatic, marsh or forest vegetation that could provide storm damage benefits; water quality benefits; elimination of local costs for road, sewer or other utilities; alternative site uses or other benefits.	All potential allowable benefits have been taken into account, per USACE economic guidance and best practices.
NYSDOS 046	Appendix A Engineering	p. A-237	After the first cost of implementing an acquisition, there are no (or limited) operation and maintenance costs, while other measures require ongoing maintenance and/or periodic reconstruction. How does this factor affect the evaluation of acquisition?	The fact that there would be no (or limited) O&M costs associated with implementing an acquisition has been taken into account, per USACE economic guidance and best practices.
NYSDOS 046	Appendix A Engineering	p. A-237	How would the high rate of USACE sea level rise estimates affect the number of homes in the respective flood plains? These amounts should be reported and compared with the numbers in the as-is evaluation.	FGRR Appendix E "Plan Formulation" provides a detailed discussion of nonstructural plan formulation. The floodplains used in the analysis are based on present-year data, per USACE economic guidance and best practices.
NYSDOS 046	Appendix A Engineering	p. A-237	If or when breaches occur in the future, the barrier land area affected by management measures should be acquired, due to the potential for additional repeat breaches in the future. Previously the USACE agreed this was a good recommendation. A reference to this recommendation should be included in this section, along with suggestions on how such acquisitions might be funded.	This topic is addressed in FGRR Appendix H "Land Management," specifically in Section III, in identifying the land management risk associated with breach response plans, and in Section IV, Land and Development Management Opportunities in Formulation. USACE has identified that the minimum real estate necessary to construct a breach response is temporary construction easements. Acquisition of homes in breach vulnerable areas, or land management measures to address rebuilding in breach vulnerable areas should be considered as part of the local sponsor's floodplain management plan. Please note, since the Recommended Plan includes conditional breach response largely in publicly-owned tracts of land, there are limited instances where this would be a concern over the first 30 years of the project.
NYSDOS 047	Appendix A Engineering - Non-structural Road Raising Alternatives	p. A-242	Are costs for augmented drainage structures to get water out of enclosed areas included in the costs of road raising alternatives? These costs should be described.	Road raisings are no longer part of the Recommended Plan.
NYSDOS 048	Appendix A Engineering, Section 8.0 Post-Sandy TSP Modifications	p. A-376	The USACE concludes that post-Hurricane Sandy beach conditions require intervention. This conclusion is not fully supported by subsequent events. How does the USACE reach the conclusion that the situation is urgent, what is at risk, and how will the risks be mitigated by the proposed actions?	Conditions post-Hurricane Sandy were closer to Future Vulnerable Conditions than Base Level Conditions in many areas, which modeling results suggest would result in greater damages. This can explain the increased urgency foro action.
NYSDOS 049	Appendix A Engineering, section 9.4.2.1. Breach Closure Costs	p. A-411	We recommend revising Table 7-95 to reflect breaches with a size comparable to the existing one at Old Inlet in the Wilderness Area of Fire Island National Seashore. In addition, any cost or quantity estimates in the reports should be similarly revised to reflect more realistic breaches.	The cost estimates and quantities reflect recent data from Old Inlet.
NYSDOS 050	Appendix A Engineering. Overwash	p. A-426	The definition in the report should include the essential role overwash plays in coastal barrier formation.	FGRR Appendix A "Engineering" includes the definition for overwash. A discussion of the processes that are important to coastal barrier island formation and evolution (including inlets) is included in the FGRR and FEIS.
			Borrow Source Investigations	
NYSDOS 051	Appendix B Borrow Source Investigations: Objective	p. B-1	Describe method for how sample locations for beach sand models were chosen. Provide reference to study that concluded that sand bypassing evaluated in the engineering appendix is not expected to provide more than a small percentage of fill needs.	The profile locations for which sediment samples were collected tried to achieve a spacially balanced placement (ata aoproximtely every other profile). The locations along each profile that sediment samples were collected tried to achieve a balanced representation of different beach segments to inform the design parameters of beach fill. Of these samples, a decision was made to omit the deepest 2 samples. The reasoning for this was that the active profile locations better represent the exposure to wave energy the profile would experience. Additionally, typically the deepest samples contain sand with the smallest grain size diameter. Longevity of sand fill is correlated to coarser sand grains. And placement typically occurs on the higher elevations of the profile. Typical annual bypassing rates for Shinnecock Inlet and Moriches Inlet are less than 100,000 cy/year, whereas the fill volumes recommended forWesthampton and Fire Island, respectively are roughly an order of magnitude greater than that. This information is summarized in FGRR Appendix B "Borrow Areas."
NYSDOS 052	Appendix B Borrow Source Investigations - Para. 7. Screening Criteria	p. B-2	Clarify whether insufficient quantity of fill is limited to availability of borrow sites, or if there are instead economic limitations that preclude transport of sufficient fill from distant borrow sites. Identify surveys that were conducted which concluded negligible long term impact to flora and fauna from suspension of fines.	The referenced paragraph in FGRR Appendix B "Borrow" provides the criteria that was utilized in screening the potential borrow sites.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
NYSDOS 053	Appendix B Borrow Source Investigations - Para 8-Grain Size Characteristics	p. B-3	Provide upfront definition of compatibility with the existing beach system in the context of this project.	The grain size distribution is the most important factor in beach/borrow compatibility. The compatibility of available sediments is ranked by a factor which estimates the volume of sand with a given distribution needed to produce a required volume of beach fill. This factor allows some compensation for the difference between borrow and native sand. The portion of borrow material that does not match the native sediment gain size distribution is assumed to be lost to the offshore. The existing beach system shows coarser sediments at Montauk, getting progresively finer towards Fire Island Inlet. For this reason, the beach was divided into numerous reaches. This allowed design borrow fill to reflect this horizontal distribution better. This information is summarized in FGRR Appendix B "Borrow Areas."
NYSDOS 054	Appendix B Borrow Source Investigations - Para 9-Grain Size Characteristics	p. B-3	Describe method for collection of samples, particularly on the horizontal plane. Identify whether random or not. Provide number of samples taken.	The method of collection of sediment samples was to have the surveyor who was collecting profile data to concurrently collect beach samples at the Back-Berm; Fore-Berm; Mean High Water (MHW); 0 ft. NGVD; Mean Low Water (MLW); 6.0 ft. NGVD, -12.0 ft NGVD; -18 ft. NGVD; and -30.0 ft. NGVD using a scoop. USACE specified which profile lines to collect samples at (it was roughly every other profile). This information is summarized in FGRR Appendix B "Borrow Areas."
NYSDOS 055	Appendix B Borrow Source Investigations - Para 10-Grain Size Characteristics	p. B4	Explain what measures will be taken to account for cross-shore sediment transport when deciding on placement of dredge material.	The overfill factor methodology attempts to estimate the amount of cross-shore loss during placement or in the short-term following placement of the incompatible faction of the borrow sediment. (generally sand finer than the native sand). For example, with an overfill factor of 1.15, 1.15 cubic yards of borrow sediment will be placed for each 1 cubic yard of beach fill desired. Approximately 1 cy will remain, and a larger portion of the 0.15 cy will be lost cross-shore due to the placement and short-term sorting operations. The remainder of the 0.15 cy will be lost during the longer-term sorting from varying storm waves sporadically reaching the higher elevations of the beach profile. This information is summarized in FGRR Appendix B "Borrow Areas."
NYSDOS 056	Appendix B Borrow Source Investigations - Para 11 Grain Size Characteristics	p. B4	Identify the "various comparative analysis techniques" referenced. These studies are from the 60's and 70's; are there more recent studies available for reference? Clarify how much time is required for a beach to approach native grain size distribution. Will this occur before the next installment of beach nourishment, which is set to occur every 4 years? Explain in what way borrow material (that does not match the native sediment grain size distribution) will be lost offshore. Explain why the re-nourishment factor, which addresses higher alongshore transportability of fine grained sediment, is no longer recommended in beach fill design calculations.	Paragraph 11 provides background information on determining the compatibility of borrow material. Additionally, there are methods more recent than the 60's and 70's, however they are less conservative (i.e., they show smaller overfill factors, and prescribe less fill). Same issue with the Rj fact: if and Rj factor, say 1.5, shows that a profile should be renourished more frequenty than a more compatible material would (say Rj= 1.0). Ths FIMP analysis would simply exclude the borrow material, and would only allow material with an Rj factor of 1.0 or less. This reduces the amount of sediments outside the native size distribution. As for the time for the native profile to reachieve it's pre-fill distribution, that is highly dependent on the storms that are able to activate (wet) the higher portions of the profile. Theoretically, if no storms occur during the project life, the sediment above the mean higher high water elevation would never adjust. Adjustment requires each unsuitable grain to be mobilized by water access. Picture a glass jar with a variety of grain sizes mixed inside. Gravel, sand, silt sizes. and you shake the jar. The fines would sink to the bottom, only instead of being confined by the jar, the sediment sizes finer than the native would sink and spread horizontally (cross-shore).
NYSDOS 057	Appendix B Borrow Source Investigations - Para 12-Grain Size Characteristics	p. B4	Provide greater transparency of which, if not all, samples were averaged together. It appears that in using this method, a combination of excessively low and excessively high mean grain diameter may be averaged together and deemed acceptable. It is stated that the use of the "simplified methodology" of a mechanical sieve analysis over more robust methods was chosen because differences in results would not result in a great enough change for inclusion or exclusion of a potential source. Clarify what the threshold is for a "great enough change"	The protocal followed is based on EM 1110-2-1100. The core samples were averaged by legth of layer the sample represented. For example is sample S-1 represented the top 5 feet of the core, and sample S-2 represented the bottom 15 feet of the 20 foot core, then the S-2 sample would be weighted 3x more than sample S-1. Mechanical sieve analysis is required in any event. But the equations used to define the mean and standard deviation very by analysis method. For example, the historic definition of sample mean is the 84th and the 16th percentile grain size in phi units, averaged. The Method of Moments has the mean equal to the 84th, the 50th, and the 16th percentile grain sizes in phi units, averages. Both methods were tested, and the results on the overfill factors was negligible. Had non-negligible changes been observed, the older analysis would have been scrapped and the more detailed Method-of-Moments used. This information is summarized in FGRR Appendix B "Borrow Areas."
NYSDOS 058	Appendix B Borrow Source Investigations - Para 13 Beach Model Development	p. B-5	Beach Model Development: Sediment samples were collected in 1995. Identify whether Beach sediment samples were re-evaluated post-Sandy. Explain basis for small sample set of 11 beach models to represent 83 miles of shoreline. What method was used in selecting location?	Beach sediment samples were not re-evaluated post-sandy. Based extensive prior experience in evaluating coastal projects, the 11 beach models selected were determined to be approriate. Post-storm samples are the farthest from "native" condition. Storms erode the finer materials, leaving the coarsest sediments. The months and years following a storm, fines are re-introduced into the profile by summer "building waves" and by normal longshore transport. The material distribution represents the wave energy experienced. Finer material means lower energy, coarser material means higher energy. In this case the coarsest material was on Montauk, and the finest was on Fire Island. The shoreline was divided into models representing morphological and hydrodynamic zones. And the the mean grain size only varied between 0.48mm and 0.39mm between Montauk and Fire Island Inlet. The overfill method is not that sensitive to the thousanth decimal of mean grain size to warrent more than 11 models.
NYSDOS 059	Appendix B Borrow Source Investigations - Para 15 Borrow Source Screening	p. B-5	Borrow Source Screening: Vibracore datasets used are dated.	Noted. The striation of sediment underneath the ocean floor only varies in high energy wave environments. The majority of core samples are located in deeper water where the ocean floor is relatively stable. For example is a core was taken in a no energy zone 50 years ago, and coring equipment was able to exactly replicate the location, the core would reasonable be expected to be exactly the same striation.
NYSDOS 060	Appendix B Borrow Source Investigations - Para 16 Borrow Source Screening	p. B-5	Revise sentence globally for clarity: "Trucked in fill has no wave, geomorphological, and when specified in a detailed enough manner, negligible fines"	FGRR Appendix B "Borrow Areas" provides a clear description of trucked fill. Trucked sand is placed by dump truck and moved by bull dozers to include the shallow nearshore zone. Dozers are limited to "dry" ground, and rely on waves and tides to distibute material in the deeper nearshore zones. These zones are the end of the wave transformation zone, and thus have little effect of the wave climate Additionally the adjustment of the fill to the deeper areas is slower and would thus be slower to have any effect on wave development. Furthermore, quarried sand is typically more uniform than sand subjected to an ocean environment. So the quarried sand having a mean of 0.40mm will have the majority of grains much closer to 0.40mm than ocean sand, which results in less fine material.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
NYSDOS 061	Appendix B Borrow Source Investigations - Para 16 Borrow Source Screening	p. B-5	Globally, provide basis for the statement that inlet flood shoals are likely to contain material unsuitable for ocean beach fill, when there is currently no data available.	Inlet flood shoals generally contain significant amounts of fine sands and silts that making them unsuitable as borrow material for the high energy ocean fronting beach. This information is summarized in FGRR Appendix B "Borrow Areas."
NYSDOS 062	Appendix B Borrow Source Investigations - Para 16 Borrow Source Screening	p. B-5	Provide cut-off for consideration of whether inlets are in close enough proximity of fill area to be considered a feasible option.	There is no specific cut-off for consideration of dredged material from Inlet dredging as borrow material. The Recommended Plan provides for placing essentially all of the dredged material from Inlet maintenance on the beach.
NYSDOS 063	Appendix B Borrow Source Investigations - Para 21 Borrow Source Screening	p. B-5	Was sediment characterization data of quarry material requested at the time of screening? If not, why?	As stated in Par 21, none of the quarries met the quantity available threshold, so there was no need to obtain any further sediment characterization.
NYSDOS 064	Appendix B Borrow Source Investigations - Table 1	p. B-6	It would be beneficial to provide standard deviation of Mean Grain Size (mm)	The standard deviation of mean grain size is provided in FGRR Appendix B "Borrow Areas" Table 1.
NYSDOS 065	Appendix B Borrow Source Investigations - Table 3	p. B-7	Provide reasoning for why grain size data was not provided for potential upland sources.	Since none of the quarries met the quantity available threshold, there was no need to obtain any further sediment characterization.
NYSDOS 066	Appendix B Borrow Source Investigations - Para 16	p. B-7	Why isn't grain size used as a measure of compatibility. A better explanation of the overfill factor would be helpful. Identify which offshore locations were analyzed before the conclusion was made that there are no suitable locations.	FGRR Appendix B "Borrow Arees" clarifies that there is sufficient fill material from maintenance dredging of nearbt Fire island Inlet, which is the most economal borrow source.
NYSDOS 067	Appendix B Borrow Source Investigations - Para 18	p. B-8	Clarify what is considered a "convenient distance"/ "convenient fill range" from quarry to fill area.	FGRR Appendix B "Borrow Areas" clarifies that use of an offshore borrow site was more economically viable.
NYSDOS 068	Appendix B Borrow Source Investigations - Para 22	p. B-9	Discuss what USACE uses as guidelines for sensitive geomorphic areas.	In this context, non-sensitive geomorphic areas are those with negligible sediment elevation changes, minimal erosion or accretion. This information is summarized in FGRR Appendix B "Borrow Areas."
NYSDOS 069	Appendix B Borrow Source Investigations: Para 27 Borrow Source Recommendations	p. B-12	Provide explanation of why hundreds of miles of seismic data that was collected is not being used due to difficulty of use. How recent are the Holocene thickness maps that are used for delineation?	The referenced sentence in FGRR Appendix B "Borrow Areas" has been deleted for clarity.
NYSDOS 070	Appendix B Borrow Source Investigations: Para 27 Borrow Source Recommendatio	p. B-12	Explain why use of quarry fill was out ruled in favor of initial placement of offshore fill that was located so far from the site that it was not considered in the initial borrow source screening. It would be beneficial to provide the distance and method of transport of offshore fill. Will sediment characterization of quarry material be conducted before recommendations are finalized?	FGRR Appendix B "Borrow Areas" clarifies that use of quarry fill was determined not to be economic with respect to the offshore borrow sites. Therefore no further characterization of quarry material is needed.
NYSDOS 071	Appendix B Borrow Source Investigations - Para 31	p. B-13	Should include reference to placement of maintenance dredge material as part of initial fill or future re-nourishments.	Reference to placement of maintenance dredge material as part of initial fill or future re-nourishments is included in FGRR Appendix B "Borrow Areas."
NYSDOS 072	Appendix B Borrow Source Investigations - Para 34	p. B-13	Since breach contingency plan is proactive, it would make sense to provide anticipated quantity of fill to be placed, and anticipated frequency.	A description of anticipated quantity of fill to be placed, and anticipated frequency is included in FGRR Appendix B "Borrow Areas."

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
NYSDOS 073	Appendix B Borrow Source Investigations - Para 35	p. B-13	Provide explanation of why no fill is recommended at Southampton reach.	The Southampton dune-berm system in this reach is in excellent condition and is not expected to require renourishment during the project life.
NYSDOS 074	Appendix B Borrow Source Investigations - Para 35. Wave Attenuation Avoidances	p. B-16	(note: numbering is inconsistent). Are there more recent beach profile survey studies/data that can be used? This study identifies that GENESIS results with or without the project both anticipate a decreased, or stable, net transport rate within 3 miles down drift of Cherry Grove, thus causing no adverse impact; it does not reveal whether there would be a difference in the decreased amount of net transport.	FGRR Appendix B "Borrow Areas" includes the correct numbering system. The beach profie surveys utilized contain the most complete data for the model runs. The analyses performed did not consider whether there would be a difference in the decreased amount of net transport.
NYSDOS 075	Appendix B Borrow Source Investigations - Para 38	p. B-19	With regard to statement "In order to have sufficient fill for Fire Island, it is impossible with the data currently existing to avoid use of the borrow areas on the ridges". It would be beneficial to clarify if it is meant that it is impossible to do in a different way while remaining cost-effective.	FGRR Appendix B "Borrow Areas" clarifies that use of borrow sites is necessary from a cost-effective standpoint.
		Plan Formulation Appendix		
NYSDOS 076	Appendix E Plan Formulation, Section 3-B-5	P 35	Data and observations from the recent Wilderness breach should be included when discussing breach response and impacts. The impacts from the Wilderness breach have been studied by both the USGS and USACE. Initial findings from Aretxabaleta, 2014, indicate that water level response in back-barrier bays remain unchanged following the breach by Hurricane Sandy. We suggest including language that references observations from this breach.	The suggested language and reference is included in FGRR Appendix E "Plan Formulation."
NYSDOS 077	Appendix E Plan Formulation, Section 3-D-2	P 40	We suggest including similar language in the Main GRR Report, perhaps in section 2.1.11 on Breach and overwash impacts.	The suggested language and reference is included in the FGRR main body.
NYSDOS 078	Appendix E Plan Formulation, Section 4-G, NYS CMP	P 120	Please make the following changes to the description of the NYS CMP: "The CMP and Article 42 establish a balanced approach for managing development and providing for the protection of resources within the state's designated coastal area. The policies of New York State, reflected in the CMP, express clear preference for non-structural solutions for erosion and flooding, such as elevating or flood-proofing buildings. Municipalities are encouraged to prepare Local Waterfront Revitalization Programs (LWRPs) in order to refine the state's CMP and take local factors into account. In communities with fully approved LWRPs, federal actions must be consistent with the LWRP policies in order for a consistency determination to be issued."	The suggested language is included in FGRR Appendix E "Plan Formulation."
NYSDOS 079	Appendix E Plan Formulation, Section 4-I	P 134	The fact that pre-Sandy analysis has determined which measures move forward does not capture the potential change in options post-Sandy. Of particular note are plans which remove structures from dunes.	FGRR Appendix E "Plan Formulation" includes a discussion of changes in the project area/project in response to Hurricane Sandy.
NYSDOS 080	Appendix E Plan Formulation, Section 5-A	p. 135	Please make the following edits: " The approach gives first priority to management options, particularly options that restore natural processes. The second priority is to include non-structural alternatives, with beach nourishment or other structural alternatives considered last. This formulation approach is consistent with the approach taken in the policies and procedures of the NY State Coastal Zone Management Program, and also places a priority on avoiding or minimizing any negative environmental impacts. This approach also considers the entire area as a system". Please use this suggested language in the other appendices where the original language appears (e.g., Appendix A, A-329; Main GRR Report, p. 99).	The suggested language appears in the FGRR main body, FGRR Appendix A "Engineering, and FGRR Appendix E "Plan Formulation."
NYSDOS 081	Appendix E Plan Formulation, Section 5-A	p. 157	Are the non-structural measures not included in the budget? It is understood that acquisition measures are not included in the budget, but the non-structural approaches are included (over $600 M non-structural measures). A similar statement is not made about the beach fill activities, so there is some confusion about available funds.	Nonstructural measures, including acquisition, are included in the Recommended Plan cost estimate.
NYSDOS 082	Appendix H Land Management, Section I	P. 2	Please insert language that explicitly states that the USACE is fulfilling a requirement under FIMP to investigate land use management, but that recommended actions that are outside of USACE jurisdiction are not the responsibility of the USACE. The report indicates that the Appendix contains recommendations, but it should be clear that they are not funded through FIMP.	FGRR Appendix H "Land Management" includes the suggested language.
NYSDOS 083	Appendix H Land Management, Section II	P. 5	Please make the following changes to the description of the NYS CMP: (See comment)	FGRR Appendix H "Land Management" includes the suggested language.
NYSDOS 084	Appendix H Land Management, Section III	P. 5	We would agree that there is value in maintaining an open bay to ocean connection in some situations; however, the FIMP TSP does not include any options in the BCP for a breach to remain open indefinitely. The idea of allowing an open breach to exist was introduced during early discussions of the BCP, but the option was not included in the final BCP. This needs to be recognized in the statement above.	Approval is needed by the National Park Service for actions on land managed by the agency.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
NYSDOS 085	Appendix H Land Management, Section III	P. 5-6	There are additional public benefits to acquisition beyond habitat restoration, which should be noted. For example, benefits such as flood water retention.	FGRR Appendix H "Land Management" includes a description of the benefits of acquisition beyond habitat restoration.
NYSDOS 086	Appendix H Land Management, Section IV	P. 7	Please indicate when these "meetings" took place. The overall FIMP formulation spans many decades.	Reference in the FGRR Appendix H "Land Management" was removed. FEIS Appendix O "Public Comments" includes a summary of public coordination and meetings.
NYSDOS 087	Appendix H Land Management, Section IV	P. 9	An additional improvement to CEHA in conjunction with the map updates would be public online access to these maps. They are currently inaccessible online.	USACE will make the maps available to NYS if it should want to post them on its website.
NYSDOS 088	Appendix H Land Management, Section IV	P. 10	The establishment of an acquisition fund is recommended, but not described in any detail. What are the options for establishing this fund? Would this be solely a local responsibility, or would the State/ Federal contribute as well? The report mentions different entities that might be able to purchase property, but it does not describe how this would occur.	Land acquisition is a non-federal responsibility.
NYSDOS 089	Appendix H Land Management, Section IV	P. 11	Please elaborate on "selective acquisition is considered further in the context of restoration alternatives." Is this restoration in terms of the CPFs or is this in reference to the acquisition under the nonstructural measures?	Reference to selective acquisition was removed from FGRR Appendix H "Land Management" for clarity.
NYSDOS 090	Appendix H Land Management, Section IV	P. 12	Please make the distinction between the operations and maintenance of the FIMP project post-storm and post-storm response planning. As it is currently written, it is unclear which responsibilities fall under the O&M manual and which would be included in a local post-storm response plan.	Confusing language was removed from FGRR Appendix H "Land Management" for clarity.OMRR&R responsibilities are detailed in the FGRR main body, and FGRR Appendix K "OMRR&R Requirements." Local post-storm redevelopment plans are outside the scope of the OMRR&R actions for the project.
NYSDOS 091	Appendix H Land Management, Section IV	P. 12	There is some confusion in the report about which measures might be implemented under FIMP authority and which are recommended for additional local/state/ federal consideration. For example, "one option under consideration is the development and implementation of local post storm redevelopment plans ... " It is unclear what "under consideration" means, by whom? This type of recommendation is supported by DOS in conjunction with other planning initiatives, such as a local/county Hazard Mitigation Plan, an LWRP, or other comprehensive plan. The NY Rising Community Reconstruction Program (NYRCR) is an example of a specific post-storm planning initiative that focused on development and implementation of community-driven rebuilding and resilience strategies. Several communities within the FIMP study area completed these plans. Below is suggested language that puts a greater emphasis on the importance of this type of planning: "Planning in the form of pre- and post-storm response is critical for communities that are at risk of flooding and storm damage. In addition to these types of local storm response and preparation plans, other planning documents, such as a local or regional Hazard Mitigation Plans or a Local Waterfront Revitalization Program (LWRP), can help bolster and prepare communities for future storm and flooding impacts. These types of planning efforts should include an assessment of the hazards and risks to a community and its assets, along with regional implications. Post-storm redevelopment planning should not solely focus on rebuilding back to pre-storm conditions, but preparing in advance for future storm events so that capital spending and redevelopment are completed in a resilient manner. Lessons learned from past storms can help shape future recommendations for rebuilding restrictions, rebuilding to safer standards or relocating out of hazardous areas."	FGRR Appendix H "Land Management" includes the suggested language.
NYSDOS 092	Appendix H Land Management, Section V	P. 12-13	As written, it is unclear that any acquisition is taking place under FIMP. The Main GRR, p. 106, notes that the post-Sandy plan includes acquisition or relocation of 40 homes located within the dune. Please clarify how many homes are being acquired under FIMP TSP, and whether they are part of the mainland non-structural measures.	While the exact number of homes to be acquired is still being determined, acquisitions where justified are part of the mainland nonstructural plan. FGRR Appendix F "Real Estate Plan" includes information about the estimated number of homes to be acquired.
NYSDOS 093	Appendix H Land Management, Section VI and VII	P. 13-14	Adaptive management. There is inconsistency in the adaptive management plan that is referenced in this Appendix. Under Section V, the plan appears to consist only of adaptive management for nourishment. However, as described under Section VI and in the Main GRR (p. 111), it covers all elements of the TSP (" ... accommodate climate changes as it relates to all the project elements"). We suggest utilizing similar language in section VII.	Confusing language was removed from FGRR Appendix H "Land Management" for clarity.
NYSDOS 094	Appendix I Physical Monitoring	P. I-2	Project description. Revise planned re-nourishment life from 50 years to 30 years plus 20 years post monitoring.	FGRR Appendix J "Monitoring and Adaptive Management Plan" includes information about the 30-year renourishment period.
NYSDOS 095	Appendix I Physical Monitoring	P. I-3	Inlet management Plan. It would be beneficial to include a revised, post-Sandy, sediment budget. See Comment Document Marked in pdf as NYSDOS 001 p. 26	FGRR Appendix J "Monitoring and Adaptive Management Plan" includes a description of back bay sediment in the conditional and reactive BCP, and Coastal Process Features that emulate back bay shoals.
NYSDOS 096	Appendix I Physical Monitoring	P. I-5	Shoreline Inspection. Describe the method of documentation of the general condition of shoreline reaches during site visits. Identify what may classify as an "unusual condition" during inspection	FGRR Appendix J "Monitoring and Adaptive Management Plan" clarifies that documentation will be detailed in a memorandum with notes and photos, prepared and submitted to the Adaptive Management Team. Unusual conditions include observable erosion (e.g., escarpment erosion), accretion, or other condition of note that deviates substantially from design.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
NYSDOS 097	Appendix I Physical Monitoring	P. I-6	Wave Measurements. Are there any existing buoys from which data can be used to compliment this study?	FGRR Appendix J "Monitoring and Adaptive Management Plan" states that data from existing buoys will be used.
NYSDOS 098	Appendix I Physical Monitoring	P. I-7	Water Level Measurements. Clarify the length of time in which water level gages will be used for monitoring. Does long term mean entire length of the project (50 years)?	FGRR Appendix J "Monitoring and Adaptive Management Plan" states that water level gages will be used for 50 years.
NYSDOS 099	Appendix I Physical Monitoring	P. I-7	Borrow Area Monitoring. Document whether dredge removal from borrow site will affect sediment transport of controls. How many vibracore samples will be taken at each profile? Will the experienced geologist elected to do sampling be USACE staff or contracted?	A detailed borrow area moniotoring plan will be developed during Pre-construction Engineering Design, in coordination with NYS and other partners.
NYSDOS 100	Appendix I Physical Monitoring	P. I-8	Beach Fill. It would be beneficial to discuss cross-section drift at inlets as well as shoreline updrift and downdrift. Is there a possibility of modeling currents based on erosion/accretion locations and rates?	A decision about modeling currents will be made during Pre-construction Engineering Design, in coordination with NYS and other partners.
NYSDOS 101	Appendix I Physical Monitoring	P. I-8	Beach Profiles. Provide explanation for choosing to model only winter profile. How will dunes be protected during survey activities? How will control profiles be chosen?	Beach profiles will be surveyed twice per year following completion of initial construction throughout the first nourishment cycle (4 years), after which one post-winter survey/year is proposed. Specific details will be developed during Pre-construction Engineering Design, in coordination with NYS and other partners.
NYSDOS 102	Appendix I Physical Monitoring	P. I-9	Inlet Management. Confirm whether there will be an analysis of cross shore transport and whether controls will be used.	There are no plans at the present time to analyze cross shore sediment transport.
NYSDOS 103	Appendix I Physical Monitoring	P. I-9	Ground Modification. It would be beneficial to show multiple beach profiles in horizontal succession, parallel to the shoreline, in order to illustrate where erosion/accretion is occurring on both sides of the groin.	A decision about how to best illustrate erosion and accretion will be made during Pre-construction Engineering Design, in coordination with NYS and other partners.
NYSDOS 104	Appendix I Physical Monitoring	P. I-10	Breach Response Plan. Paragraph is lacking explanation of identification process to determine which areas are more likely to experience overwash and breaching. Identify exactly when/protocol for determining when post-storm beach profiles will be conducted.	A decision about how to best identify areas likely to experience overwash and breaching will be made during Pre-construction Engineering Design, in coordination with NYS and other partners.
NYSDOS 105	Appendix I Physical Monitoring	P. I-10	Sediment Transport Modeling. In response to statement "Sediment transport modeling will be performed in order to increase our ability to predict the effects of alterations in the ridge system (borrow area dredging) on the shoreline", what will be done to address the rate and direction of sediment transport from long-shore drift?	FGRR Appendix J "Monitoring and Adaptive Management Plan" describes an intereagency agreement for sediment transport modeling.
NYSDOS 106	Appendix I Physical Monitoring	P. I-11	Wave, current, bed load and suspended sediment concentration measurements. Need better explanation of the relationship between ridge systems and sediment transport. Why will gages at nearshore remain in place for only several weeks, while offshore gages will remain for several months?	FGRR Appendix J "Monitoring and Adaptive Management Plan" describes an intereagency agreement for gage placement and data collection.
NYSDOS 107	Appendix I Physical Monitoring	P. I-12	Analysis and Reports. Is there a possibility for locations besides western Fire Island to be monitored for wave, current, bed load and suspended sediment concentration?	Only western Fire Island was considered necessary for monitoring for waves, currents, bed load, and suspended sediment concentration.
NYSDOS 108	Appendix I Physical Monitoring	Attachment B-Page 3 (B-3)	General OMRR&R Duties of the Local Sponsor. Provide criterion for permanent appointment of local official. Describe permanent easement by which local communities will be bound. Identify when Project Cooperation Agreement will be finalized.	A decision about how and when to identify permanent appointment of a local official will be made during Pre-construction Engineering Design, in coordination with NYS and other partners.
NYSDOS 109	Appendix I Physical Monitoring	B-4	Beach and Berm. Identify whether localities have weighed in on proposed maintenance responsibilities and describe how these projects will be funded. Describe what is meant by "original" in the statement: "The berm and beach shall be graded and reshaped to original elevations to repair erosion ... "	"Original" refers to the project design. As the non-federal sponsor, NYSDEC is responsible for working with local interests with regard to the details of OMRR&R.
NYSDOS 110	Appendix I Physical Monitoring	B-5	Provide method of coordination between USACE and municipalities for OMRR&R requirements.	As the non-federal sponsor, NYSDEC is responsible for working with local interests with regard to the details of OMRR&R.
NYSDOS 111	Appendix I Physical Monitoring	LiDAR Requirements, Section 4.3 Aircraft	Describe how often planes will fly, and provide anticipated associated costs.	A decision about how often planes will fly will be made during Pre-construction Engineering Design, in coordination with NYS and other partners.

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT
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Environmental Analysis Branch

February 14, 2019

Mr. David Stilwell
Field Supervisor
U.S. Fish and Wildlife Service
3817 Luker Road
Cortland, New York 13045

Subject: Atlantic Coast of Long Island, Fire Island Inlet to Montauk Point (FIMP), New York Coastal Storm Risk Management Project, U.S. Fish and Wildlife Coordination Act Report (FWCAR)

Dear Mr. Stilwell:

The U.S. Army Corps of Engineers, New York District (District) is pleased to provide the final project description for the FIMP General Reevaluation Report (GRR) and Environmental Impact Statement (EIS) (Enclosure 1), the final Monitoring and Adaptive Management Plan (Enclosure 2) and District Final Responses to the U.S. Department of the of the Interior (DOI) consolidated comments (Enclosure 3) on the July 2016 Draft GRR and EIS received via letter dated October 19, 2016.

The District, New York State Department of Environmental Conservation (NYSDEC) and their local partners, members of the DOI, including the U.S. Fish and Wildlife Service (Service), and other agencies have participated in extensive coordination to finalize the documents provided in these encloses, in particular the details of the Coastal Process Features (CPFs) which are designed to achieve no net loss of sediment into the back bay system as part of the mutually acceptable plan as well as for compliance with Section 7 of the Endangered Species Act by creating early successional habitat for piping plovers (*Charadrius melodus*).

The following updates have been made to the project based on the extensive sponsor, local partner, resource agency and public coordination since the release of the July 2016 Draft GRR and EIS:

1. Updated sand quantities in tables and text
2. Additional language regarding "no net loss" of sediment (how to achieve the goal of approximately 4.2 million cubic yards of sand)
3. Additional section on proactive breach response triggers (ex: Southampton transitioned from Proactive to Reactive for Real Estate purposes)
4. Updated discussion of Downtown Montauk related to beach nourishment
5. Additional language describing that vacant land will be acquired as part of mainland nonstructural plan
6. Updated description of current list of CPFs, including renumbering sites and the removal of sites that do not have landowner support and are no longer included (Cupsogue, Sunken Forest, Point of Woods, Carrington, Regan Property)

7. Incorporated an updated CPF table with quantities to achieve the approximate 4.2 MCY. The quantity in the table alone will not achieve the 4.2 MCY quantity and therefore Adaptive Management will be utilized to reach the overall total
8. Included a description of mainland CPF's.

The District has carefully considered and responded to all DOI comments (Enclosure 3) and has incorporated the comments where appropriate in the GRR and EIS. These documents will be available in mid-February for each agency to back check and then finalize their respective environmental coordination.

After reviewing the Draft FWCAR (June 2016) the District notes that many of Service requests for additional information (including adaptive management, proposed beach fill volumes and clarification on what proposed mitigation measures [CPFs] are proposed) are provided in the final project description (Enclosure 1). The District also agrees with and has adopted many of Service suggested measures (such as pre construction surveys of the borrow areas, compatible grain size in placement areas, no raking of the wrack material, restoring tidal marshes, offsetting effect of bulkheads and creating shore bird breeding and feeding habitats). Some of Service recommended measures are inconsistent with the FIMP authorized project (lowering proposed dune heights) countering the overall project purpose and others fall outside of USACE authorization and cannot be adopted as part of the FIMP project (including monitoring for contaminants, shellfish population and nutrients loading within the bays or the eradication of *Phragmites*). The District suggests as part of finalizing the FWCAR, the Service and District staff work together as necessary via meeting and conference call to finalize the list of recommended measures and optimize those that are under the District authority. The District requests that Service please provide a final FWCAR no later than March 25, 2019 in order to be included in the Final EIS and maintain the overall project schedule for project approval.

The District looks forward to working with your office to complete the Feasibility phase and throughout the Pre-Engineering and Design and Construction phases and thanks you for your continued assistance and input to this process which helps to advance the execution of this regionally-significant project.

If you require any additional information, please feel free to contact Mr. Robert Smith, Project Biologist at 917-790-8726.

Sincerely,

Peter Weppler
Chief, Environmental Analysis Branch

Enclosure 1 FIMP Final Project Description
Enclosure 2 FIMP Final Monitoring and Adaptive Management Plan
Enclosure 3 District Response to DOI consolidated comments on July 2016 Draft GRR and EIS

cc: LIFO

FIRE ISLAND TO MONTAUK POINT, NY COASTAL STORM RISK MANAGEMENT STUDY - DRAFT GENERAL REEVAULATION REPORT AND DRAFT ENVIRONMENTAL IMPACT STATEMENT (JULY 2016)

This document presents a summary of DOI's review comments for the subject reports, and the USACE's response to comments.

DOI's comments were documented in an October 19, 2016 letter from Mr. Andrew L. Raddant (Regional Environmental Officer, DOI Office of the Secretary) to COL David A. Caldwell (District Engineer, USACE New York District).

The comments in the letter and this document are organized by DOI Bureau and Office: USGS, PPA, NPS, and USFWS.

Comments are abridged for clarity and space. Comment ID numbers were assigned by USACE in order to organize this document.

Referenced page numbers are those from either the DOI's letter, or the USACE's reports.

Key to Terms

BA = Biological Assessment. BCC = breach closed condition. BCP = Breach Contingency Plan. BO = Biological Opinion. BOC = breach open condition. BLC = baseline condition. BRP = Breach Response Plan. CV = contingent valuation. CVM = contingent valuation method.
Department of the Army. DOI = Department of the Interior. FEIS = final Environmental Impact Statement. FGRR = final general reevaulation report. FVC = future vulnerable condition. FWOP = future without project (condition). FWP = future with project (condition). GHG = greenhouse gas.
HEP = Habitat Evaluation Procedures. MOU = Memorandum of Understanding.NEFSC = Northeast Fisheries Science Center. NPS = National Park Service. NOAA NMFS = National Marine Fisheries Service. PPA = Office of Policy Analysis. SAV = submerged aquatic vegetation.
TSP = Tentatively Selected Plan. USACE = U.S. Army Corps of Engineers. USFWS = U.S. Fish & Wildlife Service. USGS = U.S. Geological Survey. WOSI = West of Shinnecock Inlet. WTP = Willingness to Pay.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
USGS COMMENTS				
DOI 00A	General	DOI page 6-45	USGS provides comments in 8 categories (A-H), each of which had one or more sub-categories under the overall heading of "I. SCIENCE", as listed below.	
		A. LACK OF BEST AVAILABLE SCIENCE, STORM TERMINOLOGY, UNCERTAINTY		
DOI 001	General	DOI page 6-13	1) Throughout the DEIS/DGRR, the barrier island chain is described as being in a deteriorated state due to chronic erosion, storm impact and anthropogenic activities. On pages 6-13, USGS disputes the historical shoreline change analysis in Gravens et al (1999) and states that the use of the "incorrect, elevated" erosion rates make the TSP appear to provide more benefits than it actually will". USGS cites Hapke et al (2010, 2011b,2016) as showing that the Fire Island barrier landform is naturally resilient and exhibits strong recovery capacity and has experienced persistent recovery since Hurricane Sandy	While respectfully acknowleding the USGS position, USACE maintains that the findings of Gravens et al. (1999), and additional shoreline and beach profile analysis through 2001 are valid and appropriate in determining the FWP and FWOP conditions, as they consider the historic, FWOP and FWP influence of beach fill projects. The majority of USGS' specific comments and concerns relate to the fact that more recent literature suggests a "relatively stable" barrier island system within the FIMP study area. However, this conclusion appears to be largely based on analysis that reflects human intervention, including relatively large quantities of fill placed along barrier island communities. On the other hand, the shoreline analysis performed as part of FIMP removes the "accretional" effect of these fill projects therefore resulting in higher net erosion rates. It is noted that the stabilizing influence of these projects is also recognized in the recent literature, for example in Lentz et al. (2013): "Because dune crestline retreat and elevation loss have been limited by human activities in the coastal communities in western Fire Island, the beach and dune system appears more morphologically stable than areas further east.… This suggests that human modifications in conjunction with the dominant framework controls lead to a more stable profile along western Fire Island."
DOI 002	General	DOI page 13-14	2) The methodology of calculating the regional ocean sediment budget in the draft plan is vague, and, in places, contradictory. The methodology of calculating shoreline change is not scientifically valid. Similar to erosion rates, the sediment budget is fundamental input data for developing an erosion mitigation strategy. (USGS cites sections in the DGRR and Appendix A where they dispute the basis of the sediment budget particularly the use of the Gravens et al (1999) report)	The methodology of calculating the regional ocean sediment budget in the draft plan is described in Sub-Appendix A3, Section 6. USACE appreciates USGS' comment regarding the sediment budget periods. However, USACE has used professional judgement to determine that the analysis period represents a good balance between current/representative engineering activities (e.g., inlet dredging, local beach fills, etc.) and resulting shoreline change rates. While a longer analysis period is generally better, in some cases a longer period may not be representative of existing inlet and management activities. USACE recognizes the potential for onshore sediment flux in Central Fire Island and recommends that it be further documented and quantified via extensive monitoring. This recommendation is detailed in the FGRR.
DOI 003	General	DOI page 14-17	3) Much of the landform change is based on outdated or incomplete beach profile and remote sensing datasets (Lidar). Throughout the DGRR various analyses tend to use selective datasets in support of USACE findings, rather than the entire available data. (USGS cites sections in the DGRR and Appendix A where they dispute the basis of the sediment budget particularly the use of the Gravens et al (1999) report)	The FGRR and FEIS provide a summary of the engineering analyses that were used in the planning, design, and evaluation of project features, spanning over the course of the study. This information has been used to supplement the Gravens 1999 analysis. At this time, USACE does not intend to revisit the analyses used to arrive at a mutually acceptable plan between DOA and DOI (the Recommended Plan). The project includes a robust monitoring and adaptive management plan (FGRR Appendix J "Monitoring and Adaptive Management Plan") that underscores the importance of using site-specific data.
DOI 004	GRR/EIS - General	DOI page 17-18	4). Contradictory statements regarding the effects of offshore mining of sand (and the importance of cross-shelf sediment flux) on barrier island geomorphology and biological resources. The draft DGRR/DEIS states that studies have been conducted showing that the offshore sand borrow sites would cause minimal adverse wave attenuation and barrier island geomorphic effects. This is somewhat contradicted in other areas of the plan, such as in the sediment budget discussion and in Appendix B which states "It was further hypothesized that removal of material from these ridges may interrupt the onshore migration of material from the ridges to the shoreface. USACE acknowledges that the potential for this onshore movement is a plausible process." Recent research shows that modification of the sand ridges offshore of western Fire Island are expected to cause changes (meters per year) to the persistent shape of the shoreline (List et al., 2016; Safak et al., 2016). Recent observations and modeling also shows the importance of an onshore sediment flux to the coast (Listed et al., 2016; Warner et al. 2016), which is required to maintain the relative stability of the western segment of Fire Island (Hapke et al., 2010, 2011; Schwab et al., 2013). The impact of the proposed sand mining on cross-shore transport rate is not yet quantified however the science shows that modifications of the nearshore topography offshore of western Fire Island is expected to have consequences and can be modeled. USGS met with the USACE and discussed cooperatively working to resolve these potential impacts via a monitoring/adaptive management strategy. Clarification and consistency on this point in the DGRR/DEIS is a necessity. Several specific examples follow:	The DGRR includes a description of the potential for onshore sediment flux (e.g., Appendix A- Section 6.3) and as pointed out in the comment from USGS, "USGS met with the USACE and discussed cooperatively working to resolve these potential impacts via a monitoring/adaptive management strategy". This point will be consistently included throughout the FGRR and FEIS, specifically in the sections identified in the USGS Category A-4 comments.
DOI 004a	DGRR, Sec 1.1	DOI page 18	The plan states that "alongshore movement of sand shapes the prevailing shoreline condition." Recent research (and some of earlier Corps model results; GENESIS) indicates that cross-shelf and cross-island sediment flux is also critical in shaping the shoreline condition	The DGRR includes a description of the potential for onshore sediment flux (e.g., Appendix A- Section 6.3) and as pointed out in the comment from USGS, "USGS met with the USACE and discussed cooperatively working to resolve these potential impacts via a monitoring/adaptive management strategy". This point will be consistently included throughout the FGRR and FEIS, specifically in the sections identified in the USGS Category A-4 comments.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
DOI 004b	DGRR, Sec 2.1.7	DOI page 18	The plan states "Long-term erosion is associated with gradients and/or interruptions in littoral drift (i.e.. long-shore sediment transport". This is an unsupported assumption; neglects cross-shore components of sediment flux.	The FGRR includes a description of the potential for onshore sediment flux.
DOI 004c	DGRR, Sec 5.4.2.2	DOI page 18	The plan states "At each of the Inlets the most cost-effective means to achieve bypassing is through additional dredging of the ebb shoal outside of the navigation cannel with downdrift placement". similar to modifications of sand ridges offshore of western Fire island, the proposed dredging of ebb tidal shoals can potentially alter wave impact on the adjacent shoreline and thus affect gradients in alongshore sediment transport (affect coastal change). This should be discussed.	The FGRR and FEIS includes a discussion of the potential for onshore sediment flux.
DOI 004d	DGRR, Appendix A, Sec 6.3.3.6	DOI page 18	*When discussing potential offshore sediment sources the plan states, "However, it was determined that this source was not required to meet the accepted range of longshore sand transport rates at Fire Island Inlet". HOW WAS THIS DETERMINED?*	FGRR Appendix A "Engineering" has been revised to include a discussion of how the accepted range of longshore transport rates at Fire Island were determined.
DOI 004e	DEIS, ES-13	DOI page 18	Do not agree with statement: "Few long-term significant impacts from construction or operation of the TSP are expected." TSP will reduce the ability of the island to respond naturally to SLR and increased storminess. TSP will alter nearshore bathymetry which is expected to change persistent shoreline shape along western Fire Island.	The FEIS includes language to specify that this statement is specific to socioeconomic conditions.
DOI 004f	DEIS, Section 1.1	DOI page 18	"This alongshore movement of sand maintains the prevailing shoreline conditions." There is no mention of importance of sediment exchange between the inner shelf and beach.	The FEIS includes language that speaks to the importance of sediment exchange between the inner shelf and beach.
DOI 004g	DEIS, Section 1.4	DOI page 18	General Conclusion 8: "It is clear that reestablishing longshore transport should be given priority, as restoration of all other processes is contingent upon a balanced sediment transport system." Cross-shelf sediment flux is as important to coastal change as is alongshore transport (List et al., 2016).	The FEIS has been edited as detailed in comment response DOI 004.
DOI 004h	DEIS, Section 4.1.2	DOI page 18	The plan states, "In addition, given the immense size of the offshore sand ridges near our Project, relatively small borrow areas can provide ample sediments for nourishment projects with minimal or no impact to the onshore movement of sediments (NPS 2008)."	The FEIS includes text that clarifies this statement, and will refer to Appendix J "Monitoring and Adaptive Management Plan."
DOI 005	DGRR, Sections 1.6, 2.1.3, 2.1.5, 2.1.7, 2.1.9.3, 2.1.11, 3.2, 4.5.3	DOI page 18-19	5) Hazard/processes terminology requires editing. There are a number of areas within the DGRR/DEIS that use descriptive terms that should be quantified or defined and other instances when terminology is incorrectly used. When finalized, it is assumed that the documents will be subject to a thorough copy edit, thus the following list is not meant to be comprehensive.	The FGRR and FEIS better describe and define description terms. In addition, responses DOI comments identified in pages 18-19 of its October 2016 letter is included in the FGRR and FEIS.
DOI 006	DEIS/DGRR	DOI page 19	6) The DEIS/DGRR acknowledges that the modeling of future conditions has a high level of uncertainty, but does not present uncertainty estimates in the summary of modeling damage costs for the FWOP and the TSP. Several specific examples listed below,	Damages and economic benefits for the various alternatives were computed using a life cycle model. The model accounts for the uncertainty in inputs such as stage-damage curves, breaching, erosion, sea level rise, timing of storms, etc. by assuming a range of variability for each of this parameter and using Monte Carlo sampling techniques. Uncertainty in the storm damage Benefits estimate has been incorporated into the FGRR. Please see response to USGS Category A-6 comments that provides comments to specific sections.
DOI 006a	DGRR,Section 3.1	DOI page 20	Here the document describes the FWOP condition as the "most likely future condition." However, the metric for "most likely" and similar assertions made for the FWOP are not defined. If this likelihood based on a formal assessment, the form of that assessment should be presented in the FGRR. If not, the FGRR should explain the process used to determine "most likely" and similar assertions used here and elsewhere. For example, "reasoned, documentable forecasting of what is most likely to occur, based on historic practices and trends" is an assertion with no underlying basis in compelling evidence. Thus, Section 3.1 requires more support and documentation. Was this a modeling exercise or formal expert assessment across the assumptions listed on this and following pages? If so, what process was followed?	The methods and assumptions for the FWOP condition are based upon USACE planning requirements, including the requirement for extensive coordination with coordination with sponsors and stakeholders. Text has been added to the FGRR that describes the general methods used to determine the FWOP condition.
DOI 006b	DGRR,Section 4.1	DOI page 20	"storm damages in the bays are relatively sensitive to condition of the barrier island that in some locations storm damages may double with a 0.5 ft. increase in elevation". This implies that the benefit-cost ratio analysis presented in the plan is extremely sensitive to water elevation in the back bays. However, there is no detailed accounting of the error involved in predicting these water levels using the USACE modeling approach anywhere in the plan. Note that Tables 25 and 50 in the DGRR break down with- and without-project annual damages to the $1000 level. But no information is provided to suggest what is a realistic uncertainty in these predictions. It appears that the assumption is made that a future scenario storm tide (storm and future vulnerable condition via the life-cycle modeling) can be modeled within inches. An error analysis should be carried through the modeling and included in the monetization of the hazards/benefits in the FGRR.	The USACE economic model includes an elevation uncertainty for building elevations and resulting flood depths with a 0.6 ft. standard deviation. The input of this uncertainty is included in the results. Please see response to USGS Category A-6 comments for more information.
DOI 006c	DGRR, Appendix A Section 6.1.4	DOI page 20	Here the plan outlines model uncertainty, but these uncertainties are not carried through the benefit cost-ratio analyses; or are not presented in the plan. They also do not outline the methodology of quantifying the without-project future. A major concern is stating that vertical datum error could be on the order of ~0.5 ft. while the DGRR (Section 4.1) states that a 0.5 ft. increase in water level could double the damage in some areas. This uncertainty does not appear to be accounted for in the modeled damage assessments but should be clarified in the FGRR.	As stated in section 6.14 of DGRR Appendix A "Engineering," the various uncertainties in model inputs (including datum errors) are anticipated to result in prediction errors of less than 0.3 ft. in the bay. The economic models include an elevation uncertainty for building elevations and resulting flood depths with a 0.6 ft. standard deviation. The input of this uncertainty is included in the results.
DOI 006d	DGRR, Appendix A Section 6.5.1	DOI page 20	The Glossary (section 12.2) on vertical datum is disconcerting. The difference between mean sea level (MSL) and NGVD29 is shown to vary substantially in the region (0.15-0.23 m). The plan chooses to select a constant value of 0.15 m. This range of values is on the order of the water level changes described in some of the storms, yet this error does not appear to be accounted for in modeled damage assessments. This requires clarification in the FGRR.	FGRR Appendix A "Engineering" (Section 12.2) includes information about how water level predictions by hydrodynamic models are not overly sensitive to small bathymetric changes. Therefore, using one representative conversion for the project has a negligible impact on the final water level simulations.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
DOI 006e	DGRR, Appendix D Section 6.2.7	DOI page 20	The Life Cycle approach is used to track impact of multiple storm events on the future vulnerability of each individual structure. With no discussion of potential uncertainty this appears to be speculative. This requires clarification.	Damages and economic benefits for the various alternatives were computed using a life cycle model. The model accounts for the uncertainty in inputs such as stage-damage curves, breaching, erosion, sea level rise, timing of storms, etc. by assuming a range of variability for each of this parameter and using Monte Carlo sampling techniques. Uncertainty in the storm damage Benefits estimate has been incorporated into the FGRR. Please see response to USGS Category A-6 comments that provides comments to specific sections.
DOI 006f	DEIS, Section 2.2	DOI page 21	The FWOP is a forecast based on what has occurred "and what is likely to occur in the Study Area during the projects life . . . ". The lack of presentation or clarification on the uncertainty in forecasting what is "likely to occur" should be addressed in the FDEIS/FGRR.	The FEIS has been revised to include reference to the life cycle model utilized to predict FWOP conditions; uncertainties are incorporated into the model.
		B. FLOOD HAZARDS		
DOI 007	DGRR	DOI page 21	1) A clear and concise summary of hazards the plan is proposing to address is required. As currently written, the DEIS/DGRR provides an unbalanced and contradictory discussion of inundation hazards imposed by barrier island breaching and overwash as compared to inundation due to water exchange from the ocean to bays via the federally managed inlets. Our concern here has been consistently communicated to USACE over many years. (Several specific examples listed below,	USACE concurs that storm-induced flooding between the ocean and back bays via the inlets accounts for most of the flood damages experienced in the project area, with breaches and overwash having significant contributions only during the most severe storm events. FGRR Appendix A Sub-Appendix 1 "Storm Surge Modeling Stage Frequency" (Section 9.2) includes a discussion of the the relative contributions of inlets versus flow over the existing barrier islands. In addition, FGRR Appendix A "Engineering" (Section 6.1.6) includes a discussion of the differences between baseline (BLC) and various other Future Without Project conditions, including Breach Open Conditions (BOC). These differences illustrate the hazard associated mainly with existing inlets (BLC) vs. increased overwash/breaching (FVC) and open breaches (BOC).The FGRR main body and FGRR Appendix D "Benefits" provide the relative contribution of the maintained inlets versus breaches/overwash of the barrier islands for both the Without Project Damages and the With Project Reduction in Damages.
DOI 007a	DEIS/DGRR	DOI page 21	The discussion of the barrier island chain's ability to damp tidal amplitude in the back bay is appreciated (DGRR, Section 2.1.10) and basically is in agreement with published USGS analyses (e.g., Aretxabaleta et al., 2014). However, the DGRR/DEIS contends that storm surge via island breaching and overwash are significant flooding hazards, yet the potential of the island chain in damping storm surge in the back bays is not clearly outlined in the plan. Storm -induced flooding hazards (damages) are due to water exchange between the ocean and back bays via managed inlets, breaches, and overwash. Nowhere in the report are the relative contributions of these three conduits clearly differentiated. Nor is there any discussion of the effect storm duration has on flooding hazards. For long duration storm events, a vast majority of the storm surge makes it into the bays; for sea level rise , 100% makes it into the back bays. Current science does not support the USACE's position that the threats associated with breaching /overwash are the primary inundation threats in the FIMP project area. In reality the flooding hazard associated with the management of federal inlets present a much higher risk for mainland flooding during stoms. Examples of where this should be clarified in the DGRR follow:	USACE concurs that storm-induced flooding between the ocean and back bays via the inlets accounts for most of the flood damages experienced in the project area, with breaches and overwash having significant contributions only during the most severe storm events. FGRR Appendix A Sub-Appendix 1 "Storm Surge Modeling Stage Frequency" (Section 9.2) includes a discussion of the the relative contributions of inlets versus flow over the existing barrier islands. In addition, FGRR Appendix A "Engineering" (Section 6.1.6) includes a discussion of the differences between baseline (BLC) and various other Future Without Project conditions, including Breach Open Conditions (BOC). These differences illustrate the hazard associated mainly with existing inlets (BLC) vs. increased overwash/breaching (FVC) and open breaches (BOC).The FGRR main body and FGRR Appendix D "Benefits" provide the relative contribution of the maintained inlets versus breaches/overwash of the barrier islands for both the Without Project Damages and the With Project Reduction in Damages.
DOI 007b	DGRR, Section 2.1.3:	DOI page 21	Plan states that breaches "have greatest influence on decadal or century-long sediment transport dynamics by re-directing/trapping longshore sediment transport. Century-long is highly unlikely, unless the inlet is stabilized; at some time the breach will be bypassed naturally or close; an exception to this is the formation of Fire Island Inlet in the late 1600s and the subsequent westward progradation of Democrat Point. Again, this leads to an assumption used in development of modeling breaching hazard, thus requires clarification or supportive information.	The referenced sentence continues: "…into ebb and flood shoals during the period that the breach remains open". The FWOP condition reflected in the model assumes the continued management of the inlets.
DOI 007c	DGRR, Section 2.1.9:	DOI page 21	These existing inlets contribute to flooding in the back bay that occurs during storm events. It is not made clear what percentage of the hazard can be assigned to the managed inlets.	USACE concurs that storm-induced flooding between the ocean and back bays via the inlets accounts for most of the flood damages experienced in the project area, with breaches and overwash having significant contributions only during the most severe storm events. FGRR Appendix A Sub-Appendix 1 "Storm Surge Modeling Stage Frequency" (Section 9.2) includes a discussion of the the relative contributions of inlets versus flow over the existing barrier islands. In addition, FGRR Appendix A "Engineering" (Section 6.1.6) includes a discussion of the differences between baseline (BLC) and various other Future Without Project conditions, including Breach Open Conditions (BOC). These differences illustrate the hazard associated mainly with existing inlets (BLC) vs. increased overwash/breaching (FVC) and open breaches (BOC).The FGRR main body and FGRR Appendix D "Benefits" provide the relative contribution of the maintained inlets versus breaches/overwash of the barrier islands for both the Without Project Damages and the With Project Reduction in Damages.
DOI 007d	DGRR, Section 2.1.11;	DOI page 21	During Sandy - - - overwash occurred along approximately 45% of the island. It needs to be made clear in the FGRR/DEIS that this does not fully equate with an increase of the total water level in the back bay UNLESS the overwash actually makes it into the back bay. Aerial photos following Hurricane Sandy indicate that overwash processes transported sand into the back bays in relatively few areas.	The FGRR and FEIS state that the presence of overwash does not equate to an increase in the total water level in the back bay.
DOI 007e	DGRR, Section 3.2	DOI page 22	When discussing inlet management under the without-project situation, ". . . these ongoing efforts will not measurably alter the existing hydrodynamics of the inlets and bays." From analysis of tide gauge data in Great South Bay, we would expect that dredging would have an effect on storm surge the same way it affects tidal amplitude. USGS observations and analytical modeling suggests that dredging of managed inlets has as large an effect on water transfer as breaching; i.e., Wilderness Breach.	The Recommended Plan does not include changes to the authorized maintenance of the Federal navigation channels, other than dredging of the ebb shoals for the purpose of sand bypassing.
DOI 007f	DGRR, Section 3.4:	DOI page 22	The plan states that "During the period of time that a breach would be open, there would be altered tidal exchange, allowing higher storm tides and increased flooding and potentially, increased wave energy along the mainland". It is true that there would be altered tidal exchange. Analysis of tide gauge data in Great South Bay indicates that the tidal amplitude increased a few centimeters due to the Wilderness Breach (Aretxabaleta et al., 2014, Vam Ormondt et al., 2015), which when added to the storm surge will minimally increase storm tides. However, a breach would have to be extraordinarily large to significantly increase wave energy on mainland areas, a point that needs to be clearly reflected in the FGRR/FEIS.	The phrase "increased wave energy" has been deleted from the referenced FGRR passage.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
DOI 007g	DGRR, Section 4.4.1	DOI page 22	Figure 12 shows vulnerable breach locations on Fire Island. When compared to USGS Coastal Change Hazards portal, there are differences. This should be identified and explained. In addition, it is not clear what size storm Figure 10 is based on. This also should be clarified. This section also states that part of this analysis is based on "reasonably foreseeable future conditions". As noted earlier, based on the lack of information, this statement is unsupported as written (a common problem throughout the plan); the FEIS/FGRR needs to clarify what constitutes, quantitatively, "reasonable." Vulnerability varies significantly from storm to storm. It is also dependent on the storm conditions. This also warrants an explanation.	USACE concurs that vulnerability varies significantly from storm to storm and is also dependent on the storm conditions. Figure 12 shows the potential locations that are most prone to breaching, considering current dune and beach conditions, and barrier island width based on the model tests. The "reasonable foreseeable future" is based on the assumptions detailed in Section 3 of the FGRR.
DOI 007h	DGRR 4.4.4.2	DOI page 22	The entire argument on inlet stability is highly questionable. The net balance of sediment along the inlet might be affected by breaching in the short term, but the assumption that there is going to be additional deposition in the inlet is not appropriate over the decadal timescale. In discussing inlet stability, the plan considers increased costs of inlet maintenance due to dredging when a breach remains open. However, the plan never openly addresses the flooding hazard caused by inlet maintenance. This should be discussed in the FEIS/FGRR.	The referenced passage pertains to potential impacts to inlet stability under a breach open condition. The Recommended Plan does not include changes to the authorized maintenance of the Federal navigation channels, other than dredging of the ebb shoals for the purpose of sand bypassing.
DOI 007i	DGRR, Section 4.5.4:	DOI page 22	Table 25 summarizes without-project annual damages. Unfortunately, this table does not separate flooding hazards due to water exchange via managed inlets, breaches, and overwash; i.e., what is the relative hazard associated with management of inlets as navigation channels? It does, however show that leaving inlets open accounts for ~6% of the annualized flooding hazard and that mainland inundation is by far the largest hazard (~71%).	USACE concurs that storm-induced flooding between the ocean back bays via the inlets account for most of the flood damages experienced in the project area, with breaches and overwash having significant contributions primarily during the most severe storm events. Most of the project damages (and benefits) occur on the mainland, with the greatest costs associated with the nonstructural measures included in the Recommended Plan. Additional, ongoing analyses will quantify the relative percentages due to the inlets vs. breaches and overwash. The FGRR details the results of these analyses.
DOI 007j	DGRR, Section 4.6	DOI page 22	A major point stressed throughout the draft plan is that allowing the Wilderness Breach to remain open presents a significant increase in the back bay flooding hazard. Here the plan states that the Wilderness Breach "did not significantly affect the tidal amplitude" (no references are provided to support this statement but it agrees with the findings of Aretxabaleta et al. (2014)). However, the plan goes on to state that storm surge modeling simulations show that the Wilderness Breach will "significantly" (~1 foot or greater) increase storm tide elevations in Great South Bay and Moriches Bay during "storm events" (also not defined). This claim is repeated in DGRR, Appendix A, Section 3.4. This requires a more detailed explanation, in that how could the breach have limited impact on tidal amplitude in the bay (which will not change during a storm), but allow increased storm surge during large storms? What this implies is that the barrier island damps storm surge. If there is little change in the tidal amplitude, there has to be a different physical mechanism to explain the changes related to the storm surge. Could overwash be one of the factors (although the assumption is that overwash will not change much with/without breaching)? Model results that simulate Hurricane Sandy suggest that the Wilderness Breach would increase storm tide by inches, not feet (Van Ormondt et al., 2015). Thus, it is important to clarify in the FGRR why the model results presented in the DGRR suggest such a large effect from a relatively minor breach. See additional comments under the Modeling section below.	The reference has been added to the FGRR. Please see USACE comment responses to other comments included under USGS Category B for information about the technical questions.
DOI 007k	DGRR, Section 6.1.1:	DOI page 23	The Inlet Management Plan described the proposed dredging of ~1M cubic meters every two years from Fire Island Inlet. These dredging efforts will increase the flooding hazard in the back bay and should be quantitatively addressed in the benefit-cost ratio analyses.	The Recommended Plan does not include any proposed changes to the authorized Federal navigation project at Fire Island Inlet, which was authorized over 40 years ago and provides for maintenance dredging of the navigation channel with sand placement on Gilgo Beach.
DOI 007l	DGRR, Section 7	DOI page 23	Table 50 lists the summary of annual benefits of the project. The breakdown is the same to the without-project damages presented in Table 25. This table shows that ~8% of the benefit comes from closing breaches. It also shows that ~84% of the benefit comes from reducing mainland inundation, however this is not clearly stated in the body of the plan.	A clearer summary of the proposed benefits of the plan is presented in the FGRR.
DOI 007m	DGRR, Appendix A, Section 4.6.5:	DOI page 23	"…a breach open at Moriches Bay will have a minimal or no influence at Shinnecock Bay and vice versa…" Support for this assumption should be provided in the FGRR, or deleted otherwise. There is a clear connection between the two bays that is only slightly smaller than the connection between GSB and Moriches where, according to the document, there is an influence.	The referenced sentence has been removed from FGRR Appendix A "Engineering."
DOI 007n	DGRR, Sub-Appendix A-4, Section 2.1	DOI page 23	"The model performance to reproducing the tidal propagation through the inlets and throughout the bays is evaluated by comparing the observed and modeled tidal constituents . . ." However, nowhere in the report is the impact of managed inlets clearly differentiated from the impact of breach (nor overwash).	The Recommended Plan does not include changes to the authorized maintenance of the Federal navigation channels, other than dredging of the ebb shoals for the purpose of sand bypassing.
DOI 007o	DGRR, Sub-Appendix A-4, Section 2.4	DOI page 23	The modeled effect of the breach open may be as high as 10 inches during smaller storm events and up to 22 inches during the larger storm events. This large difference differs from that reported by van Ormond et al. (2015) - - specifically when addressing role of the Wilderness Breach. Requires an explanation in the FGRR.	van Ormondt et al. (2015) only evaluated tidal and very small storm conditions and their results agree with UASCE analysis presented in FGRR Appendix A Sub-Appendix 4 "Numerical Modeling of Breach Open at Old Inlet." The storms considered by USACE, as detailed in Section 2.4 of Sub-Appendix A-4, are significantly larger and result in larger differences as a result of the breach open condition.
DOI 007p	DEIS, Section 1.3:	DOI page 23	The third sentence states: "The present inlet configurations, as established through periodic dredging provide greater tidal exchanges in the back bays than had historically existed in the unstabilized condition." This basically says that management of inlets increased the flooding hazard, yet the level of hazard being addressed by the TSP focuses only on breaches/overwash. This requires explanation or justification in the FEIS/FGRR.	USACE concurs that storm-induced flooding between the ocean back bays via the inlets account for most of the flood damages experienced in the project area, with breaches and overwash having significant contributions primarily during the most severe storm events. Most of the project damages (and benefits) occur on the mainland, with the greatest costs associated with the nonstructural measures included in the Recommended Plan. Additional, ongoing analyses will quantify the relative percentages due to the inlets vs. breaches and overwash. The FGRR details the results of these analyses.
DOI 007q	DEIS, Section 2.1: Paragraph 2, p. 2-4	DOI page 23	DEIS, Section 2.1: Paragraph 2, p. 2-4 states: "In addition to altering sediment transport pathways, inlets also serve as a conduit for floodwaters to enter the bays during storm events. Therefore, modifications of current inlet design and dredging practices that may provide measures to limit storm surge propagation through inlets that leads to bay flooding have also been explored (USACE 2009a)." It would be appreciated if the finding of this "exploration" would be summarized here in the DEIS (or DRGG	FGRR Appendix E "Plan Formulation" includes a discussion of the alternative inlet design and dredging practices that were considered.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
DOI 008	DGRR Sections 4.5.5: Table 25, 6.12.1: Table 50, Appendix D, Table 23, 26.	DOI page 24	2) A clear and concise summary of the proposed benefits of the plan is required. The DGRR/DEIS provides summaries of FWOP monetized damages being addressed and the proposed monetized benefits of the TSP, but these summaries could be substantially clarified. We suggest that this should be in the DGRR executive summary and in the body of the report in one location. Table 24 in the DGRR presents a summary of without-project annual damages and Table 50 a summary of with- and without-project annual damages. These tables separate modeled monetized damages into (a) "Inundation damages (due to inlet conditions, wave setup, storm-related breaching, and overwash in the back bay"), (b) "Breach Open Damages (Inundation due to subsequent storms with a breach remaining open)", (c) "Shorefront Damages", and (d) "Emergency Costs/Breach Closure Costs". A similar breakdown is conducted in the summary of with-project annual damages (DGRR, Appendix D, Table 23) and summary of annual benefits by plan features (DGRR, Appendix D, Table 26). Unfortunately, these tables are not presented in a form that allows the public and reviewing agencies to distinguish the damages due to water exchange via managed federal inlets, breaches, and overwash; a key to understanding the benefit of the coastal measures being proposed in the plan.	A clearer summary of the proposed benefits of the plan is presented in the FGRR Appendix D "Benefits."
DOI 008a	DGRR Sections 4.5.5: Table 25, 6.12.1: Table 50, Appendix D, Section 4..1.1L Table 7, Appendix D, Section 8.2.1, 8.3, 8.7: Table 23, Section 9, Table 26.	DOI page 24-25	Additional comments related to clarification of relative importance of closing breeches to the project benefits are provided to DGRR Sections 4.5.5: Table 25, 6.12.1: Table 50, Appendix D, Section 4..1.1L Table 7, Appendix D, Section 8.2.1, 8.3, 8.7: Table 23, Section 9, Table 26.	A clearer summary of the proposed benefits of the plan is presented in the FGRR Appendix D "Benefits."
		C. RESILIENCY PROCESSES AND ECOSYSTEM SERVICES		
DOI 009	DGRR, Sections 2.3, 3.1.3, 4.4.4.1, Appendix A, Section 6.1.1.5:		1) The DGRR/DEIS does not adequately address that the decadal-to centennial scale resiliency of the barrier islands is dependent on storm-driven processes (breaching and overwash). There should be a discussion and assessment of the negative impacts of retarding processes related to breaching and overwash when formulating the benefits-cost ratios on both the physical aspects of reduction in long-term resiliency to sea level rise and increased storminess and potential impact on ecosystem services. Examples include DGRR, Sections 2.3, 3.1.3, 4.4.4.1, Appendix A, Section 6.1.1.5:	The DGRR details how the resilience of the barrier islands is dependent on breaching and overwash. For example, DGRR Section 1.6: "The barrier islands can overwash and breach during significant storm events, which is an important coastal process that contributes to the long-term sustainability of the system, but also impacts development both on the barrier and the back bay." The Recommended Plan includes Coastal Process Features meant to contribute to coastal storm risk management by enhancing the resiliency of the natural system and its ability to recover after storm events include which include reestablishing cross-island transport.
DOI 009a	DGRR		The storm history section is furthermore entirely unreferenced, yet numbers reported in it appear to be used to generate some parameters (storm durations) in the storm scenarios later modeled. For example, in the Coastal Processes Investigations: Storm Surge and Storm-Induced Barrier Island Breaching Modeling section, Numerical Model Calibration and Verification, states: "*model skill for simulating barrier island overwash and breaching was assessed by comparing model results with available high water marks (HWM) for two of the most significant storms of record: the September 1938 Hurricane and December 1992 Nor'easter. The intent of the test was specifically to qualitatively validate the ability of the model to reproduce observed overwash and breaching…the agreement between simulated peak water levels for both storms and the reported measurements can be considered excellent considering the uncertainty associated with this type of data*". The lack of citations makes it impossible to determine the validity of modeled storm results, even qualitatively as suggested, such as the 1938 and 1992 storms.	FGRR Appendix A "Engineering" includes a detailed discussion of storm history.
DOI 009b	DEIS, Section 2.1, p. 2-5	DOI page 26	The DEIS acknowledges "that barrier island breaching can be beneficial to coastal processes and ecological services within the ocean, barrier, and bay system along the south shore of Long Island". Thus, three alternatives to breach management are presented: proactive, reactive, and conditional. However, there is not a "no action" alternative. In addition, the plan does not monetize the ecosystem services nor impact on long-term physical resiliency of the system if allowed to migrate landward.	The "Conditional" and "Wilderness" breach closure plans, which are also the "No Action" plans, provide for allowing breeches to either close naturally or remain open if it is determined that there would be no significant adverse impact.
DOI 009c	DEIS, Section 2.2.1.3	DOI page 26	"Sediment input into the bay may contribute to both the degradation and the long-term formation of salt marsh and submerged aquatic vegetation beds." This is not a logical explanation, in that these processes are responsible for the formation of successional habitat. Please revise in the FEIS.	The FEIS includes a better description about sediment input.
DOI 009d	DEIS, Section 2.7.1	DOI page 26	Table 2-4. Summary Comparison of the Alternatives. When describing the TSP for vegetation, the plan says, "There would be less sediment input within the estuaries adjacent to the barrier islands, which would decrease the long-term formation of salt marsh and SAV beds. For the FWOP, the table says, "the sediment input to the bay may contribute to both the degradation and the long-term formation of salt marsh and SAV beds." These two statements are mutually exclusive. FWOP says that greater sediment input would result in negative impacts to salt marsh and also salt marsh development (depending on location of the breaches/overwash). TSP says that less sediment input would result in negative impacts to salt marsh. Both cannot be true. The weight of evidence from the published literature indicates that the natural condition (i.e., most like FWOP) is best-adapted to sediment input.	The FEIS includes a better description about sediment input.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
DOI 009e	DEIS, Section 2.7.1	DOI page 26	Table 2-4. Summary Comparison of the Alternatives. (1) There is a fundamental lack of quantitative information that allows the benefits and costs of FWOP and TSP to be compared on the same basis. For example, many of the ecosystem (wetlands, vegetation, fish and wildlife) benefits of the FWOP and TSP require monetization or some form of standardizing value in terms of gain or loss of area, function, etc. As written, these resource impacts are (a) incomplete in their characterizations (e.g., TSP is very brief), and (b) unable to be compared because they state or imply that different ecosystem services are being assessed. (2) Several of the characterizations are unbalanced. Taking the vegetation resource assessment, for example, a "need for additional housing and infrastructure" is asserted as a negative outcome of FWOP. But the landscape stability of the TSP may be more likely to drive demand for new housing and infrastructure (i.e., the island is considered safe for development because it is protected by an engineering project (e.g., NRC (1995).	The comparison of the benefits and costs of FWOP and the Recommended Plan were done in accordance with USACE policies and regulations. The USACE does not have a method for quantifying value of, or monetizing, ecosystem services for comparison of benefits. Additional detail has been added to the affected environment descriptions and impact assessment as a result of revisions made to address other comments.
		D. SEA LEVEL RISE		
DOI 010		DOI page 27	1) The majority of the sea level rise rates used in determination of hazards, benefit-cost ratio, etc. are unrealistically low. The DGRR/DEIS states that flooding is likely to increase in magnitude due to future elevated rates of sea level rise. However, throughout most of the plan, analyses of damages and benefits of the TSP are based on the assumption that the rate of sea level rise will continue to increase following the historical trend. Although the FWOP and TSP plans are evaluated using the "intermediate" and "high" rates of sea level rise (a realistic rate based on current science is somewhere between these rates) in a short discussion of Table 54, DGRR, Section 7.6.1, the reader should be reminded throughout the document that the sea level rise rates used in a majority of the document are scientifically incorrect and are unrealistically low. Table 54 suggests that the TSP would actually result in a higher benefit-cost ratio at higher (more realistic) rates of sea level rise. This requires a detailed discussion of the assumptions made and model input parameters required to produce these modeling results. Examples of specific comments related to sea level rise are:	Per USACE guidance, the base level of potential relative sea-level change is considered the historically recorded changes for the study site. All economic analyses for which results are tabulated in previous sections of the FGRR were based on this historic rate of sea level change. However, in accordance with Engineering Regulation ER 1100-2-8162 "Incorporating Sea Level changes in Civil Works Program," (December 31, 2013) proposed projects must be also evaluated for a range of possible sea level rise rates. In addition to the historical rate ("low") which is a 0.7 ft. increase over the period of analysis in the study area, the project must also be evaluated using "intermediate" and "high" rates derived from modified NRC Curves I and III, which for this study are estimated to be 1.1 ft. and 2.6 ft. increases, respectively over the 50 year period-of-analysis. The methods and results of the relative sea level change analysis are included in the FGRR and FEIS.
DOI 010a	DGRR, Section 3.2	DOI page 27	The reasoning for discounting increases in frequency or intensity of future storms should be explained. What is the reasoning for assuming that wave climate will be similar to historic patterns	There is no current USACE methodology or protocol for projecting changes in wave climate due to climate change. Assuming wave climate will be similar to historic patterns is a conservative approach since there would be greater damages (and potential benefits) if wave climate was assumed to be greater.
DOI 010b	DGRR, Section 7.6.1	DOI page 27	Table 54. Need to reference where the sea level rise rates are derived from and explain in detail how the benefit cost ratio increases as sea level rise rates increase. Questions include: ● It appears that the plan assumes that ALL future breaches will be closed, including in the Federal Tracks. Is this accurate? *Renourishment costs remain the same under different SLR rates. It is not clear how this is possible, and request that the FGRR provide additional justification. Additional information should also be presented to explain the difference between a renourishment cycle (or schedule) and Proactive Breach Maintenance, especially given the fundamentally different time frame for continued implementation. 28 ● Note that recreation benefits remain the same under all SLR conditions. Appears that increased construction/engineering projects designed to mitigate increasing damages are not considered to decrease recreational benefits. We question whether this a reasonable assumption, and request clarification in the FDRR.	The applicable USACE guidance will be cited in Table 54. Text in Section 7.6.1 cites USACE ER 1100-2-8162, which requires that proposed projects be evaluated for a range of possible relative sea level change scenarios. Specifically, the text states that "In addition to the historical rate ("low:), which is a 0.7 ft. increase over the period of analysis, the project must also be evaluated using "intermediate" and "high" scenarios derived from modified NRC Curves I and III, which for this study are estimate to be 1.1 ft. and 2.6 ft. increases, respectively over the fifty year period of analysis." The Plan assumes breaches will be closed in accordance with the Breach Response Plan. It also assumes that periodic nourishment and proactive breach response will be in accordance with the Recommended Plan and also, and that recreation benefits would not change. The additional renourishment costs associated with SLC is accounted by the Sea Level Change (SLC) Adaptations Line in Table 54.
DOI 010c	DGRR, Section 8.2.1	DOI page 28	The Plan claims that it was designed to enhance the resiliency of the coastal system, particularly with regard to sea level rise. However, the plan does not discuss potential impacts of limiting the ability of the island to naturally mitigate in response to increasing sea level. Also, it is careless to leave the reader with the false impression that the TSP will protect the coastal area from inundation hazards related to sea level rise.	By placing sand on the barrier island to enhance the natural coastal processes, the project will be able to migrate in response to increasing sea level which enhances the overall resiliency of the coastal system. Regarding the comment that the GRR gives a false impression "that the TSP will protect the coastal area from inundation hazard related to sea level rise", the FGRR includes language that clarifies that flood damage risks remain (i.e., residual damages) with the Recommended Plan in place under each of the sea level rise scenarios.
DOI 010d	DGRR, Appendix A, Section 3.1.8	DOI page 28	The plan states that "relative sea level rates shall consider as a minimum a low rate based on an extrapolation of the historic rate, and intermediate and high rates which include future acceleration of the eustatic sea level change rate. These rates of rise correspond to 0.7, 1.1, and 2.4 ft. over 50 years for the low, medium and high rates of relative sea level rise." There are established rates and ranges of sea level rise scenarios that can and should be used in accounting for future sea level rise, such as those from the 2012 National Climate Assessment, Rahmstorf et al. (2012), or Kopp et al., (2014), particularly in the potential for acceleration.	Per USACE guidance, the base level of potential relative sea-level change is considered the historically recorded changes for the study site. All economic analyses for which results are tabulated in previous sections of the FGRR were based on this historic rate of sea level change. However, in accordance with Engineering Regulation ER 1100-2-8162 "Incorporating Sea Level changes in Civil Works Program," (December 31, 2013) proposed projects must be also evaluated for a range of possible sea level rise rates. In addition to the historical rate ("low") which is a 0.7 ft. increase over the period of analysis in the study area, the project must also be evaluated using "intermediate" and "high" rates derived from modified NRC Curves I and III, which for this study are estimated to be 1.1 ft. and 2.6 ft. increases, respectively over the 50 year period-of-analysis. The methods and results of the relative sea level change analysis are included in the FGRR and FEIS.
DOI 010e	DGRR, Appendix A, Section 6.3.3.4	DOI page 28	The Brunn rule is used to calculate a "sink" of sediment (erosion rate) due to sea level rise. This approach is not supported by any evidence, as the Brunn rule component of shoreline change has never been successfully isolated from all other drivers of shoreline change.	The Bruun rule, albeit a significant simplification of shoreline erosion caused by sea level change, remains a generally accepted USACE methodology due to its simplicity.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
DOI 010f	DGRR, Appendix D, Section 10: Table 27	DOI page 28	This table summarizes the impact of elevated rates of sea level rise on the TSP benefit cost ratio. ● Plan should identify what is the reasonable expected sea level rise rate during the project (50 years). ● The damages associated with breaches remaining open go up ~27 times at high SLC while back bay inundation damages go up ~3 times. This appears to over-emphasize the hazard associated with breaching and assumes that the barrier islands will not be able to withstand elevated sea level rise rates via overwash and breaching processes. The FGRR should include the basis for this assumption. ● This table requires a detailed explanation along with a summary of assumptions (and uncertainty levels).	Per USACE guidance, the base level of potential relative sea-level change is considered the historically recorded changes for the study site. All economic analyses for which results are tabulated in previous sections of the FGRR were based on this historic rate of sea level change. However, in accordance with Engineering Regulation ER 1100-2-8162 "Incorporating Sea Level changes in Civil Works Program," (December 31, 2013) proposed projects must be also evaluated for a range of possible sea level rise rates. In addition to the historical rate ("low") which is a 0.7 ft. increase over the period of analysis in the study area, the project must also be evaluated using "intermediate" and "high" rates derived from modified NRC Curves I and III, which for this study are estimated to be 1.1 ft. and 2.6 ft. increases, respectively over the 50 year period-of-analysis. The likelihood of breaches will significantly increase under the FWOP, and could lead to greater breach associated damages during peak storm conditions, notwithstanding the ability of the barrier island to withstand elevated sea level rises via overwash and breaching. Per USACE policy, uncertainty was considered under the historic sea level change scenario. Text has been revised with a summary of assumptions and uncertainty.
DOI 010g	DEIS, ES-11	DOI page 28	The plan claims that the TSP will "reduce the risk of flow and water levels during storms", thus also result in "less potential for saltwater in groundwater compared to Without Project". Important to note, up front that this applies to flooding not to saltwater intrusion, which will remain a major issue as sea levels rise. Also, flooding from elevated ground water table as sea level rises should be mentioned as another climate-related hazard that the TSP will not address; the FIMP only addresses inundation hazards associated with ocean-bay water exchange.	The FEIS includes language that clarifies that the "less potential for saltwater in groundwater" applies only from flooding, not saltwater intrusion from groundwater. In addition, the FEIS discussion of residual risk also clarifies that impacts from groundwater table as sea level rises is a climate-related hazard that the Recommended Plan will not address.
DOI 010h	DEIS, ES-11	DOI page 28	"The TSP would help counter the impacts associated with the projected rise in sea level and the associated negative impact to plant communities." This is possible for the short-term, however, the TSP will minimize the ability of the island to survive increasing rates of sea level rise via retarding breaching and overwash. This statement thus ignores any positive effects of overwash and breaching and the unique ecotype that these dynamics support.	The FEIS includes a better description about the positive effects of overwash and breaching.
DOI 010i	DEIS, Section 2.2.2:	DOI page 29	"The development in the Study Area is vulnerable to damages from three mechanisms, inundation due to storm surge, undermining due to storm erosion and shoreline change, and structural failure due to intense wave impact." This fails to mention the hazard associated with increasing rates of sea level rise that will clearly impact the project area in the timeframe of the FIMP.	The FEIS includes a better description about the vulnerability of the study area to relative sea level change.
		E. MITIGATION, ECOSYSTEM RESTORATION, ENVIRONMENTAL MONITORING		
DOI 011	General	DOI page 29	1) The DGRR/ DEIS does not identify mitigation or an environmental monitoring plan for the major components of the TSP. There is some mention of mitigating the impact of closing breaches, but these are not fully developed plans. For example:	The Monitoring and Adaptive Management Appendix has been revised to better describe the environmental monitoring that will be performed during the project life cycle.
DOI 011a	DGRR, Section 4.4.4.1	DOI page 29	The DGRR uses observations from historic breaches in the transgressive (eroding) segments of island chain to assess "sediment trapping" function of inlet models. These observations may not be applicable to the regressive (accreting) segments of Fire Island west of ~ Watch Hill. Regardless, this is extremely difficult to predict and adds additional uncertainty (which needs to be presented in the FGRR) in the determination of the impact breaching has on the coastal sediment budget. Note that there is no mention here of mitigating the negative impact of breach closures by placing sediment in back bay area although it is mentioned elsewhere in the plan. If this is indeed the intent of the plan, it should be outlined in this section.	USACE agrees that the evolution of breaches is extremely difficult to predict. Uncertainty in the study predictions was addressed as part of the life cycle economic simulations by considering a range of potential breach growth rates. Text has been added to the FGRR to clarify that the Coastal Process Features will offset the negative impact of breach closures by placing sediment in the back bay area.
DOI 011b	DGRR, Section 4.4.4.1	DOI page 29	Sediment exchange. Estimates of bay deposition volumes listed on Table 15 do not appear to take into account the degree to which the bay accommodation space is already filled prior to breaching. For example, relatively little sediment was lost landward at the Wilderness breach because it was already relatively shallow from the prior flood-tidal delta.	USACE agrees that the evolution of breaches is extremely difficult to predict. One of the complicating factors are the differences in bay bathymetry behind potential breach locations. Therefore, uncertainty in the breach growth and bay deposition predictions was addressed as part of the life cycle economic simulations by considering a range of potential breach growth rates.
DOI 011c	DGRR, Section 6.1.3.2	DOI page 29	It is proposed that sediment will be placed in the back bay areas when a breach is closed; "an additional quantity of sand on the bayside of the barrier islands to replicate this process. . . .". Specifics as to how this quantity of sand will be determined needs to be added to the discussion and factored into the costs	The FGRR and FEIS include detailed description of the Coastal Process Features and how sediment needs were determined, along with corresponding cost estimates.
DOI 011d	DGRR, Section 6.3: Table 44	DOI page 29	Table 44 summarizes TSP environmental impacts. It falls a bit short on identification on "measures to mitigate" as follows: * Although reducing breaching/overwash will be reduced due to FIMP, how the FIMP will mitigate the reduced ability of the island to migrate/build elevation, particularly in areas of proactive breach plan, needs to be included in the FEIS/FGRR. * It is stated that the borrow areas will have minimal impact on sediment transport. It neglects, however, to state that alteration of nearshore topography is expected to alter decadal-scale persistent beach shape. * There is no mention that FIMP will reduce the periodic flushing of the bay due to breaching. The FEIS/FGRR should included this impact including a discussion on how this might be mitigated, or whether it should it be mitigated in that, maintenance of managed inlets enhances this flushing?	The following information has been added to Table 44: 1) added that Coastal Process Features that will offset negative impact of breach closures by placing sediment in back bay areas; 2) added "Recommended Plan provides for monitoring and adaptive management of the borrow site; 3) added "The Conditional and Wilderness Conditional Breach Response components of the Recommended Plan, together with the O&M dredging of the inlets and supplemental dredging of the ebb shoals will lessen the indirect impact to water quality."

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
		F. MODELING		
DOI 012	DEIS/DGRR	DOI page 30	1) The primary concerns about the modeling results presented in the DRGG/DEIS are the assumptions, assertions, and selective datasets input into the modeling routines that overemphasize the hazard associated with barrier island breaching and overwash. (see comments in other sections). For lack of a better description, the modeling presented in the DGRR/DEIS uses a worse-case scenario to support the proposed need for implementation of coastal measures outlined in the TSP; e.g., huge breaches in comparison to the current Wilderness Breach, dune height values chosen from deteriorated conditions, incorrect high erosion rates, larger storms, minimal recovery following storm impact, etc. This is an acceptable management approach if that was the intent, However, it is not clearly expressed in the DGRR/DEIS that the strategy is to use a worse case scenario and if so, should be so clarified. Nor, if this approach was intentional, is it clear why a unrealistically low rate of sea level rise was used as input to a majority of the modeling, or why there is no recognition that the barrier island system will not significantly reduce the storm surge in the back bay areas for long-duration storms (Aretxabaleta et al., 2014). Conclusions of inundation hazards expressed in the DGRR/DEIS are almost entirely based on the model approach reported by Moffat & Nichol (e.g., Irish and Cañizares, 2006, 2009; Cañizares and Alfageme, 2005; Irish et al., 2004)	Conclusions regarding inundation hazards presented in the DGRR and DEIS are based on the work presented in Sub-Appendix A.1. Modeling work and conclusions are not based on worst-case scenarios only. The modeling was performed for baseline conditions (i.e., no additional erosion or dune deterioration), future vulnerable conditions based on reasonable assumptions regarding beach and dune conditions, and a range of breach open conditions. Erosion and recovery rates are based on historic data and account for the effect of historic beach fill projects. Finally, the modeling is based on a combination of historic, not larger, storm surges and tide conditions. The effects of the barrier island and inlets on the propagation of storm surge into the bays is inherently accounted for in the modeling, which also accounts for differences in storm duration since the modeling is based on historic storm hydrographs.
DOI 012a	Sub-Appendix A-4	DOI page 30	The Moffat & Nichol report (DGRR, Sub-Appendix A-4) focuses on the modeled impact of the Wilderness Breach. These model results show there is little change in tidal conditions with the Wilderness Breach open, but they maintain that the effect on storm-induced flooding is huge, "The modeled effect of the breach open may be as high as 10 inches during smaller storm events and up to 22 inches during the larger storm events." This appears exaggerated for a number of reasons: ● First, if there is no percentage difference in tidal amplitude, a large percentage change in storm surge would not be an expected outcome. Of course, when considering single storms, there are many specific effects that make each storm special. ● It appears that the entire difference pattern shown in Figures 10 and 11 is unexpected. There is a large difference at the breach, but it dissipates quickly as expected from strong frictional effects. The maximum differences tend to appear far from the breach. It is striking that they find such large differences considering that Figure 9 shows little or no difference between the two simulations (which is consistent with USGS findings). We question if there may exist issues with the frictional parameterization, especially in the case with breaching. On Figure 6 the M2 tidal amplitudes seem reasonable, but the phases at Lindenhurst and Bellport appear to be out of phase. The resulting effect on tide is that the amplitude appears at completely the wrong time, which would, in turn, affect the phasing of any other oscillation. A resulting effect is that they appear to be superimposing the tides on the surge in the bay at the wrong times with the potential for having severe differences. ● Another confusing result is regarding the change from the previous breach open scenario to the 2014 breach conditions. The beach open condition (BOC - 3 months) included a 2500 ft. width and a 7 ft. depth breach at Old Inlet (17,500 ft2). However, the Stony Brook (Flagg) data gives a maximum area of 630 m2 (6800 ft2) for June 2014. Thus, it is not clear how they obtain the large increases in their stage-frequency curves using the June 2014 configuration.	Sub-Appendix A-4 "Numerical Modeling of Breach Open at Old Inlet" summarizes changes modeled using the same tools, approach, and inputs (including breach bathymetry) as van Ormond et al. (2015) with one significant difference: none of the work referenced in USGS' comments (Aretxabaleta et al. 2014 or van Ormond et al. 2015) investigates the effect of the breach on bay water levels during large storms (i.e., less than 10% Annual Exceedance Probability). It is recognized that a small difference in tidal amplitude does not necessarily translate into small differences in storm surge during large storm events. Although the cross-sectional area of the BOC-1 (3 month) breach is larger than the June 2014 breach, the deep channel and more mature inlet channels in the June 2014 breach are believed to increase hydraulic conveyance.
DOI 012b	DGRR, Section 2.1.2	DOI page 31	Reference Taney (1961) that inlets "migrate over time to the west." This is not true for all breaches. In fact, most close (e.g., see Leatherman and Allen, 1985). This becomes important in the development of assumptions input into modeling of damages related to breaches and thus, should be clarified.	The DGRR text states that the breaches "eventually close by natural processes."
DOI 012c	DGRR, Section 2.1.9.4	DOI page 31	The plan states, "Observations and modeling results have shown that, at its current size, the breach in the Wilderness Area has not significantly altered tidal elevations in GSB or Moriches Bay by more than one inch. However, model simulations show that the breach in the Wilderness Area increases storm water levels within GSB and Moriches Bay during storm events. Citations are needed to support these statements (or refer the reader to Sub-Appendix A-4?). The FGRR should clarify whose observations and modeling; how the models of current conditions were validated; how the significance of the increase in tide elevations resulting from future storms was determined; and, what is the margin of error within the model and the observations.	A Reference to FGRR Sub-Appendix A4 "Numerical Modeling of Breach Open at Old Inlet" has been added to the FGRR main body text. Details regarding observations, modeling, calibration etc. are presented in the Sub-Appendix.
DOI 012d	DGRR, Section 2.1.12	DOI page 31	The plan states that, "This attenuation of ocean surges becomes less pronounced for larger storm events which can overwash and breach the barrier island." This has to do with the duration of the storm, and the size of the storm. Storm duration is not addressed - - - the focus is only on importance of breaches and overwash bringing more water into the back bay. We question whether there was sufficient information to characterize storm duration with the models. Clarification is needed.	The model used in the analysis inherently accounts for storm duration, as the simulations are based on historic storm surge hydrographs.
DOI 012e	DGRR, Section 4.2	DOI page 31	Using SBEACH for lowering the dune height that is then used for the DELFT simulations will result in an overestimation of overwash and overtopping especially in the earlier part of the storm simulations. The modeled storm does not need to wait until the morphological changes occur. Often dune lowering and bay-to-offshore breach formation occurs in the later part of the storm when the bay water level is starting to decrease. The expected contribution of the dune lowering to the inundation results should be presented here in the FGRR.	Bay-to-offshore breach formation may occur during the latter part of a storm and that process is captured in the current models. However, dune lowering is likely to occur either early in the storm because of wave-induced overtopping or closer to the peak of the storm as the water levels get higher. Based on professional judgement and knowledge of the study area, it is unlikely that the dunes would survive the peak of the storm only to be lowered when the water levels decrease.
DOI 012f	DGRR, Section 4.2	DOI page 31	The simulations assume a constant rate of occurrence of storms. It is not clear how the results would change if enhanced cyclone activity was considered (as suggested by Grinsted et al., 2012; 2013). Please clarify.	Enhanced cyclone activity was not considered as part of the study.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
DOI 012g	DGRR, Section 4.2	DOI page 31	It is not clear from the information how the alternative tide scenarios are conceived. Is the highest spring tide maintained during the entire duration of the modeled storm? Please clarify in the FGRR.	Additional details regarding the combination of surge and tides are presented in Sub-Appendix A1 "Storm Surge Modeling Stage Frequency."
DOI 012h	DGRR, Section 4.2	DOI page 31	It is not clear what the origin of the 0.6-1 m wave setup water level elevation is. DELFT? We would expect it to vary depending on the wave height. Please clarify.	Wave setup was calculated in SBEACH and DELFT3D; it does depend on wave height. Reference Sub-Appendix A1"Storm Surge Modeling Stage Frequency" for details.
DOI 012i	DGRR, Section 4.2	DOI page 31	It is not clear what the value of water level is used for the stage-frequency results. Is it the peak during a storm at a single location or some other statistical value (e.g., 95 percentile)?	Per USACE guidance and economic methods, the water level used for the stage-frequency analysis is peak during a storm. Details are presented in Appendix A1 "Storm Surge Modeling Stage Frequency."
DOI 012j	DGRR, Section 4.2	DOI page 31	Friction along the inlets will limit the penetration of the offshore wave setup into the bay. This is not mentioned anywhere in this section. Please clarify.	Reference Appendix A1 "Storm Surge Modeling Stage Frequency" for a description of propagation of ocean waves setup into the bays.
DOI 012k	DGRR, Section 4.2.4	DOI page 32	Shorefront water levels. This section states: "It is noted that individual waves can temporarily increase or decrease water elevation and cause wave runup on sloping surfaces. However, wave runup is not included in the flood elevations used to calculate shorefront inundation damages." There are ways to do this relatively easily. Empirically, it can be done with the Stockdon et al. (2006) equation. Models such as XBeach can simulate the infragravity wave runup (which is the strongest component during storms). It seems that here the analysis is using outdated methodology; new means are readily available.	Runup estimates are available from SBEACH model results. However, shorefront inundation damage models are based on still water level inundation, excluding runup. This is because the actual level of inundation within the building envelope is generally limited to still water levels unless there is a structural failure of the walls. Structural failure due to wave impacts are captured as part of wave damages.
DOI 012l	DGRR, Section 4.3	DOI page 32	This section states: "The estimated amount of beach recovery has been established for various shoreline locations. These recovery amounts have been developed in order to match the long-term erosional trends for each location, and establish whether the area is erosional, stable or accreting in the long-term." Recovery, which SBEACH cannot simulate, is simply specified in order to match the measured long-term shoreline change trends. Presumably this means the trends from the Gravens et al. (1999), which as noted above cannot be relied on. Please clarify.	While USACE agrees that the trends from Gravens et al. (1999) are simplifications of the system it was used because no better estimates are known to be available. The model's assumptions are documented in the FGRR.
DOI 012m	DGRR, Section 4.4	DOI page 32	Modeling of overwash and breaching are dependent on (among other things), "long-term erosional trends", and "shoreline undulations". These are based on Gravens et al (1999) historical shoreline analysis, which is inaccurate/not the most recent science. The TSP needs to address this and explain the rationale for using the older analysis, and how more recent analyses might change model results. The assumption that increases in SLR rates will increase the risk of breaching is reasonable, however there needs to be some evaluation of how accurately this can be predicted.	While USACE agreea that the trends from Gravens et al. (1999) are simplifications of the system it was used because no better estimates are known to be available. The model's assumptions are documented in the FGRR.
DOI 012n	DGRR 4.4	DOI page 32	The plan uses Delt3D to compute bay water elevations. This is the same as the approach used by Van Ormondt et al. (2015) who when simulating Sandy, indicated that the increased storm tide in Great South Bay was ~3 inches due to the Wilderness Breach. The FGRR should resolve several related questions, including why the storm tide reported by the TSP is different (one foot or greater) i.e., error, input storm conditions, manipulation of dimensions of Wilderness Breach? The discussion then claims to have "verified" the flood levels via comparison with the 1938 Hurricane and the December 1992 Nor'easter --- worse case scenarios. The details of this modeling is outlined in Appendices A and Sub-Appendices 4-A. The discussion should explain in detail why the modeling results differ from results published by Van Ormondt et al. (2015).	USACE model results do not differ significantly from van Ormondt et al. (2015) results. It should be noted that van Ormondt et al. (2015) did not simulate large storms; the USACE model includes these types of storms.
DOI 012o	DGRR, Section 4.4.1.2	DOI page 32	In Table 10, "Breach Closed" conditions show effective width of the beach being completely different from the baseline conditions. In section 4.4.3.5, it says "the pre-breach barrier island width is taken as that on the BLC." Is the figure showing "added width"? This needs further explanation.	In FGRR Table 10, the effective width represents an abstract measurement of the vulnerability to breaching based on model results and accounts for the beach and dune width. Therefore, it does not match exactly the physical beach width described in Section 4.3.3.5.
DOI 012p	DGRR, Section 4.4.1.2	DOI page 32	Table 10 shows that the return frequencies of overwash for "Breach closed" conditions and for "FVC" are basically the same (even worse in some cases). Explanation is needed on how it is possible that there is an overwash reduction benefit in the TSP if overwash is going to be occurring basically the same number of times? Also the return frequencies of full breach are worse at the Lighthouse, Davis Park and slightly worse at a couple of other locations. If this is the case, it would seem to be better to not apply TSP to these locations. Please clarify.	FGRR Table 10 shows results for Breach Closed Conditions (BCC) for a closure at +9.5 ft. NGVD29 in all the potential breach locations, a condition slightly more vulnerable than Future Vulnerable Condition (FVC). Therefore, rebreaching frequency is higher for BCC than FVC in some locations. The Recommended Plan includes closure at higher dune elevation (+15 ft. NGVD29, same as beach fill section) in the developed communities.
DOI 012q	DGRR, Section 4.4.1.2	DOI page 33	"In the baseline condition, the probability of breaching is relatively low, but increases significantly in the future vulnerable condition". This implies that the sediment budget, erosion rate and recovery rate following storms are important in this analysis. If so, is the FVC an accurate assumption considering that the Gravens erosion rates reported in the TSP are incorrect? This needs to be clarified/resolved in the FGRR. "Dune height and beach width" is important when developing the FVC, and the primary driver, according to the plan is the "beach width". Again, erosion rates and variability are important - - as are beach recovery rates. The FGRR should present the Beach Recovery Rates used when modeling the FVC.	Based on professional judgement and knowledge of the study area, USACE supports that the Gravens et al. (1999) erosion rates are correct.
DOI 012r	DGRR, Section 4.4.2	DOI page 33	"Drawing upon past experience with breaching, numerical modeling and engineering judgment to project breach evolution, the likelihood for breach growth was evaluated at each of the three bays." This entire analysis is lacking sufficient justification and support. The analysis uses observational data from breaches at Pikes Beach, Old Inlet, and Cupsogue. These beaches occurred in the transgressive (erosional) segment of the barrier island chain. The area west of Watch Hill is a regressive (accreting) system. Thus, using historical breach behavior observations at Pikes Beach, Old Inlet, and Cupsogue to describe breach growth rates may not apply to the area west of Watch Hill. In fact, breach behavior is highly variable. Lacking further justification, the utility of Table 13 is questionable.	Data from breaches at Pikes Beach, Old Inlet, and Cupsogue are the only breach evolution data available. The potential variability/uncertainty with regards to evolution at other locations is captured by simulating a range of potential widths vs. one deterministic value. Moreover, the area west of Watch Hill is not uniformly regressive (accreting) as evidenced by the continued need for renourishment in several areas. Table 13 does not address the likelihood of breaching but the evolution of a breach once it occurs. Instead, breaching risk is presented in FGRR Table 10.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
DOI 012s	DGRR, Section 4.4.2	DOI page 33	The plan states that breach "…growth rate is dependent upon the tidal prism of the back bay and can be fit to an exponential curve…" The suggestion of breach growth fitting an exponential curve is questionable, but, as explained in Appendix A, this means an increasing form of the decaying exponential curve. Referring to the growth curve as "exponential" gives the wrong impression. In reality, the model, A=A0(1-exp(-kt)) uses an exponential, but clearly no exponential growth. The width and area evolution of the Wilderness Breach (monitored by Stony Brook) shows a completely different pattern from what the plan is suggesting (fig. 8). The "large breach" at Great South Bay and its evolution is much larger than observed. Even the "small" breach scenario seems to overestimate breach growth in this case. In summary, it appears that the breach growth curves presented in the plan have are problematic, especially their "large breach" case. The plan continues to use the large breach scenario when the Wilderness Breach has been open for ~4 years and appears to have a relatively stable configuration at ~500 m2.	Overall, the proposed breach evolution curves are considered representative of the range of historic breach observations but cannot be expected to match exactly on particular measurement. The small breach size is based on the recent observations at the Wilderness Area breach and the large breach size is based on previous observations at Cupsoque and Pikes Beach.
DOI 012t	DGRR, Section 4.4.3.6: Figure 14-15	DOI page 34	Stage frequency curves suggest that flooding hazard is greater under BCC (Breach closed condition) than at the BLC (baseline condition) or FVC. This requires further explanation as to how closing inlets could increase flooding hazard by 2 ft.?	In the Breach Closed Conditions (BCC) barrier island elevation is only +9.5 ft. NGVD29 in all the potential breach locations, a condition slightly more vulnerable than Future Vulnerable Condition (FVC).
DOI 012u	DGRR, Appendix A, Section 6.1.1	DOI page 34	Using just the water level and wave conditions from ADCIRC and WISWAVE as input to SBEACH can result in over- and under-estimations of the overwash effects. The water level difference between bay and offshore drives the morphological change in the barrier. If the conditions in the bay are misrepresented, the resulting water level difference can produce errors. This needs to be clarified, as does how the water level difference from ADCIRC and WISWAVE compare to the results from DELFT and SWAN.	USACE has reviewed its modeling results and concluded that conditions in the bay are not misrepresented.
DOI 012v	DGRR, Appendix A, Section 6.1.1	DOI page 34	It seems unexpected that the flow is produced with a two-dimensional simulation, while it seems that the sediment dynamics use a 3-D model (Delft3d-MOR). This is likely to create inconsistencies and requires further clarification. The controlling factor of the exchange between bay and ocean is the friction (especially in the proximity of the inlet/breach). Using a 2-D Delft configuration (6.1.1.4) may result in a poor characterization of the frictional forces. The bottom friction representation is critical to produce accurate water flow in the inlet and ultimately water level conditions. A 2-D approach can result in underestimation of the friction in the inlet that has to be numerically compensated in other regions to achieve adequate skill. Using bottom roughness formulations that include the effects of sediment, ripple, and wave conditions would be a more suitable approach.	All simulations were run in 2D mode. Bottom friction is represented in the model, which was calibrated and validated using in-field condition data.
DOI 012w	DGRR, Appendix A, Section 6.1.1.5	DOI page 35	In the validation section, the plan discusses the need to adjust the frictional drag values in order to match the observed water levels. This issue is always problematic, however including the necessary physics in the model simulation is likely required to obtain the highly variable spatial characteristics of such a complex environment. Explanation or clarification of this is required in the FGRR.	Additional details about model simulations are provided in Appendix A1 "Storm Surge Modeling Stage Frequency."
DOI 012x	DGRR, Appendix A, Section 6.1.1	DOI page 35	The FGRR should indicate how different the breaching and overwash results are if no dune preconditioning (dune lowering) with SBEACH is conducted. The concern here is that during a storm, a significant fraction of the storm duration is going to be under condition where full dune height is present. Please also describe how is this accounted for.	Conclusions regarding inundation hazards presented in the DGRR and DEIS are based on the work presented in Sub-Appendix A.1 "Storm Surge Modeling Stage Frequency." Modeling work and conclusions are not based on worst-case scenarios only. The modeling was performed for baseline conditions (i.e., no additional erosion or dune deterioration), future vulnerable conditions based on reasonable assumptions regarding beach and dune conditions, and a range of breach open conditions. Erosion and recovery rates are based on historic data and account for the effect of historic beach fill projects. Finally, the modeling is based on a combination of historic, not larger, storm surges and tide conditions. The effects of the barrier island and inlets on the propagation of storm surge into the bays is inherently accounted for in the modeling, which also accounts for differences in storm duration since the modeling is based on historic storm hydrographs.
DOI 012y	DGRR, Appendix A, Section 6.1.1.5	DOI page 35	As written, the storm history section is entirely unreferenced, yet numbers reported in it appear to be used to generate some parameters (storm durations) in the storm scenarios later modeled. For example, in the Coastal Processes Investigations: Storm Surge and Storm-Induced Barrier Island Breaching Modeling section, Numerical Model Calibration and Verification, states: "model skill for simulating barrier island overwash and breaching was assessed by comparing model results with available high water marks (HWM) for two of the most significant storms of record: the September 1938 Hurricane and December 1992 Nor'easter. The intent of the test was specifically to qualitatively validate the ability of the model to reproduce observed overwash and breaching…the agreement between simulated peak water levels for both storms and the reported measurements can be considered excellent considering the uncertainty associated with this type of data". The lack of citations makes it impossible to determine the validity of modeled storm results, even qualitatively as suggested, such as the 1938 and 1992 storms.	Storm history parameters are documented in Sub-Appendix A1 "Storm Surge Modeling Stage Frequency."
DOI 012z	DGRR, Appendix A, Section 6.1.3.1	DOI page 35	This section includes the statement that "the peaks-over-threshold method significantly underestimated water level for small return periods." The FGRR needs to describe how this is known. It is unclear from the results presented. Also explanation is also needed as to why simulations of normal storms (with return periods of one year or even less) are not used to estimate the stage-frequency diagrams. It would appear to be easier than to project information from NOAA stations.	See additional details in Section 10 of Sub-Appendix A1 "Storm Surge Modeling Stage Frequency."
DOI 012aa	DGRR, Appendix A, Section 6.1.5	DOI page 35	The results in Figure 6.29 seem to be a direct consequence of the infrequent nature of the storms used for long return periods. As each storm impacts specific areas of the system, when only a small sample size is available, then bias toward those storms will likely be present. While the response at low return periods is mostly linear, nonlinearity is introduced by the small sample size in longer return periods.	USACE acknowledges that a small sample size can introduce bias. The sample size for large storms (long return period) is based on best available data. It should be noted that non-linearity is related to the size of the storms and related physical response, not just the sample size.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
DOI 012bb	DGRR, Appendix A, Section 6.1.5.2	DOI page 35	Assuming that bay surge water level can be directly added to bay wave setup is an oversimplification the physics of the system. As pressure gradients caused by the addition of wave setup and surge are established, the bay will dynamically adapt to the new conditions and in general, the combine effect is likely to be smaller than presented in the plan and should be reflected in the FGRR.	USACE has concluded that linearly superimposing bay storm water levels and bay-generated wave setup is a reasonable approach. There is no data or research that USACE is aware of to support the concept that the combined effect would be significantly smaller than the sum of both effects.
DOI 012cc	DEIS, Section 2.1	DOI page 36	Breaches left unchecked, as evidence by breach closure efforts in 1980 and 1993 . . .". All beaches behave differently. Indeed, most breaches on the Fire Island barrier island system close naturally.	Concur with statement that all breaches behave differently. The existing breach at the Wilderness Area has not closed yet.
DOI 012dd	DGRR, Sub-Appendix A-4	DOI page 36	Sub-Appendix A-4 states, "The differences between modeled and observed water levels during November 2012 area is consistent with those shown by van Ormond et al. (2015)." "The model generally over predicts the maximum water elevation which could be a consequence of performing the simulations with a larger cross section at the breach than the one that existed during that period." This statement requires further clarification. Please also indicate how much of an over-prediction, and why a larger cross section of the breach is used than the one that existed.	The referenced sentence refers to the results shown in Figure 7 of FGRR Appendix A Sub-Appendix 4 "Numerical Modeling of Breach Open at Old Inlet". The figure shows the modeled and measured water levels in November 2012. According to the results shown in the figure, the overprediction ranges from 0.7 to 1.8 inches. The surveyed conditions at Old Inlet from June 2014 are used in the revised model bathymetry (Figure 5). The breach open conditions from June 2014 are representative of the majority of the conditions during the 2-year simulation. However the modeled breach size could lead to an overestimation of the effects of the breach during the first months when the breach was rapidly growing. The June 2014 model bathymetry was also chosen to be consistent and allow comparison with the modeling efforts by the USGS (van Ormond et al. 2015).
DOI 012ee	DGRR, Sub-Appendix A-4, Section 3.1	DOI page 36	DGRR, Sub-Appendix A-4, Section 3.1: Figure 13: This is confusing in that when modeling a smaller breach (June 2014 – half the size of the BOC-1) and the BOC-1 at 3 months, the difference with- and without-breach appears to be get smaller with the larger breach. (This also shows up on Figure 12 which models the 1938 storm, and shows smaller inlet and larger inlet produce about the same results). Clarification in the FGRR is strongly recommended.	The cross-sectional area of the BOC-1 (3 month) breach is larger than the June 2014 breach. However, the deep channel and more mature inlet channels captured in the June 2014 breach are believed to increase hydraulic conveyance. Reference Sub-Appendix A4 "Numerical Modeling of Breach Open at Old Inlet" for detailed information.
DOI 012ff	DGRR, Sub-Appendix A-4, Section 3.1	DOI page 36	The cross-sectional area of the BOC-1 (3 month) breach is larger than the June 2014 breach, however the deep channel and more mature inlet channels captured in the June 2014 breach are believed to increase hydraulic conveyance. This section is where the BOC-1 condition is described as a 2500' x 7' breach. Thus, this statement about a "deep channel" and "more mature inlet channels" doesn't make sense; i.e., a wider channel will not decrease the frictional resistance to water flow, deeper channels will.	The June 2014 breach is 20 feet deep at its deepest and narrowest section. This deeper/narrower section appears to result in increased flow relative to the wider/shallower BOC-1 condition.
		G. ADAPTIVE MANAGEMENT		
DOI 013		DOI page 36	1) The Adaptive Management Plan as outlined is currently vague and unclear regarding the procedures or protocols to be put in place to allow for changes to TSP as the project evolves and monitoring data are collected. Neutral facilitation, particularly in assembling and defining a decision-making strategy for the Adaptive Management Advisory Team is not listed as part of the Adaptive Management Plan as outlined. Facilitation will help to ensure discussion stays on track and that actions to be decided upon are amendable to all parties. Although the adaptive management strategy is largely to be developed as the team is assembled, ensuring a neutral body is present to make sure all interests are fairly represented is imperative for a successful adaptive management framework to be implemented and be effective in the project years to follow; particularly as given the long life of the project, it is certain that members of the advisory team will rotate in and out.	The FGRR Appendix J "Monitoring and Adaptive Management Plan" has been revised to better describe the procedures to be put in place to allow for changes to the Recommended Plan.
DOI 013a	DGRR, Section 6.2	DOI page 36	"Modifications of the nearshore topography of the sand ridges offshore of western Fire Island will be the subject of cooperative monitoring between the USGS and USACE, and will be part of monitoring/adaptive management programs under FIMP." Although the USGS welcomes the development of a cooperative monitoring program, no agreement exists to conduct such a program at this time.	A cooperative agreement for monitoring activities will be developed prior to commencement of pre-construction monitoring.
DOI 013b	Appendix I, page I-3	DOI page 37	This section will need to describe the method used to determine the sediment budget and the criteria that would need to be met in order to warrant a change from these planned amounts.	The Physical Monitoring Appendix and Monitoring and Adaptive Management Plan have been combined; the referenced section no longer exists. The substance of the comment will be addressed in the revised FGRR Appendix J "Monitoring and Adaptive Management Plan."
DOI 013c	Appendix I, page I-6	DOI page 37	This section will need to describe how the updrift and downdrift distances for shoreline change monitoring will be determined. A complete sediment budget includes sub-aerial and sub-aqueous components of the coastal system; clarification for monitoring is necessary. We question why only shoreline contours and profile changes are used to update the sediment budget when Lidar will be available, and whether there is a separate plan for those data?	The shoreline monitoring plan in FGRR Appendix J "Monitoring and Adaptive Management Plan" has been updated to include the requested information.
DOI 013d	Appendix I, page I-3	DOI page 37	Over what time period are the estimated releases of sediment resulting from groin modification expected? Annually? Over the life of the plan? Clarify.	The only groin modification in the Recommended Plan is the removal of the Ocean Beach Groin. The design of the groin removal, which affects the estimated sediment releases, will be developed during Pre-construction Engineering and Design.
DOI 013e	Appendix I, page I-4	DOI page 37	Numerical modeling should be added to "inspection, measurement, and analysis."	Reference to numerical modeling has been added to FGRR Appendix J "Monitoring and Adaptive Management Plan"
DOI 013f	Appendix I, page I-5	DOI page 37	Here and throughout this monitoring section, the plan proposed to produce plots of shoreline change. There needs to be a component of the adaptive management plan that requires shoreline change analysis to ensure that the plots are analyzed and interpreted correctly. The plan should include a strategy to publish analyses and reports where they can be assessed via a portal-like interface.	FGRR Appendix J "Monitoring and Adaptive Management Plan" has been revised to better describe data sharing protocols.
DOI 013g	Appendix I, page I-6	DOI page 37	As above, comparative plots are not monitoring tools in and of themselves, but require an analysis component.	FGRR Appendix J "Monitoring and Adaptive Management Plan" has been revised to denote that comparative plots are not monitoring tools.
DOI 013h	Appendix I, page I-6	DOI page 37	If the plan is going to choose a season for long-term monitoring of the shoreline, it should be the Fall survey (Sept/Oct). Using a Feb-early March survey, in the middle of winter, is not representative of the system, but when the last storm was.	USACE's intent is to monitor during worst case conditions for identification of areas at risk for breaching; the actual season for monitoring can be discussed and agreed to by the Adaptive Management Team.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
DOI 013g	Appendix I, page I-6:	DOI page 37	We propose that all monitoring data will be stored in a portal-type digital interface.	FGRR Appendix J "Monitoring and Adaptive Management Plan" has been revised to better describe data sharing protocols.
DOI 013h	Appendix I, page I-6	DOI page 37	Weekly topography/bathymetry monitoring should also include ebb and flood shoals in addition to the throat of the breach. We suggest that subbottom data is collected simultaneously to better observe changes in modern sediment thickness. In addition, the plan should account for additional surveys if a hurricane or severe nor'easter occurs during project lifespan. This provides the necessary date to link nearshore bathy/sediment availability to shoreline change.	Based on past experience, it was determined that weekly data collection in breach areas adds great cost for not much benefit, and so will not be added to the monitoring protocol. Subbottom data collection is the appropriate tool to gage modern sediment thickness changes. These surveys are proposed to be collected at the project life midpoint in the borrow areas and a surrounding buffer. A description of post-storm surveys of breach areas (including regular aerial photography, and profile data collection) are detailed in FGRR Appendix J "Monitoring and Adaptive Management Plan"
DOI 013i	Appendix I, page I-6 to I-9	DOI page 37	Shorelines and Beach Profiles Collection. Given the extensive body of published literature on shoreline change rates for Fire Island as well as methodology and techniques of determining rates of change that account for uncertainty, more detail needs to be provided in the plan on the extraction techniques of shorelines from Lidar and methodology used to calculate shoreline rates of change. Additionally, beach profiling methods also need to be more fully described to ensure techniques used are those that will allow collection error to be calculated. Where both shorelines and profiles will be used to update sediment budget estimates, which have very large acknowledged uncertainties, applying techniques that allow error to be quantified will serve to improve constrain uncertainty in future estimates.	FGRR Appendix J "Monitoring and Adaptive Management Plan" has been revised to better describe the requested information.
DOI 013j	Appendix I, page I-7	DOI page 37	Weekly ADCP surveys of water flow through breach should also be collected if possible; of some method to estimate flow velocity.	Based on past experience, it was determined that data collection of this type in breach areas adds great cost for not much benefit, and so will not be added to the monitoring protocol.
DOI 013k	Appendix I, page I-7	DOI page 37	"Borrow sites will be mapped (hydrographic and cored) pre- and post-dredge. Through mid-life of project, bathymetry surveys will be repeated." We suggest that subbottom data is collected as well - - - likely be able to resolve changes in modern sediment thickness that will not necessarily be resolved using multibeam alone. Also, that additional surveys will likely have to be conducted following a major storm (this could be important for the sediment transport modeling and provides necessary data to link nearshore topographic change to shoreline change).	Project life midpoint subbottom surveys within borrow areas and adjacent areas is a recommended monitoring action. Sediment transport modeling value lies in average changes over a longer time period, thereby limiting the value of post-storm borrow modeling.
DOI 013l	Appendix I, page I-8	DOI page 37	Will the beach profiles extend into Wilderness Areas to account for sediment gains/losses well outside of the placement areas? We are concerned that profile spacing of 1500ft (~460m) will miss a lot of the alongshore variability that exists in the system (see standard deviations in Table 5 of DGRR). In addition, it will be important to include the method for ensuring that natural system variability is distinguished from changes associated with project implementation. Profile spacing isn't small enough to quantify meaningful estimates of erosion/accretion volumes.	The greatest value in beach profile data collection lies in measuring long-term changes over long periods. The proposed spacing of 1,500 feet repeated in the same locations pre- and post-storm and pre- and post- fill over the project life is expected to average out the shorter-term variability.
DOI 013m	Appendix I, page I-8	DOI page 38	We are concerned about the proposal to conduct one survey per year in late February-early March after the first nourishment cycle. As with the shoreline the monitoring, this needs to happen at a more stable time period to assess the health of the system rather that in the middle of winter.	The health of the system at its seasonally most eroded conditions is more conservative. However, the "repeated over time in the same locations at roughly the same seasonal time period" assesses the system change adequately, without the disturbance of the majority of beachgoers.
DOI 013n	Appendix I, page I-9	DOI page 38	Multibeam will likely be appropriate for surveying the inlet throat, but the bathymetry of flood and ebb shoals will be much more difficult to capture using this technique due to their very shallow nature and dynamic behavior. A contingency mapping plan should be established in case multibeam is not feasible (e.g., jet skis with single beam systems, ROVs, etc.). In addition, it would be better to reference all elevation data to an ellipsoid during data acquisition; this way anyone else that wants to use the data can convert from that initial format to their datum of choice thereby minimizing errors associated with conversions from several different horizontal and vertical datums.	Inlet-specific shoal depths will be incorporated when planning the mutli-beam surveys. This change will be undertaken prior to each multi-beam survey as a normal course of action thus no change to appendix is needed. All USACE-collected elevation data is referenced to the NAVD88 vertical datum and NAD83 State Plane horizontal datum.
DOI 013o	Appendix I, page I-10	DOI page 38	Physical monitoring of overwash areas should include measures of overwash thickness; this information can be used to support/inform sediment budget updates.	Physical monitoring of overwash areas will be included in order to measure overwash thickness.
DOI 013p	Appendix I, page I-10	DOI page 38	Subaerial morphologic changes: To continue to monitor subaerial morphology changes, occupation of existing USGS profile locations and methodology should be considered (Henderson et al., 2015). Rather than 3d surfaces generated from beach buggy surveys, Lidar data should be used to derive continuous surfaces and evaluate morphologic change.	Occupation of existing USGS profile locations can be incorporated. The most cost-effective method at the time of the survey will be utilized. Lidar data collected repeatedly in the same manner, at the same elevations, with the same specifications over time minimizes potential errors, and may be used to in addition to or in place of other methods of surface data collection.
DOI 013q	Appendix I, page I-10	DOI page 38	Breach response plan: Criteria by which areas will be classified as "likely to overwash/breach" needs to be explained. Please explain/clarify how bay bottom elevations would indicate likelihood of overwash/breaching, and how the sensitivity of overwash habitat will be considered when acquiring profile elevations across newly formed overwash/breaches.	Please note that the Breach Response plan is no longer included as a sub-Appendix to FGRR Appendix J "Monitoring and Adaptive Management." Historically, breaches have occurred the majority of times in response to bay water forcing through the barrier to meet the ocean specifically at areas where bay bathymetry shows deeper water access closer to the bay shoreline. As an example, the typical depth of water in a bayside community is 8 feet approximately 20 feet from the shoreline, but there is a boat access channel in the middle of the community shoreline that has water depths of 12 feet, approximately 20 feet from the shoreline and this depth continues till is meets the same grade farther out in the bay; a breach is more likely to occur at the boat access channel location than in the remainder of the community.
DOI 013r	Appendix I, page I-10	DOI page 38	Sediment transport modeling: Much of this text describes actions that have already been completed. This section will have to be updated to include the published results of these efforts.	FGRR Appendix J "Monitoring and Adaptive Management Plan" has been revised to better describe sediment transport modeling.
DOI 013s	Appendix I, page I-10	DOI page 38	Descriptions of inner-shelf mapping requires updating and modification to support sediment transport research needs.	USACE will continue to coordinate with the DOI about the region's sediment transport research needs.
DOI 013t	Appendix I, page I-10	DOI page 38	All modeling and observational approach requires updating, rewriting, and an agreed-upon budget prior to inclusion in the final FIMP.	USACE will continue to work with the DOI regarding the tasks and the budget.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
DOI 013u	Appendix I, page I-10	DOI page 39	We now know that onshore sediment flux is a critical component of the FI coastal sediment budget. USGS is working on expanding our understanding of the processes that control this onshore flux. While the USGS has expressed willingness to work with the Corps and continue our sediment transport modeling research, no agreement on costs, nor cost-shares exist. This can happen prior to finalization of this plan.	The research needs and cost sharing will continue to be evaluated as the study progresses, and as the project is design and constructed.
DOI 013v	Appendix I, page I-10	DOI page 39	The costs for monitoring (and analysis?) appear extremely low; $673K per yr. This is ~1% of the annualized project costs.	The monitoring costs are based on historic experience and USACE cost estimating best practices.
DOI 013w	Appendix I, page I-10	DOI page 39	Water level gauges are supported for first 4 yrs of the project. It is important to maintain these stations for the duration of the project in order to monitor the impact of coastal engineering and island breaching on flooding hazards.	Water level gages exist in all three bays, making water level gages continue in project years 5 through 30 less valuable use of resources
DOI 013x	Appendix I, page I-10	DOI page 39	The borrow areas will be “monitored” once during the project. Again, monitoring after major storm event should be considered, in that, change in bathymetry is expected to change beach shape.	Project life midpoint subbottom surveys within borrow areas and adjacent areas is recommended. Sediment transport modeling value lies in average changes over a longer time period, thereby limiting the value of post-storm borrow modeling.
DOI 013y	Appendix I, page I-10	DOI page 39	Beach profiling should be extended to ~15 m water depth in order to quantify volume changes through the active profile.	Long range data will be collected to ensure that sediment to the depth of closure is captured.
DOI 013z	Appendix I, page I-11	DOI page 39	Analysis and Reports: Clarification is necessary regarding who will be conducting the analysis of the monitoring effort, whether there is sufficient funding to support this type of analysis, and/or whether there will be a peer-review process required for these products. Peer-review is recommended to ensure any adaptive management decisions made are based on vetted and sound techniques, analysis, and interpretations.	Monitoring results are not typically subjected to peer review.
DOI 013aa	DGRR, Appendix K, Page 17	DOI page 39	The proposal to use a Bayes model to determine the likelihood of natural closure of breaches is problematic. No such model exists, nor are there any indications that this probabilistic approach would work in predicting such a complex process. This is a research goal, but at this time not an adaptive management tool.	The text will be edited to refer only to a generic model, not a Bayesian model. The specific model to be used will be determined at the time of the analysis.
DOI 013bb	DGRR, Appendix K, Page 21	DOI page 39	States that breaches will be closed in 45 days. Elsewhere in the plan it says 60 days. Please clarify/reconcile	FGRR Appendix J "Monitoring and Adaptive Management Plan" has been updated to reflect a 60 day timeframe.
DOI 013cc	DGRR, Appendix K, Pages 22-23	DOI page 40	Breach Response Protocols Attachment A includes a number of quotes from reports that were published in the 1980s. Much has been learned since then, but we appreciate that this section recognizes the importance of breaching/overwash. Unfortunately, the analysis does not monetize the impact of retarding the processes associated with beneficial aspects of breaching and overwash, which is a significant concern with the determination of the benefit-cost ratio. Other specifics from these pages are: ● It is not certain how old the Fire Island barrier island chain is. The shoreline was located somewhere offshore (present water depth of ~18 meters) about 7 to 8 thousand years ago, but it is not known when the islands themselves developed. ● The central segment of Fire Island has been in its present position for anywhere from 750-1300 yrs based on radiometric dates in the Sunken Forrest area (some done a while ago) as stated in the Appendix. In fact, the USGS have stratigraphic and historical shoreline data that shows the central segment of the island has been accreting for some time (at least the past 80 yrs). ● The discussion needs to mention that the area east of Sunken Forest has been prograding west and seaward for the past ~350 yrs; as Fire Island migrated to it's present position. This island behavior is not due to “greater exposure to weather events toward the east end” as stated, but does have a lot to do with sediment availability and nearshore framework geology (which is expressed in the bathymetry), which alters wave energy and approach angle. ● The discussion should mention that the barrier island change east of ~Watch Hill is behaving like a transgressional barrier island; it is trying to migrate landward via breaching and overwash. Historical shoreline analysis show that Western Fire Island (west of ~Sunken Forest) has not generally seen "ocean side erosion" as stated. Over the past 80+ yrs there are some areas that show erosion and some that show accretion, however as a whole, this segment of the island chain is basically stable. The persistent shape (erosion and accretion cells) are fundamentally controlled by wave action as the height and approach angle are controlled by the sand ridge morphology on the inner shelf.	Attachment A was removed from FGRR Appendix J "Monitoring and Adaptive Management Plan," as is it is not pertinent to the decision-making process.
DOI 013dd	DGRR, Appendix K, Pages 22-23	DOI page 40	● The discussion needs to mention that the area east of Sunken Forest has been prograding west and seaward for the past ~350 yrs; as Fire Island migrated to it's present position. This island behavior is not due to “greater exposure to weather events toward the east end” as stated, but does have a lot to do with sediment availability and nearshore framework geology (which is expressed in the bathymetry), which alters wave energy and approach angle. ● The discussion should mention that the barrier island change east of ~Watch Hill is behaving like a transgressional barrier island; it is trying to migrate landward via breaching and overwash. Historical shoreline analysis show that Western Fire Island (west of ~Sunken Forest) has not generally seen "ocean side erosion" as stated. Over the past 80+ yrs there are some areas that show erosion and some that show accretion, however as a whole, this segment of the island chain is basically stable. The persistent shape (erosion and accretion cells) are fundamentally controlled by wave action as the height and approach angle are controlled by the sand ridge morphology on the inner shelf.	Attachment A will be removed fromFGRR Appendix J "Monitoring and Adaptive Management Plan," as is it is not pertinent to the decision-making process.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
DOI 013ee	DGRR, Appendix K, Pages 22-23	DOI page 40	● There is no scientific evidence that supports the assertion that offshore source of sand is diminishing offshore of the western segment of Fire Island, or that the island is "thinning". This is misleading as written, suggesting an island system that is deteriorating. In fact, the TSP will actually decrease the ability of the island to respond to sea level rise and increase the potential of island thinning - - as is clearly stated on p. 23 (referencing Williams and Foley, 2007 NPS report). ● The western segment of the island demonstrates regressive behavior (accretion/stable). We do not know how this western component of the island will respond as sea level rise rates increase; no modern analogs available for comparison. The assertion that the eastern end will experience increasing breaches and overwash as sea level increases is a good assumption, however quantifying this remains speculative.	Attachment A will be removed fromFGRR Appendix J "Monitoring and Adaptive Management Plan," as is it is not pertinent to the decision-making process.
DOI 013ff	DEIS, Section 4.1.1	DOI page 40	Actions to be undertaken. Using a probabilistic, Bayesian approach, based on empirical physical, climatological and hydraulic data, time of year considerations, etc. a decision tool will be created for use by the Science and Engineering Advisory Team (see 5.c below) in their role in advising the decision makers regarding breach closure actions. Development and use of a Bayesian model will determine the likelihood of natural closure and confidence values for that likelihood. This is a purely speculative description of a model and its application that lacks substantive detail to evaluate its design, appropriateness and efficacy. The development and testing of such a model is a long-term (order of years) endeavor. What is the basis in the scientific and decision-management literature that supports and informs this effort? How does this approach compare to a simpler, observational-based approach?	USACE and partner agencies have coordinated breach response processes and the identification of a Bayesian protocol as a means to satisfy multiple agency priorities. The process was proposed and agreed upon in concept in several working level meetings. USACE anticipates further development in Pre-Construction Engineering and Design, as well as a collaborative approach to identifying the substantive detail.
		H. ECONOMICS		
DOI 014	DGRR - General	DOI page 40	1) The predictive modeling of without- and with-project damages appear to show that the primary costs are associated via water exchange via the managed inlets and that the largest benefit of the TSP is the non-structural component. See also comments from the Office of Policy Analysis.	Comment noted.
OFFICE OF POLICY ANALYSIS				
DOI 015	Subappendix D1	DOI page 45	Over-Estimated Benefits. The estimate of beach recreation benefits due to implementation of the project appear to be overstated. The analysis presented suggests benefits associated with baseline/without project conditions are included as part of the total beach recreation benefits resulting from implementation of the project (estimated to be $22,695,000 annually, Table 29 in Sub appendix D1). Other concerns aside, the information presented in Table 29 indicates roughly 80 percent of the total annual beach recreation benefits appear to be benefits that would accrue absent implementation of the project (i.e., under the baseline or without the project). Absent revision of the recreational benefit analyses, only approximately $4.5 million of the Equivalent Annual Benefits for 50 years should be accepted for purposes of moving forward. This would drop the current benefit-cost ratio to under 1.2	The assessment and valuation of the FWOP condition a measure of the willingness to pay (WTP) to maintain the beaches against erosion, is a standard USACE methodology to quantify project benefits. The FWOP condition for the recreation use survey is to maintain the beaches at widths present in 1998. The actual survey wording to elicit that WTP as per question 8 of the survey form is: "8. Which of the following amounts is the maximum amount, in addition to any current fee for beach use or parking, you would be willing to pay for a daily admission pass to maintain Fire Island beaches against erosion?"
DOI 016	Subappendix D1	DOI page 46	Non-Standard Survey Methods. The survey used to collect information about beach use and how people value potential incremental benefits associated with implementation of the project did not follow standard survey protocols in the context of employing surveys for the economic valuation of changes in natural resource conditions. As such, the utility of the data collected from the survey implemented and used for the analysis is questionable.	The major limitations in the survey methods were to have respondents complete the surveys without an interviewer and to only ask willingness to pay (WTP) questions to quantify the respondents value for maintaining the beach against erosion. The survey excluded the additional WTP questions to avoid having a survey that was too lengthy, which would result in a low completion rate, and to reduce potential confusion in responding to what appear to be repetitive questions. Due to limitations on the budget at the time of completion a self directed survey was chosen as the most efficient way to collect information.
DOI 017	Subappendix D1	DOI page 46	Potential Inclusion of Non-Recreation Benefits Resulting in Double-Counting. While the use of surveys is common for the economic valuation of natural resource, the approach described in Sub appendix D1 suggests the estimates derived from the survey may not be solely associated with recreational use and may include values associated with other uses and/or non-uses. For example, a WTP expressed by respondents who reside within the study area may include storm protection benefits as part of their stated WTP. If so, this could lead to double-counting within the overall measurement of net economic benefits if storm protection benefits are estimated separately.	It is acknowledged that some respondents may have included some measure of other benefits in their willingness to pay (WTP) bids. USACE believes that this impact is limited given the relatively low percentage of residents responding to the survey.
DOI 018	Subappendix D1	DOI page 46	Over-Estimated Beach Visits. Based on the description presented in the appendix of how annual beach visitation was estimated, the estimates of visitation under the with- and without project conditions may be overstated and therefore, result in an overestimate of beach recreation benefits.	The methods used to estimate beach recreation benefits are compliant with USACE guidance and best practices.
DOI 019	Subappendix D1	DOI page 46	Overall, the appendix does not clearly document the development of the survey instrument or provide a copy of the survey instrument, it includes statements that suggest questionable survey administration and data collection techniques were employed, and it includes statements that suggest questionable approaches to data analysis and interpretation were implemented. The bullets below include text pulled directly from the appendix to support the observations presented above.	Details on the survey development were not considered necessary for documenting the recreation use estimates.
DOI 020	Subappendix D1 - Section I.4.(B), page 2	DOI page 46	"The information necessary to develop a simulated demand curve was obtained from a survey conducted during August-September, 1998. Respondents were asked about their WTP for the 'with-project' condition, and about their 'without' and 'with-project' beach visitation. The methodology described above is referred to as the contingent valuation method (CVM)" PPA comment: Based on the description of the survey conducted and presented in Sub appendix D1, the methodology is not consistent with standard practice in conducting a quality contingent valuation (CV) survey. In addition, a copy of the survey instrument was not included in the appendix.	Copies of the Survey Instruments were added to the FGRR Sub-Appendix D1 "Recreation." Survey Design and analysis was led by Dr. Jonathon Silberman who has extensive experience in conducting contingent valuation studies. Review of Sub-Appendix D1 for compliance with the USACE requirements was performed as part of the USACE Agency Technical Review.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
DOI 021	Subappendix D1 - Section I.4.(B), page 2	DOI page 46	"Two CVM questionnaires were used since beachfill is proposed for areas accessible through different transportation means and require different valuation. The first obtained information from respondents using the Fire Island beaches.(questionnaires were distributed on the Fire Island Ferries). The second obtained information from respondents using the beaches at Smith Point, East Hampton and Southampton." PPA comment: It is not clear why two different questionnaires would be needed simply because different transportation options were necessary to access the beaches included in the study area. Identical questionnaires could have been used for all locations sampled in the study area and a question or questions at the end of the survey could be used to get information about how respondents typically access the beach from their place of residence.	The survey questionnaires for use on the ferry were designed to capture information regarding the number of beach visits the respondents would make on each ferry trip in order to develop a comprehensive view of beach use and WTP. Questionnaires for use at other beaches were distributed at the beach itself and therefore questions such as "7. Will you visit the beach during your trip to Fire island?" would not be appropriate.
DOI 022	Subappendix D1 - Section I.4.(B), page 2-3	DOI page 47	"Interviewers were not used to collect the CV information. Given the complexity of a CV questionnaire, respondents did have a degree of difficulty interpreting and responding to the 'with-project' visitation and willingness-to-pay (WTP) questions. Many respondents had the identical 'without-project' and 'with-project' visits, suggesting difficulty in interpreting the question (if that was the case 'with-project' visits should be zero)." PPA comment: It is incorrect to assume that respondents had difficulty interpreting and responding to the survey simply because "respondents had the identical 'without-project' and 'with-project' visits". This also suggests that respondents would not be induced to take additional visits to the beaches in the study under the "with project" conditions. It is common for CV surveys to include questions designed to gauge a respondent's understanding of the information and scenarios presented. However, it is unclear if such questions were included in the survey used for the beach recreation analysis.	As noted in FGRR Appendix D1 "Recreation," the question about visitation after improvements to the beach was to provide how many more visits the respondent would make, not total visits with the project. Responses indicating that the respondent would increase visitation to each beach in the same amount as their current visitation generally indicated that they were recording their total number of visits.
DOI 023	Subappendix D1 - Section I.4.(B), page 3	DOI page 47	"Extensive data editing was necessary on the 'with-project' visitation question, resulting in a likely understatement of visits and benefits." PPA comment: This statement requires detailed clarification in the FGRR. The analysis does not clearly describe what is meant by "extensive data editing," why it was necessary, why it would lead to a understatement of visits and benefits, or what was done to "edit" the data and whether it represented valid data correction/cleaning. In addition, the analysis previously stated that "many respondents had the identical 'without-project' and 'with-project' visits" to suggest there already may be minimal visitation differences.	The question about visitation after improvements to the beach was to provide how many more visits the respondent would make, not total visits with the project. Responses indicating that the respondent would increase visitation to each beach in the same amount as their current visitation generally indicated that they were recording their total number of visits. The majority of data edits were to make responses of increased visitation with the project equal to zero when the respondent indicated an increase in visitation equal or close to their current visitation. This edit may have valid increases in visitation.
DOI 024	Subappendix D1 - Section I.4.(B), page 3	DOI page 47	"An interviewer process would probe the respondent to ensure understanding and consistent answers." PPA comment: This appears to be inconsistent with a previous statement made by the authors that said "interviewers were not used to collect the CV information." If interviewers were used to "probe the respondent to ensure understanding and consistent answers," (emphasis added) then this suggests an interviewer was attempting to directly influence the responses to the CV questions. While it is common practice to control for survey mode in the analysis of CV data when different survey modes are used (e.g., mail vs internet vs phone), it is incorrect for an interviewer conducting an in-person CV survey to probe a respondent on their answers to questions with the intent to obtain "consistent" responses. Following such an approach would call into question the validity of the survey data collected and its use for analytical purposes.	The need for an interview to avoid influencing responses if fully understood. The context of the statement was that an interviewer process would have probed for the reason a respondent cited a given willingness to pay (WTP), verifying that the respondent fully understood the question. It is followed by the statement "The quality of the Data from the respondent completed methodology is a limitation of the study".
DOI 025	Subappendix D1 - Section I.4.(B), page 3	DOI page 48	"Carefully editing of questionnaires and responses reduced some of the outlier responses." PPA comment: The issue of outliers is common in data analysis. However, editing of survey responses is not consistent with standard practice to address outlier responses. The appendix does not provide details about how it defines an outlier or the analytical approach taken to identify and account for outliers in the survey data collected. This statement also needs to be fully clarified in the FGRR, with supporting documentation to ensure the validity of the analysis conducted	The most significant editing was with regards to the visitation responses for the FWP / wider beach condition. Several respondents cited increases in visitation to various beaches that exactly matched their response to existing visitation, indicating that they had misunderstood the question.
DOI 026	Subappendix D1 - Section I.4.(B), page 3	DOI page 48	"The quality of the data from the respondent completed methodology is a limitation of the study." PPA comment: We agree with this statement. However, while the authors identify the quality of the data is a limitation, the appendix requires clarification about how this limitation was appropriately accounted for in the analysis.	The limitations associated with respondent completed forms was recognized during the data collection design. Given the available budget it was determined that the ability to collect a greater number of responses outweighed the concerns regarding data quality. As noted in the two paragraphs preceding the statement regarding the limitation of the data, the data required some significant editing prior to use "resulting in a likely understatement of visits and benefits".
DOI 027	Subappendix D1 - Section I.4.(C), page 3	DOI page 48	"Normally, the WTP question for the 'with-project' condition elicits a respondent's incremental or additional WTP, above what they bid for the 'without project' condition. In this instance the WTP question only elicited the respondent's 'without-project' bid. t is not feasible to estimate directly the incremental 'with-project' WTP. This is a limitation of the study and which may overstate the NED benefits." PPA comment: This statement highlights how the survey conducted does not represent a theoretically valid valuation question for use in eliciting a respondent's incremental WTP for with-project vs without-project conditions. As such, the analysis incorrectly attributes values associated with the without-project scenario (i.e., baseline) as values that would result from implementation of the "with-project" scenario, thereby overstating beach recreation benefits from the "with-project" scenario.	The project has the potential to provide two distinct types of benefits. The benefits for preventing future erosion are captured as part of the FWOP condition. The benefits of a wider beach are captured as the increased attendance in the FWP condition.

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DOI 028	Subappendix D1Section II., page 7	DOI page 48	“The average incremental WTP from this study is greater and the number of valid zero bids is less than in other studies using similar methodology. Explanations for these differences are the questionnaire completion methodology (in the current study respondents completed the questionnaire without an interviewer resulting in a higher percentage of uncertain and inconsistent responses), the relatively high income and education levels of respondents in this study resulting in higher WTP, the small sample sizes that magnify outlier responses, and that no beach user fee is currently charged on Fire Island or at the survey beaches.” PPA comment: The appendix does not list references to other studies for which such a comparison can be made. Therefore, the statements regarding the magnitude of the WTP estimates and the number of zero bids are not currently supported. Furthermore, the analysis incorrectly references the estimates as “incremental WTP” after stating on page 3 that the structure of the survey instrument and WTP questions did not allow for the estimation incremental WTP for with-project conditions.	Best available information was utilized during the recreation analysis.
DOI 029	Subappendix D1 Section IV.2., page 10	DOI page 49	“At Fire Island the algorithm for beach attendance used the number of summer ferry (round-trip) passengers to Fire Island from the Navigation Data Center, Army Corps of Engineers (2,227,472), and information from the CV survey. The algorithm is: Fire Island Beach Visits by Visit Type = [Average summer beach visits at Fire Island per round trips on the ferry * percentage of total sample ferry trips * Total Round Trip Ferry Passengers].” PPA comment: It is not clear why it is necessary to multiply the number of round trip ferry passengers (where the appendix says this is based on the responses to the CV survey) by the average number of summer beach visits per round trips on the ferry. This equation suggests a possible inflation of estimated visitation by doubling counting trips taken and implying that multiple trips to the beach can be taken per single round trip ferry passenger. Please clarify or revise.	The majority of visits are not day trips and the survey responses indicate that there are multiple visits to the beach for each round trip ferry trip. Reference Table 5 of Sub Appendix D1 "Recreation."
DOI 030	Subappendix D1 Section VII., pages 28-29	DOI page 49	“This evaluation indicated that the number of roundtrip ferry transits is approximately 2,421,753, which is 109% of the 2,227,472 roundtrips reported in 1998. Accordingly the 1998 attendance estimate of 3,802,737 and increased visitation estimate of 486,477 have been increased by 109%) to provide a current attendance of 4,134,413. Additionally, information provided by the NPS cites a typical attendance to the Park Service beaches of 650,000 per year. To adjust the usage numbers to reflect the areas now proposed for beachfill, a conservative assumption that 84% of the visitors to Park Service beaches arriving via ferry use the community beaches would benefit from the project. Overall beach visitation by ferry passengers is estimated to be 3,484,413 per year and the increase in visitation for these users is estimated to be 445,754 per year.” PPA comment: The appendix cites the NPS as the source of the NPS visitation statistic, but it does not clearly describe how it is used to derive the overall estimate of beach use for the affected area. While the appendix states approximately 650,000 visits occur annually to NPS beaches, data published by the NPS covering recreation visits to Fire Island National Seashore indicate a lower average annual level of use of approximately 579,237 visits from 1998 through 2015. Average annual visitation over the past 10 years has been lower at roughly 516,253 visits. This suggests that visitation to the area of analysis may have been overstated. However, it is still not clear how the NPS visitation estimates are actually used to derive the overall estimate of annual beach visitation for the affected area. Please clarify in the FGRR.	Because the proposed action on NPS lands is generally limited to breach management, the visitation to the NPS beaches was excluded from the visitation used to estimate recreation visits. Use of lower visitation to the NPS properties would result in higher overall benefits.
NATIONAL PARK SERVICE				
DOI 031	General	DOI page 52	1. Breach Management and Flood Hazzard * For the safety of barrier island residents, breaches that occur within communities or within the Lighthouse tract of Fire Island National Seashore will be prevented or closed immediately. To compensate for the loss of movement of sediment into bayside environments, sediment will be mechanically placed into bayside areas where possible and practical. The National Park Service will determine when and if breaches which occur within the major federal tracts of the Fire Island National Seashore will be closed in consultation with the US Army Corps of Engineers, the New York State Department of Environmental Conservation, the New York Department of State, other Department of the Interior agencies. See also USGS comments on DEIS section 2.3.7, p. 2-33, last bullet, DGRR section 6.12.1, Table 50, DGRR p. 107). Breaches occurring on large undeveloped tracts along the FIMP project area beyond Fire Island should be evaluated to determine if it is feasible to allow them to remain open to maximize cross island sediment transport and other environmental benefits (i.e., creates early successional habitat important to State and Federally-listed species, creates regionally important Horseshoe Crab spawning areas, provides increased recreational and commercial shellfishing and finfishing opportunities, creates areas for new saltmarsh development and submerged aquatic vegetation and creates sandflats which provide important habitat for migratory shorebirds, etc.).	USACE concurs with the NPS' description of the protocol.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
DOI 032	General	DOI page 52	FLOOD HAZARD. The USACE needs to acknowledge that the primary flooding threats in the study area are associated with the management of the federally-managed inlets (Fire Island Inlet, Moriches Inlet and Shinnecock Inlet) which present a much higher risk for mainland flooding during storms. Also, the FIMP project proposes to include the dredging of 73,000 to 379,000 cy from the ebb shoal in addition to deepening the navigation channels of each inlet as part of the scheduled Operations and Maintenance dredging at a two year interval. The Corps should address the potential for this proposed practice to exacerbate the flooding hazard associated with the management of the federal inlets. It is not clear if Moriches Inlet is a managed for navigation and what impact this management has on flood hazards on the mainland. See also USGS comments on DGRR 6.1.1. and Appendix I.	The Recommended Plan provides for sand by-passing and restoration of the natural longshore processes by maintaining the existing Federal navigation channels to their authorized depths and also dredging sand trapped in the ebb shoals, with the dredged sands placed on the barrier island beach. The plan does not provide for deepening of the existing navigation channels and therefore, there would be no potential for exacerbate the flooding hazard.
DOI 033	Adaptive Management	DOI page 52	2. Adaptive Management The DEIS indicates that an adaptive management plan should include: (1) data collection that would be implemented to have an improved understanding of the physical, social and environmental setting, (2) modeling efforts (engineering and formulation) to analyze the data, and (3) an adaptive management framework that would establish the overall objectives, decision rules, and identify the adaptations to the plan that could be accomplished with the project. Given that significant data exist and substantial modeling has been done, setting objectives for the adaptive management plan should proceed at the earliest opportunity. FIMP cannot move forward without an approved adaptive management plan. The USACE recently proposed to consider several features for consideration in an adaptive management approach. These include breach closure height and template, inlet management, beachfill, non-structural implementation and coastal process features. This is a very positive step and we are committed to working closely with the Corps and the State to develop the plan. However, this plan must include the effects of offshore dredging as described in #5 below.	USACE will continue to work with DOI, New York State, and other partners prior to, during, and after construction.
DOI 034	ES-10, Appendix K	DOI page 52	3. Coastal Process Features (ES-10, Appendix K). The Corps and DOI recognize that there are additional needs and opportunities to provide for coastal process features which replicate the cross-island transport of sediment, provide barrier island resiliency, and long-term sustainability. Project features that contribute to coastal storm risk management through the reestablishment of the coastal processes are included at six locations. The Corps needs to coordinate further with the NPS on the following coastal process features proposed on NPS lands: Sunken Forest. NPS agrees that the Sailors Haven marina and bulkheads are having an impact on the bayside shoreline. However the NPS does not support the immediate removal of the marina and bulkheads at this time. A full range of alternative should be developed that could include engineered designs that at a minimum mitigate for the impacts of the marina and bulkheads including the use of breakers and other features that reduce the impacts of wave action and winter storm, to designs that would remove and redesign the marina so it has less impact on the bay shoreline and erosion. NPS does not support the removal of Phragmites or the installation of coir log bioengineering. Additional at this area, the manipulation of upper beach, dune, upland and interior dune access is an unacceptable project component and needs to be removed from FIMP. They would not be approved projects by the NPS. Reagan Property. The eroding bayside shoreline components are acceptable projects but must have an adaptive management component and monitoring element to evaluate the effectiveness of manipulating the area that would be compensating for the hard structured bulkheads of the Fire Island Pines. These methods need to be analyzed to prove their effectiveness. If they are not effective, alternative methods to restore cross-island sediment transport should be incorporated.	The FGRR and FEIS include text to document changes made to the Coastal Process Features subsequent to receipt of this comment.
DOI 035	Appendix J	DOI page 52	West of Shinnecock Inlet (WOSI). Phragmites control should be eliminated from all of these coastal process projects and FIMP in general. Removal and maintenance of Phragmites is costly with a low rate of success. The cost of such maintenance would be better utilized in other more important aspects of FIMP. An example of the difficulties in managing the removal of Phragmites is the Fire Island to Moriches Inlet Stabilization Project (FIMI) project within Smith Point County Park. Atlantique to Corneille. The NPS supports the addition of saltmarsh but not at the expense of uplands. This is an area where bayside placement of sand would be beneficial to mitigate for loss of shoreline due to bulkheads and bayside erosion and lack of over-wash and cross-island sediment. Table K-1. Table K-1has more properties listed than described than in the site-specific preceding paragraphs. Please clarify what those projects are, and if those described in more depth are the top priority. The table does not reflect that.	The FGRR and FEIS include text to document changes made to the Coastal Process Features subsequent to receipt of this comment.
DOI 036	Appendix J	DOI page 52	Breach Response Protocols Attachment A includes a number of quotes from reports that were published in the 1980s. Much has been learned since then, but we appreciate that this section recognizes the importance of breaching/overwash. Unfortunately, the ana	FGRR Appendix H "Land Management Plan" incorporates language that reflects this comment, as agreed to through discussions about mutual acceptability of the plan. Similar language may be included in the PPA, pending approval from USACE Counsel. In order to streamline the FGRR and FEIS, the Land Management Plan will only be included as an appendix to the FGRR.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
DOI 037	Appendix B	DOI page 54	5. Effects of offshore dredging on geomorphology and biological resources DEIS Appendix B states that it has been "...further hypothesized that removal of material borrow areas located on sand ridges located south of Fire Island may interrupt the onshore migration of material from the ridges to the shore face," acknowledging that the potential for this onshore movement is a plausible process. As USGS has noted, "Recent research shows that modification of the sand ridges are expected to cause changes (meters per year) to the persistent shape of shoreline in western Fire Island; a decadal scale process. Recent modeling also shows the importance of an onshore sediment flux to the coast, which is required to maintain the relative stability of the western segment of Fire Island. The impact of the proposed nearshore sand mining on cross-shore transport rate is not yet quantified." This effect of offshore dredging must be closely monitored (e.g., as part of the Adaptive Management plan) for unacceptable levels of impact on the Fire Island barrier as a part of an adaptive management plan. See also USGS comments, part I.A.(4) first paragraph. Recent research shows that modification of the sand ridges offshore of western Fire Island are expected to cause changes (meters per year) to the persistent shape of the shoreline (List et al., 2016; Safak et al., 2016).	The impacts of borrow area dredging are detailed in FGRR Appendix J "Monitoring and Adaptive Management Plan."
DOI 038	DEIS 2.3.3	DOI page 55	6. Groin Modifications Groin Modification Plan (EIS 2.3.3, p. 2-22): The existing groins at Ocean Beach would be modified by shortening and lowering the height of the structure, once the Ocean Beach water supply is relocated. The groin modification alternative partially fulfills the vision objectives, but offers limited reduction in storm damages when considered as a stand-alone alternative. Groin modification itself, can be considered as a coastal process feature. Opportunities exist for beneficial reuse of the stone, which may be needed for other coastal process features. The NPS requests the complete removal of the groins at Ocean Beach. During large storm events it is clear the groins contribute to down drift erosion to the west (ex. Tropical storm Hermine 9/2016). Removal would in fact reduce storm damages. Since the removal of the groins is predicated on the relocation of the water supply which was originally built into the FIMI project, efforts should be made to facilitate that relocation as part of FIMP if it is not completed in FIMI.	The Recommended Plan includes the removal of the Ocean Beach groins.
US FISH AND WILDLIFE SERVICE				
DOI 039	DEIS Chapter 3	DOI page 57	For those fish and wildlife resources identified in the Table of Contents under Affected Environment (i.e., Water Resources, Wetlands, Vegetation, Fish and Wildlife, Rare Species and Habitats), we believe that the existing environmental setting is inadequate and address the reasons for this in the following.. In addition, with the 15-year span between data collection and issuance of the DEIS, we are unsure of the time-frame being used to describe the existing environmental or baseline conditions. As such, an explanation and justification of the time-frame used for the baseline should be included in the FEIS, along with a discussion of why this remains relevant throughout the environmental impact analysis.	The FEIS includes an explaintion about the time frame of the data used and the overall study history; where readily available, updated data / information has been incorporated.
DOI 040	DEIS Chapter 3	DOI page 57	Comment 1: The "Affected Environment" section of the DEIS does not contain the best available information on avifauna and does not adequately describe the baseline conditions or existing environmental setting for bird species.	Comment acknowledged. The dates of field studies and data collection as compared to the DEIS publication date reflect the overall history of this project. The habitats and communities have not changed over this time period, hence the descriptions remain valid. To the extent updated information is readily available and easy to incorporate, the FEIS will include supplemental information. Unfortunately the updated information was not readily available to include in the FEIS.
DOI 041	DEIS Chapter 3	DOI page 60	Comment 2: Limitations of USACE (2003) avian survey report. Recommendations for Comments 1 and 2: See Page 60-61	The FEIS includes references provided in the comment.
DOI 042	DEIS Chapter 3	DOI page 62	Comment 1: The DEIS does not establish a current baseline condition for marine, estuarine, or freshwater fish and invertebrate species in the project area. Recommendations: ● The FEIS should describe the baseline conditions for fish and invertebrates (including shellfish), using best available information. We recommend that the USACE contact the National Oceanographic and Atmospheric Administration's (NOAA) Northeast Fisheries Science Center (NEFSC) and NYSDEC to obtain the best available information on the fish and shellfish in the project area. With much of the focus in the DEIS on Atlantic surf clams, the USACE should consider information on this species which is collected and maintained by the NEFSC. ● Researchers at the State University of New York (SUNY) Stony Brook are also evaluating mobile fauna (i.e., fish and crabs), hard clams, and other bivalve shellfish in portions of the Great South Bay areas affected by the Old Inlet breach. We recommend that the USACE contact SUNY for preliminary results of their research. Presentations of their research were given in 2015. Copies of archived presentations can be found at: https://www.youtube.com/watch?v=w-1f-4UGqsM). ● USACE (2002) reported on the need for annual fish and invertebrate surveys to maintain an understanding of the baseline conditions for these resources and their responses to changes in the environment. These surveys were discontinued. This should be explained in the FEIS along with the uncertainties introduced by the use of dated surveys in establishing the "existing environmental baseline" for the present DEIS	The FEIS was updated to included a summary of additional studies identified in the comment that were readily available,
DOI 043	DEIS Chapter 3	DOI page 63	Comment 1: The "Affected Environment" section of the DEIS does not rely on the best available information in establishing the baseline or existing environmental setting for marine and estuarine habitats, including wetlands, and water quality. Recommendations for Comments 1 and 2: See Page 64-65.	The FEIS includes an explaintion about the time frame of the data used and the overall study history; where readily available, updated data / information has been incorporated.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
DOI 044	DEIS Chapter 4	DOI page 65	Comment 1: The Environmental Consequences section of the DEIS lacks a detailed description of the environmental analysis approach used in the impact assessment. In addition, many of the stated conclusions about the impacts of the proposed alternatives are not supported by the best available information. Recommendations: ● We recommend the USACE include a detailed environmental analysis approach for fish and wildlife resources in the DEIS. ● We recommend the USACE discuss the levels of biological uncertainty and incorporate them into their analysis.	The Environmental Consequences section includes an appropriate level of analysis for evaluating the proposed alternatives, in order to comply with USACE planning and NEPA guidance.
DOI 045	DEIS Chapter 4	DOI page 66	Comment 2: The impact assessment for the proposed alternatives needs further explanation so that any potential affects can be truly analyzed. Recommendations: ● A detailed description of the anticipated outcomes for significant fish and wildlife resources including endangered species populations and habitats under each alternative, and relative to the no action alternative under all sea level rise scenarios, should be provided in the FEIS. The description should include the amount of habitat or the percent of the fish and wildlife populations likely to be directly and indirectly affected under each alternative. In addition, we recommend providing maps that show where species and their habitats will be protected or impacted. ● We also continue to recommend as we did in our May 26, 2016, letter that the USACE undertake a quantitative evaluation of the with- and without- project impacts by project reach and sea level rise scenario. This approach would offer all involved agencies a common understanding and contribution to the development of the	The Environmental Consequences section includes an appropriate level of analysis for evaluating the proposed alternatives, in order to comply with USACE planning and NEPA guidance.
DOI 046	DEIS Chapter 4	DOI page 67	Comment 3: A Conceptual Ecosystem Model (CEM) was developed by the USACE for use in the impact assessment, however, the DEIS does not specifically indicate how the results of the CEM were integrated into the impact assessment. Recommendation: ● The Corps should re-evaluate the utility of the CEM in the DEIS. Retaining the CEM and developing new relationships among drivers, stressors, and endpoints would facilitate discussions with the regulatory agencies regarding mitigation planning and overall impact assessment process.	The Conceptual Ecosystem model provided the basis for development of the Habitat Evaluation Procedures (HEP); both are replaced by the identification and integration of the Coastal Process Features as project features of the Recommended Plan.
DOI 047	DEIS Chapter 4	DOI page 68	Comment 1. The best available science does not support conclusion in the DEIS that closing or preventing all breaches and overwashes of the barrier islands will provide net benefits to shorebird populations or have no long term adverse impacts. Recommendations: ● Identify locations within project area with limited or no infrastructure where natural processes can be allowed to occur. For areas with infrastructure, quantify the amount of overwash that will be lost or prevented by the Project and develop mitigation measures to compensate for this loss; ● Complete a more thorough impact analysis that incorporates the most recent avifauna data from NYSDEC and other sources listed earlier and that takes into account the direct, indirect, and cumulative impacts. Design mitigation measures that appropriately address these impacts; ● Establish goals to address impacts from coastal engineering projects such as functional restoration of wet and dry sand habitats for shorebirds that are lost to incompatible coastal engineering practice (e.g., see Atlantic Flyway Shorebird Business Plan 2015). ● Assess bird use, abundance, and diversity and then use this data in an impact assessment, with consideration to survey design, methodology, and analysis. Investigate methods to acquire biological information and undertake the appropriate statistical analysis of birds in the environment and their response	The Recommended Plan includes Conditional and Wilderness Breach Response Plan that allows some breaches to either close naturally or to remain open. In addition inclusion of the Coastal Process Features will offset potential impacts to endangered species and provide for no net loss of sediment to the bay ecosystem. It is also noted that as a result of a breach, there is a loss of potential nesting habitat to shorebirds as a result of open water as opposed to early successional sandy beach habitat.
DOI 048	DEIS Chapter 4	DOI page 69	Comment 2. Despite the large amount of saltmarsh habitat in the study area and the potential for it to provide habitat to imperiled avian saltmarsh species, the DEIS should discuss impacts on salt marsh habitat or saltmarsh birds. Recommendations: ● Given that the Saltmarsh Habitat and Avian Research Program surveyed numerous tidal saltmarshes in the FIMP project area, we recommend reaching out to the SHARP researchers for population estimates of saltmarsh species in order to better assess impacts to these species. If these are not available we recommend using saltmarsh habitat as a surrogate for determining impacts to saltmarsh birds. The FEIS should objectively assess impacts to saltmarsh habitat by quantifying the amount of overwash/sediment transport that would be prevented by the project alternatives and model the subsequent effects on saltmarshes. ● The FEIS should also include appropriate mitigation measures which could include: Incorporating saltmarsh monitoring into adaptive management/ mitigation; restoring or enhancing saltmarshes (e.g., restoring hydrology, thin layer sediment application) to keep pace with sea level rise; looking for acquisition/buyout opportunities on the mainland in areas that would provide migration corridors for saltmarsh habitat; and funding further saltmarsh bird population monitoring and productivity studies in the project area.	The Recommended Plan will not adversely impact salt marsh or wetland habitat and includes Coastal Process Features to enhance/benefit these habitats and associated species.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
DOI 049	DEIS Chapter 4	DOI page 71	Comment 3. The conclusions regarding impacts to marine offshore birds need further discussion to indicate how they are supported by the best available information. Recommendations: ● The FEIS should identify potential mitigation measures for marine bird species. ● The impact of dredging ebb tidal shoals at the federally-maintained inlets on listed species habitat should be evaluated.	A citation supporting the conclusion that the Recommended Plan will not impact offshore birds as been added to the FEIS.
DOI 050	DEIS Chapter 4	DOI page 72	Comment 1. The proposed project alternatives will result in adverse effects to fish and wildlife and their habitats, by preventing the formation, or significantly reduce the frequency of, breaches and overwashes of the barrier islands for the next 50 years. Comment 2. The DEIS does not include an analysis of without-project and with-project impacts that presents how much early successional and wetland habitat would be formed in the without-project scenario and what would be prevented in the with-project scenario. This is critical in terms of understanding the scope and scale of impacts and the appropriate amount of mitigation that should be provided in the FEIS. Recommendations ● We continue to recommend that the USACE develop a comprehensive breach management plan which includes alternatives that address the importance and benefits of barrier island breaching and overwashing (cross-island sediment transport), and evaluate plans that achieve these benefits. ● The USACE (2002) reported on surveys conducted for back-bay benthic invertebrate and finfish communities, noting "Further evaluations of these differences will be necessary to characterize their ecological significance and to assess potential impacts." The USACE should identify if additional studies were undertaken as recommended in their study and include these in the FEIS. ● The NEFSC conducts triennial population surveys with hydrodynamic clam dredge for Atlantic surf clams and ocean quahogs. As a result, we recommend that the USACE contact the NEFSC to obtain the best available information on the distribution of this species as well as the appropriate sampling gear for the purpose of accurately describing shellfish	A revised Breach Response Plan has been developed that includes Proactive, Reactive, Conditional, and Wilderness Breach response plans, which has been agreed to by DOI as components of the Recommended Plan. The revised Coastal Process Features will ensure placement of 4.2 million cubic yards of material in order to ensure no net loss of sediment.
DOI 051	DEIS Chapter 4	DOI page 74	Comment 3. The TSP would likely adversely impact the extent and persistence of marshes over time given our knowledge about the role of overwashes and breaches on barrier island marsh and sand flat formation. Recommendation: ● The FEIS should discuss how the impacts discussed above will be addressed in way that does not compromise natural barrier island resiliency. In doing so, the DEIS should include a landscape level evaluation of wetland impacts within the project area, including the mainland.	Updates to the design and implementation of Coastal Process Features have been agreed to by DOI as components of the Recommended Plan.
DOI 052	DEIS Chapter 2	DOI page 75	Comment 1: The DEIS, pages 2-55-56, Section 2.7.3, Potential Mitigations/Best Management Practices, contains the USACE's proposals for avoiding and minimizing impacts to coastal habitats and species. As presented, it is unclear how these measures are sufficient to mitigate the potential impacts to barrier island and back-bay habitats. Comment 2: In some cases, mitigation measures are proposed that would need to be implemented on lands outside the USACE's jurisdiction, presenting uncertainties about their implementability. Comment 3: The DEIS is unclear about the creation of artificial habitats as mitigation for the project alternatives. Recommendations for Comments 1-3: ● The scope and degree of mitigation addressing the environmental impacts of this project should be approached via a quantified analysis of the with- and without-project conditions and address sea level rise scenarios. ● Modelling may assist the USACE in evaluating mitigation alternatives. For example, USFWS (2011) stated, "A marsh succession model (MSM) consisting of a geographic information system that displays the plant communities based on the salinity, soils and distance to a channel was developed as a tool to evaluate channel deepening impact."	Updates to the design and implementation of Coastal Process Features have been agreed to by DOI as components of the Recommended Plan.
DOI 053	DEIS Coastal Process Features and Ecosystem Restoration	DOI page 78	Comment 1: We do not support the assumptions made in the USACE's Habitat Evaluation Procedures (HEP) model or the results that were used to support the USACE's proposed Coastal Process Features. Recommendation: ● Mitigation measures should be developed for all project impacts, including the prevention and reduction of breaches in the project area. Measures should be developed to result in a minimum of no net loss, but preferably with a net conservation benefit.	Updates to the design and implementation of Coastal Process Features have been agreed to by DOI as components of the Recommended Plan.
DOI-SPECIFIC COMMENTS				
DOI 054	GRR, Appendix B	Page B-15, Table 5	This table lists 10 borrow areas for future renourishment that require environmental surveys, and two borrow areas for initial construction that require environmental surveys. The FEIS should include a discussion of uncertainties regarding the impacts to borrow area fish and wildlife, and a survey plan should be developed to address critical data shortfalls.	Appropriate environmental surveys and analyses for potential future borrow sites will be undertaken and documented in a Supplemental EIS/EA prior to their use.
DOI 055	GRR, Appendix I	Pages I-3,4	This description of the BRP is not consistent with the three BRPs as currently presented in the Draft Environmental Impact Statement (DEIS), GRR, or Biological Assessment (BA). An accurate and consistent description needs to be added across all documents so that it is clear to the reader what the BRP entails and so the impacts of the project can be understood and evaluated.	The FGRR and its appendices have been reviewed and edited for consistency.
DOI 056	GRR, Appendix I	Page I-15	Figure D-1, Project Plan, does not conform to, or depict, the project plans as shown in Figure 2 of the GRR, Figure B-3 of the BA or Figure 2-2 of the DEIS. All figures depicting project plans should be corrected so that they are consistent throughout all FIMP documents.	The FGRR and its appendices have been reviewed and edited for consistency.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
DOI 057	GRR	Page 26	Neither the GRR or DEIS delineate shellfish areas that may be impacted by a breach. More information should be provided so that the locations of shellfish areas and potential impacts from a breach can be understood and evaluated.	Among the impacts identified in the FGRR and FEIS is the potential for damage to shellfish areas during a major breach. The FEIS includes a general discussion of shellfish beds in both Great South and Moriches Bay and acknowledges that the locations of these can vary. The presence of shellfish beds and potential for impacts is addressed in the FEIS.
DOI 058	GRR	Page 26	GRR, page 26, states, "The existing inlets act both as hydraulic conveyances and hydraulic constrictions which limit the storm surge volume entering Great South, Moriches, and Shinnecock Bays. Comment: "The relative clause beginning with "which" describes "hydraulic constrictions," but there is no description of hydraulic conveyances in this sentence or later in this paragraph. We recommend a description should be provided. We also recommend using a simpler term and describing the effect of hydraulic conveyances. This statement would benefit from further clarification.	A description of hydraulic conveyances has been added to the FGRR.
DOI 059	GRR	Page 26	GRR, page 26, states, "...but more severe mainland flooding can occur as a result of overtopping or breaching of a barrier island, which brings more storm ocean water into the bay system during the times of moderate to severe storms." Comment: As discussed in detail herein (see also USGS comments), the Department disagrees with this statement. The relative contribution to mainland flooding from breaches and overwashes is small compared to flooding due to the existing federally-maintained inlets. Furthermore, up to this point, the document does not provide definitions of moderate or severe storms. We recommend providing definitions of these terms.	USACE acknowledges that DOI disagrees with the referenced statement. Prior sentences in the passage define storm events that cause overwash or breaches as generally, greater than a 2% annual chance of occurrence . The text also states that as the surge spreads out away from the inlets, the corresponding flood stage decreases, but this attenuation becomes less pronounced for larger storms which can overwash and breach the barrier island, thereby increasing flooding to the mainland.
DOI 060	GRR	Page 38	GRR, page 38, states, "The interim Breach Contingency Plan (BCP), that includes a process to close breaches within three (3) months and which was approved as an interim action pending the outcome of the Reformulation study, will not continue. Breaches of the barrier island will continue to be closed (with the exception of the Wilderness Area breach) but will take a year to close in the absence of a streamlined process for Federal participation." Comment: This passage should indicate that breach management occurring on NPS land will be under the direction of the NPS and not limited to the current breach in the Wilderness Area. Please elaborate on what defines a streamlined process for federal participation as this is unclear as written	A summary of the Breach Response Plans is included in the FGRR.
DOI 061	GRR	Page 41	GRR, page 41, states, "Following Hurricane Sandy, a number of home elevations have been implemented through these programs. The elevation of homes through these programs has been accounted for, based upon the information available from the local governments. No forecast of future elevation of floodplain structures is projected." Comment: The USACE should consult with the New York State Governor's Office of Storm Recovery on house elevations, as they have an ongoing program, which includes active elevations and applications for future elevations.	USACE will continue to coordinate with New York State agencies (NYSDEC, NYSDOS, NYSGOSR, etc.).
DOI 062	GRR	Page 41	GRR, page 41, states, "Monitoring of prior dredging activities suggests that the benthic communities and other biological resources within these borrow sites will not be altered on a long-term basis." Comment: This conclusion needs to be substantiated. There are no long-term studies on par with the duration of the proposed dredging activities that necessarily support this finding or assumption. The dredging activities for the Project are extensive; the initial fill volume alone is 6.44 cubic yards with additional dredge removal for renourishment and breach response activities for the duration of the project. Due to this large volume of dredge material removal more consideration should be given to the impacts of the project on benthic communities	A reference for long term benthic community monitoring at borrow areas has been added to the FGRR.
DOI 063	GRR	Page 42	GRR, page 42, states, "As presented above, barrier island breaching and overwash would contribute to sediment input into the estuaries adjacent to the barrier islands. However, the magnitude of the sediment transport would likely be reduced somewhat by closure efforts." Comment: As stated above, the USACE does not believe breaches will be closed for at least a year due to a lack of a streamlined Breach Contingency Plan (BCP) process. As a result, please expand on the comment "sediment transport would likely be reduced somewhat." There was a substantial movement of sediment into the back-bays following the creation of Pikes and Old Inlets in the early 1990s and in 2012, respectively. This influx of sediment created sand flats and bay spits used by many fish and wildlife species.	Text has been added to the FGRR to clarify that when a breach is closed the increased sediment transport through the breach while it remains open will be reduced.
DOI 064	GRR	Page 42	GRR, pages 42, states, "The need for additional housing and infrastructure is likely to result in a loss of open space and natural habitats within the study area." Comment: Please provide a reference for this statement. Changes in housing within the FIMP includes redevelopment of single parcel residential properties to high density cluster development, conversion of light industrial to residential properties, etc. The Towns of Brookhaven, Southampton, and East Hampton have open space preservation programs which should be consulted in evaluating existing and future open space development trends	The referenced sentence in the FGRR was reworded, and appropriate references were added.
DOI 065	DEIS-Exec Summary	ES-8	DEIS, page ES-8, states, "...however, the Corps and DOI have entered into an MOU in July 2014 in which both parties committed to finalizing the FIMP report, consistent with the Vision Statement. The Corps, NYS, and DOI agreed to use the public and agency review process to finalize a plan that is mutually acceptable to the Secretary of the Army and Secretary of the Interior." Comment: Correct. The agencies entered into a Memorandum of Understanding (MOU), however, the USACE and the DOI continue to coordinate on the FIMP in an effort to fulfill the Vision Statement and requirement that the project be mutually agreeable to the Secretaries of the Interior and the Army	The FEIS details how USACE and DOI have agreed on a Mutually Acceptable Plan, which is the Recommended Plan.
DOI 066	DEIS-Exec Summary	ES-11	DEIS, page ES-11, states, "...Beneficial topographic and geomorphological effects are anticipated, including raising the protective capacity of the Study area." Comment: The DEIS should clearly identify for what level of storm the project is designed to protect and should discuss the protective capacity of the project compared to Hurricane Sandy. As the FIMP is a large project with the potential for significant environmental impacts, it is important to accurately and thoroughly portray the costs and benefits of the project with the greatest level of detail possible	The level of risk reduction for the FIMP project varies considerably from location to location. For that reason the project formulation focused on the evaluating the relative overall risk reduction, as well as the residual risk associated with the various alternatives.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
DOI 067	DEIS-Exec Summary	Figure ES-1	DEIS, Figure ES-1 – "EIS Study area," and DEIS, page 3-110, Figure 3.9-1, "Potentially Affected Area within the FIMP Study Area." Comment: Figure 3.9.1 apparently denotes potentially affected areas for environmental justice analyses. Maps that depict affected areas for environmental and cultural resources should also be provided in the respective sections of the document.	The FEIS includes figures depicting resource-specific affected areas.
DOI 068	DEIS-Exec Summary	ES-10	DEIS, page ES-10, states, "The Potato Road feeder beach is contingent upon implementation of a local pond opening management plan for Georgica Pond." Comment: A local pond opening management plan for Georgica Pond is not included in the DEIS. Therefore, the Department is unable to comment on it. We note that Georgica Pond provides habitat for listed species and other plants and wildlife. This, and other ponds in Southampton and East Hampton, are significant coastal fish and wildlife habitats.	The Potato Road feeder beach has been eliminated from the Recommended Plan.
DOI 069	DEIS	2-11	DEIS, page 2-11, states, "It is expected that in the coastal ponds region, as has historically occurred and in a manner which is consistent with current practices, the East Hampton and Southampton Trustees would continue to open and close the openings between the ponds and the ocean, generally twice a year." Comment: This does not correctly describe the current condition; the coastal ponds in Southampton are opened and closed more frequently. The USACE should contact the Town of Southampton trustees for up to date and detailed information so that the Affected Environment section of the DEIS accurately describes the existing environmental setting. This, in turn, would assist in the comparison of alternatives and with and without project analyses. Additionally, since this activity is undertaken under the USACE's Regulatory Program, the DEIS should discuss how that federal action (permit issuance) effects, to any degree, the FIMP.	Since the recommended plan in the FGRR does not include any features associated with the Ponds reach, no further coordination with these towns is required.
DOI 070	DEIS	3-3	DEIS, page 3-3, states, "This attenuation of ocean surges becomes less pronounced for larger storm events which can overwash and breach the barrier island. Therefore, the flood problem along the mainland is linked to the topographic condition of the barrier system. Flooding occurs as a result of surge propagating through the inlets, but more severe mainland flooding can occur as a result of overtopping or breaching of a degraded barrier island, which brings more storm ocean water into the bay system during the times of moderate to severe storms." Comment: The GRR/DEIS indicates that storm surge via island breaching and overwash are significant flooding hazards, yet the potential of the island chain in damping storm surge in the back bays is not clearly outlined in the plan. The majority of storm-induced flooding hazards (damages) are due to water exchange between the ocean and back bays via managed inlets (navigation channels), and not from breaches and overwash. Nowhere in the report are the relative contributions of flooding through inlets or overwashes clearly differentiated. Nor is there any discussion of the effect storm duration has on flooding hazards. For long duration storm events, a vast majority of the storm surge makes it into the bays; for sea level rise, 100 percent makes it into the back-bays. Current science does not support the USACE's position that the threats associated with breaching/overwash are the primary inundation threats in the FIMP project area. Instead, the flooding hazard associated with the management of federal inlets present a much higher risk	USACE concurs that storm-induced flooding between the ocean back bays via the inlets account for most of the flood damages experienced in the study area, with breaches and overwash having significant contributions primarily during the most severe storm events. Most of the project damages (and benefits) occur on the mainland, with the greatest costs associated with the nonstructural measures included in the Recommended Plan. Additional, ongoing analyses will quantity the relative percentages due to the inlets vs. breaches and overwash. The FGRR will detail the results of these analyses.
DOI 071	DEIS	3-4	DEIS, page 3-4, Section 3.2.1, "Surface Waters" Comment: This section references studies or reports by the USACE (1998 and 1999f). However, these reports do not represent the best available information concerning water quality on the south shore bays. Please contact the New York State Department of Environmental Conservation (NYSDEC) and/or the following website for more up-to-date information: http://www.dec.ny.gov/docs/water_pdf/wiatllisgsbfii.pdf. We also recommend that the USACE contact the Suffolk County Department of Health and Safety (SCDHS) for additional information on water quality as they have been conducting monthly monitoring of the south shore bays relative to water quality indicators, as well as harmful algal blooms, brown tide, red tide, etc. More information is available on their web site at: http://www.suffolkcountyny.gov/Departments/HealthServices/EnvironmentalQuality/Ecology/MarineWaterQualityMonitoring.aspx Overall, we believe an accurate baseline of surface water conditions is necessary to address the potential impacts, either beneficial or adverse, the project alternatives may have on water quality.	The referenced NYSDEC and Suffolk County websites do not provide additional water quality data that is readily available. No changes were made to FEIS to address this comment.
DOI 072	DEIS	3-4	DEIS, page 3-4, states, "The numerical model includes all the necessary processes to accurately simulate the inlet and barrier island overwash processes and breaching processes in a system-wide and comprehensive manner for the complete FIMP project area, considering the three bay and inlet system (GRR 2016 Appendix A)." Comment: This model should be used in the development of the with- and without- project impacts.	The numerical model was used to develop bay stage-frequency curves and overwash-breaching impacts for various project alternatives.
DOI 073	DEIS	3-5	DEIS, page 3-5, states, "There is little to no information on current water quality conditions for coastal ponds on the south shore, which include Mecox Bay, Sagaponack Lake and Georgica Pond (Suffolk County Department of Health and Safety 1996)." Comment: The above comment is no longer accurate. We recommend the USACE contact the NYSDEC for more up-to-date information. In addition, the following link provides current information relative to water quality issues for these and other ponds: http://www.dec.ny.gov/docs/water_pdf/wiatllissbao.pdf	The Recommended Plan does not include any features that would affect water quality of the coastal ponds. The FEIS has been revised to document this fact.
DOI 074	DEIS	3-7	DEIS, page 3-7, Figure 3.2-1, "Major Surface Water Features in Study Area" Comment: This Figure only depicts central Great South Bay and not the other surface water features in the project area, both freshwater and saltwater. This figure should be updated to include the other major surface water features in the project area so that the full extent of the Affected Environment and existing environmental setting is clearly depicted and easily understood.	The DEIS inadvertently included only one page of this mult-page figure; the FIES includes all 6 Map pages and depicts all major surface water features in the Study Area.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
DOI 075	DEIS	3-8	DEIS, page 3-8, states, "No significant differences in DO existed either spatially or temporally and no general geographic patterns of increase or decrease were evident." Comment: As noted above, we recommend that the USACE coordinate with the NYSDEC and the SCDHS for additional and up-to-date water quality data and include this information in the FEIS	The FEIS will state the timeframe of data used to describe the affected environment. The dates of field studies and data collection as compared to the DEIS publication date reflect the overall history of this project. Updated water quality information would not change the conclusions of the FEIS and has not been incorporated.
DOI 076	DEIS	3-9	DEIS, page 3-9, states, "Salinity throughout the water column varied from 21.60 to 39.31 ppt for the entire three-year study." Comment: These were taken at several locations off the coast of Long Island. The lower limit seems low for ocean waters. Please clarify.	Salinity values in the EIS were checked to the study data and are correct.
DOI 077	DEIS	3-9	DEIS, page 3-9, states, "Alternately, unstabilized inlets are vulnerable to closure as evident from inlet records. For instance, no inlets to Moriches Bay existed for a period of nearly 100 years from 1839 to 1931. It is likely that submerged aquatic vegetation (SAV) beds and associated eelgrass (Zostera marina) were absent from the bay during this period due to low salinity and water clarity conditions. Furthermore, estuary records available for the majority of the 20th century indicate that tidal ranges for Moriches and Shinnecock bays have constantly increased, presumably improving water quality in the bays." Comment: The DEIS should explain why tidal ranges have constantly increased in Moriches and Shinnecock Bays. We note Militello and Kraus (2001) reported the following after Shinnecock Inlet was dredged to new specifications in 1990, "It should be noted that local residents have anecdotally remarked that the tide range seems to be increasing in Shinnecock Bay - for example, residents have noted an apparent rise in reach of the water level at docks	USACE is not aware of any scientific evidence that support the anecdotal observations regarding tidal ranges increasing in Shinnecock Bay.
DOI 078	DEIS	3-11	DEIS, page 3-11, states, "Additionally, the narrow inlets connecting the bays to the ocean waters prevent adequate flushing of oxygenated bay waters into the hypoxic river bottoms." Comment: Is this stating that the federally-maintained inlets are narrow? Please clarify.	The Inlets are maintained at the authorized width. The word "narrow" has been deleted from the referenced sentence.
DOI 079	DEIS	3-15	DEIS, page 3-15, Section 3.3.4.1 "Bay Intertidal (including Salt Marsh, Sand Shoal, and Flats)" Comment: This section does not include a quantification of these habitats in the project area. Information from the NYSDEC's website at http://www.dec.ny.gov/lands/5113.html provides information on trends in wetland losses that should be included in this environmental analysis as the proposed project would likely impact wetland development on the barrier island through the reduction in sediment transport via breaches and overwashes. This information should be used to guide the USACE in developing a strategy for restoration projects that would benefit existing salt marshes and in the formulation of mitigation alternatives	Wetland mapping information from NYSDEC's website has been incorporated into FEIS Appendix A to illustrate the location, classification and size of wetlands in the study area.
DOI 080	DEIS	3-17	DEIS, page 3-17, states, "Coastal inlets play an important role in nearshore processes. Inlets are the openings in coastal barriers through which water, sediments, nutrients, planktonic organisms, and pollutants are exchanged between the open sea and the protected embayments behind the barriers." Comment: We recommend that the FEIS include a discussion on the importance of inlets as migratory pathways for commercially and ecologically important fish, shellfish, foraging areas for marine avifauna, and primary pathways for normal and storm tidal surges. Recent examples to draw upon include Pikes Inlet (1992) and Old Inlet (2012-present). Breaches and inlets can have beneficial effects on biological resources and these should be described sufficiently in the DEIS using the best available information and science so that they can be understood. These biological impacts are important considerations in the comparison of project alternatives and mitigation measures	The FEIS text has been revised to include a discussion of the importance of inlets and their beneficial effects.
DOI 081	DEIS	3-18	DEIS, page 3-18, states "Mapped New York State Freshwater Wetlands for the barrier islands are listed and shown, in table and figure format, in Appendix A." Related to this, the DEIS at page 321 states, "Mapped New York State Freshwater Wetlands for the mainland upland habitat are listed and shown, in table and figure format in Appendix A." Comment: Appendix A of the DEIS provides a list and two "snapshot examples" of freshwater wetlands on the mainland and barrier island. Either the statements above (and similar ones throughout Chapter 3) should be modified or Appendix A should include maps for all the freshwater wetlands in the project area. Otherwise, the DEIS will include an incomplete presentation of freshwater wetlands in the project area.	Wetland mapping information from NYSDEC's website has been incorporated into FESI Appendix A "New York State Mapped Freshwater Wetlands in the Study Area" to illustrate the location, classification and size of wetlands in the study area.
DOI 082	DEIS	3-19	DEIS, page 3-19, states, "A comprehensive vegetation mapping study for the FIIS found that less than 1 percent of the 4,075 vegetated acres analyzed was represented by freshwater wetland habitat associations (CMI 2002)." Comment: See comment above. The DEIS does not address the location of freshwater wetlands for the rest of the project area. This should be included in the Final EIS and available for others to review and assess.	Wetland mapping information from NYSDEC's website has been incorporated into FESI Appendix A "New York State Mapped Freshwater Wetlands in the Study Area" to illustrate the location, classification and size of wetlands in the study area.
DOI 083	DEIS	3-20	DEIS, page 3-20, states, "A comprehensive vegetation mapping study for the FIIS found that approximately 21 percent of the 4,075 vegetated acres analyzed was represented by low (11 percent) and high salt marsh (10 percent) (CMI 2002). Of the 330 barrier island acres cover type mapped by the USACE in 2001–2002, approximately 7 percent was salt marsh and 4 percent was characterized as bayside intertidal flats (USACE 2003a). There is an estimated 2,984 acres of salt marsh and 375 acres of sand shoal/mud flat habitat associated with the barrier islands (USACE 2005e)." Comment: To make this information more accessible and understandable to the reader it should be provided in a table and map along with more detail on the locations where these measurements were made. The USACE should discuss any discrepancies between results presented above.	Information is presented for overall characterization of the area. Discrepancies likely reflect level of accuracy, differences in methodologies, differences in the spatial extent of areas mapped, and base data sources used in the referenced studies. While including a table might be helpful, it is considered unnecessary to describe the existing environment and has not bee added to the FEIS. Additional wetland mapping has been added toFESI Appendix A "New York State Mapped Freshwater Wetlands in the Study Area."
DOI 084	DEIS	3-20	DEIS, page 3-20, states, "A comprehensive vegetation mapping study for the FIIS found that approximately 8 percent of the 4075 vegetated acres analyzed was represented by common reed marsh (CMI 2002)." Comment: To provide for a better description of the existing environmental setting and baseline conditions, and to include the best available information in the impact analysis, the FEIS should include similar information for the rest of project area	Vegetation community mapping included in the Conceptual Model developed for FIMP will be incorporated into the FEIS.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
DOI 085	DEIS	3-25	DEIS, page 3-25, states, "The Sunken Forest is identified as an indicator community for the maritime forest habitat type in the FIMP Conceptual Model (USACE 2006a)." Comment: Here, and throughout the document, indicator species are referenced but is unclear how they were used in the impact assessments and further discussion about these species is not provided after their first mention in the document.	The referenced sentence does not add value to the assessment and will be deleted.
DOI 086	DEIS	3-25	DEIS, page 3-25, states, "Within the Study Area much of the bayside beach has been eliminated due to bulkhead construction, immediate upland development and/or severe erosion." Comment: The limited bayside beaches do provide ecological function such as foraging areas for shorebirds and spawning sites for horseshoe crabs. On a local level they can be very important in driving changes in the distribution, abundance, and productivity of piping plover and other shorebirds, such as at Smith Point County Park. USACE (2003) indicated these had the highest densities of shorebirds. The USACE should consider these species' use of this habitat when evaluating impacts of the project alternatives and the use and importance of these areas should be presented in the DEIS so that the reader understands the ecological value of the bayside beaches.	The FEIS has been revised to include information about bayside beaches ecological function to aid in evaluating impacts of project alternatives.
DOI 087	DEIS	3-28	DEIS, page 3-28, states, "In general, the ocean quahog is considered a marine offshore species with adults most commonly occurring in dense beds of waters ranging from 26 feet to a depth of 200 feet (USFWS 1997b). One of the USACE reference studies reviewed reported collection of ocean quahog, and this was limited to a single occurrence during a three-year study conducted west of Shinnecock Inlet (USACE 2008)." Comment: We note that the sampling gear used for the referenced surveys in USACE (2008) for benthic macroinvertebrates included otter trawls or Smith-McIntyre (0.1 square meter) benthic grab samplers, both of which are not the preferred gear for ocean quahog stock assessments based on the review of Northeast Fisheries Science Center (NEFSC) stock assessment reports at http://www.nefsc.noaa.gov. Of note, the NEFSC conducts triennial population surveys with hydrodynamic clam dredge for Atlantic surf clams and ocean quahogs. As a result, we recommend that the USACE contact the NEFSC to obtain the best available information on the distribution of this species as well as the appropriate sampling gear for the purpose of accurately describing shellfish resources in the borrow areas. Best available information for this species would allow the USACE to undertake a more realistic assessment of the potential impacts of the project alternatives on this and other important offshore benthic resources.	Any recent NEFSC stock assessment reports were obtained; no information relevant to ocean quahog distribution in the borrow areas was found, therefore, no updates to the FEIS were necessary. Future monitoring for ocean quahog will follow NEFSC protocols, including recommended sampling equipment.
DOI 088	DEIS	3-28	DEIS, page 3-28, states, "Off the coast of Long Island, surf clam beds extend from the marine beach habitat to marine offshore depths of approximately 150 feet (USFWS 2007d)." Comment: The document should clarify whether this is within the depth zone of the borrow areas, and, if so, what the potential impacts and proposed mitigation would be to the resource.	The FEIS clarifies that borrow areas are within the depth zone that corresponds to that where surf clams may be found and evaluates potential impacts and mitigation measures for benthic organisms.
DOI 089	DEIS	3-28	DEIS, page 3-28, states, "Several surf clam stock assessments conducted by NYSDEC and USACE determined higher concentrations of surf clam can be found within waters west of Fire Island Inlet in comparison to waters east of the inlet (USACE 2002b), however surf clam densities can be expected to fluctuate in space and time as evidenced by historical data (NOAA NMFS 2000)." Comment: The stock assessments referenced above were conducted over 14 years ago. We note that the NEFSC conducts triennial stock assessments for these species and should be consulted for best available information. As noted, surf clam populations can be expected to fluctuate throughout the project area, therefore, the DEIS should address in the impacts to this species over the 50-year life of the project.	NEFSC data regarding the distribution of surf clams has been compiled and pertinent information has been added to the FEIS.
DOI 090	DEIS	3-28	DEIS, page 3-28, states, "A 2001 surf clam survey conducted by USACE in borrow areas located within the Study Area reported the highest concentrations of surf clam within the area of Fire Island Pines and areas west of Shinnecock Inlet (USFWS 2007d), however, the sampling locations selected for this study were not intended to quantify surf clam populations for the entire Study Area." Comment: See comment, above.	NEFSC data regarding the distribution of surf clams has been compiled and pertinent information has been added to the FEIS.
DOI 091	DEIS	3-29	DEIS, page 3-29, states, "Common species observed in the area throughout the year include species of scoter (Melanitta spp.), greater shearwater (Pufinus gravis), and northern gannet (Morus bassanus) (USACE 2003a, Coastal Research and Education Society of Long Island [CRESLI] 2006)." Comment: The DEIS should indicate that these were shore-based conducted surveys or explain the limitations in detecting seabird use of the proposed offshore borrow areas via land-based surveys. The USFWS's North Atlantic Landscape Conservation Cooperative has undertaken mapping of predicted probabilities of occurrence of Atlantic seaduck populations. The maps are intended to be used for informing decisions about siting offshore facilities; marine spatial planning; and other uses requiring maps of seabird distributions. Additional information can be found here and should aid the USACE in the discussion of seaducks in the coastal areas of Long Island and apply this information in the impact assessment: http://northatlanticlcc.org/projects/marine-bird-mapping-and-assessment	A discussion of limitations of land-based surveys is included in the FEIS. USFWS information has been considered in the impact assessment.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
DOI 092	DEIS	3-29	DEIS, page 3-29, states, "Mammals use the marine offshore habitat of the Study Area primarily as a migration corridor. Whale indicator species identified for this habitat in the FIMP Conceptual Model include the pygmy-sperm whale (Kogia breviceps) and the Federally and state endangered North Atlantic right whale (Balaena glacialis) (USACE 2006a)." Comment: It is not clear why only indicator species are discussed. The USACE should describe all marine offshore mammals that are documented within the project area based on the best available information. Furthermore, while these species were identified as indicator species for marine offshore habitat, this section does not clarify if they are found within in the project area, and if so, what their distribution or abundance is. A more complete description of marine offshore mammals should be provided so that a complete and accurate impact analysis can be performed. The significance and presence of the indicator species should be described such that the reader can understand how indicator species were incorporated into the impact analysis.	A more complete description of marine offshore mammals is provided in the FEIS. The significance and presence of the indicator species, and methods used in the impact analysis are described in the FEIS.
DOI 093	DEIS	3-29	DEIS, page 3-29, states, "Whale indicator species identified for this habitat in the FIMP Conceptual Model include the pygmy-sperm whale (Kogia breviceps) and the Federally and state endangered North Atlantic right whale (Balaena glacialis) (USACE 2006a)." Comment: The pygmy sperm whale distribution includes deeper waters from the outer continental shelf and beyond. With such a distribution, it is unclear why it was selected as an indicator species. The USACE should include a discussion on why it was selected as an indicator species and how this factored into the impact assessment undertaken in the DEIS Environmental Consequences section.	The FEIS has been updated to include a discussion on why it was selected as an indicator species, and how this factored into the impact assessment.
DOI 094	DEIS	3-30	DEIS, page 3-30, states, "The greatest concentrations of surf clams are associated with depths less than 65 feet (USFWS 1997b), however this species is not commercially significant throughout the Study Area due to its recent decline in population." Comment: This assessment is not based on the best available information and conflicts with other statements made earlier in the document. In terms of best available information, more recent analyses indicate that Atlantic surf clam is one of top 10 landed species in terms of economic value (see Scotti et al 2010). Species that are commercially significant should be accurately described and these discrepancies should be fixed or explained.	Information about the commercial significance of Atlantic surf clam in the study area has been added to the FEIS.
DOI 095	DEIS	3-32	DEIS, page 3-32, states, "Inlets represent important areas where the exchange and circulation of bay waters takes place, with Fire Island Inlet being crucial in maintaining the high productivity rate of Great South Bay (USFWS 1991)." Comment: The Service notes that we believe all coastal inlets are features that can contribute to ecological sustainability, diversity, and productivity.	USACE agrees that all coastal inlets are features that can contribute to ecological sustainability, diversity, and productivity.
DOI 096	DEIS	3-33	DEIS, page 3-33, states, "The marine intertidal habitat is an important feeding area for many species of waterfowl, including sandpipers (e.g., spotted sandpiper [Actitus macularia], and Calidris spp.), as well as the Federally and state endangered piping plover (Charadrius melodius)." Comment: The federal status of the piping plover is incorrect and should be changed to "Federally threatened and state endangered."	The FEIS now states that the Federal status of the piping plover is "Federally threatened and state endangered."
DOI 097	DEIS	3-35	DEIS, page 3-35, states that " The upland habitats of the barrier island ecosystem support a variety of bird species. One hundred sixty-two (162) species of songbirds and various raptors utilize upland areas of the barrier islands within the Study Area (USACE 2003a)." Comment: In the report, the 162 species referenced above also include other families of birds including shorebirds, seabirds, waterfowl and others, some of which do not utilize upland areas. We recommend that the USACE re-evaluate their data and revise this statement accordingly so that the existing condition is correctly represented and so accurate information is incorporated into the impact analysis and development of mitigation measures.	Text in the FEIS has been revised to accurately describe species that utilize the upland areas of the barrier islands.
DOI 098	DEIS	3-35	DEIS, page 3-35, states, "Based on 2002–2003 avian surveys, 32 of the 162 bird species documented on the barrier island were observed in the dunes and swales habitat (USACE 2003a). This includes many of the shorebirds and gulls that are found in the marine beach habitat of the Atlantic shores and inlets ecosystem as described and listed in Appendix C, Table C-3. In addition, numerous other species are commonly found within the more protected areas behind the dune. The state special concern horned lark (Eremophila alpestris) is known to breed and winter in the Study Area and the snow bunting (Plectrophenax nivalis) is a winter visitor with flocks ranging from dozens to several hundred." Comment: The USFWS has identified a number of species of high conservation concern that should be addressed in the environmental impact analysis. These species are discussed in Steinkamp (2008)	Text is included in the FEIS to better communicate impacts to species of high conservation concern referenced in the comment.
DOI 099	DEIS	3-35	DEIS, page 3-35, states, "The snowy owl (Nyctea scandiaca) is a regular visitor to the south shore of the barrier island, often spotted within the dunes and swales habitat and is also considered a dune and swales habitat FIMP Conceptual Model indicator species (USACE 2006a)." Comment: The snowy owl is often described as an irregular irruptive species that occurs in certain winters (Gross 1931; Gross 1947; Newton 2002). More information about how "regular visitor" is defined and/or information about the selection of this species as an indicator species should be provided and its ultimate utility on addressing the impact of the TSP on breeding and migratory fish and wildlife species should be clear. How indicator species were chosen for the FIMP conceptual model should also be explained and the species chosen should be appropriate as the conceptual model was developed to "guide the EIS' evaluation of potentially significant impacts" (USACE 2004).	"Regular visitor" is defined in the FEIS. In addition, the FEIS includes information about the selection of certain species as indicator species.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
DOI 100	DEIS	3-36	DEIS, page 3-36, states, "a variety of birds use the sandy bayside beach habitat for resting and feeding, including several endangered/threatened/special concern taxa…However, these species typically do not nest in bayside beach habitat found within the Study Area (Bull 1985, DeGraff and Rudis 1986, Stokes and Stokes 1996, Sibley 2000, USACE 2003a.)" Comment: Piping plovers have been documented nesting on storm-created bayside beaches on Fire Island and elsewhere in the project area. Information specific to Fire Island is available in reports provided to the Service and the USACE by Derose-Wilson (2013, 2014, and 2015) and Monk et al. (2015). The use and importance of bayside habitat to piping plovers and other species should be adequately described and depicted in the DEIS as the project alternatives will likely have impacts on this habitat. Furthermore, the potential impacts of the project alternatives in limiting or preventing access to these habitats due to dune construction and planting of vegetation, and the subsequent vegetation succession, should be discussed in the DEIS and mitigation measures provided as appropriate	Information regarding bayside habitat to piping plovers and other species, and potential impacts from project alternatives has been added to the FEIS.
DOI 101	DEIS	3-38	DEIS, page 3-38, states "Invertebrate indicator species identified in the FIMP Conceptual model for the bay intertidal habitat include horseshoe crab, barnacles, eastern mudsnail, Say mud crab, hermit crab, green crab and other crab species, amphipods, isopods, sea stars and zooplankton (USACE 2006a)." Comment: The invertebrate indicator species for the bay intertidal habitat do not include any infauna such as oligochaete worms and nematodes which were shown to dominate bay intertidal sediment core invertebrate samples in the USACE's 1999 study entitled, "Comparative Study of Beach Invertebrates on the Westhampton Barrier Island." These types of invertebrates are important food sources for shorebirds and excluding them from the model may under-estimate potential impacts to wildlife at higher trophic levels. Overall, many of the selected indicator species are large and motile, which is not representative of the invertebrate community as a whole.	The indicator species for the FIMP project were chosen during preparation of the Phase 1 Conceptual and Phase 2 Conceptual Model (USACE, 2001 and USACE, 2004) development. The models were developed with input from Federal agencies, State agencies, universities, consultants and other offices. Stakeholders included the USGS and NPS. The indicator species were also presented in the USACE 2006 FIMP Reformulation Study Phase 3. The indicator species were utilized to identify which project features could impact the various habitats and communities and are a component of the impact assessment. At this juncture, it is not feasible to change the previously identified indicator species.
DOI 102	DEIS	3-41	DEIS, page 3-41, states, "Based on habitat availability, salt marsh had one of the lowest numbers of individuals per acre recorded for the study relative to other habitats, with 13.4 individuals per acre. Common reed and common-reed/shrub dominated communities had 25 individuals per acre (USACE 2003b)." Comment: Vegetation structure and habitat complexity support greater abundance and diversity of avian species. However, this comparison does not address among habitat differences, for instance, among barrier island saltmarshes or mainland saltmarsh habitats which may assist in directing restoration or mitigation alternatives. In the case of non-endemics such as upland birds or migrants, their presence in saltmarsh habitat can be affected by tidal cycle and season. The 2003 study referenced in this section is also confounded by sampling methods that failed to capture or underrepresented secretive marsh bird abundance (see Conway and Gibbs 2005; Conway and Gibbs 2011), as well as inadequate sampling across habitats and seasons. Therefore, an accurate representation of avian use of saltmarsh and the relative importance of saltmarsh within the project area should be clarified. Adequate sampling, evaluation, and discussion of avian saltmarsh use should be incorporated so that the existing condition is understood and so that a sufficient impact analysis can be performed.	A statement regarding the importance of salt marsh as avian habitat has been added to the FEIS.
DOI 103	DEIS	3-41	DEIS, page 3-41, states "Osprey, sharp-tail sparrow (Ammodramus caudacutus) seaside sparrow (Ammodramus maritimus), American oystercatcher, piping plover, and least tern as well as seabirds, egrets, herons, rails, other shorebirds, and migratory and resident passerine species are the FIMP Conceptual Model indicator species/groups for the salt marsh (including shoals and sand and mud flats) habitat type (USACE 2006a). Comment: Grouping the Conceptual Model data for shoals, sand- and mudflats together with saltmarshes may obscure larger trends in the data considering that "saltmarsh had one of the lowest numbers of individuals per acre recorded for the study relative to other habitats, with 13.4 individuals per acre", while "sand shoal and mudflats of the bayside intertidal areas had the highest species richness and abundance of all community types surveyed, with an average of 37.6 individuals observed per acre (USACE 2003a)". Separating these two habitat types and designating separate indicator species may allow for more accurate estimation of impacts since the avian communities may respond differently. However, it is still unclear how these were applied in the Conceptual Model and how results of the Conceptual Model was used in the impact assessment.	The FEIS includes a discussion about the indicator species for each habitat, the application of the Conceptual Model, and how the results of analyses were used in the impact assessment.
DOI 104	DEIS	3-41	DEIS, page 3-41, states, "The black skimmer (Rhynchops niger) is another FIMP indicator species for this habitat type and is a common breeder in the Study Area and is often found utilizing bay subtidal areas for foraging." Comment: Best available information from the NYSDEC indicates that the black skimmer is not a common breeder in the project area. There are presently several confirmed colonies occurring on Long Beach Island and the Rockaways, which is well west of the project area. We recommend that the USACE consult with the NYSDEC to obtain the best available information and update the DEIS to accurately reflect the current use of the project area by skimmers.	The FEIS includes a information about black skimmer presence in the study area.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
DOI 105	DEIS	3-42	DEIS, page 3-42, states "The habitat diversity provided by the proximity of the upland areas to marshes and tidal creeks along the bays supports a variety of bird and wildlife species. Many of the bird species described for the terrestrial upland of the barrier island ecosystem can also be found within the vegetated habitats of the mainland upland. The coastal ponds along the south shore of the mainland, especially the larger brackish ponds, support migrating and wintering waterfowl. Similar to the intertidal areas of the barrier island, periodically exposed shoreline areas provide significant foraging opportunities for shorebirds as well as foraging and breeding opportunities for osprey." Comment: This section lacks specificity. The description provided is vague and it is unclear what species are using this habitat. Specific species found in this habitat should be listed so that the existing environmental and baseline condition is represented using the best available information and incorporated into the impact analysis.	The FEIS includes species-specific information in the referenced section.
DOI 106	DEIS	3-43	DEIS, page 3-43, states, "Based on habitat and life history assessments, it has been determined that the following Federally listed species are likely to occur in the FIMP Study Area (USACE 2014b): • Piping Plover (Charadrius melodus), Federally Threatened; • Roseate Tern (Sterna dougallii), Federally Endangered; • Rufa red knot (Calidris canutus rufa), Federally Threatened; and • Seabeach amaranth (Amaranthus pumilus), Federally Threatened." Comment: Based on limited surveys that were recently undertaken by the USFWS and others, the northern long-eared bat (Myotis septentrionalis; threatened) also occurs in the project area. Two south shore sites that have been identified include the Wertheim National Wildlife Refuge and the NPS's William Floyd Estate.	The FEIS includes USFWS and others' northern long-eared bat data.
DOI 107	DEIS	3-44	DEIS, page 3-44, states, "The piping plover population on has supported as many as 54 pairs of piping plovers (in 2008), declining to 27 pairs in 2013." Comment: It is not clear where the location of this population is based on this incomplete sentence. Accurate piping plover populations and NYSDEC LICWS survey areas should be included in the DEIS so the public and agencies can evaluate the impact assessments in the DEIS.	The FEIS includes location information and NYSDEC LICWS survey area data.
DOI 108	DEIS	3-44	DEIS, page 3-44, states that the federally-listed species in the project area (Piping Plover, Roseate Tern, Rufa Red Knot, and Seabeach Amaranth), "...are found within essentially the same habitats. This habitat encompasses areas located between the high tide line and the area of dune formation and consists of sand or sand/cobble beaches along ocean shores, bays and inlets and occasionally in blowout areas located behind dunes." Comment: This list misses key habitats used by these species. Specifically, overwash is used by piping plovers for nesting and foraging (USFWS 1996; Schupp et al. 2013), and both piping plovers and red knots use areas below the high tide line (i.e., intertidal areas) for foraging (Loegering and Fraser 1995; Houghton 1999; Elias-Gerken et al. 2000; Fraser et al. 2005; Niles et al. 2008; USFWS 2014). Ephemeral pools are also used by foraging piping plovers (McIntyre and Heath 2011; Elias-Gerken et al. 2000). An accurate description should be provided such that impacts of the project on these species can be understood and evaluated. It is important that the environmental baseline conditions are presented so that this information can be evaluated along with the comparison of alternatives - especially as overwash and intertidal areas will be affected directly and indirectly by the project.	The FEIS includes greater detail regarding key habitats used by Federally-listed species.
DOI 109	DEIS	3-44	DEIS, page 3-44, states, "According to USFWS, Hurricane Sandy created approximately 200 acres of new potential overwash habitat located within the project area (USACE 2014b)." Comment: It is hard to determine what is meant by "new potential overwash habitat." Based on context, this sentence is likely describing the amount of potential nesting habitat in the form of overwash that was created. The sentence should be rewritten accordingly. Additionally, it should specify how many of the 200 acres are still available as potential nesting habitat. The intent of providing this information should also be clarified. Understanding the current extent of available nesting habitat for piping plovers is critical in determining the impacts of the project alternatives on this species.	The FEIS includes information about the current acreage of potential piping plover nesting habitat.
DOI 110	DEIS	3-44	DEIS, page 3-44, Table 3.6-1, "Federal- and State-Listed and Candidate Species That May Be Potentially Affected by the Project" lists the Least Tern as federally-listed (endangered). Comment: The Atlantic Coast population of the least tern (Sterna antillarum) is not federally-listed. This should be corrected	The FEIS states that the Atlantic Coast population of the least tern is not Federally-listed.
DOI 111	DEIS	3-47	DEIS, page 3-47, states, "Common tern breeding sites within the barrier beach Study Area include Fire Island Sunken Forest, Fire Island Wilderness, and Fire Island Long Cove (NYSDEC 1997)." Comment: This information is outdated and is not supported by best available data which is available through the NYSDEC. Currently, the saltmarshes provide the majority of nesting habitat for common tern in the project area. This should be updated so that existing condition is accurately described and so that impacts of the project on the species and its required habitat are evaluated properly. Accurately describing common tern use of saltmarsh is of particular importance since the project may have indirect impacts on the development and long-term stability of saltmarsh habitat.	The FEIS includes information about common tern breeding sites.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
DOI 112	DEIS	3-48	DEIS, page 3-48, states, "During the USACE avian surveys in the Study Area, least terns were observed within beach and primary dune habitats and as flyovers. In May and June of 2002 a mixed colony of nearly 100 common and least tern was documented on the beach/primary dune area just east of Shinnecock Inlet; the colony was again documented at this location during 2003 spring surveys (USACE 2003a)." Comment: Best available data for recent trends (up to the present) are available from the NYSDEC. To best represent the baseline condition of the Affected Environment, we recommend the USACE update the DEIS with more recent information	The FEIS includes reference to best available NYSDEC data for least terns.
DOI 113	DEIS	3-49	DEIS, page 3-49, states, "The current Peregrine falcon range within the State includes the Adirondacks, the New York City area, and the Hudson Valley." Comment: The DEIS should be updated with best available information from the NYSDEC as this sentence does not provide an accurate description of the range of this species.	The FEIS includes reference to best available NYSDEC data for Peregrine falcon ranges.
DOI 114	DEIS	3-49	DEIS, page 3-49, states for piping plovers that, "Mating generally begins in late March and continues through early June." Comment: Mating can occur into late June and early July; this should be reflected in the DEIS. It is important that the correct breeding season is understood and described since this will need to be factored in the Environmental Consequences section. Additionally, best management practices and mitigation measures often integrate time-of-year restrictions based on breeding season so correct breeding chronology should be recognized.	The FEIS includes correct information about piping plover mating season.
DOI 115	DEIS	3-49	DEIS, page 3-49, states, "Piping plovers nest within the Study Area at several locations, including Democrat Point, Robert Moses, Smith Point, Cupsogue, Shinnecock East Hampton." Comment: The species nests at 29 sites across the project area according to best available information available from the NYSDEC. Information regarding the nesting locations of piping plovers throughout the Affected Environment area should be accurate and up to date and should be clear to the reader as this species will likely be impacted both directly and indirectly by the project alternatives. Furthermore, a complete presentation of all breeding survey areas should be provided so that project alternatives can be sufficiently evaluated and understood, and so proper mitigation measures can be developed.	The FEIS includes NYSDEC nesting site data.
DOI 116	DEIS	3-50	DEIS, page 3-50, states, "Below are the recent figures of piping plovers within the Project Area: • 2015: Piping plovers: 154 window pairs, 255 fledglings • 2014: Piping plovers: 155 window pairs, 204 fledglings • 2013: Piping plovers: 153 window pairs, 134 fledglings • 2012: Piping plovers: 193 window pairs, 152 fledglings • 2011: Piping plovers: 187 window pairs, 192 fledglings (NYSDEC 2016)." Comment: These numbers were generated by the USACE with data supplied by the NYSDEC (K. Jennings, pers comm.). The USFWS's review of this same data set finds that these numbers are inaccurate when looking broadly across the project area from Fire Island Inlet to Montauk Point. The USACE should contact the NYSDEC for plover pairs and fledglings in the FIMP project area.	The Biological Assessment Appendix of the FEIS includes NYSDEC nesting site data.
DOI 117	DEIS	3-50	DEIS, page 3-50, provides the following information about Red Knots within the project area: "This species was documented in the Study Area during 2003 bird surveys (USACE 2003a). Individual birders have documented red knot presence at: Democrat Point (west end of Fire Island-August 2012-2 red knots), Robert Moses State Park (August 2013 – 8 Red Knots), and Smith Point County Park (September of 2011 – 4 red knots) (USACE 2014a)." Comment: In addition to these sightings, red knots have been documented within the project area at various other locations and in greater numbers. These sightings have been documented by Virginia Tech, by Audubon New York volunteers performing international shorebird surveys, and by birders that have recorded the sightings in eBird. The best available and most complete information regarding this endangered species should be used in order to accurately represent the existing condition, as well as to be incorporated into the impact analysis and development of mitigation measures.	The FEIS includes detailed information about Red Knots, including existing conditions and potential project impacts.
DOI 118	DEIS	3-58	DEIS, page 3-58, states, "Ninety pairs of the Federally listed endangered roseate tern (the fourth largest colony in the northeastern U.S.) also nested at this site in 1990 (USFWS 1991). The colony also supports three pairs of the Federally threatened piping plover (Charadrius melodus) and about 200 pairs of state special concern black skimmer." Comment: This information is out of date and is no longer accurate. This should be replaced with more accurate information or be rewritten to provide a historical context. We recommend the USACE contact the NYSDEC for the best available information.	The FEIS has been updated to clearly state that the roseate tern nesting colony is outside the Study Area and to reflect the ongoing USACE/USFWS coordination as documented in the PBO and Fish and Wildlife Coordination Act Report (FWCAR). Note, the PBO and FWCAR are included as appendices to the FEIS.
DOI 119	DEIS	3-58	DEIS, page 3-58, states, "A population of seabeach amaranth (Amaranthus pumilis), a candidate for listing under the ESA, occurs at Cedar Beach (USFWS 1991)." Comment: Seabeach amaranth is federally-listed as threatened. This should be corrected so that the reader is informed of the correct status of this species.	The FEIS notes that Seabeach amaranth is a Federally-listed threatened species.
DOI 120	DEIS	3-99	DEIS, page 3-99, Figure 3.8-1. "Major Recreation Areas in Study Area" Comment: This only depicts recreational areas in the western portion of the project area. Please update this figure or add additional figures that depict the rest of the project area. Human recreation and related disturbances are documented threats to shorebirds, particularly nesting shorebirds such as piping plovers (Burger 1981; Burger 1994; Burger et al. 2004; Sabine et al. 2008). The DEIS should provide clear representations of these areas so the reader can see the locations where, and extent to which, such conflict might occur throughout the Study and can evaluate how this may change as a result of the project.	The DEIS inadvertently included only one page of this multi-page figure; the FIES includes all six map pages and depicts all major recreation areas in the study area.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
DOI 121	DEIS	ES-11	DEIS, page ES-11, states, "The TSP would reduce the frequency and volume of the barrier overwash and reduce the number of the barrier breaches. This would reduce the biological impacts related to breaches compared to the FWOP. Avian habitats associated with the marine intertidal, inlets, barrier islands, dunes and swales, upland, bayside beach and back bay areas will likely be less impacted because there would be less coastal erosion and breaching of beaches, dunes, and shorelines. Beach narrowing would also be lessened as a result of storm events, which would improve the quality of this habitat, which is utilized by many species." Comment: Overwashes are part of natural processes driving habitat changes on the barrier island. Many species have adapted to these processes, including species that colonize newly formed early successional habitats, like the piping plover, least tern, seabeach amaranth, and others. This section does not quantify the impacts, however, the first sentence points to a reduction in the volume of barrier island overwash and number of breaches. This information should be provided if available as it would be included in the mitigation analysis required by NEPA.	The Recommended Plan includes Coastal Process Features that will provide habitat for important species. Additionally, the added 4.2 million cubic yards of material placed bayside will ensure no net loss of sediment to the bay ecosystem.
DOI 122	DEIS	ES-11	DEIS, page ES-11, states, "...There would be less sediment input within the estuaries adjacent to the barrier islands, which would decrease the long-term formation of salt marsh and submerged aquatic vegetation (SAV) beds." Comment: The DEIS should include tables that quantify the amount and area of sediment input that would be lessened as a result of the project alternatives and the potential impact to existing marshes and marshes that would be prevented from forming in the future. Alterations to sediment input can potentially have direct effects on saltmarsh development and long-term stability, so it is important to quantify changes due to the project alternatives in order to adequately analyze impacts and develop appropriate mitigation measures. Providing tables would also make it easy for readers to access and evaluate this important information. The DEIS should also address any mitigation due to this impact.	The Recommended Plan includes Coastal Process Features that will provide habitat for important species. Additionally, the added 4.2 million cubic yards of material placed bayside will ensure no net loss of sediment to the bay ecosystem. The FEIS has been revised to reflect the impacts and benefits associated with the Recommended Plan.
DOI 123	DEIS	ES-11	DEIS, page ES-11, states, "...Beach narrowing would also be lessened as a result of storm events, which would improve the quality of habitat, which is utilized by many species." Comment: The USACE (2015) has stated that, "[New] inlet and flood tidal delta formation are believed to be a larger contributor to barrier island migration (Leatherman 1976) along the Atlantic coast" and "[O]verall, this process of landward movement of beach sand is considered vital to the barrier beach system." Our recommended approach builds off of the USACE's recognition that barrier island breaching can be beneficial to ecological services (page 1 of the draft breach response plan; and USACE 2015). The dominant coastal behavior of Fire Island is alternating episodes of shoreline retreat and advancement in response to storm cycles (Hapke et al. 2010 and 2011; Hapke et al. 2016). Hurricane Sandy in 2012 resulted in widespread overwash and three relatively minor breaches. Although Sandy was historically the largest storm on record as measured by storm surge, its impact on the shoreline of Fire Island barrier island system was not statistically notable or distinguishable from other large storms (nor'easters and tropical storms) of the previous decade. These results support that the barrier landform is naturally resilient in that it experiences storm impacts but exhibits strong recovery capacity	The FEIS includes information about how the barrier landform is naturally resilient in that it experiences storm impacts but exhibits strong recovery capacity.
DOI 124	DEIS	DEIS pages 2-41-42	DEIS, pages 2-41-42, Table 2.4, states for Wetlands, "TSP would reduce the risk of coastal storm damages and provide protection to wetlands. TSP would not require filling any wetlands and would not produce significant changes in hydrology or salinity affecting wetlands." Comment: This conclusion contradicts the conclusions reached for "Vegetation" (discussed below), and limits the impact discussion to salinity and hydrology and not other factors such as sedimentation. As noted below in the same table, the project alternatives will prevent or reduce sediments reaching barrier island salt marshes or shallow areas. This will adversely affect the ability of new wetlands to form or existing wetlands to migrate and heighten in response to storms and sea level rise and will also adversely affect new habitats and submerged aquatic vegetation from colonizing these areas. This is an adverse affect for which mitigation has not been identified	The FEIS includes a description of how reduced sediment movement to the bayside of the barrier island is an adverse affect that will be offset by the sand placed in the bay through the Coastal Process Features.
DOI 125	DEIS	DEIS page 2-42	DEIS, page 2-42, Table 2-4 states for Vegetation, "The TSP would reduce the frequency and volume of the barrier overwash and reduce the number of the barrier breaches. There would be less sediment input within the estuaries adjacent to the barrier islands, which would decrease the long-term formation of salt marsh and SAV beds. The TSP would help counter the impacts associated with the projected rise in sea level and the associated negative impacts to plant communities." Comment: See above. As noted, both breaches and overwash provide material for future barrier migration onshore in response to sea level rise. This sediment is also of great importance for the creation of successional habitat and the maintenance of seagrass beds and saltmarshes. In terms of the project alternatives impact of countering the impacts associated with sea level rise, we note that for long duration storm events, a vast majority of the storm surge makes it into the back-bays, for sea level rise, 100 percent makes it into the back-bays. The USACE states the project alternatives were designed to enhance the resiliency of the coastal system, particularly with regard to sea level rise. However, the project alternatives do not discuss potential impacts of limiting the ability of the island to naturally mitigate in response to increasing sea level. Also, a false impression is given in regard to assertions that the project alternatives will protect the coastal area from inundation	The FEIS includes a description of how the project related impacts of potentially limiting the ability of the island to naturally migrate will be offset by the sand placed in the bay through the Coastal Process Features.

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DOI 126	DEIS	DEIS pages 2-42-43	DEIS, pages 2-42-43, Table 2-4, Future Without Project and Vegetation, states that "The sediment input to the bay may contribute to both the degradation and the long-term formation of salt marsh and SAV beds." Comment: This statement and those given above are mutually exclusive: In the FWOP greater sediment input would result in negative impacts to salt marsh and also salt marsh development (depending on location of the breaches/overwash). But, the DEIS states, under the project alternatives that less sediment input would result in negative impacts to salt marsh. The weight of evidence from the published literature indicates that the natural condition (i.e., most like FWOP) is best-adapted to sediment input.	The FEIS includes a description of the impact of sediment input on salt marsh and its development. It also describes how the Recommended Plan includes Coastal Process Features that will provide habitat for threatened and endangered species, and will ensure no net loss of sediment to the bay ecosystem.
DOI 127	DEIS	DEIS page 2-43	DEIS, page 2-43, Table 2-4, TSP Alternative and Impacts to Fish and Wildlife, states, "Avian habitats associated with the marine intertidal, inlets, barrier islands, dunes and swales, upland, bayside beach and back bay areas will likely be less impacted because there would be less coastal erosion and breaching of beaches, dunes, and shorelines. Beach narrowing would also be lessened as a result of storm events, which would improve the quality of this habitat, which is utilized by many species." Comment: This section arrives at the conclusion that all avian habitat and species would benefit from preventing or reducing breaches and overwash. This is not supported by the large body of scientific evidence that points to the importance of these habitats to some of our most imperiled species, including federally- and state-listed species and species of special concern. Beach narrowing may occur if dunes are present, but if dune blow outs exist or dunes are not present, beaches can be quite wide and support a number of listed and at-risk shorebird species. These trends were shown in Derose-Wilson (2013; 2014; and 2015) and Monk et al. (2015). Further, the DEIS does not present any scenarios concerning beach widths under different storm events to support the speculative conclusion that beach narrowing would be lessened and habitat quality would be improved.	The FEIS includes a summary of the benefits of breach and overwash habitat importance for avian species, and scenarios concerning the effects of beach widths under storm events on habitat quality.
DOI 128	DEIS	DEIS pages 2-44-45	DEIS, pages 2-44-45, Table 2-4, FWOP alternative and Fish and Wildlife, states, "Continuation of the ongoing short- and long-term impacts on dune nesting and beach foraging areas would be expected for many species of birds. Avian habitats associated with the marine intertidal, inlets, barrier islands, dunes and swales, upland, bayside beach and back-bay areas will likely continue to be impacted as a result of the lack of comprehensive plans and programs in place to control and repair coastal erosion and breaching of beaches, dunes, and shorelines. If beaches continue to narrow as a result of major and minor storm events, over time this could contribute to the decreased size and quality of this habitat, which is utilized by many species." Comment: See above. This conclusion is based on a simplistic evaluation of impacts wherein all avian species and the habitats they use are adversely affected by breaches and overwash, which is not the case. Avian species with different habitat needs and different life history strategies would need to be evaluated separately in order to provide a more accurate analysis of impacts.	The FEIS includes a discussion of avian species organized by habitat needs and life history strategies.
DOI 129	DEIS	DEIS pages 2-43-44	DEIS, pages 2-43-44, Table 2-4, Fish and Wildlife states, "The TSP would reduce the frequency and volume of the barrier overwash and reduce the number of the barrier breaches. This would reduce the biological impacts related to breaches discussed under the FWOP. Avian habitats associated with the marine intertidal, inlets, barrier islands, dunes and swales, upland, bayside beach and back bay areas will likely be less impacted because there would be less coastal erosion and breaching of beaches, dunes, and shorelines. Beach narrowing would also be lessened as a result of storm events, which would improve the quality of this habitat, which is utilized by many species." Comment: This summary omits the impact of long-term loss and degradation of early successional habitats on the ocean and baysides of the barrier islands that would occur as a result of stabilizing the beaches. Overwash and barrier island breaching remove dune and upland habitat while creating new inlet and back-bay habitat in a natural cycle. Decreasing the prevalence of erosion and beach narrowing may preserve habitat for some avian species in the short-term, but over time the habitat will be stalled in a stable, densely-vegetated state that is not conducive for avian species that are adapted to early successional habitat for foraging and nesting, particularly listed species like the piping plover.	The FEIS provides a discussion of potential impact of long-term loss and degradation of early successional habitats that would occur as a result of stabilizing beaches. It also describes how the Recommended Plan includes Coastal Process Features that will provide habitat for threatened and endangered species, and will ensure no net loss of sediment to the bay ecosystem.

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DOI 130	DEIS	DEIS pages 2-45-46	DEIS, pages 2-45-46, Table 2-4, Rare Species and Habitats, states, "The Study Area will continue to provide critical habitat for threatened and endangered species under the TSP, as Federal and state protection measures for these species would remain in place. Since no major changes in the marine offshore habitat is anticipated under the TSP, impacts to marine offshore rare species and habitats are not anticipated. Localized dredging of sand for the TSP are expected to continue in the same manner although more frequently. The increase in renourishment would be completed for the next 30 years which would entail dredging fill from offshore borrow areas. The TSP could have a positive impact on dunes in the barrier island ecosystem that are outside of the Study Area but close enough that they may potentially be impacted. It is likely that impacts would be similar but not as intense as impacts within the Study Area. The TSP would likely reduce the risk of coastal storm damage. Although vehicular use for beach renourishment may negatively impact nesting birds by disturbing them or destroying their nests or some types of vegetation by crushing the plants themselves or their seedlings. The use of best management practices will reduce the likelihood of impacts." Comment: This summary of the potential environmental impacts associated with the TSP on rare species and habitats omits long term impacts to primary successional (sparsely- vegetated) ocean, mid-island, and back-bay habitats which are expected to decline with the stabilization of the barrier island system. This was acknowledged in DEIS page 4-41, which states, "Reduced sediment delivery to the back bay system results in fewer areas that are sparsely vegetated. These somewhat barren areas may be preferred nesting or congregating grounds for shorebirds." Sparsely-vegetated areas are vital for listed species such as piping plovers and seabeach amaranth and should be given ample consideration in the impact analysis. We also note that all nourishment activities do not cease after 30 years; beach fill will still occur under the proactive breach response for the duration (50 years) of the FIMP. Lastly, the second to last sentence of the Table 2-4 statement is a fragment and should be combined with the following sentence in the table.	The FEIS includes a discussion of the potential environmental impacts on rare species and habitats over the full duration of the Recommended Plan with consideration of the benefits of the CPFs in establishing primary successional (sparsely- vegetated) habitats.
DOI 131	DEIS	DEIS page 2-54	DEIS, page 2-54, "Table 2-5 Borrow Areas – Initial Construction," indicates that over 2.3 million cubic yards of sediment is expected to be dredged from Fire Island Inlet Ebb shoals. Comment: The impacts of dredging this area and the disposal of sediments are not evaluated or discussed in the DEIS. The beaches surrounding Fire Island Inlet provide habitat for listed species such as the piping plover, therefore the impact of this dredging on listed species habitat at Democrat Point and the disposal area at Gilgo Beach or elsewhere should be evaluated and discussed in the DEIS - Environmental Consequences section.	The FEIS includes a discussion of dredging and disposal impacts. Please note that the planned dredging of the ebb shoals is solely for the purpose of sand bypassing and restoring the natural longshore process, and that the volumes in Table 2 are over the 50 year project life. In addition, there is no planned dredging of Democrat Point, and that there is a long history of placement of bypassing onto Gilgo Beach, as well as many areas on the Fire Island to Moriches Inlet and Moriches Inlet to Shinnecock Inlet barrier islands.
DOI 132	DEIS	DEIS Chapter 3	DEIS, pages 3-1 through 3-125, Chapter 3, "Affected Environment" Comment: This chapter makes frequent reference to the FIMP Conceptual Model's indicator species. The Conceptual Ecosystem Model was developed to be used as a tool in impact analysis of the DEIS however, there is no further mention of the Conceptual Model and its use in Chapter 4, entitled, "Environmental Consequences." The connection between the DEIS and the Conceptual Models is therefore unknown. In referencing USACE (2005), the following statements are made in regard to the use of the Conceptual Model in the FIMP EIS: Page 5-3, "These impacts will be assessed in the models at a conceptual level for each habitat and further addressed in the final EIS document for the FIMP Reformulation Project." Page 6-2, "Any complete pathway will be addressed in the EIS for the FIMP study, along with an assessment of the magnitude and extent of the potential impact(s). Once the assessment model is developed, the assessment of potential impacts attributable to the project feature can be performed as part of the EIS." Page 6-6, "The overall objective of the Phase 3 Model development is to provide a framework to systematically identify complete pathways or linkages that must be explored in the EIS. In this way, a systematic and comprehensive assessment of multidimensional features can be performed, and the EIS will be an environmentally sound and technically defensible document that incorporates the interests of all stakeholders and addresses all potential positive and negative impacts of the FIMP storm damage reduction project for the 83-mile study area."	The FEIS includes a discussion regarding the connection between the Conceptual Ecological Model and its use in the impact analysis.
DOI 133	DEIS	DEIS page 3-14	DEIS, page 3-14, states, "Flooding may occur from overflow of inland or tidal waters, rapid accumulation of runoff or surface waters, mudslides resulting from water accumulation, heavy rainfall and high groundwater levels (Tetra Tech EMI 2007)." Comment: Mudslides are not applicable to the project area.	References to mudslides do not appear in the FEIS.
DOI 134	DEIS	DEIS page 4-4	DEIS, page 4-4, states, "Assuming the large volume of offshore sand that is moving shoreward, removal of such small quantities in the borrow areas on sand ridges on the shoreface would not impact the morphodynamic system that occurs along Fire Island" Comment: The potential of sediment removal from borrow areas impacting the morphodynamic system is an important consideration and the conclusion that the project will not have negative impacts should be based on sound science and a clear understanding of the sediment in the system. This information should also be provided to readers in the DEIS. Please quantify the "large volume of offshore sand," as it is missing from the text in this section. Given that 6.44 million cubic yards of sand will be dredged from borrow areas for the initial fill alone, quantifying the offshore sand that is moving landward will help readers understand why the expected dredge material to be removed is considered a "small quantity."	The FEIS has been updated to include information on the total volume of sand present in the offshore sand ridges and the estimated volume needed for the Recommended Plan.

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DOI 135	DEIS	DEIS page 4-4	DEIS, page 4-4, states, "In addition, given the immense size of the offshore sand ridges near our Project, relatively small borrow areas can provide ample sediments for nourishment projects with minimal or no impact to the onshore movement of sediments (NPS 2008)." Comment: This statement references multiple nourishment projects which are not identified in the DEIS. Further, recent research shows that modification of the sand ridges offshore of western Fire Island are expected to cause changes (meters per year) to the persistent shape of the shoreline (Lentz et al. 2016; Safak et al. 2016). Recent observations and modeling also show the importance of an onshore sediment flux to the coast (Lentz et al. 2016; Warner et al. 2016), which is required to maintain the relative stability of the western segment of Fire Island (Hapke et al. 2010 and 2011; Schwab et al. 2013). The impact of the proposed sand mining on cross-shore transport rate is not yet quantified, however, the science shows that modifications of the nearshore topography offshore of western Fire Island is expected to have consequences and can be modeled.	The FEIS identifies nourishment projects that are referenced in the text. In addition, USACE recognizes the potential for onshore sediment flux in Central Fire Island and recommends that it be further documented and quantified via extensive monitoring.
DOI 136	DEIS	DEIS page 4-8	DEIS, page 4-8, states, "Under natural conditions, periodic breaching of the coastal barrier results in flushing portions of the back bay and improved water quality, as demonstrated at the existing breach in the Wilderness Area (USACE 2014a)...No noticeable direct change in water quality of either the Atlantic Ocean or Great South Bay is expected with the TSP." Comment: The DEIS appears to contradict itself in the two sentences. It recognizes the benefits of breaching on water quality in the back bay while stating that preventing this natural process will have no noticeable direct change to water quality. The USFWS's position, as stated in our draft 2(b) report (USFWS 2016), is that the project alternatives would reduce opportunities for water quality improvement in the back-bays via breach formation within the FIMP.	The FEIS describes expected water quality changes with the Recommended Plan in place, and states that breaches will be allowed to occur and remain open in areas designated for Conditional and Wilderness Breach response actions.
DOI 137	DEIS	DEIS page 4-12	DEIS, page 4-12, states, "The TSP would build-up dunes, provide beachfill and beach nourishment, and provide sand bypassing at inlets. These actions would be expected to reduce the potential impacts to estuarine wetlands by reducing barrier island breaching and overwash. The sediment input to the bay may contribute to both the degradation and the long-term formation of salt marsh and SAV beds. The TSP would also reduce the potential impacts associated with the projected rise in sea level. The potential for inundation of low marsh zones would be reduced, less vegetation would be relocated into zones that were previously occupied by high marsh plant communities, and vegetated area would be stabilized." Comment: Scientific citations should be provided to support and explain the conclusions made here so it can be understood how these conclusions were reached. It is not clear how the project alternatives would reduce impacts of sea level rise but this is an important conclusion that should be articulated appropriately. Additionally, an adequate discussion and analysis of the long-term impacts of decreased sediment input has not been provided and should be added as these impacts are potentially significant. Both breaches and overwash provide material for future barrier migration onshore in response to sea level rise. This sediment is also of great importance for the creation of successional habitat and the maintenance of seagrass beds and saltmarshes. This statement should also be revised in the FEIS to ensure that the impression is not given that the project alternatives will protect the coastal area from inundation hazards related to sea level rise.	The FEIS includes a discussion of impacts of potentially limiting the ability of the island to naturally migrate in response to increasing sea level.
DOI 138	DEIS	DEIS page 4-12	DEIS, page 4-12, states, "In addition to direct loss of wetlands as a result of development, remaining plant communities in the vicinity of the development would likely decline in quality as a result of decreased water quality from stormwater runoff and increased occurrence of invasive species such as common reed (Phragmites australis). While development related impacts are expected to be comparable with or without the TSP, implementation of the TSP would lessen the impacts associated with development compared to the FWOP." Comment: It is not clear how, or in what ways, the project alternatives would lessen the impacts associated with development compared to the FWOP. Additional information and support for this conclusion should be provided. As currently presented, the project alternatives do not address storm water runoff or a comprehensive plan to address common reed invasion of wetlands. This section should also explain why the USACE believes the NYSDEC and USACE's Wetland Regulatory Programs are deficient in protecting against direct loss of wetlands from development or that mitigation in those circumstances is not successful when applied.	A discussion of how NYSDEC and the USACE Regulatory Program protect wetlands from development has been added to the FEIS. The conclusions drawn in the referenced paragraph have been reviewed and revised in consideration of the comment..

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DOI 139	DEIS	DEIS page 4-16	DEIS, page 4-16, describes the impacts of the TSP on vegetation of the barrier island ecosystem as follows "The TSP could have a positive impact on the barrier island ecosystem within the Study Area by reducing the risk of coastal storm damage. Although vehicular use for beach renourishment may negatively impact some types of vegetation by crushing the plants themselves or their seedlings. For example, barrier island vegetation such as the ESA-threatened and state endangered, seabeach amaranth (Amaranthus pumilus) and state listed rare seaside knotweed (Polygonum glaucum) are adapted to the conditions in this habitat, and have been documented at several locations in or nearby the marine beach habitat within the dunes and swale habitat of the Project (USFWS 2007d). The use of best management practices will reduce the likelihood of impacts to these types of vegetation." Comment: This passage speculates that the project alternatives "could have a positive impact" on the barrier island ecosystem, but fails to discuss what these are and how they are more beneficial to natural processes. Further, it is not clear what the USACE's best management practices are relative to off-road vehicle (ORV) driving. It is also unclear in what ways or areas the vegetation within the barrier island system will be positively impacted by the project alternatives. It should be noted that seabeach amaranth grows in early successional habitat and can benefit from storms and overwash (Weakley and Bucher 1992) and the long-term adverse impacts of preventing these processes are not evaluated or discussed. Without the inclusion of this information, the impact analysis is not complete and subsequent conclusions may be incorrect.	Discussions of the positive impacts that the Recommended Plan, including CPFs will have on the barrier island ecosystem have been added to the FEIS. The monitoring and adaptive management plan detailed in FGRR Appendix J "Monitoring and Adaptive Management Plan" precludes project related disturbance to sensitive vegetation.
DOI 140	DEIS	DEIS page 4-30	DEIS, page 4-30, states, "Under the FWOP scenario, continuation of the ongoing short- and long-term impacts on dune nesting and beach foraging areas would be expected for many species of wading birds, coastal seabirds and shorebirds. Avian habitats associated with the marine intertidal, inlets, barrier islands, dunes and swales, upland, bayside beach and back bay areas will likely continue to be impacted under the FWOP as a result of the lack of comprehensive plans and programs in place to control and repair coastal erosion and breaching of beaches, dunes, and shorelines. If beaches within the Project continue to narrow as a result of major and minor storm events, over time this could contribute to the decreased size and quality of this habitat, which is utilized by many bird species (shorebirds, wading birds, and coastal seabirds) for nesting and foraging. If a series of storms is coupled with rising sea levels, eroding and accreting beach sediments may cause the locations of bird habitats to shift. Local bird populations may fluctuate and may eventually decline as a direct result of degraded foraging and nesting habitats." Comment: This appears speculative as presented, and written in general terms. Impacts should be discussed in terms of different bird species, as impacts will vary among wading birds, coastal seabirds, and shorebirds; without this approach the analysis of impacts on these species is not complete or accurate. Many beach-nesting bird species are adapted to, and depend on, early successional habitat created by storms and other overwash events. The creation and maintenance of these habitats will be altered by the project alternatives, and the impacts have not been adequately assessed or discussed here, in terms of scope, scale, abundance, distribution, diversity, or productivity. The individual habitat needs of these species and both the direct and indirect effects of the proposed project alternatives on their habitat need to be incorporated to provide a sufficient analysis of impacts and to develop appropriate mitigation measures.	The FEIS has been revised to include separate discussions of impacts for the various avian groups (wading, coastal, or shore birds) and the impact assessment has been reviewed and revised in consideration of the comments.
DOI 141	DEIS	DEIS page 4-33	DEIS, page 4-33, states, "Minor changes in macroinvertebrate species occurrence were identified in pre- and post-construction surveys. For example, the third-most abundant macroinvertebrate prior to dredging was the New England dog whelk (Nassarius trivittatus), which was not observed in the years post-construction." Comment: As discussed earlier, this conclusion of "minor change" needs further explanation as loss of the third-most abundant macroinvertebrate seems to represent more than a "minor change" in benthic invertebrate assemblages. Without clarification, this conclusion can not be understood or objectively evaluated. Because dredging may impact benthic communities, it is important that the findings of previous studies are understood and correctly interpreted if they are being used to make conclusions about the current project. Furthermore, the USACE should include their criteria for determining and classifying the degrees of impacts or changes to these communities, how they will monitored over the 50-year project and what mitigation measures will be used to address known adverse impacts of changes in habitat, species assemblage, and biomass.	USACE concurs with DOI's statement. The difference in macroinvertebrate community is not a minor change; the FEIS has been revised accordingly. FGRR Appendix J "Monitoring and Adaptive Management Plan" includes details on the monitoring that will be conducted to verify impacts of Recommended Plan on the benthic community.

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DOI 142	DEIS	DEIS page 4-35	DEIS, page 4-35, states, “Offshore birds are not likely to interact with dredge activities due to their transience and wide range. These offshore avifauna spend days or weeks at sea, occasionally returning to shore to rest. Most their prey consists of bait fish, such as herring, which form large schools offshore, beyond the project. Offshore birds are not likely to interact with dredge activities, due to their transience and wide range. There is a small possibility that a seabird might perch on dredge equipment; however, if an individual found it unsuitable to rest, it may easily leave and find better habitat. The TSP would not impact the use of oceanic habitat by birds.” Comment: This conclusion is not supported by scientific evidence and thus appears speculative as written. The science used to reach this conclusion should be provided so that its validity can be assessed. Furthermore these are blanket descriptions that do not apply to all offshore birds. The transience and range of offshore birds vary by species, therefore the impacts on these different types of offshore birds should be evaluated separately depending on specific habits of the species. Wintering sea ducks, in particular, do not fit the description provided so these conclusions may not be relevant to them. Additionally, their presence in the project area and potential impacts on these species have not been adequately described or evaluated in the DEIS, however, coast-wide wintering sea duck surveys, migratory sea duck surveys, and seabird modeling efforts all indicate that sea ducks and other seabirds have been observed or are likely to utilize the waters in and around the project area (Sea Duck Joint Venture 2015; North Atlantic Landscape Conservation Cooperative 2015; USFWS 2012). Large-scale modification of habitats will occur in the borrow areas, and there will be impacts to the nearshore and intertidal disposal areas. While few studies have looked at the impacts of dredging activities on seabirds, more information is being generated through studies conducted for aggregate mining and wind power facilities that require dredging, resulting in the disruption of offshore bottom and pelagic habitats. Seabirds may be disturbed and flush from feeding areas due to dredging and fill placement operations. Indirect effects to specialists will occur as habitat is degraded or lost and prey resources suffer mortality. There are concerns that dredging may impact these seaduck species by removal or reduction of prey sources through benthic habitat alteration, creation of turbid conditions that limit visibility and prey detection, decreased access to prey species due to deposition of suspended sediments, or disturbance to wintering flocks from sounds and vessels associated with dredging activities (Michel et al. 2013).	The FEIS includes references to scientific data to back up conclusions, and addition information about potential impacts to offshore avifauna.
DOI 143	DEIS	DEIS page 4-40	DEIS, page 4-40, states “Ultimately, increased beach and dune areas would provide many birds with additional nesting habitat (USACE 1998a).” Comment: Specific bird species that would be provided with additional nesting habitat should be identified so that this conclusion can be understood. Additionally, more information is needed in the FEIS regarding a comparison of quantitative data on the “increased dune and beach areas;” will the beach remain static over the 50-year project life or will fluctuations in beach widths and dune occur, and if so, have these been quantified? While an overall increase in beach area can be a benefit to some beach nesting birds, constructed dunes can negatively impact some nesting species including piping plover. As previously recommended, the DEIS should include a quantitative analysis of the with- or without project scenarios. Lastly, while there may be a perceived increase in beach and dune areas, this does not necessarily translate to positive outcomes for birds. For example, USACE’s funded, peer-reviewed research by Cohen et al. (2009) concluded that plover breeding areas confined to oceanside only beaches exhibited lower nesting densities and many constructed beaches are used for recreation which precludes shorebird nesting.	Specific species have been identified in the FEIS; with the addition of the barrier island CPFs and implementation of the Monitoring and Adaptive Management and conditions of the Programmatic Biological Opinion, the Recommended Plan would benefit beach nesting birds. The impact assessment in the FEIS has been revised accordingly.
DOI 144	DEIS	DEIS page 4-40	DEIS, page 4-40, states, “Predatory birds, such as owls and hawks, may experience an indirect effect on their foraging ecology. As dune height is increased, overwash events will decrease. The barrier island will then tend toward a more heavily vegetated state. Greater cover will make prey species, such as mice and voles, more difficult for predators to hunt.” Comment: This passage indirectly addresses the issue of accelerated habitat succession due to implementation of the project alternatives. That is, the rapid construction of dunes and beach will elicit changes to the back-barrier habitats due to the reduction or preclusion of overwash and breaching. Over time, early successional, partially vegetated grassy areas will be replaced by scrub/shrub and forest habitats. These changes effects on the predatory species noted above should be discussed using the best available information so that the conclusions reached can be clearly understood and evaluated objectively. Additionally, the impacts of increased dune height and increased vegetation on other bird species, particularly piping plovers and beach-nesting birds, should be evaluated and described, as these species are those that are most vulnerable to changes in these habitat conditions. Without using the best available science and incorporating the effects on particularly vulnerable species, the impact analysis is not sufficient and the resulting conclusions may not	References regarding the effects of vegetation changes on the success of predatory birds have been added to the FEIS.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
DOI 145	DEIS	DEIS page 4-41	DEIS, page 4-41, states, "Most birds will not be affected by the indirect effects of the preferred alternative (i.e. reduced sediment deposition and fewer overwash or breach events). Reduced sediment delivery to the back bay system results in fewer areas that are sparsely vegetated. These somewhat barren areas may be preferred nesting or congregating grounds for shorebirds. However, these areas lack cover, exposing birds to predation and extreme weather. More SAV due to less frequent overwash will also increase potential for surface ice, which may hinder feeding of diving birds." Comment: This conclusion appears speculative as written. Supporting evidence should be provided so that it's clear how the conclusion was reached, particularly because there is a large body of scientific evidence describing piping plover use of overwash corridors and associated back-bay habitats. It also is not clear what "most birds" refers to, so we recommend that additional information is provided so the particular species being discussed in this analysis are explicit. Citations should also be provided to better explain how shorebirds would be more vulnerable to predators and weather in open spaces, since it is generally held in the scientific community that shorebirds are adapted to and rely on these open conditions for survival; evidence otherwise should be provided. Likewise, the linkages between SAV, overwash, and surface ice should be clearly articulated and supported with the best available science. Without clarification and more information this conclusion can not be properly understood or evaluated.	The FEIS includes a clarification and more information to support USACE's conclusions.
DOI 146	DEIS	DEIS page 4-49	DEIS, page 4-49, states the following about project impacts on red knot foraging areas: "Stabilizing the eroding beaches under the TSP may have a positive effect on maintaining or increasing suitable shoreline feeding habitat in the long term (USACE 1999b). Potential short term impacts to red knot habitat could result from proposed filling activities, placement may temporarily decrease the habitat quality of the red knot's food source resulting in a decrease in the value of the foraging habitat until the beach is stabilized and its faunal community restored." Comment: The beneficial impacts of the project on shoreline feeding habitat are speculative as written ; scientific evidence should be provided so that this conclusion can be objectively evaluated and so that the positive effects are clearly articulated and understood. We also note that red knots forage in habitats impacted by sediment transport, such as saltmarshes and intertidal flats; however, the potential long-term impacts of decreased sediment transport (as a result of reduced breaching, overwash, and inlet bypassing) are not quantified, evaluated, or discussed in the DEIS. Without evaluating the impacts of these habitats conclusions regarding the impacts of the project on this species are not complete or accurate.	The FEIS includes a clarification and more information to support USACE's conclusions. Spplicable, readily available supporting citations have been added to the text.
DOI 147	DEIS	DEIS page 4-55	DEIS, page 4-55, states, "In the EFH, this may mean that SAV may not experience quite as much growth, so the ecological benefits would not be as great. Since invertebrates, finfish, reptiles, and birds all rely on SAV, they would still experience an improvement in habitat and food availability; however, it would not be to as great of a degree as in the TSP. Alternative 1 may not provide quite as much erosion control as the preferred alternative, so the sparsely vegetated areas used by birds for nesting and congregating would not be as reduced. Additionally, increased physical processes (e.g., wind and tidal mixing) would help prevent ice formation, benefiting diving birds." Comment: There are no scientific citations to support any of the statements made in this passage. Most of the effects are discussed in qualitative terms without any substantiation via modelling or field observations. The methods and/or scientific evidence used to formulate these conclusions should be provided so that they can be understood and evaluated in the Environmental Consequences section.	The FEIS includes a revised evaluation of the potential impacts on fish, birds, benthos, etc., with the addition of citations, as applicable and available.
DOI 148	DEIS	DEIS page 4-86	DEIS, page 4-86, states: "The New York District based the cumulative impact analysis for this DEIS on the TSP and alternatives, other actions associated with the Project, and other activities in the surrounding region with the potential to contribute to cumulative environmental impacts. The New York District conducted the analysis in accordance with the Council on Environmental Quality NEPA regulations and handbook, 'Considering Cumulative Effects Under the National Environmental Policy Act' (CEQ 1997b)." Comment: The USACE has not fully considered the cumulative impacts of other beach disposal and construction projects within the USACE's New England and New York Divisions' jurisdiction. Overall, hundreds of miles of shoreline will have ongoing or proposed projects of beach disposal - either formal beach nourishment or dredged disposal operations. When each project is viewed individually, it is possible to believe that offshore fish, nearshore fish, and migratory shorebirds can simply move on to an undisturbed area while construction is occurring. However, when these projects are viewed over their entire geographic scope, one must question whether there will be an undisturbed area to which these species can retreat. The perspective of all current and proposed sand mining and beach disposal projects across this geographic range should be the basis for a thorough cumulative impact analysis.	The FEIS includes an expanded discussion of potential cumulative impacts associated with projects identified within the study area. Considering the size of the study area and region in relation to the spatial and temporal limits of projects that would reasonably occur at the same time, consideration of projects outside the study area in the cumulative impact assessment is not considered necessary.
DOI 149	DEIS	DEIS page 4-87	DEIS, page 4-87, states, "Representative projects were researched and considered in broad categories of regional projects. Dozens of regional projects were identified, and those with a potential to introduce cumulative impacts in conjunction with potential effects of the Proposed Action were included in the analysis." Comment: See comment, above. The USACE should describe what projects were assessed and explain the criteria that were used to determine if projects had the potential to introduce cumulative impacts so that the reader can understand and follow the logic of the cumulative impacts assessment and subsequent conclusions. There are federal and local projects within and nearby the project area that are not discussed in the analysis but seem probable to contribute to cumulative impacts, without the inclusion of these projects the cumulative impacts analysis is neither complete nor sufficient. Enough information should be provided such that it can be understood why these projects were not discussed or deemed not to have cumulative impacts.	The FEIS includes information about current and proposed sand mining and beach disposal projects in the region, that may cause cumulative impacts.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
DOI 150	DEIS	DEIS page 4-88	DEIS, page 4-88, states, "Sand placement activities have the potential to directly affect several shoreline communities. As in the borrow areas, these communities are; located in dynamic, high energy areas where substrates are continuously shifting, eroding and accreting along the south shore of Long Island. Beach and surf zone, organisms are well adapted to their rigorous environments. Although a temporary loss of shallow nearshore/intertidal habitat would occur, a new sandy bottom should begin to recolonize shortly after construction ceases. Varying nourishment schedules and other project variables (contractor availability, funding, local conditions, etc.) may cause staggering of construction activities so that extensive stretches of the, shoreline are not nourished at the same time. In addition, only a short stretch (typically 500-1000 feet) of beach is nourished at one time. This practice allows motile species to avoid area where beach fill placement will occur." Comment: This discussion does not address cumulative impacts, as there is no analysis or discussion of other projects or activities. It only reiterates impacts of the FIMP. Incorporating discussion and analysis of other projects is critical in determining cumulative impacts and fulfilling the requirements of NEPA. Furthermore, the conclusions of this analysis are not supported by any citations or scientific evidence and appears to be speculative. Additionally, if "staggering of construction activities" will lessen project impacts by ensuring that extensive stretches of beach are not nourished simultaneously, then this strategy should be written into the project plan and nourishment activities should be purposely scheduled.	The FEIS includes information about current and proposed sand mining and beach disposal projects in the region, that may cause cumulative impacts.
DOI 151	DEIS	DEIS page 4-89	DEIS, page 4-89, states, "The Marsh Islands are an integral part of the Bays targeted for restoration by the U.S. Army Corps of Engineers, The Port Authority of New York and New Jersey, National Park Service (Gateway), New York State Department of Environmental Conservation, New York City Department of Environmental Protection, the National Resources Conservation Service and the New York/New Jersey Harbor Estuary Program. Restoring salt marshes and coastal wetlands in the Bays are a critical component of Estuary Restoration." Comment: It is not clear what "The Marsh Islands" and "the Bays" are referring to or where they are located. It is also unclear how the restoration of these areas is related to the FIMP's strategy for Coastal Storm Risk Management or relevant to the cumulative impacts analysis. Consequently, the particular marshes and bays being discussed, their locations, and their connection to the FIMP should be clearly identified and discussed. Clarification should be provided so that the reader can understand the projects and the relationship of the projects to the FIMP, and so that they can fully understand and evaluate any conclusions made regarding cumulative impacts.	Reference to "The Marsh Islands" and "Bays" in the FEIS are clearly identify and discussed. Additionally, the location of these features, and their connection to the study are presented in the text.
DOI 152	DEIS	DEIS page 4-89	DEIS, page 4-89, states, "The U.S. Army Corps of Engineers, New York District awarded a contract on March 23, 2012 to restore Black Wall and Rulers Marsh Islands in Jamaica Bay, N.Y. The project was designed to beneficially use clean sand from the New York - New Jersey Harbor 50-foot deepening project to restore marsh habitat in Jamaica Bay. Following completion of the placement of 375, 000 cubic yards of Ambrose Channel sand that is being used to restore 42 acres of marsh at Yellow Bar Hassock Marsh Island, and additional 250,000 cubic yards of sand from the Ambrose Channel deepening project were beneficially used to restore 22 acres of marsh at the Black Wall and 12 acres of marsh at Rulers Bar. Approximately 45.5. acres of salt marsh habitat were restored at Yellow Bar Hassock via placement of approximately 375,000 cubic yards of sand from Ambrose Channel. The 45.5 acres of marsh is comprised of approximately 13.1. acres of transplanted low marsh plant hummocks, 21,859 high marsh transition plants and 17,175 high marsh plants planted on 4,427 acres and 350 pounds of dispersed seed over 27.75 acres. Ambrose Channel sand was also beneficially used in September and October 2012 to restore an additional 30 acres of marsh islands at Black Wall (155,000 cubic yards of sand, 20.5 acres) and Rulers Bar (95,000 cubic yards of sand - 9.8 acres.)" Comment: This section does not articulate how these restoration projects are related to the FIMP or what the cumulative impacts of the projects would be. In order to be useful, the above projects should be discussed in the context of the FIMP and cumulative impacts to the environment. Furthermore, a map should be provided of the area in discussion that illustrates the location of Jamaica Bay in relation to FIMP, as well as the location of the restoration projects within Jamaica Bay. Whether these were stand-alone restoration projects or parts of a larger project should also be made clear.	Because construction of the marsh island projects were completed in 2012 and are outside of the FIMP project area, these paragraphs have been removed from the cumulative impact discussion.
DOI 153	DEIS	DEIS page 4-90	DEIS, page 4-90, concludes, "because of the continued-occurrence of overwashing, and sand placement along the shoreline communities which could mimic overwash conditions, the impact to these communities and nesting shorebirds is not considered substantial." Comment: It is not clear where within the project overwash would be allowed or mimicked or to what extent overwash would occur. We recommend including information on the expected locations of overwash and how often it would be able to occur so that this conclusion can be properly evaluated. Any plans within the project to mimic overwash conditions should also be provided. This information is crucial in understanding and evaluating the impacts of the project on nesting shorebirds.	The conclusions in the FEIS has been revised due to recent changes to the Recommended Plan, Coastal Proces Features, Breach Contingency Plan, and the locations of the other projects considered in the cumulative impact assessment.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
DOI 154	DEIS	DEIS page 2-55	DEIS, page 2-55, states, "The New York District will conduct surveys during the spring/summer, and prior to construction activities, to identify and to document all known Federal or state-listed wildlife species observed in the Project area, and will initiate consultation with appropriate state and Federal agencies. Monitoring will be flexible. All findings will be reported to the USFWS for potential consultation to modify any procedures to reflect actual observed impacts and associated responses." Comment: The USACE should consult and complete consultation with the Service to address all aspects of project construction including contingency plans to deal with equipment failure and weather delays. These are foreseen circumstances that can be addressed upfront in the consultation.	Coordination between USACE and the USFWS continues. The FEIS includes an updated Programmatic Biological Opinion (FEIS Appendix B "Endangered Species"). In addition, the monitoring and adaptive management plan (FGRR Appendix J "Monitoring and Adaptive Management Plan") provides a mechanism for addressing delays in construction activities and contingencies. USACE will continue to coordination with DOI in accordance with the MAMP throughout the project life.
DOI 155	DEIS	DEIS page 2-55	DEIS, page 2-55, states, "The New York District will plant endemic vegetation at low densities (18 in. on center) on the dune/upper beach interface, reducing the density of beachgrass plantings on the south face of the dune, and developing a variable density planting scheme on the south side of the dune slopes." Comment: Measures to mitigate project impacts should be well thought out and based on the best available science. The USACE therefore should explain the rationale for defining 18 inches on center as low density, and provide evidence to support the projected benefits to plant and wildlife resources. Ensuring that mitigation measures are achievable and having a detailed plan to ensure implementation is also important. We recommend the USACE explain what a "variable density planting scheme" will entail and discuss any plans to keep vegetation density low over the 50-year project life.	The planting plan is based on recent experience and best practices, and should be viewed in conjunction with the Coastal Process Features. It should be noted that there are no plans to manage the vegetation density beyond the initial 5 years, as detailed in FGRR Appendix J "Monitoring and Adaptive Management Plan."
DOI 156	DEIS	DEIS page 2-56	DEIS, page 2-56, states, "Provisions for the project to only undertake low impact construction activities, such as beach surveying or the installation of sand fencing, during the active breeding of piping plover, utilizing a 300-ft protective buffer zone." Comment: This description needs further explanation. Please clarify if the 300-ft protective buffer zone would be 300 feet from nests, chicks or adults.	The FEIS has been revised to state that the 300-ft protective buffer zone location pertains to distance from piping plover nests.
DOI 157	DEIS	DEIS page 2-56	DEIS, page 2-56, states, "Suitable habitats within the Project area(s) shall be protected through the placement of symbolic fencing and warning signs. Symbolic fencing is intended to avoid or minimize accidental crushing of nests and repeated flushing of incubating adults, as well as provide an area where chicks can rest and seek shelter when people are on the beach." Comment: Please explain who will undertake the placement and maintenance of symbolic fencing in the project area. In addition, the USACE should explain what buffer distances and monitoring will be used to ensure the effectiveness of the symbolic fencing to "avoid or minimize accidental crushing of nests, and repeated flushing of adults," etc.	Details on the symbolic fencing protocol are provided in the Final Biological Assessment.
DOI 158	DEIS		DEIS, page 2-56, states, "All pedestrian and ORV access into, or through, the active breeding or growing areas shall be prohibited. Walkways may be permitted after an assessment by a qualified biologist and with the permission of the USFWS. Only persons engaged in monitoring, management, or research activities shall enter the protected areas. These areas shall remain symbolically fenced for piping plovers until at least July 1, and as long thereafter as viable eggs or unfledged chicks are present." Comment: The FEIS should be clear on who will establish and enforce these prohibitions.	Details on the enforcement protocol are provided in the Final Biological Assessment.
DOI 159	DEIS	DEIS page 2-56	DEIS, page 2-57, states, "...the local implementation of existing USFWS protection measures, impacts associated with the proposed Project will be minimized." Comment: It is not clear what the protection measures entail. Please specify in the FEIS the existing USFWS protection measures referred to in this sentence.	Details on the protectoin measures are provided in the Final Biological Assessment.
DOI 160	DEIS	DEIS page 4-49	DEIS, page 4-49, states, "To minimize impacts to the species and habitat, efforts would be made to artificially create and maintain high quality red knot habitats and reduce project induced effects of increased recreational disturbance." Comment: This is not discussed elsewhere within the DEIS. It is not clear, based on the information provided, what sort of habitat would be created and maintained or where within the project area this would occur. The USACE should provide a detailed plan describing this proposed work so that it can be evaluated and understood. Without more information it not possible to discern if the proposed measures adequately mitigate for impacts of the project or if they are appropriate for the targeted species. Furthermore, we believe that mitigating impacts on red knot habitat is important and we recommend that the USACE formally incorporate mitigation measures into the project plan with sufficient detail such that the implementation of the measures is ensured.	The Coastal Process Features will mimic natural features and maintain habitat for Red Knot. The conservation measures identified in the Biological Opinion will address impacts. FGRR Appendix J "Monitoring and Adaptive Management Plan" includes information about monitoring and a process for adaptive management.
DOI 161	DEIS	DEIS page 4-88	DEIS, page 4-88, states, "Varying nourishment schedules and other project variables (contractor availability, funding, local conditions etc.) may cause staggering of construction activities so that extensive stretches of the, shoreline are not nourished at the same time. In addition, only a short stretch (typically 500-1000 feet) of beach is nourished at one time. This practice allows motile species to avoid area where beach fill placement will occur." Comment: Scientific evidence should be provided to illustrate that staggering of construction activities lessens project impacts so that this conclusion can be understood and evaluated. If staggering construction activities is a scientifically valid way to minimize impacts of beach fill, then it should be formally incorporated into the project plan to ensure that it occurs. As it is written now, it occurs as a tentative byproduct	The FEIS includes information about the benefits of staggering construction activities.

COMMENT #	SECTION	PAGE	COMMENT	RESPONSE
DOI 162	DEIS	DEIS ES-1	DEIS, page ES-1, states "...while maintaining, enhancing, and restoring ecosystem integrity and coastal biodiversity." Comment: These terms are used here and in three other identical sentences in several places throughout the document to describe, in part, the goals of the project alternatives. However, there is no further discussion of these goals, measurable objectives, how they will be monitored or adaptively managed. Currently, specifics related to definitions, targets, and monitoring of these goals is absent in the document. We recommend that the USACE define these terms and discuss how they will be measureable and achievable in the context of the project alternatives. The USFWS is available to assist in defining and achieving these goals.	The FEIS defines the references terms and discuss measureable objectives. Additional detail is provided in FGRR Appendix J "Monitoring and Adaptive Management Plan."
DOI 163	DEIS	DEIS page 2-29	DEIS, page 2-29, states, "The TSP includes a variety of project-based features that would contribute to protecting areas from flooding, erosion, and other storm damage, while concurrently maintaining, preserving, or enhancing the natural resources." Comment: It is not clearly explained how the project-based features (artificial dunes, beaches, houses elevations, levees, breach prevention and filling, sand fence placement, beach grass planting, and other identified 'coastal process features'), maintain, preserve or enhance natural resources. For example, the document points to the critical habitat provided by overwash and breaches to listed shorebird species, but the project based features will reduce or prevent overwashes, breaches, wetland expansion, barrier island migration, sand flats, etc. Decreasing saltmarsh and submerged aquatic vegetation (SAV) beds over a long-time period (50 plus years) is a significant environmental impact that has not been quantified or discussed comprehensively in terms of impacts to fish and wildlife resources or mitigation alternatives. Both breaches and overwash provide material for future barrier migration onshore in response to sea level rise. This sediment is also of great importance for the creation of successional habitat and the maintenance of seagrass beds and saltmarshes.	The FEIS includes a discussion about how Coastal Process Features will maintain, preserve, or enhance natural resources.
DOI 164	DEIS	DEIS page 2-33	DEIS, page 2-33, states, "Project Features that contribute to coastal storm risk management by enhancing the resiliency of the natural system and its ability to recover after storm events include the following: ● Sunken Forest – Reestablishes the natural storm risk management conditions of the dune, upper beach and bay shoreline by removing bulkhead adjacent to marina and existing boardwalk, regrading and stabilizing disturbed areas using bioengineering and shoreline, ● Reagan Property – Reestablishes the natural storm risk management condition of dune, upper beach and shoreline by burying bulkhead, regrading and stabilizing disturbed areas using bioengineering, and creating intertidal areas. ● Great Gunn – Reestablishes salt marsh features by reestablishing hydrologic connections and disturbances. ● Tiana – Reestablishes the bay shoreline natural storm risk management features by reestablishing the dune, salt marsh, and enhancing the SAV beds. ● WOSI – Reestablishes the bay shoreline natural storm risk management features by reestablishing the existing salt marsh. ● Corneille Estates – Reestablishes bay shoreline natural storm risk management features by reestablishing bayside beach habitat." Comment: The Sunken Forest project is not currently supported by the NPS. In addition, details concerning the Reagan Property project are still needed. As of an August 17, 2016, meeting, the NPS was in agreement with the USACE on a conceptual project to address erosion caused by the updrift bulkhead, but exactly what that might entail is still to be determined.	Some proposed Coastal Process Features, including Sunken Forest, have been removed from the Recommended Plan. The FEIS has been revised to include only a description of the Coastal Process Features that are part of the Recommended Plan.
DOI 165	DEIS	DEIS page 4-4	DEIS, page 4-4, states, "The TSP also includes a variety of project-based features that would contribute to protecting areas from flooding, erosion, and other storm damage, while concurrently maintaining, preserving, or enhancing the natural resources. With regard to topography, land formation, and geologic characteristics, these project-based features would enhance the upper beach/dune width/slope/height, remove parking lots and re-grade to natural contours, reconfigure existing tidal channels, and remove." Comment: It is not evident in the project description where parking lots would be removed or existing tidal channels reconfigured. Also, the last sentence is incomplete. Information on the tidal channel reconfigurations is needed for us to provide our assessment of impacts in the Fish and Wildlife Coordination Act (FWCA) Report and to recommend mitigation measures, as appropriate.	The FEIS has been revised to include only a description of the Coastal Process Features that are part of the Recommended Plan.

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT
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NEW YORK NEW YORK 10278-0090

Environmental Analysis Branch

February 14, 2019

Mr. Brian Frank
Chief Environmental Analyst
East Hampton Planning
300 Pantigo Place
East Hampton, NY 11937

Subject: Atlantic Coast of Long Island, Fire Island Inlet to Montauk Point (FIMP), New York Coastal Storm Risk Management Project, East Hampton Local Waterfront Revitalization Program (LWRP) Consistency Determination.

Mr. Frank:

The U.S. Army Corps of Engineers, New York District (District) is pleased to provide the final project description for the FIMP General Reevaluation Report (GRR) and Environmental Impact Statement (EIS) (Enclosure 1).

The District, New York State Department of Environmental Conservation (NYSDEC) and local partners, and other agencies including the New York State Department of State (NYSDOS), have participated in extensive coordination to finalize the project description, in particular the details of the Coastal Process Features (CPFs) which are designed to achieve no net loss of sediment into the back bay system as part of the mutually acceptable plan as well as for compliance with Section 7 of the Endangered Species Act by creating early successional habitat for piping plovers (*Charadrius melodus*).

The following updates have been made to the project based on the extensive sponsor, local partner, resource agency and public coordination since the release of the July 2016 Draft GRR and EIS. These updates will not require any updates to the Districts Town of East Hampton existing LWRP consistency determination:

1. Updated sand quantities in tables and text
2. Additional language regarding "no net loss" of sediment (how to achieve the goal of approximately 4.2 million cubic yards of sand)
3. Additional section on proactive breach response triggers (ex: Southampton transitioned from Proactive to Reactive for Real Estate purposes)
4. Updated discussion of Downtown Montauk related to beach nourishment
5. Additional language describing that vacant land will be acquired as part of mainland nonstructural plan
6. Updated description of current list of CPFs, including renumbering sites and the removal of sites that do not have landowner support and are no longer

included (Cupsogue, Sunken Forest, Point of Woods, Carrington, Regan Property)

7. Incorporated an updated CPF table with quantities to achieve the approximate 4.2 MCY. The quantity in the table alone will not achieve the 4.2 MCY quantity and therefore Adaptive Management will be utilized to reach the overall total
8. Included a description of mainland CPF's.

The District requests that the Town of East Hampton please provide concurrence on the District's LWRP Determination no later than April 15, 2019 in order to be included in the Final EIS and maintain the overall project schedule for project approval

The District looks forward to working with your office to complete the Feasibility phase and throughout the Pre-Engineering and Design and Construction phases and thanks you for your continued assistance and input to this process which helps to advance the execution of this regionally-significant project.

If you require any additional information, please feel free to contact Mr. Robert Smith, Project Biologist at 917-790-8726.

Sincerely,

Peter Weppler
Chief, Environmental section

Enclosure 1 FIMP Final Project Description
Enclosure 2 Final LWRP Consistency Determination

cc: NYSDOS - Maraglio

NEW YORK STATE DEPARTMENT OF
STATE COASTAL ZONE MANAGEMENT PROGRAM

Policy Statement for the Town of East Hampton Local Waterfront Revitalization Program

Project: Fire Island to Montauk Point (FIMP) Reformulation Project

Applicant: U.S. Army Corps of Engineers, New York District

Applicable Policies: The Town of East Hampton Local Waterfront Revitalization Program (LWRP) policies (East Hampton 1999) were reviewed as to their applicability to the FIMP Reformulation Project. Based upon this review, 26 LWRP policies and sub-policies were identified as potentially applicable to the proposed Project. These policies are presented below, followed by an explanation of Project consistency. Policies that are clearly not applicable are not discussed.

Policy 4 Strengthen the economic base by encouraging the development and enhancement of those traditional uses and activities that have provided such areas with their unique maritime identity.

Determination – As applied to Three Mile and Montauk Harbors, the Recommended Plan would insure that traditional uses of the south shore of Long Island would be enhanced and preserved. The Recommended Plan would stabilize the barrier island shoreline and manage the risk from coastal storm damage to the surrounding area, thus encouraging the development and enhancement of those traditional uses and activities that have provided Three Mile and Montauk Harbors with their unique maritime identity. Therefore, the District has determined that the Recommended Plan would be consistent with this policy.

Policy 5 Encourage the location of development in areas where public services and facilities essential to such development are adequate.

Determination – This policy is intended to further the rural pattern of the Town, which concentrates development in village and hamlet centers. The Recommended Plan would manage the risk of coastal storm damage to existing infrastructure along the south shore of Long Island from hurricane and storm surge flooding. Risk management would provide stability and enhancement to existing and future development Projects. The without Project condition would eventually impact development as contractors would be hesitant to develop in an unstable, unprotected environment. Therefore, CENAN has determined that the Recommended Plan would be consistent with this policy.

Policy 7 Significant coastal fish and wildlife habitat will be protected, preserved, and where practicable, restored so as to maintain their viability as habitats.

Policy 7a (Locally Significant Fish and Wildlife Habitats)
Locally significant coastal fish and wildlife habitat, as identified on the coastal area map, shall be protected, preserved, and where practicable, restored so as to maintain their viability as habitats.

Policy 7b (Protection of Diversity)
Protect to the maximum extent practicable the vulnerable plant and animal species and natural communities that have been identified on the state and federal levels by the New York Heritage Program, the NYSDEC protected native plant list (NYCRR 193.3), the NYSDEC list of endangered, threatened and special concern species and the federal list of endangered and threatened wildlife and plants (50 CFR 17).

Determination - All of Great South Bay and many adjoining marshes and natural areas are designated as Significant Coastal Fish and Wildlife Habitat (SCFWH). Policy 7 states that filling of shallows, grading, shoreline alteration and dredging are among generic activities most likely to affect protected habitats. These activities are integral to the proposed Project which consists of dredging sand from offshore borrow areas for placement on the Atlantic shoreline of Fire Island to create enhanced beach area and dunes for coastal storm risk management. No dredging will occur within State-designated SCFWH. No filling or grading will occur within marshes or wetlands; fill placement is limited to the Atlantic shoreline only. Fill placement along the Atlantic shoreline of Fire Island in the Project area will create wider beaches and dunes to minimize breaching and overwashing and consequent damage to habitats and communities on the barrier island and along the south shore of Long Island. There will be no change in existing tidal exchange patterns, only a continuation of the non-storm induced conditions. The Recommended Plan includes twelve barrier island locations where coastal process features (CPFs) will be reestablished to meet the overall reformulation objective of no net loss of habitat or sediment.

A comprehensive assessment of potential Project impacts to threatened and endangered species and habitats was conducted and is presented in Chapter 4 of the Environmental Impact Statement (EIS) prepared for the Project and the Biological Assessment (BA) and Programmatic Biological Opinion (PBO) (see Appendix B of the EIS). The proposed activities would be undertaken in a manner consistent with this policy.

Policy 8 Protect fish and wildlife resources in the coastal area from the introduction of hazardous wastes and other pollutants which bio-accumulate in the food chain or which cause significant sub-lethal or lethal effect on those resources.

Determination – The material that may be obtained from the offshore borrow areas, consists primarily of clean, coarse-grained sand. The material that would be dredged and used for beach nourishment on the down drift beaches would not contain hazardous wastes or other pollutants that would bio-accumulate in the food chain or cause significant sub-lethal or lethal effects on those resources. Sediment re-suspension is likely to cause temporary increases in turbidity; however, these increases would be limited in duration and spatial extent and are not expected to significantly affect fish or aquatic wildlife in the Project areas. The proposed activities would not adversely affect fish and wildlife resources and would be undertaken in a manner consistent with this policy.

Policy 12 Activities or development in the coastal area will be undertaken so as to minimize damage to natural resources and property from flooding and erosion by protecting natural protective features including beaches, dunes, barrier islands and bluffs.

Determination – The Long Island south shore barriers, inlets, and associated beaches, dunes, and nearshore areas are natural "defenses" that help preserve coastal lands and property from damage and reduce the danger to resources and property resulting from flooding and erosion. The proposed activities would be conducted in the inlets, mainland (10-year floodplain non-structural building retrofits, floodproofing, relocation, and acquisition), and barrier islands. These properties and their associated coastal processes ordinarily provide varying levels of risk management measures to the barrier island upland areas, the south shore bays, and Long Island south shore mainland. The purpose of the Project is to implement measures that will augment and restore the natural protective capabilities of the barrier islands, inlets, and mainland.

The nourishment of beaches and dunes with appropriate material is an allowable activity pursuant to the coastal erosion hazard area regulations contained in 6 NYCRR Part 505 (see also Policy 35), and is a non-structural erosion control measure preferred over structural measures by the State in its tidal wetlands, erosion hazards, and coastal management program statutes and regulations (see Policies 17, 35, and 44). Restoring the natural protective characteristics of the barrier island, inlets, and associated beaches, dunes, and nearshore areas (resulting in the protection of the barrier island itself, the bay-system and the mainland of Long Island) would be consistent with and further promote Policy 12, which is to minimize damage to natural resources and property by protecting the naturally occurring protective characteristics and the associated physical processes.

Policy 15 Mining, excavation or dredging in coastal waters shall not significantly interfere with the natural coastal processes which supply beach materials to land adjacent to such waters and shall be undertaken in a manner which will not cause an increase in erosion of such land.

Determination – The proposed action includes the removal of material from offshore borrow sources. The borrow areas are located more than 1 mile offshore, where excavation and dredging has been demonstrated to have a negligible impact on the nearshore coastal processes, and will not cause an increase in coastal erosion. Best management practices will be followed during all dredging activities and the proposed dredging depth in the borrow areas will not reduce the flow of sediments to adjacent areas. Coastal processes along the shoreline sand placement areas will not be interfered with as only natural sands will be placed; no structures or shoreline hardening is proposed. The twelve barrier island and two mainland CPF locations will reestablish the coastal processes of breaching and overwashing with the introduction of approximately 4.2 million cubic yards of material into the bay ecosystem over the project life. The Monitoring and Adaptive Management aspect of the Recommended Plan will document that coastal processes are maintained. The proposed activities are consistent with this policy.

Policy 16 Public funds shall only be used for erosion protective structures where necessary to protect human life, and new development which requires a location within or adjacent to an erosion hazard area to be able to function, or existing development; and only where the public benefits outweigh the long-term monetary and other costs including the potential for increasing erosion and adverse effects on natural protective features.

Determination – The Project will minimize breaching and overwashing of the barrier islands and is a necessary measure for storm damage reduction on the barrier islands as well as the south shore of Long Island. The Project will enhance and recreate natural protective features of the barrier islands through beach renourishment and berm construction and does not include structural measures. Benefits to the human and natural environments outweigh the expenditures of public funds. This has been demonstrated through the completion of a comprehensive economic assessment of the Reformulation Plan. The Project is consistent with this policy.

Policy 17 Non-structural measures to minimize damage to natural resources and property from flooding and erosion shall be used whenever possible.

Policy 17A (Only Non-structural Measures Permitted in Certain Reaches) Along the south shore ocean facing reaches of the town, only non-structural measures to minimize flooding and erosion are permitted.

Determination – The proposed use of suitable dredged sand for beach nourishment and dune creation is a non-structural measure. The beach nourishment minimizes damage to natural resources and property from flooding and erosion by strengthening natural protective characteristics and providing the sediments necessary for these characteristics to function. The Project is consistent with this policy.

Policy 18 To safeguard the vital economic, social and environmental interests of the State and of its citizens, proposed major actions in the coastal area must give full consideration to those interests, and to the safeguards which the State has established to protect valuable coastal resource areas.

Determination – The Project will reduce the frequency and degree of breaches and overwashes of the barrier islands and mainland and thereby afford coastal storm risk management to the barrier as well as communities on the south shore of Long Island. In addition, several of the inlets (such as Fire Island Inlet and Moriches Inlet) are regionally important navigation inlets that must be stabilized and maintained. The areas adjacent to the inlet support regionally important water-dependent and water-related uses, including commercial fishing and recreational boating facilities, public parklands, and other uses. The physical character of the barriers must be maintained to protect these uses.

The south shore of Long Island also supports a variety of public recreational and commercial activities. The south shore of Staten Island's coastline must be maintained to protect these uses. The without Project condition would eventually impact public recreational and commercial activities. The Project would provide coastal storm risk management to an important public recreational area and adjacent commercial and residential properties with minimal short-term impacts to economic, social, and environmental resources. Therefore, the District has determined that the Recommended Plan would be consistent with and advance this policy.

Policy 19 Protect, maintain, and increase the level and types of access to public water related recreation resources and facilities.

Determination – The beach areas in the proposed Project area support a variety of public recreational activities (see also Policies 18 and 20). The Recommended Plan would result in positive impacts on recreation as a result of better coastal storm risk management in the Project area. The without Project alternative would result in increased flood risks and increased erosion, thereby decreasing recreational potential in the area.

Buffer areas approximately 1,000 feet in length will be closed during construction activities for safety reasons. Although a reduction in public access to the work site during construction would occur, this impact would be temporary. As beach placement activities are completed within each 1,000-foot compartment, the buffer is shifted accordingly. Public use of the beach area would be restored at that time. The proposed activities would be undertaken in a manner consistent with this policy. Also, over the 50-year Project life the proposed activities would advance the policy to protect, maintain, and increase public access to and use of public water-related recreation resources and facilities.

Policy 20 Access to publicly-owned foreshore and to lands immediately adjacent to the foreshore or the water's edge that are publicly-owned shall be provided and it shall be provided in a manner compatible with adjoining uses.

Determination – Many of the lands and waters adjacent to and at the sites of the proposed activities are publicly-owned and accessible underwater lands and parklands that support a variety of public uses are present in the area (see also Policies 18 and 19). Based on the Policy 19 analysis above, the proposed activities would be undertaken in a manner consistent with and would advance this policy.

Policy 21 Water dependent and water enhanced recreation will be encouraged and facilitated, and will be given priority over non-water-related uses along the coast.

Policy 21A **(Water-related Recreation Improvement Sites)**
Water dependent and water-enhanced recreation will be encouraged and facilitated at sites recommended under "Opportunities for Improvement" and "Recreational Uses Compatible with New Development" in the analysis narrative of "Town of East Hampton Local Waterfront Revitalization Program" (East Hampton 1999) and in "Public Access and Recreation Improvements" in Projects, Section XIV of "Town of East Hampton Local Waterfront Revitalization Program" (East Hampton 1999).

Determination – Many of the lands and waters within the Project area are publicly-owned and currently support a variety of public water dependent uses such as fishing, boating and beaching. The Project will protect and enhance these uses in the long-term, with only staggered short-term loss of use during construction, as described under Policy 19. The proposed Project is consistent with and will advance this policy.

Policy 23 Protect, enhance and restore structures, districts, areas or sites that are of significance in the history, architecture, archeology or culture of the State, its communities, or the Nation.

Determination –The Fire Island Light Station (Town of Islip) and the Beach Road Historic District (Village of Southampton) are the only properties within the study area that are listed on the National Register, and none of these properties are in East Hampton. A number of other structures, each more than 50 years of age, which may possess the requisite characteristics and integrity to be eligible for the National Register are visible from the beach (JMA 2000), including: the Robert Moses State Park Tower; the former Point O' Woods Life Saving Station (presently the Fire Island Hotel and Resort), and houses in various communities in the study area (see Table 3.10-1 of the EIS). None of the properties listed in Table 3.10-1 are located in East Hampton. The Project will afford additional coastal storm risk management to existing properties on the National Register, as well as the other identified structures. The Project will not affect archaeological site or marine resources, such as shipwrecks. The Project will protect cultural resources and is consistent with this policy.

Policy 24 Prevent impairment of scenic resources of statewide significance.

Determination – Portions of East Hampton have been designated as scenic resources of statewide significance (NYSDOS 2010). Although some of these portions of East Hampton are within the Project area, CENAN is not proposing any actions in these areas that will impact these scenic resources of statewide significance. Consequently, the Project will not impair scenic resources of statewide significance.

Policy 25 Protect, restore, or enhance natural and man-made resources which are not identified as being of statewide significance, but which contribute to the overall scenic quality of the coastal area.

Determination – Implementation of the Recommended Plan would require the use of large construction equipment, such as dredge barges and excavators that would visually interrupt the natural landscape during construction activities. The Project would not require the use of construction equipment within the Town of East Hampton. These short-term impacts would be similar to visual impacts that currently occur and would not be significant. Long-term, the Recommended Plan would reduce the impacts from storm and flooding events that may cause significant erosion or breaching of beaches, dunes, and shorelines. By reducing these types of impacts, the Recommended Plan will contribute positively to the overall scenic quality of the coastal area.

Policy 30 Municipal, industrial, and commercial discharge of pollutants, including but not limited to, toxic and hazardous substances, into coastal waters will conform to State and National water quality standards.

Determination – The Project will not discharge pollutants. The Project is likely to result in sediment re-suspension and associated increases in turbidity during dredging in the borrow areas and during sand placement along the shoreline. These turbidity increases will be temporary and will not result in a violation of this policy.

Policy 35 Dredging and dredge spoil disposal in coastal waters will be undertaken in a manner that meets existing State dredging permit requirements and protects significant fish and wildlife habitats, scenic resources, natural protective features, important agricultural lands and wetlands.

The proposed dredging of clean, relatively coarse-grained accumulated sand from offshore borrow areas will not adversely affect significant coastal fish and wildlife habitats (see Policy 7), natural protective characteristics (see Policies 12, 14, 15, 17, and 18), or wetlands (see Policy 44).

The proposed dredging activities would take place in waters greater than 6 feet deep, and are therefore not required to meet the regulatory standards contained in the State's tidal wetlands land use regulations in 6 NYCRR Part 661. However, the use of the dredged material for beach nourishment in the areas adjacent to the Atlantic Ocean tidal wetland littoral zone would require a tidal wetlands permit (see Policy 44). Likewise, the placement of material on the bayside of the barrier island as part of the CPFs would also take place in the littoral zone, requiring a tidal wetlands permit. The sand placement area is within state designated significant fish and wildlife habitats. The State tidal wetlands regulations in 6 NYCRR Part 661 indicate that the use of the dredge material for beach nourishment in an area adjacent to tidal wetlands is a generally compatible use; however, such a use is dependent on several character and resource values and the effects such nourishment and its associated dredged materials might have on intertidal wetlands and adjacent areas. The material to be dredged and used to nourish the beaches is compatible with the material currently on the beaches. The nourishment of beaches and dunes where necessary and appropriate is an activity that may be authorized pursuant to the coastal erosion hazard area regulations in 6 NYCRR Part 505 (see also Policy 12).

The Project will be implemented in such a manner as to avoid adverse impacts to these habitats during construction to the extent practicable. Long-term benefits to significant fish and wildlife habitats are anticipated as the placement of the beach fill would lead to larger and wider beach areas that could be used for breeding and nesting by shorebirds. The bayside material placement CPFs would simulate breaching and overwashing and create habitat for sensitive species.

There is an overriding need to maintain the physical character of the barrier island and its associated natural protective characteristics, as well as the natural resource values of these characteristics. An EIS has been prepared for the Project which details the potential impacts to natural and cultural resources. In addition, all required permits, such as a NYSDEC Tidal

Wetlands Permit, Section 401 Water Quality Certificate, Clean Water Act Section 404 permit, will be acquired and all permit conditions will be complied with.

Consultation and coordination with State and Federal resource agencies (US Fish &Wildlife Service, NOAA Fisheries, National Park Service and State Natural Resource agencies) will be conducted and species specific seasonal restrictions and mitigation measures will be put in place and will include monitoring and adaptive management. The proposed activities will be conducted in a manner consistent with this policy.

Policy 38 The quality and quantity of surface water and groundwater supplies will be conserved and protected, particularly where such waters constitute the primary or sole source of water supply.

Policy 38A Maintain water resources as near to their natural condition of purity as reasonably possible to safeguard public health.

Determination – The Project will not affect water supply sources. Temporary increases in turbidity may occur during dredging and sand placement activities; however, these will be limited to construction periods and will be limited in spatial extent and duration. Best management practices will be implemented to minimize impacts. The Project is consistent with this policy.

Policy 41 Land use or development in the coastal area will not cause national or State air quality standards to be violated.

Determination – The Project will result in mobile air emissions sources during construction only. No stationary sources are proposed. A conformity analysis is being conducted for the Project and any required mitigation measures to offset temporary emissions increases will be implemented. A detailed air impact analysis is included with the EIS prepared for the FIMP Reformulation Project. The Project is consistent with this policy.

Policy 43 Land use or development in the coastal area must not cause the generation of significant amounts of the acid rain precursors: nitrates and sulfates.

Determination – Refer to the response to Policy 41; the Project is consistent with this policy.

Policy 44 Preserve and protect tidal and freshwater wetlands and preserve the benefits derived from these areas.

Determination – As demonstrated above in the Policy 35 analysis, the proposed activities would take place in and adjacent to the Atlantic Ocean and bayside littoral zone and unvegetated intertidal wetland areas. Material would not be placed in vegetated tidal wetlands. No wetlands within the Town of East Hampton would be directly affected by the Project. The proposed activities are compatible uses according to the tidal wetlands land use regulations in 6 NYCRR Part 661. The proposed activities include one of the preferred non-structural erosion control measures identified in the State erosion hazard area regulations, the Coastal Policies contained in the State's Coastal Management Program document, the State tidal wetlands land use regulations, and Article 42 of the Executive Law and its implementing regulations in 19 NYCRR Part 600. The beach nourishment activities will result in physical changes to the intertidal area that will adversely affect some invertebrates at the site of the beach nourishment activities while the Project is being undertaken (see Policy 35 analysis). However, these adverse effects would not be significant, would be temporary, and would not result in significant adverse effects nor significantly impair the benefits derived from the tidal wetland areas. The proposed activities would be undertaken in a manner consistent with this policy.

References

East Hampton 1999	East Hampton Town Board. "Town of East Hampton Local Waterfront Revitalization Program." December 3, 1999.
JMA 2000	John Milner Associates, Inc. (JMA). 2000. Cultural Resources Baseline Study Fire Island Inlet to Montauk Point. Suffolk County, New York Reformulation Study. Prepared for The Greeley-Polhemus Group and the U.S. Army Corps of Engineers New York District.
NYSDOS 2010	New York State Department of State (NYSDOS), Division of Coastal Resources. "East Hampton Scenic Areas of Statewide Significance." January 2010.

DEPARTMENT OF THE ARMY
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REPLY TO
ATTENTION OF
Environmental Analysis Branch

February 14, 2019

Ms. Judy-Ann Mitchell
USEPA Region 2
290 Broadway – 25th Floor
New York NY 10007-1866

Subject: Atlantic Coast of Long Island, Fire Island Inlet to Montauk Point (FIMP), New York Coastal Storm Risk Management Project

Dear Ms. Mitchell:

The U.S. Army Corps of Engineers, New York District (District) is pleased to provide the final project description for the FIMP General Reevaluation Report (GRR) and Environmental Impact Statement (EIS) (Enclosure 1), the final Monitoring and Adaptive Management Plan (Enclosure 2), District Final Responses to the Environmental Protection Agency (EPA) comments (Enclosure 3) on the July 2016 Draft GRR and EIS received via letter dated October 20, 2016.

The District, New York State Department of Environmental Conservation (NYSDEC) and local partners, and other resource agencies have participated in extensive coordination to finalize the project description, in particular the details of the Coastal Process Features (CPFs) which are designed to achieve "no net loss" of sediment into the back bay system as part of the mutually acceptable plan, as well as for compliance with Section 7 of the Endangered Species Act, by creating early successional habitat for piping plovers (*Charadrius melodus*).

The following updates have been made to the project based on the extensive sponsor, local partner, resource agency and public coordination since the release of the July 2016 Draft GRR and EIS:

1. Updated sand quantities in tables and text
2. Additional language regarding "no net loss" of sediment (how to achieve the goal of approximately 4.2 million cubic yards of sand)CY
3. Additional section on proactive breach response triggers (ex: Southampton transitioned from Proactive to Reactive for Real Estate purposes)
4. Updated discussion of Downtown Montauk related to beach nourishment
5. Additional language describing that vacant land will be acquired as part of mainland nonstructural plan
6. Updated description of current list of CPFs, including renumbering sites and the removal of sites that do not have landowner support and are no longer

included (Cupsogue, Sunken Forest, Point of Woods, Carrington, Regan Property)

7. Incorporated an updated CPF table with quantities to achieve the approximate 4.2 MCY. The quantity in the table alone will not achieve the 4.2 MCY quantity and therefore Adaptive Management will be utilized to reach the overall total
8. Included a description of mainland CPF's.

The District has carefully considered and responded to all EPA comments (Enclosure 3) and has incorporated revisions based upon your comments, where appropriate, in the GRR and EIS. These documents will be available in mid-February for each agency to back check and then finalize their respective environmental coordination requirements. The District will sign the General Conformity Determination so as to ensure its inclusion in the Final EIS, per regulation, and also so as to maintain the overall project schedule.

The District looks forward to working with your office to complete the Feasibility phase of the study and throughout the Pre-Engineering and Design and Construction phases of the project and thanks you for your continued assistance and input to this process which helps to advance the execution of this regionally-significant project.

If you require any additional information, please feel free to contact Mr. Robert Smith Project Biologist at 917-790-8726.

Sincerely,

Peter Weppler
Chief, Environmental section

Attachments
Enclosure 1 FIMP Final Project Description
Enclosure 2 FIMP Final Monitoring and Adaptive Management Plan
Enclosure 3 District Response to EPA comments on July 2016 Draft GRR and EIS

FIRE ISLAND TO MONTAUK POINT, NY COASTAL STORM RISK MANAGEMENT STUDY - DRAFT GENERAL REEVAULATION REPORT AND DRAFT ENVIRONMENTAL IMPACT STATEMENT (JULY 2016)

This document presents a summary of EPA's review comments for the subject reports, and the USACE's response to comments.

EPA's comments were documented in an October 20, 2016 letter from Ms. Judy-Ann Mitchell (Chief, EPA Region 2 Sustainability and Multipedia Programs Branch) to Mr. Robert Smith (USACE New York District Environmental Analysis Branch).

Comment ID numbers were assigned by EPA in its October 20, 2016 letter.

Key to Terms

EPA = Environmental Protection Agency. FEIS = final Environmental Impact Statement. FGRR = final general reevaulation report. GHG = greenhouse gas. USACE = U.S. Army Corps of Engineers.

COMMENT #	COMMENT	USACE RESPONSE
EPA 001	Executive Summary. From the document, and from published sources, there appear to be differences of opinion regarding the closure of the Otis Pike Wilderness Breach. EPA suggests that the Executive Summary include a separate "dialogue box" that goes over the issues, any tidal data and existing modeling, and discusses the Department of Interior's upcoming environmental impact statement addressing the breach.	The FEIS Executive Summary will include a separate "dialogue box" that summarizes the issues, any tidal data and existing modeling, and discusses the Department of Interior's upcoming environmental impact statement addressing the breach.
EPA 002	The U.S. Army Corps of Engineers' proposed Montauk Point, NY Coastal Storm Risk Management Project should also be included in the cumulative effects section of the DEIS. Discuss whether there will be any effect of the armoring of Montauk Point on the westward movement of sand that is discussed in this DEIS.	A discussion of the proposed Montauk Point, NY Coastal Storm Risk Management Project will be included in the Cumulative Effects section of FEIS. The text will include a discussion of whether there will be any effect of the armoring of Montauk Point on the westward movement of sand that is discussed in this FEIS.
EPA 003	Appendix B discusses the borrow sources of sand for the project, and the screening methodologies used to identify those sources. It also states that adaptive borrow area management practices will be used, and further studies will investigate the impact of using borrow area sand for sediment management of the coastline. However, this is not, and should be noted as one of the adaptive management elements in Section 2.1 Development of Alternatives.	The FEIS will include a discussion of screening methodologies for borrow area sand sources, adaptive borrow area management practices, and investigations of impacts of using borrow area sand for sediment management of the coastline to adaptive management elements in Section 2.1 "Development of Alternatives."
EPA 004	While the DEIS includes an analysis of greenhouse gas emissions, it relies on the draft version of the Council on Environmental Quality's climate change guidance, On August 1, 2016, CEQ released the "Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in the National Environmental Policy Act Reviews." The final guidance discusses mitigation, and states that Federal agencies should include mitigation options within the project NEPA document. Accordingly, we recommend that in addition to including the GHG emissions associated with the project and a qualitative description of relevant climate change impacts, the final EIS analyze reasonable alternatives and/or practicable mitigation measures to reduce project-related GHG emissions.	The "Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in the National Environmental Policy Act Reviews" (the Final Guidance) was rescinded on April 5, 2017 (Federal Register/Vol. 82, No. 64/Wednesday, April 5, 2017). Therefore, additional analysis and discussion of GHGs is not warranted in the FEIS.
EPA 005	While the DEIS includes estimates of GHG emissions for the preferred alternative, no estimates were given for other alternatives. NEPA requires rigorous and objective evaluation of all alternatives, 1 and this approach is supported for GHG emissions by the CEQ Guidance2. We recommend including GHG estimates resulting from each alternative and mitigation measure in the FEIS.	The "Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in the National Environmental Policy Act Reviews" (the Final Guidance) was rescinded on 04/05/2017 (Federal Register/Vol. 82, No. 64/Wednesday, April 5, 2017). Therefore, additional analysis and discussion of GHGs is not warranted in the FEIS.
EPA 006	The EPA recommends that the FEIS identify and consider measures to avoid or reduce GHG emissions associated with the project, including reasonable alternatives and practicable mitigation opportunities, and disclose the estimated GHG reductions3 for example, construction of the saltwater wetlands. EPA further recommends that the Record of Decision commits to implementation of reasonable mitigation measures that would reduce or eliminate project-related GHG emissions.	The "Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in the National Environmental Policy Act Reviews" (the Final Guidance) was rescinded on 04/05/2017 (Federal Register/Vol. 82, No. 64/Wednesday, April 5, 2017). Therefore, additional analysis and discussion of GHGs is not warranted in the FEIS.
EPA 007	The estimated GHG emissions have been appropriately calculated and explained in the DEIS analysis to address climate change impacts; however, we recommend including a comparison of emissions across the alternatives.	The "Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in the National Environmental Policy Act Reviews" (the Final Guidance) was rescinded on 04/05/2017 (Federal Register/Vol. 82, No. 64/Wednesday, April 5, 2017). Therefore, additional analysis and discussion of GHGs is not warranted in the FEIS.
EPA 008	We recommend the U.S. Army Corps of Engineers determine whether the environmental impacts of the alternatives would be exacerbated by climate change. This determination should be informed by the future climate scenarios outlined in the affected environment section. If impacts may be exacerbated, additional mitigation measures may be warranted.	Climate change has been considered in the consideration of alternatives, consistent with USACE guidance and regulation. There are no known adverse impacts beyond those identified that would take place as a result of climate change.
EPA 009	The EPA recommends that the FEIS include descriptions of how the proposal 's design incorporates measures to improve resiliency to climate change, where appropriate. These changes could be informed by the future climate scenarios addressed in the "Affected Environment" section. The FEIS's alternatives analysis should, as appropriate, consider practicable changes to the proposal to make it more resilient to anticipated climate change. Changing climate conditions can affect a proposed project, as well as the project's ability to meet the purpose and need presented in the EIS. For this proposal, the importance of these considerations has been underscored by Hurricane Sandy.	The FEIS will include a discussion as to how project design incorporates measures to improve resiliency to climate change, consistent with USACE guidance and regulation. Both monitoring and adaptive management actions that may provide a means to address potential future climate change are included in the Recommended Plan. Please reference the Monitoring and Adaptive Management Plan for detailed information about these potential actions.
EPA 010	EPA concurs with the findings of the General Conformity analysis for this project, and will work with the Corps as part of the Regional Air Team to evaluate emissions offsets for the project.	USACE will continue to work with the EPA to evaluate emissions offsets for the project.

DEPARTMENT OF THE ARMY
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REPLY TO
ATTENTION OF
Environmental Analysis Branch

February 14, 2019

Ms. Louis A. Chiarella
NOAA/NMFS/Habitat Conservation Division
55 Great Republic Drive
Gloucester, MA 01930-2276

Subject: : Atlantic Coast of Long Island, Fire Island Inlet to Montauk Point (FIMP), New York Coastal Storm Risk Management Project, National Oceanic and Atmosphere Administration (NOAA), Supplemental Essential Fish Habitat (EFH) Assessment.

Dear Ms. Chiarella:

The U.S. Army Corps of Engineers, New York District (District) is pleased to provide the final project description for the FIMP General Reevaluation Report (GRR) and Environmental Impact Statement (EIS) (Enclosure 1), the final Monitoring and Adaptive Management Plan (MAMP) (Enclosure 2) and District Final Response to the NOAA comments (Enclosure 3) on the July 2016 Draft GRR and EIS received via letters dated October 18, 2016. Also provided is the 2019 supplemental EFH assessment (Enclosure 4) focused on the Coastal Process Features (CPFs) prepared in response to NOAA's EFH consultation letter on the Draft EFH Assessment received via letter May 3, 2016 and follow up email requests for additional information. The District's original July 2016 EFH Assessment (Appendix D of the Draft EIS) is also provided for reference (Enclosure 5).

The District, New York State Department of Environmental Conservation (NYSDEC) and their local partners and resource agencies have participated in extensive coordination to finalize the documents provided in these encloses, in particular the details of CPFs which are designed to achieve no net loss of sediment into the back bay system as part of the mutually acceptable plan as well as for compliance with Section 7 of the Endangered Species Act by creating early successional habitat for piping plovers (*Charadrius melodus*).

The following updates have been made to the project based on the extensive sponsor, local partner, resource agency and public coordination since the release of the July 2016 Draft GRR and EIS:

1. Updated sand quantities in tables and text
2. Additional language regarding "no net loss" of sediment (how to achieve the goal of approximately 4.2 million cubic yards of sand)CY
3. Additional section on proactive breach response triggers (ex: Southampton transitioned from Proactive to Reactive for Real Estate purposes)
4. Updated discussion of Downtown Montauk related to beach nourishment

5. Additional language describing that vacant land will be acquired as part of mainland nonstructural plan
6. Updated description of current list of CPFs, including renumbering sites and the removal of sites that do not have landowner support and are no longer included (Cupsogue, Sunken Forest, Point of Woods, Carrington, Regan Property)
7. Incorporated an updated CPF table with quantities to achieve the approximate 4.2 MCY. The quantity in the table alone will not achieve the 4.2 MCY quantity and therefore Adaptive Management will be utilized to reach the overall total
8. Included a description of mainland CPF's.

The District has carefully considered and responded to all NOAA comments (Enclosure 3) and has incorporated the comments where appropriate in the GRR and EIS. These documents will be available mid-February for each agency to back check and then finalize their respective environmental coordination requirements.

After reviewing the May 3, 2016 consultation letter and the October 18, 2016 NOAA comment letter, the District notes that many of NOAA requests for additional information (including the proposed mitigation measures [CPFs] and avoiding the SAV beds) are provided in the final project description (Enclosure 1). The District also agrees with and has adopted many of NOAA's suggested measures (such as avoided high density surf clam beds and BMP for dredging the borrow areas).

Some of NOAA's request for additional information in the May 3, 2016 consultation letters are not addressed in either the Final Project Description (Enclosure 1) or response to NOAA comments (Enclosure 3) and instead is listed below:

- NOAA request for areal extent of all sand placement below the high tide line
    - Figures 1 and 2 and Table 1 from the Final Recommended Plan (Enclosure 1)
    - CPF profile designs, each showing mean high and mean low tides (Enclosure 6)
    - Quantities broken out per year and per reach (Enclosure 7) where stations coordinate back to Figures 1 and 2 and Table 1 from the Final Recommended Plan (Enclosure 1)

- NOAA request for amount and extent of dredging within the inlets and ebb shoals
    - On average 2.3M CY from the three inlets combined and ebb shoals for initial construction (as shown in Enclosure 7 1st tab rows 50 – 53)
    - On average 1.8M CY from the three inlets combined and ebb shoals for each re-nourishment cycle (as shown in Enclosure 7 remaining tab rows 47 - 49)

- NOAA request for the District to identify the offshore borrow areas
    - At this time 7 possible borrow area locations are identified and shown in Enclosure 8 (Figure B-3 shows 2A, 2B, 2C and 2H), Figure B-4 shows 5Bexp and Figure B-5 shows 8D).
    - Enclosure 7 Column D notes the sediment source (borrow area / inlet) per reach

- NOAA request for an estimate of the amount of material that will be removed and the frequency of disturbance of each borrow area or inlet

- Enclosure 7 shows tabs for initial construction and estimated re-nourishment on a 4 year schedule for borrow areas and every 2 years for inlets. Refer to Column O for the total volume per reach and per sand placement cycle.

- NOAA request for detailed site specific information on the borrow areas and inlet ebb shoals
    - See Enclosures 7 and 8
    - The 2017 Borrow Area Report detailing study of Borrow Ares 2C and 5B (adjacent to 5bexp) (Enclosure 9)
    - The District will share additional information as additional pre-construction, during-construction and post construction monitoring of additional borrow areas is completed.

A NOAA recommended measure for an inlet dredging window from January 15 to June will be implemented as part of the FIMP project to the extent possible based on weather concerns and limited times allowed for dredging and placement related to seasonal restrictions for piping plovers and sea beach amaranth. The District requests that as part of finalizing the EFH Assessment, NOAA and District staff work together via meeting and conference calls to finalize the list of conservation measures.

The District requests that NOAA please provide a final EFH Assessment no later than March 30, 2019 in order to be included in the Final EIS and maintain the overall project schedule for project approval.

The District looks forward to working with your office to complete the Feasibility phase and throughout the Pre-Engineering and Design and Construction phases and thanks you for your continued assistance and input to this process which helps to advance the execution of this regionally-significant project.

If you require any additional information, please feel free to contact Mr. Robert Smith, Project Biologist at 917-790-8726.

Sincerely,

Peter Weppler
Chief, Environmental Analysis Branch

cc: NMFS - Greene

Enclosure 1 FIMP Final Project Description
Enclosure 2 FIMP Final Monitoring and Adaptive Management Plan

Enclosure 3 District Response to NOAA comments on July 2016 Draft GRR and EIS
Enclosure 4 Supplemental 2019 EFH Assessment for CPFs
Enclosure 5 July 2016 EFH Assessment (Appendix D of the Draft EIS)
Enclosure 6 CPF profile designs, each showing mean high and mean low tides
Enclosure 7 Quantities broken out per year and per reach (stations coordinate back to Figures 1 and 2 from the Final Recommended Plan)
Enclosure 8 Map of all Borrow Area
Enclosure 9 2017 Borrow Area Report (studying Borrow Areas 2C and 5B)

FIRE ISLAND TO MONTAUK POINT, NY COASTAL STORM RISK MANAGEMENT STUDY - DRAFT GENERAL REEVAULATION REPORT AND DRAFT ENVIRONMENTAL IMPACT STATEMENT (JULY 2016)

This document presents a summary of NOAA's review comments for the subject reports, and the USACE's response to comments.

NOAA's comments were documented in an October 18, 2016 letter from Mr. Louis Chiarella (NOAA Greater Atlantic Regional Fisheries Office, Assistant Regional Administrator Habitat Conservation) to Mr. Peter Weppler (Chief, USACE New York District Environmental Analysis Branch).

Comments are abridged for clarity and space. Comment ID numbers were assigned by USACE in order to organize this document.

Key to Terms

EFH = Essential Fish Habitat. FEIS = final Environmental Impact Statement. FGRR = final general reevaulation report. MSA = Magnuson-Stevens Fisheries Conservation & Management Act. NOAA = National Oceanic and Atmospheric Administration. USACE = U.S. Army Corps of Engineers.

COMMENT #	COMMENT	USACE RESPONSE
NOAA 001	As discussed in our May 3, 2016, letter, we continue to recommend that dredging within the inlets be avoided from March 1 through June 30 to avoid impeding the migration of these species into the inlet and to their upstream habitats.	USACE will avoid dredging inlets from March 1 - June 30 of each year to the maximum extent practicable.
NOAA 002	The EFH lacks any discussion of the specific details of the project components including the areal extent of the sand placement below the high tide line and the amount and extent of dredging within the inlets and ebb shoals. Although offshore borrow areas are identified and evaluated and material volumes are provided, there are no estimates on the areal extent of material that will be removed nor the frequency of disturbance at each borrow area or inlet. Additional consultation will be necessary for each individual action or dredging event undertaken. We can work with your staff to complete a programmatic consultation for this entire project to reduce the need for individual consultations, but the additional information discussed above will be needed.	USACE appreciates NOAA's approach and offer to commence programmatic consultation. USACE will continue to coordinate its coordination with NOAA about the proposed offshore borrow areas. It should be noted that each borrow area has a designated amount of material available for use. Once that quantity is meet the borrow area will not be utilized again. Reference FGRR Appendix B "Borrow Areas" for specific information about the locations and estimated volume of offshore borrow areas.
NOAA 003	The EFH assessment indicates that dredging activities would be conducted in late fall, winter and early spring. As stated in our previous letter, we recommend that dredging in the inlets and ebb shoals be avoided from January 15 to May 31 of each year to minimize impacts to winter flounder early life stages and their EFH.	USACE will avoid dredging inlets and ebb shoals from January 15 - May 31 of each year to the maximum extent practicable.
NOAA 004	In Section D3 ("Existing Environment") of the current EFH assessment, information is only provided for the Marine Offshore Ecosystem. In the DEIS, it states that components of this project will also occur in the Atlantic shores and inlets ecosystem and the back bay ecosystem. We recommend that you include these ecosystems in the project specific EFH assessment that will be necessary as the project moves forward or as part of a programmatic consultation.	The EFH assessment includes information about the Atlantic shores and inlets ecosystem and the back bay ecosystem.
NOAA 005	As a result, we typically recommend that activities that generate suspended sediments should be avoided in and near SAV beds when eelgrass is actively growing and flowering, to avoid affecting the plant's ability to photosynthesize and its growth and survival.	USACE will avoid activities that generate suspended sediments in and near SAV beds to the maximum extent practicable.
NOAA 006	Until any programmatic consultation is completed, reinitiate consultation prior to each dredging event.	USACE will reinitiate consultation prior to each dredging event until programmatic consultation is complete.
NOAA 007	To maintain access to estuarine areas of EFH for summer flounder, winter flounder, bluefish and others including their prey species, dredging in the inlets and ebb shoals should be avoided from January 15 to June 30 of each year. At other times of the year, at least 50 % of the channel should remain unobstructed to allow ingress and egress of aquatic species.	USACE will avoid dredging inlets and ebb shoals from January 15 - June 30 of each year to the maximum extent practicable. At other times of the year, at least 50% of the channel will remain unobstructed, to the maximum extent practicable.
NOAA 008	The intakes on the dredge plant should not be turned on until the dredge head is in the sediments and turned off before lifted to minimize larvae entrained in the dredge.	Intakes on dredge plants will not be turned on until the dredge head is in the sediments and turned off before lifted to minimize larvae entrained in the dredge. NOAA's recommendation is a standard operation during USACE dredging projects and is a requirement in specification packages.
NOAA 009	Dredging within the borrow areas should be designed and undertaken in a manner that maintains geomorphic characteristics of the borrow area and best management practices such as not dredging too deeply and leaving similar substrate in place to allow for the benthic community recovery should be employed.	USACE will implement best management practices to avoid or minimize any impacts at offshore borrow areas. Dredging undertaken in a manner that maintains geomorphic characteristics of the borrow area, and not dredging too deeply and leaving similar substrate in place to allow for the benthic community recovery will be employed to the maximum extent practicable. Reference FGRR Borrow Areas Appendix for a description of best management practices.
NOAA 010	Areas of high surf clam densities within the borrow area should be avoided.	USACE will implement best management practices to avoid or minimize any impacts at offshore borrow areas. USACE normally informs the local fishing fleet of the opportunity to clam the area prior to dredging events. Reference FGRR Borrow Areas Appendix for a description of best management practices.
NOAA 011	In-water work within eelgrass beds should be avoided. To avoid and minimize impacts, the most recent available GIS layers of mapped eelgrass beds within the project area should be provided to the contractor so they are aware of eelgrass bed locations at all times.	USACE will avoid in-water activities in and near eelgrass beds to the maximum extent practicable.
NOAA 011a	As stated above, a detail written response to these EFH conservation recommendations is required under the MSA. In the case of a response that is inconsistent with our recommendations, Section 305 (b)(4)(B) of the MSA also indicates that you must explain your reasons for not following the recommendations. please also note that a distinct and further EFH consultation must be reinitiated if new information becomes available.	USACE acknowledges its commitments under the MSA. A formal coordination transmittal letter that includes responses to NOAA recommendations for EFH and CPFs is forthcoming.
NOAA 012	To ensure impacts to surf clams and ocean quahogs are minimized, the borrow areas should be surveyed prior to each dredging cycle and areas of high densities should be avoided. Copies of the shellfish survey results should also be provided to us prior to any dredging in the borrow area.	USACE will implement best management practices to avoid or minimize any impacts at offshore borrow areas. This may include surveying prior to each dredge cycle the areas of surf clams and ocean quahogs. USACE normally informs the local fishing fleet of the opportunity to clam the area prior to dredging events. Reference FGRR Borrow Areas Appendix for a description of best management practices.
NOAA 013	Avoid sand mining in areas containing sensitive fish habitats (e.g.» spawning and feeding sites, hard bottom, cobble/gravel substrate, shellfish beds).	Offshore borrow areas are selected for compatible sand material as on the beach. No areas are designated as sensitive fish habitat within the proposed borrow areas.
NOAA 014	Avoid mining sand from sandy ridges, lumps, shoals, and rises that are named on maps. The naming of these is often the result of the area being an important fishing ground.	The selection process for offshore borrow areas included the avoidance of important fishing grounds, including sandy ridges, lumps, shoals, and rises.
NOAA 015	Existing sand borrow sites should be used to the extent possible. Mining sand from new areas introduces- additional impacts.	Existing sand borrow sites will be utilized to the maximum extent practicable.
NOAA 016	Conduct beach nourishment during the winter and early spring, when productivity for benthic infauna is at a minimum.	Beach nourishment will be conducted during the winter and early spring to minimize impacts to benthic infauna, to the maximum extent practicable. Most USACE beach nourishment projects typically include dredge actions from October - March. The New York District has observed that the benthic community will return 6-18 months after sand is placed on the beach.

COMMENT #	COMMENT	USACE RESPONSE
NOAA 017	Seasonal restrictions and spatial buffers on sand mining should be used to limit negative impacts during fish spawning, egg development, young-of-year development, and migration periods, and to avoid secondary impacts to sensitive habitat areas such as SAV.	USACE will implement best management practices to avoid or minimize any impacts at offshore borrow areas. Seasonal restrictions and spatial buffers on sand mining should be used to limit negative impacts during fish spawning, egg development, young-of-year development, and migration periods, and to avoid secondary impacts to sensitive habitat areas such as SAV, to the maximum extent practicable. Reference FGRR Borrow Areas Appendix for a description of best management practices.
NOAA 018	Preserve, enhance, or create beach dune and native dune vegetation in order to provide natural beach habitat and reduce the need for nourishment.	The Recommended Plan includes the preservation, enhancement, and creation of oceanside dune and berm. USACE will continue to consider ways to support the preservation, enhancement, and creation of beach and dune and native dune vegetation in the final design.
NOAA 019	Each beach nourishment activity should be treated as a new activity (i.e., subject to review and comment), including those identified under a programmatic environmental assessment or environmental impact statement.	USACE will reinitiate consultation prior to each dredging event until programmatic consultation is complete.
NOAA 020	Bathymetric and biological monitoring should be conducted before and after beach nourishment to assess recovery in beach borrow and nourishment areas.	The Recommended Plan includes pre- and post-construction monitoring for bathymetric and biological resources within the proposed borrow areas and nourishment areas. Reference FGRR Appendix J "Monitoring and Adaptive Management Plan" for specific information.
NOAA 021	The effect of noise from mining operations on the feeding, reproduction, and migratory behavior of marine mammals and finfish should be assessed.	The FEIS includes a discussion of the impacts of noise from mining operations on the feeding, reproduction, and migratory behavior of marine mammals and finfish.
NOAA 022	The cost effectiveness and efficacy of investments in traditional beach nourishment projects should be evaluated and consider alternative investments such as nonstructural responses and relocation of vulnerable infrastructure given projections of sea level rise and extreme weather events.	The cost effectiveness and feasibility of a full suite of coastal storm risk management structural and nonstructural measures (investments) were investigated as part of the study. The Recommended Plan includes nonstructural approaches cited in NOAA's comment. Reference the FGRR chapter on Plan Formulation for more information.

Coastal Process Features
Essential Fish Habitat Analysis
CPF Project Sites

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Coastal Process Features
Essential Fish Habitat Analysis
CPF Project Sites

Report

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1.0 ESSENTIAL FISH HABITAT FOR COASTAL PROCESS FEATURES

1.1 Purpose and Objective of Essential Fish Habitat Assessment

The regional fisheries management councils, with assistance from National Marine Fisheries Service (NMFS), are required under the 1996 amendments to Magnuson-Stevens Fishery Management and Conservation Act to delineate Essential Fish Habitat (EFH) for all managed species, minimize to the extent practicable adverse effects on EFH caused by fishing, and identify other actions to encourage the conservation and enhancement of EFH.

EFH is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity" (16 U.S.C. 1802(10)). In addition, the presence of adequate prey species is one of the biological properties that can define EFH. The regulations further clarify EFH by defining "waters" to include aquatic areas that are used by fish (either currently or historically) and their associated physical, chemical, and biological properties; "substrate" to include sediment, hard bottom, and structures underlying the water; areas used for "spawning, breeding, feeding, and growth to maturity" to cover a species' full life-cycle; and "prey species" as being a food source for one or more designated fish species.

Pursuant to Section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act, Federal agencies are required to consult with the NMFS regarding any action they authorize, fund, or undertake that may adversely affect EFH. For assessment purposes, an adverse effect has been defined in the Act as follows: "Any impact which reduces the quality and/or quantity of EFH. Adverse effects may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey, reduction in species fecundity), site specific or habitat wide impacts, including individual, cumulative, or synergistic consequences of actions."

The objective of this EFH assessment is to describe the potential adverse effects to designated EFH for federally-managed fisheries species within the project areas. It will also describe the conservation measures proposed to avoid, minimize or otherwise offset potential adverse effects to designated EFH resulting from the recommended plan.

1.2 Project Background

The developed areas of the barrier islands have a long history of storm damages due to wave attack, erosion of the beach and dune, and tidal flooding of infrastructure that occurs when water elevations during hurricanes and nor'easters exceed the beach and dune elevations. In addition to impacting infrastructure on the barrier island, the barrier island itself is also vulnerable to storms that erode the beach, overwash the dune system, deposit overwash fans on the bay side of the island and in the associated estuaries and create breaches (new inlets) through the barrier island.

When a breach occurs, it impacts both the barrier island and back bay system not only during the storm, but for an extended period after the storm. When a breach opens, it tends to be relatively small, but if not closed quickly, will grow rapidly over time. As these breaches grow they also may migrate (move along the island), destroying buildings and other infrastructure in the migration path. Breaches also impact the hydraulic stability of the existing inlets, which can result in increased sediment deposition in the inlet channels and compromised navigability of the inlet. Of greatest impact however, is the hydrodynamic impact on the back bay. When a breach occurs, it increases flooding in the bay environment from ocean tidal exchange combined with storm-associated elevated high water levels. This effect continues to increase as the breach grows. On the bay side of the island, breaches create open, unvegetated beach and gently sloping intertidal areas (overwash fans) of particular value to the piping plover and seabeach amaranth, federally listed Threatened species, and of value to a wide variety of other fauna that forage in the intertidal zone. One purpose of the Coastal Process Features projects is to reestablish coastal habitat features that are important to coastal flora and fauna that have been or could be reduced by projects intended to minimize overwash and breaching of the barrier islands. While the estuary bottoms include extensive shallow subtidal habitat, intertidal habitat is limited to the dynamic ribbon of shoreline at the edges of the barrier islands and Long Island. These shorelines are constantly undergoing change. Overwash fans locally convert vegetated beach to unvegetated coarse sand beach and add intertidal habitat in place of subtidal sandy and muddy bottom. The sand erodes, creating additional substrate for seagrass where less desirable physical substrate may have previously dominated. Elimination and stabilization of undeveloped barrier island overwash and erosion cycles result in elimination of significant sand addition to subtidal areas and changes to the associated plant and animal communities.

1.3 Study Area

The Study Area for the Fire Island Management Plan (FIMP) extends from Fire Island Inlet east to Montauk Point along the Atlantic coast of Suffolk County, Long Island, New York (Figure 2.1). The Coastal Process Features (CPF) study area runs (with a few exceptions) along the bay side of the barrier islands beginning at the west end of Fire Island Inlet and extending to sites along the western portion of Shinnocock Bay near Mastic Beach and West Hampton Dunes, more than 50 miles. Within that coastal reach, three CPF sites, Mastic Beach 1, Mastic Beach 2 Area 1, and Mastic Beach 2 Area 2 locate on Narrows Bay, along the south shore of Long Island opposite Pattersquash Reach. Within the study area, project footprints total about eight miles in length. Much of Fire Island lies within the legislative boundaries of the Fire Island National Seashore (FIIS), managed by the National Park Service (NPS).

Public lands throughout the barrier island segment provide areas where natural resources are protected to the greatest extent possible. FIIS is located along the Atlantic Ocean on Fire Island, Great South Bay, Moriches Bay, and Shinnecock Bay shorelines. As part of its mission statement for FIIS, NPS seeks to preserve natural processes and protect ecological resources.

2.0 PROPOSED FEDERAL ACTION

The key components to the proposed action for the larger FIMP project include: Beach Restoration (Beach and Dune Fill), Sediment Management (including Inlet Modification), Groins (including Groin Modification), Breach Response Plan (BRP), Coastal Process Features, Non-Structural Methods, and Adaptive Management. This analysis considers the effects of Coastal Process Features development on EFH. The analysis supplements the original FIMP project EFH assessment performed for the Atlantic Ocean project components. Note that the CPF features are just one of many FIMP project features.

2.1 Problem Identification

The problems along the shorefront include storm damages due to erosion, wave attack, and flooding. Along the barrier island there is also the threat of barrier island overwash and breaching. Along the back bay, there is the threat of tidal flooding during no-breach conditions. Tidal flooding becomes worse when there is a breach of the barrier island, which allows for more storm surge from the ocean to enter the bay. These storm-related conditions have occurred repeatedly in the past, resulting in damages to the built environment.

The principal problems are associated with extreme tides and waves that can cause extensive flooding and erosion within both barrier island and mainland communities. Breaching and/or inundation of the barrier islands also can lead to increased flood damages, especially along the mainland communities bordering Great South, Moriches, and Shinnecock Bays. The following are general conclusions regarding these damages.

- The greatest potential damages in the study area are along the mainland floodplain.
- Among the mainland floodplain areas, Great South Bay is the most vulnerable to storm damages.
- Along the mainland floodplain areas, specific measures need to be considered to address localized flooding.
- The barrier island provides a high degree of protection to the mainland and that protection can be compromised by a breach. Specific measures need to be considered to stabilize the barrier island.
- Along the shorefront area, the area of greatest threat from storm damages under current conditions is Fire Island.
- Along the shorefront, the potential for damages increases dramatically in all areas in the future.
- It is clear from past degradation that storm damage reduction measures and coastal process features must be evaluated together to reestablish system functioning.
- Reestablishment of longshore transport should be given priority, as most other coastal processes are contingent upon a balanced sediment transport system.

2.2 Project Authorization

The Fire Island Inlet to Montauk Point, New York, Combined Beach Erosion Control and Hurricane Coastal Strom Risk Management Project was originally authorized by the River and Harbor Act of 14 July 1960, and subsequently modified in accordance with Section 103 of the River and Harbor Act of 12 October 1962, Section 31 of the Water Resources Development Act (WRDA) of 1974, and Sections 103, 502, and 934 of the WRDA of 1986 (P.L. 99-662).

2.3 Preferred Alternative (Tentatively Selected Plan)

Recent storms such as Hurricanes Sandy and Irene have the left the dune and berm system along the south shore of Fire Island vulnerable, increasing the potential for overwash and breaching during future storms. The proposed action has been developed to reinforce the existing dune and berm system along the island.

The key components to the proposed action are: Beach Restoration (Beach and Dune Fill), Sediment Management (including Inlet Modification), Groins (including Groin Modification), Breach Response Plan (BRP), Coastal Process Features, Non-Structural Methods, and Adaptive Management. The Coastal Process Features component seeks to replace barrier island components that will be created much less frequently due to the beach and dune fill program. The discussion below describes the Coastal Process Features component for each of the 10 project locations.

2.3.1 Recommended CPF Plan

Collaborative planning established specific objectives through the development of a Restoration Framework (USACE 2009). In a natural ecosystem, features such as barrier islands and dunes protect coastal lands and property, reduce danger to human life stemming from flooding and erosion, and support habitats important to coastal species. This framework called for the reestablishment of five coastal processes that are critical to the development and sustainability of the various coastal features (such as beaches, dunes, barrier islands and bluffs), which together form the natural system vital to maintain the natural coastal features: Longshore Sediment Transport; Cross Island Sediment Transport (washover areas); Dune Development and Evolution; Estuarine Circulation; and Bayside Shoreline Processes (USACE 2009).

2.3.2 Project Elements

Reestablishment of the coastal processes to provide coastal features that contribute to coastal storm risk management and include establishment of avian endangered species habitat occur at twelve locations (Figure 2.1). The CPF projects analyzed in this document (Table 2.1) include non-structural management measures to increase nesting and intertidal habitat for piping plover and simulate cross-island washover. The project also provides, and where existing, protects seabeach amaranth. These objectives are accomplished with the following management measures, applied variously at the ten sites as necessary to achieve the project goals: grading, additional of fill, and vegetation removal (except for seabeach amaranth).

Table 2.1 CPF Project Descriptions

	CPF Project Description	ESA Habitat Creation?
1	Democrat Point West – Improvement of natural conditions of the dune, upper beach, and shoreline. Regrading to simulate cross island washover topography. Regrading and devegetating to establish ESA avian habitat.	YES
2	Democrat Point East – Regrading and devegetating to establish ESA avian habitat	YES
3	Dunefield West of Field 4 – Devegetating to establish ESA avian habitat	YES
4	Clam Pond – Placement of fill to restore the preexisting sand lobe. Stabilization of disturbed areas to simulate cross island washover areas. Fill placement and devegetating to establish ESA avian habitat.	YES
5	Atlantique to Corneille – Placement of fill to improve natural conditions of the upper beach and shoreline. Stabilization of disturbed areas to simulate cross island washover areas. Placement of fill and devegetation to establish ESA avian habitat	YES
6	Talisman – Placement of fill to improve natural conditions of the upper beach and shoreline. Stabilization of disturbed areas to simulate cross island washover areas. Fill placement and devegetating to establish ESA avian habitat.	YES
7	Pattersquash Reach – Placement of fill to simulate cross island washover areas and reestablish bay shoreline. Fill placement and devegetation to establish ESA avian habitat.	YES
8	New Made Island – Placement of fill to simulate cross island washover areas and reestablish bay shoreline. Fill placement and devegetation to establish ESA avian habitat.	YES
9	Smith Point County Park Marsh salt marsh enhancement by filling and grading to eliminate drainage ditches and restore typical salt marsh topography, including supratidal areas.	

	CPF Project Description	ESA Habitat Creation?
10	Great Gun – Devegetation to establish ESA avian habitat.	YES
11	Dune Road – Remove existing bulkheads, placement of fill to simulate cross island washover.	
12	Tiana Bayside Park – Address existing gabions, placement of fill to simulate cross island washover.	
MB1	Mastic Beach 1 – restore upland forest, high marsh and low marsh communities at Pattersquash Creek	
MB2-1	Mastic Beach 2 Area 1 – Restore upland maritime forest, high marsh and low marsh communities east of Pattersquash Creek	
MB2-2	Mastic Beach 2 Area 2 – Restore upland maritime forest, high marsh and low marsh communities along the west side of Lawrence Creek	

Note that all the projects provided benefits to ESA listed avian species, as the projects not specifically designed to create and/or enhance avian nesting and foraging habitat provide valuable wetlands and beach areas also beneficial to the critical life behaviors of the same listed species.

Barrier Islands are physically dynamic, with erosion and accretion occurring simultaneously at various locations on both the ocean and estuarine shorelines. Storms may rapidly and dramatically alter both ocean and estuarine shores, as occurred most recently during Hurricane Sandy in 2012. The Pattersquash Reach and New Made Island CPF project areas obtained new intertidal and supratidal habitat during that storm; by 2017 those areas had undergone significant erosion. Review of historic aerial photography suggests that several of the other CPF project sites have experienced significant long-term erosion losses of beach and intertidal areas. Much of the loss appears associated with seawalls and other man-made structures. The CPF projects proposed for those locations will replace the areas lost to erosion.

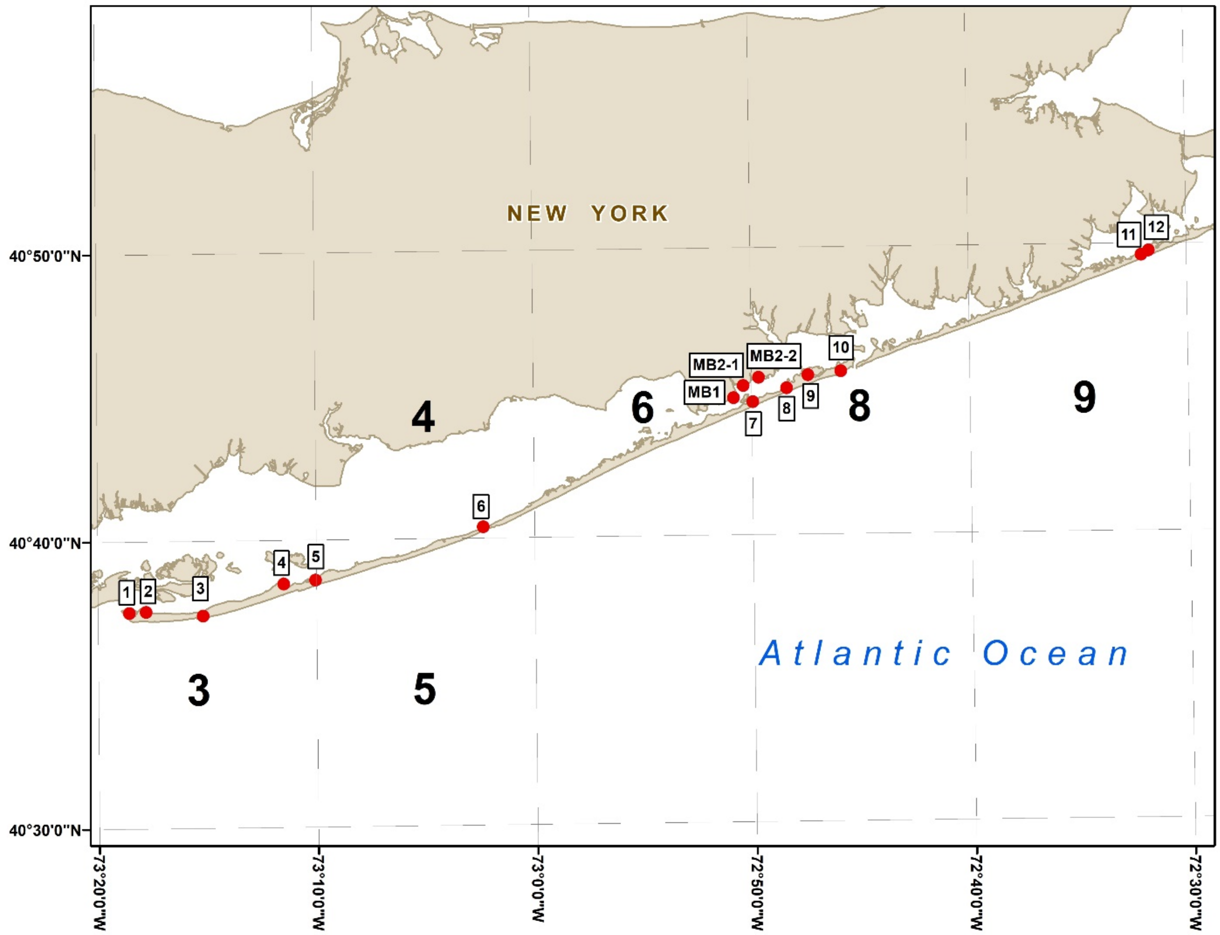


Figure 2.1 CPF Project Locations by Numbered 10-Minute Graticules in Which They Occur

2.3.3 CPF Detailed Descriptions

For the CPF project designs, USACE has substituted Highest Astronomical Tide (HAT) and Lowest Astronomical Tide (LAT) for the typical Mean High Water (MHW) and Mean Low Water (MLW) design elevations for consistency with the overall program goals and objectives of creating additional shore nesting and foraging habitat.

Sand placement at the CPF sites will be performed in coordination with renourishment cycles of the beachfill features and subject to monitoring to ensure resolution of project objectives. The USACE will not implement vegetation management or manipulation of the sites unless conducted as an incidental action associated with future placement. The USACE recommends the local land management agency consider predator management in newly created CPF's. In addition, the USACE anticipates the park's ORV policy will be implemented during nesting season.

CPF Site 1
Democrat Point West

West of Jetty-Reach GSB-1A

40.625280° N / 73.307751° W

Democrat Point West is located on the western end of Fire Island within Robert Moses State Park. Democrat Point West defines the south and east boundary of Fire Island Inlet. Democrat Point West is a complex coastal area. At the western end lies a continuously evolving sand spit. A rock jetty spanning the width of the island defines the east boundary of Democrat Point West. Democrat Point West contains heavily vegetated dunes near the center of the site. These dunes taper in elevation toward the water on the north, west, and south sides. A small tidal pond, located just east of the Point's center, is surrounded by wetlands.

To create early successional habitat that provides nesting and foraging for shorebirds, plans call for regrading and devegetating approximately 69.6 acres (ac) of proposed habitat. The regrading template includes a 3% slope extending from the lowest astronomical tidal (LAT) elevation and/or the wetland boundary to the +7 ft-NAVD88 contour. Along the spine of the site, a raised dune feature will extend to +8.3 ft-NAVD88 (+9.5 ft-NGVD29). Foraging habitat (81.4 ac) encompasses the area between the LAT and the highest astronomical tide (HAT), while nesting habitat (52.1 ac) extends from the HAT to an elevation of +8.33 ft-NAVD88. The migrating sand spit (35.9 ac) along the western side of the CPF is considered foraging habitat. On the eastern side of the project area a 23.4 ac wetland and tidal pond exists. The pond will be filled to an elevation of -2.0 ft-NAVD88 to improve the wetland's overall productivity and functionality and establish the area as foraging habitat. Connectivity to bayside foraging habitat is maintained along the shallow creek on the northeast corner of the pond. Through the proposed activities at Democrat Point West, early upland successional habitat will be created.

CPF Cut and Fill Volumes	
Feature	**Volume (cy)**
Cut Volume	-187,017
Fill Volume	168,514
Volume Difference (Fill minus Cut)	-18,503
Project Area	**139.5 acres**
OCEANSIDE TIDAL ENVIRONMENT (ft-NAVD88)	
Highest Astronomical Tide (HAT)	3.00
Mean Higher High Water (MHHW)	2.06
Mean High Water (MHW)	1.76
Mean Sea Level (MSL)	-0.18
Mean Tide Level (MTL)	-0.22
Mean Low Water (MLW)	-2.20
Mean Lower Low Water (MLLW)	-2.36
Lowest Astronomical Tide (LAT)	-3.24
Range (MHW-MLW)	3.64
Diurnal Range (MHHW - MLLW)	4.06
Largest Tidal Range (HAT-LAT)	5.89
Diurnal Range (MHHW - MLLW)	4.06
Largest Tidal Range (HAT-LAT)	5.89
BAYSIDE TIDAL ENVIRONMENT (ft-NAVD88)	
Highest Astronomical Tide (HAT)	2.79
Mean Higher High Water (MHHW)	1.85
Mean High Water (MHW)	1.58
Mean Sea Level (MSL)	-0.16
Mean Tide Level (MTL)	-0.24
Mean Low Water (MLW)	-2.06
Mean Lower Low Water (MLLW)	-2.22
Lowest Astronomical Tide (LAT)	-3.10
Range (MHW-MLW)	3.64
Diurnal Range (MHHW - MLLW)	4.06
Largest Tidal Range (HAT-LAT)	5.89
Diurnal Range (MHHW - MLLW)	4.06
Largest Tidal Range (HAT-LAT)	5.89

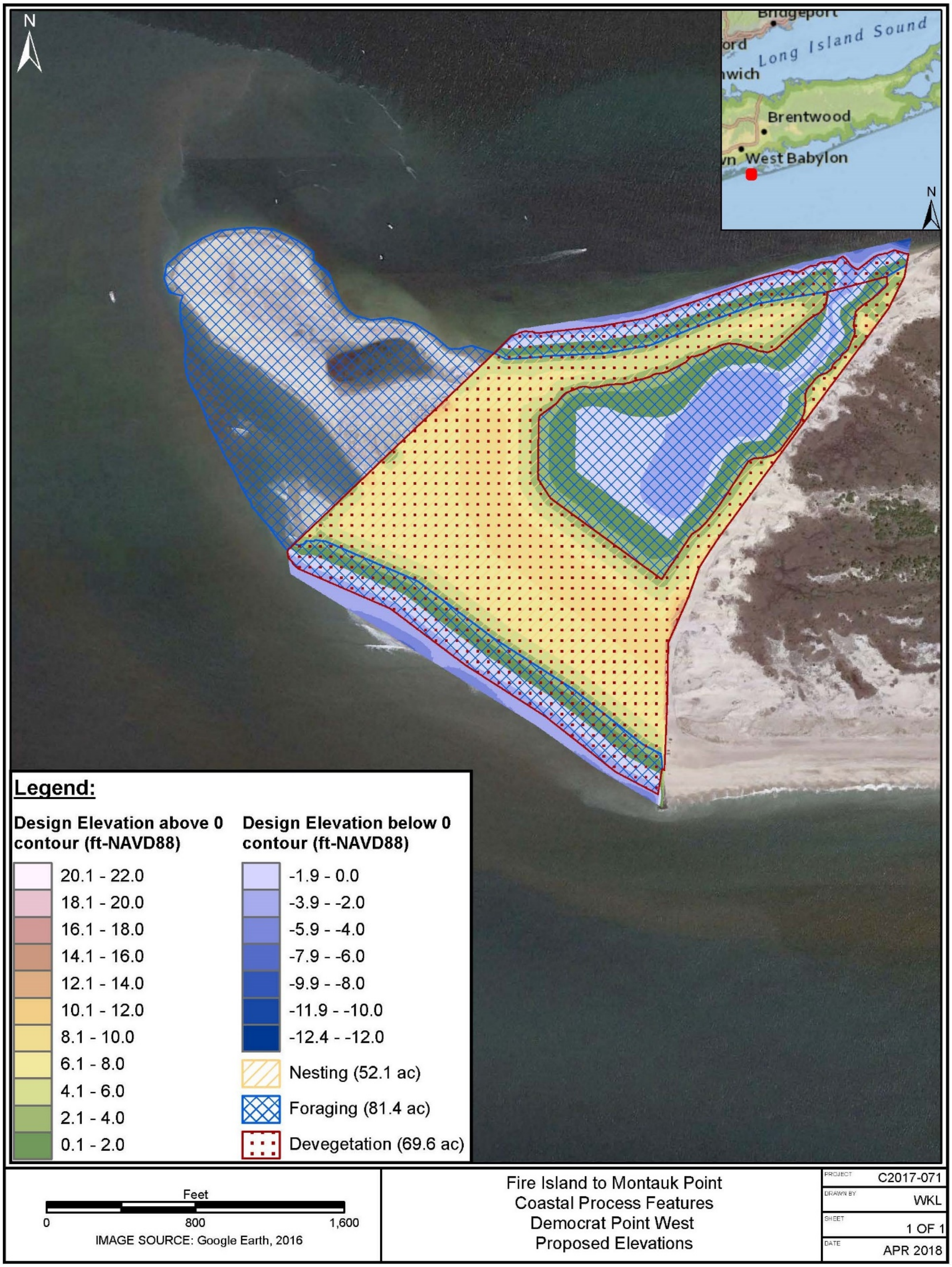


Figure 2.2 Democrat Point West Proposed Elevations

CPF Site 2
Democrat Point Bayside East of Jetty

East of Jetty-Reach GSB-1A

40.626794° N / 73.293164° W

Democrat Point (East of Jetty) is located on the western end of Fire Island within Robert Moses State Park. Democrat Point (East of Jetty) lies just east of the Fire Island Inlet. Oak Beach lies across the inlet to the north and west. Democrat Point (East of Jetty) is a sandy bayside beach, where sand was previously stockpiled during nearby dredging projects. The project area contains coastal dunes with sporadic vegetation.

To create early successional habitat that provides nesting and foraging for shorebirds, plans call for regrading and devegetating approximately 27.0 ac. This includes 5.1 ac of foraging habitat and 19.3 ac of nesting habitat. The regrading template includes a 2% slope on the north bank to allow for viable shorebird habitat. Foraging habitat encompasses the area between the LAT and the HAT, while nesting habitat extends from the HAT to a constructed elevation of +5 ft-NAVD88.

CPF Cut and Fill Volumes	
Feature	**Volume (cy)**
Cut Volume	-42,997
Fill Volume	40,428
Net Volume	-2,569
Project Area	**27.0 acres**
BAYSIDE TIDAL ENVIRONMENT (ft-NAVD88) (0 ft NAVD = 1.16 ft. NGVD)	
Highest Astronomical Tide (HAT)	2.01
Mean Higher High Water (MHHW)	1.54
Mean High Water (MHW)	1.30
Mean Sea Level (MSL)	-0.14
Mean Tide Level (MTL)	-0.15
Mean Low Water (MLW)	-1.59
Mean Lower Low Water (MLLW)	-1.72
Lowest Astronomical Tide (LAT)	-2.20
Range (MHW-MLW)	2.89
Diurnal Range (MHHW - MLLW)	3.26
Largest Tidal Range (HAT-LAT)	4.21

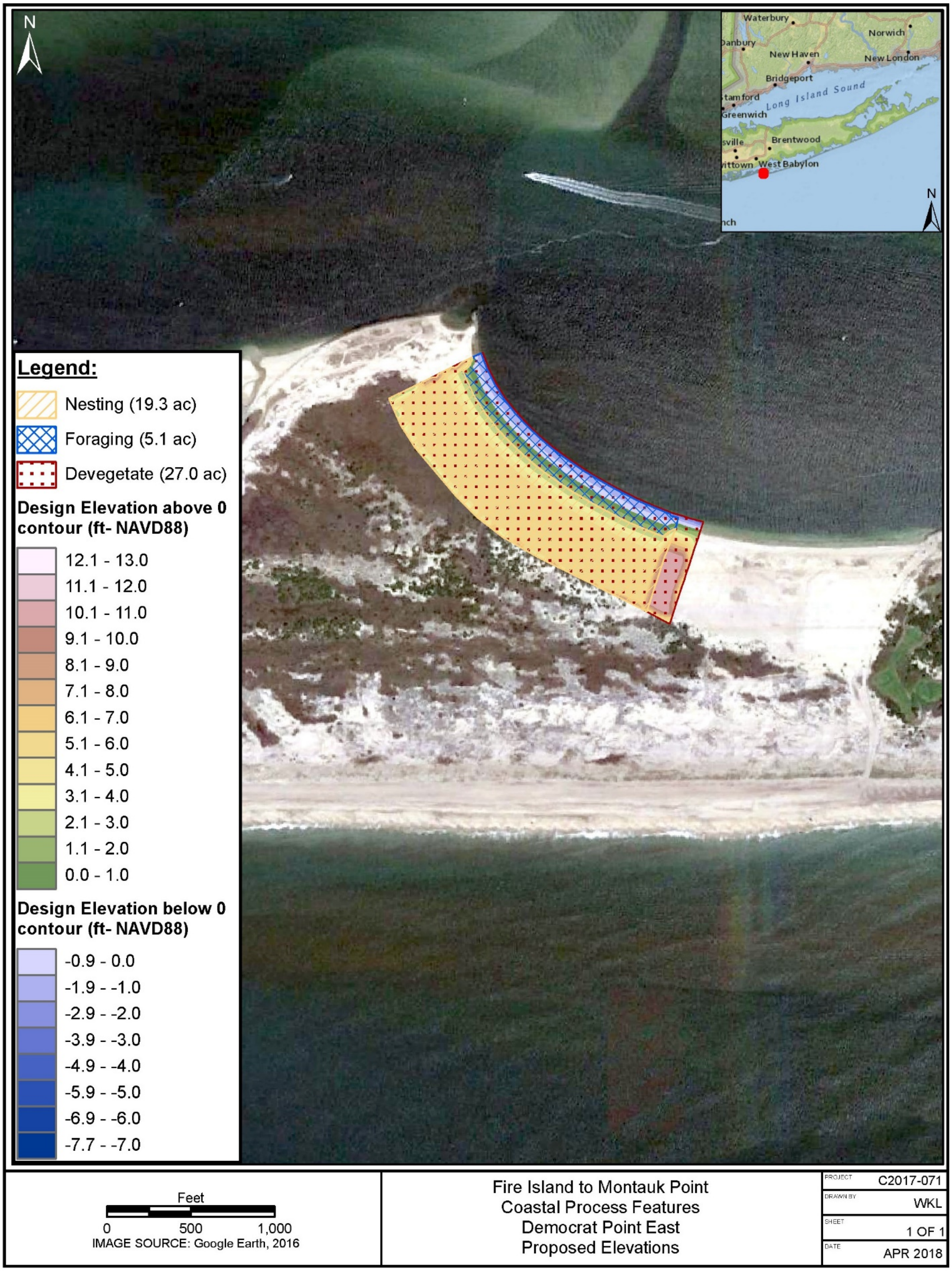


Figure 2.3 Democrat Point East Proposed Elevations

CPF Site 3
Dunefield West of Field 4 Reach GSB-1A

Reach GSB-1A

40.622158° N / 73.252615° W

CPF Cut and Fill Volumes	
Feature	**Volume (cy)**
Cut Volume	0
Fill Volume	0
Net Volume	0
Project Area	**19.4 acres**
BAYSIDE TIDAL ENVIRONMENT (ft-NAVD88) (0 ft NAVD = 1.14 ft. NGVD)	
Highest Astronomical Tide (HAT)	2.97
Mean Higher High Water (MHHW)	2.03
Mean High Water (MHW)	1.72
Mean Sea Level (MSL)	-0.22
Mean Tide Level (MTL)	-0.25
Mean Low Water (MLW)	-2.21
Mean Lower Low Water (MLLW)	-2.37
Lowest Astronomical Tide (LAT)	-3.25
Range (MHW-MLW)	3.93
Diurnal Range (MHHW - MLLW)	4.40
Largest Tidal Range (HAT-LAT)	6.22

Dunefield West of Field 4 is located on the western end of Fire Island, southeast of the Robert Moses Causeway, on the ocean side of Robert Moses State. Dune Field West of Field 4 contains dunes with areas of heavy vegetation. This CPF design seeks to devegetate uplands to provide ESA bird habitat (foraging and nesting).

To create early successional habitat that provides nesting and foraging for shorebirds, plans call for removing vegetation from approximately 18.7 ac to create 3.9 ac of foraging habitat and 11.4 ac of nesting habitat. Foraging habitat encompasses the area between the LAT and the HAT, while nesting habitat extends from the HAT to the +10 ft-NAVD88 elevation contour. Beachfront topography will approximate the anticipated FIMP beach fill template between stations 139+00 and 160+00. A high elevation dune exists on the eastern side of the project area behind the FIMP beach fill template. No regrading of the site beyond the FIMP beach fill plan is anticipated.

Figure 2.4 Dunefield West of Field 4 Proposed Elevations

CPF Site 4
Clam Pond

Clam Pond-Reach GSB-2B

40.642437° N / 73.191492° W

Clam Pond is located on the western portion of Fire Island between Saltaire and Fair Harbor. Clam Pond is shallow with an average depth of approximately 1 ft and a maximum depth of about 5 ft. Historically a sand spit existed at this location.

CPF Cut and Fill Volumes	
Feature	**Volume (cy)**
Cut Volume	0
Fill Volume	51,312
Net Volume	51,212
Project Area	**15.3 acres**
BAYSIDE TIDAL ENVIRONMENT (ft-NAVD88) (0 ft NAVD = 1.14 ft. NGVD)	
Highest Astronomical Tide (HAT)	
Mean Higher High Water (MHHW)	0.60
Mean High Water (MHW)	0.44
Mean Sea Level (MSL)	-0.02
Mean Tide Level (MTL)	-0.04
Mean Low Water (MLW)	-0.52
Mean Lower Low Water (MLLW)	-0.62
Lowest Astronomical Tide (LAT)	-1.10
Range (MHW-MLW)	0.96
Diurnal Range (MHHW - MLLW)	1.22
Largest Tidal Range (HAT-LAT)	2.18

To create early successional habitat that provides nesting and foraging for shorebirds, plans call for fill placement and grading over a project area of approximately 15.3 ac. The project area includes 4.4 ac of proposed newly created nesting habitat and 8.2 ac of proposed foraging habitat. The foraging habitat consists of both newly created and existing habitat between the HAT and LAT elevations. On the north side of the project, fill will slope from the +5 ft-NAVD88 contour to the intersection with existing grade. A living shoreline may be constructed on the north side of the project site to help retain fill. On the south side, fill will slope at 3% between +5 ft-NAVD88 and the HAT elevation, then at 1% to the intersection with existing grade.

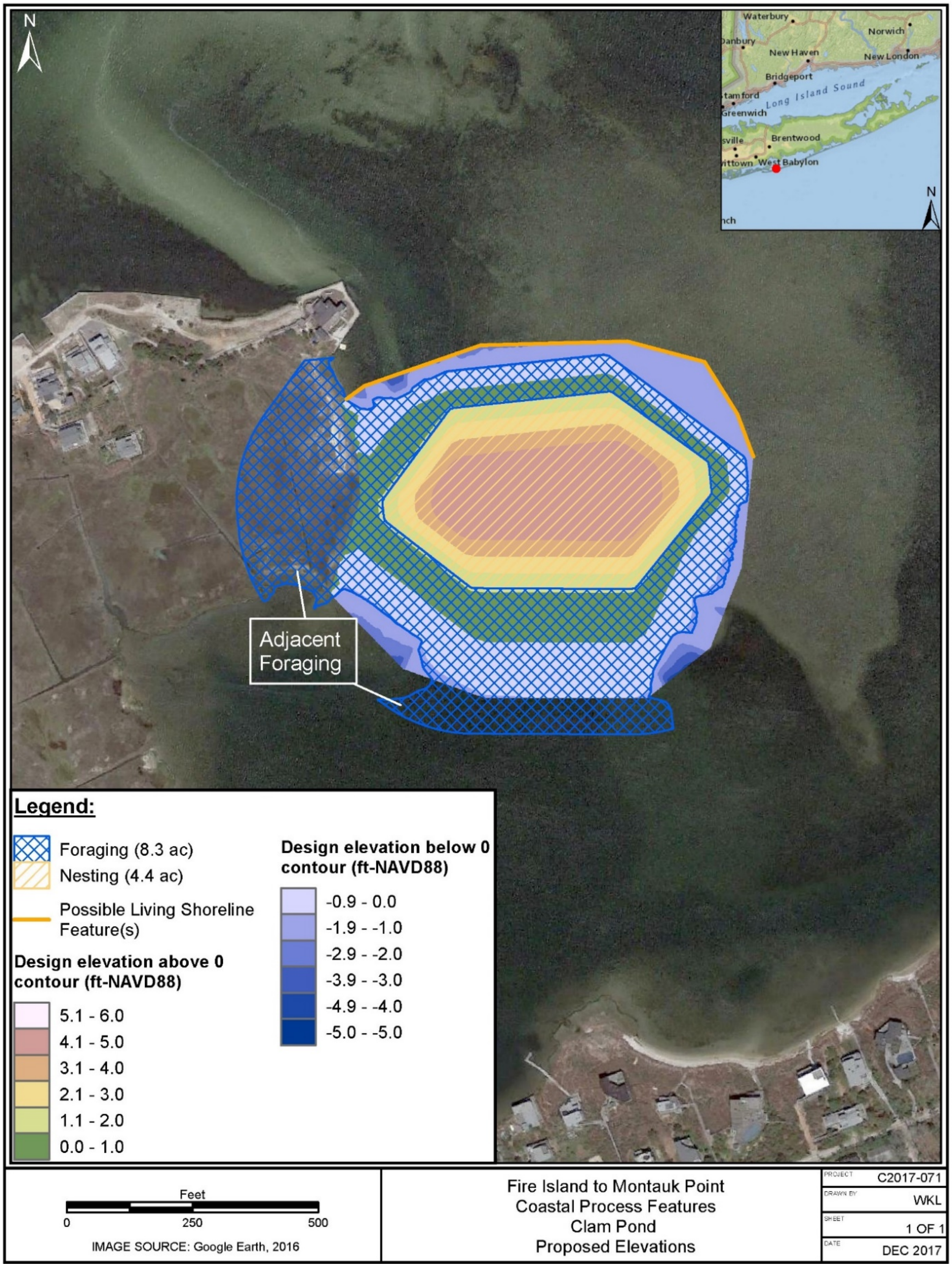


Figure 2.5 Clam Pond Proposed Elevations

CPF Site 5
Atlantique to Corneille

Reach GSB-2B

40.644944° N / 73.167889° W

Atlantique to Corneille is located on the western portion of Fire Island, on the bay just east of Atlantique Park. The average nearshore water depth on the bayside at Atlantique to Corneille is approximately 3 ft. Boat docks exist east and west of this CPF, while several small bulkheads lie on either side of the site. The CPF design fill must limit impacts to navigation features. This CPF design adds fill to provide ESA bird habitat (foraging and nesting) as well as provide CSRM benefits by simulating cross island transport.

CPF Cut and Fill Volumes	
Feature	**Volume (cy)**
Cut Volume	0
Fill Volume	62,694
Net Volume	62,694
Project Area	**15.8 acres**
BAYSIDE TIDAL ENVIRONMENT (ft-NAVD88) (0 ft NAVD = 1.13ft. NGVD)	
Highest Astronomical Tide (HAT)	1.09
Mean Higher High Water (MHHW)	0.62
Mean High Water (MHW)	0.45
Mean Sea Level (MSL)	-0.01
Mean Tide Level (MTL)	-0.03
Mean Low Water (MLW)	-0.52
Mean Lower Low Water (MLLW)	-0.61
Lowest Astronomical Tide (LAT)	-1.09
Range (MHW-MLW)	0.97
Diurnal Range (MHHW - MLLW)	1.23
Largest Tidal Range (HAT-LAT)	2.18

The plans call for the placement of fill over 15.8 ac, transitioning from the western bulkhead area to the spit to the east. The fill will result a total of 4.2 ac of foraging habitat and 9.9 ac of nesting habitat. The regrading template includes 3% and 1% slopes on the north bank to allow for viable shorebird habitat, and a 4% slope below the LAT to tie into the existing grade. The landward side of the fill profile will tie into existing grade at +4 ft-NAVD88.

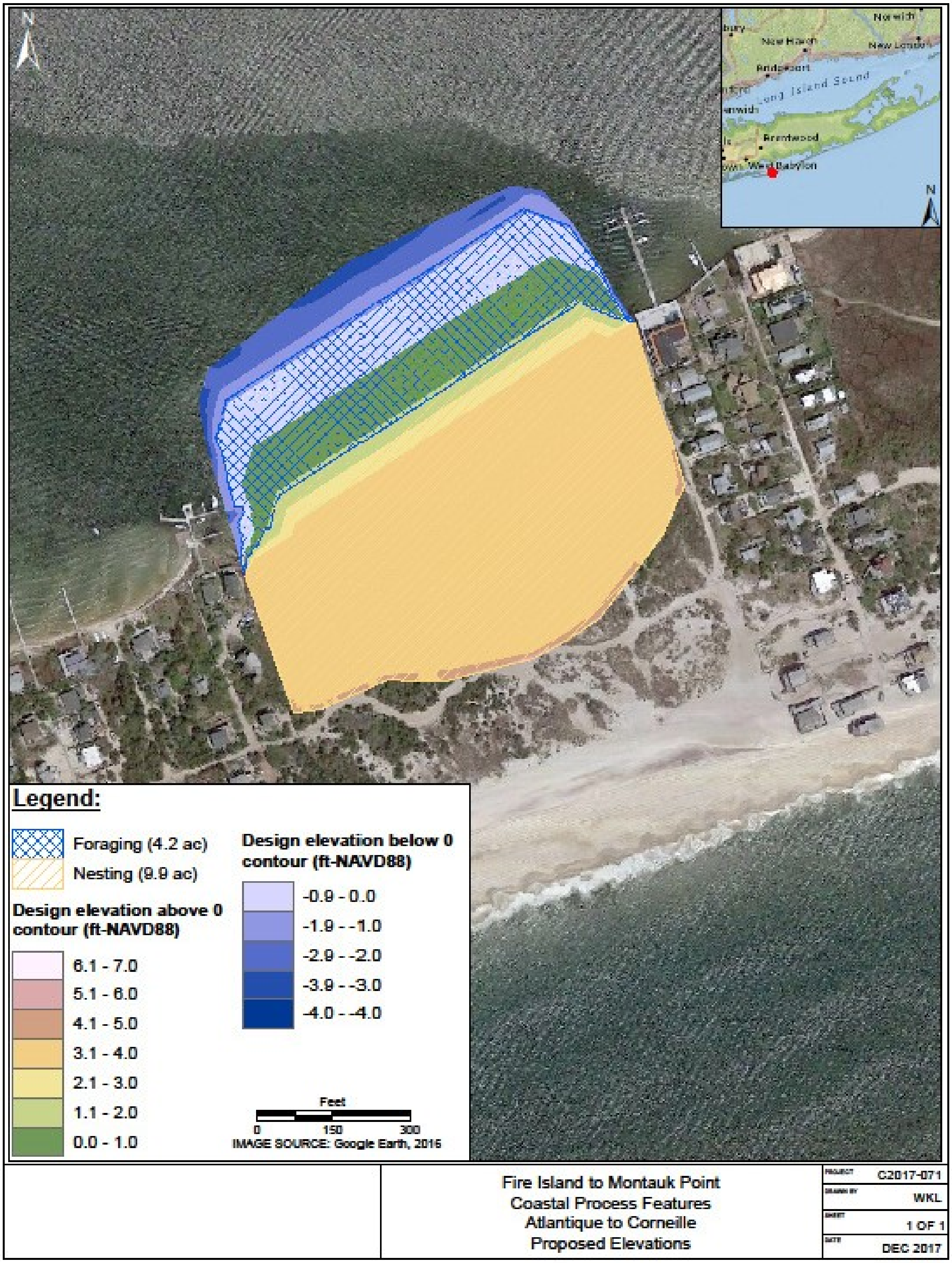


Figure 2.6 Atlantique to Corneille Proposed Elevations

CPF Site 6
Talisman

Reach GSB-3D

40.674629° N / 73.039332° W

Talisman is located in the central portion of Fire Island within Barrett Island Park between Fire Island Pines and Water Island. The average nearshore water depth on the bayside at Talisman ranges from 1 ft to 3 ft. Historically a sand spit existed at this location. The west side of Talisman includes a dock extending approximately 400 ft into the bay. A private dock lies to the east of this CPF. Fill placed at this CPF should account for potential impacts to these structures. This CPF design seeks to add fill to provide ESA bird habitat (foraging and nesting) as well as provide CSRM benefits by simulating cross island transport.

CPF Cut and Fill Volumes	
Feature	**Volume (cy)**
Cut Volume	0
Fill Volume	85,880
Net Volume	85,880
Project Area	**16.1 acres**
BAYSIDE TIDAL ENVIRONMENT (ft-NAVD88) (0 ft NAVD = 1.08 ft. NGVD)	
Highest Astronomical Tide (HAT)	1.18
Mean Higher High Water (MHHW)	0.70
Mean High Water (MHW)	0.54
Mean Sea Level (MSL)	-0.02
Mean Tide Level (MTL)	-0.02
Mean Low Water (MLW)	-0.57
Mean Lower Low Water (MLLW)	-0.67
Lowest Astronomical Tide (LAT)	-1.15
Range (MHW-MLW)	1.11
Diurnal Range (MHHW - MLLW)	1.37
Largest Tidal Range (HAT-LAT)	2.33

The plans call for the reestablishment of approximately 1,400 ft of the historic shoreline through the placement of fill over 16.1 ac. A living shoreline may be placed on the north side of the project site to help reduce the erosion rate. The project will result in a total of 7.0 ac of foraging habitat and 7.1 ac of nesting habitat. The regrading template includes 3% and 1% slopes on the north bank to create viable shorebird habitat, and a 4% slope below the LAT to tie into the existing grade. Some of the upland portions of this CPF lie below the design berm elevation of +4 ft-NAVD88. The landward side of the fill profile will transition to existing grade at a 4% slope, where necessary. Otherwise the berm will tie in to the existing grade at +4 ft-NAVD88. This will preserve the area as nesting habitat.

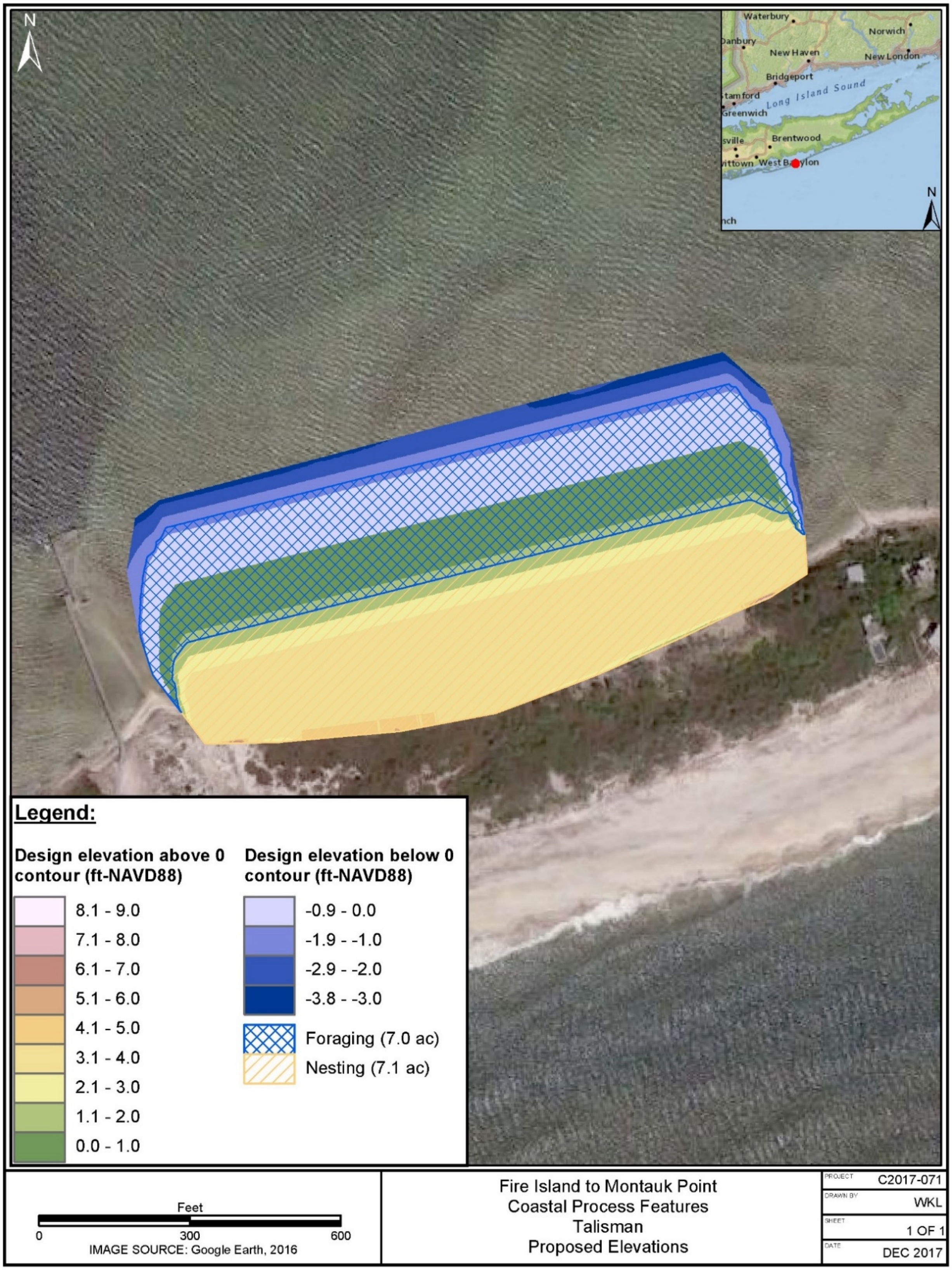


Figure 2.7 Talisman Proposed Elevations

CPF Site 7
Pattersquash Reach

Reach MB-1B

40.746433° N / 72.83247° W

CPF Cut and Fill Volumes	
Feature	**Volume (cy)**
Cut Volume	0
Fill Volume	19,396
Net Volume	19,396
Project Area	**49.4 acres**
BAYSIDE TIDAL ENVIRONMENT (ft-NAVD88) (0 ft NAVD = 1.04 ft. NGVD)	
Highest Astronomical Tide (HAT)	1.42
Mean Higher High Water (MHHW)	0.95
Mean High Water (MHW)	0.75
Mean Sea Level (MSL)	-0.09
Mean Tide Level (MTL)	-0.10
Mean Low Water (MLW)	-0.95
Mean Lower Low Water (MLLW)	-1.07
Lowest Astronomical Tide (LAT)	-1.55
Range (MHW-MLW)	1.70
Diurnal Range (MHHW - MLLW)	2.01
Largest Tidal Range (HAT-LAT)	2.97

Pattersquash Reach is located on the eastern portion of Fire Island on the bay side within Smith Point County Park. Pattersquash Reach lies between two inlets, Old Inlet to the west and Moriches Inlet to the east. The project area contains coastal dunes with vegetation and an historically ephemeral sand spit. This CPF design seeks to devegetate uplands to provide ESA bird habitat (foraging and nesting) as well as provide CSRM benefits by placing fill to simulate cross island transport.

The plans call for devegetating approximately 44.8 ac, all of which qualify as proposed habitat. All devegetation will occur north of Burma Road. The project will result in 21.4 ac of foraging habitat and 27.0 ac of nesting habitat. In addition, in-water sediment placement extends from the +1 ft-NAVD88 contour offshore to -1 ft-NAVD88. Fill then follows the -1 ft-NAVD88 contour offshore for approximately 300 ft at which point the fill toes into the existing grade at a 2% slope. No upland regrading is anticipated.

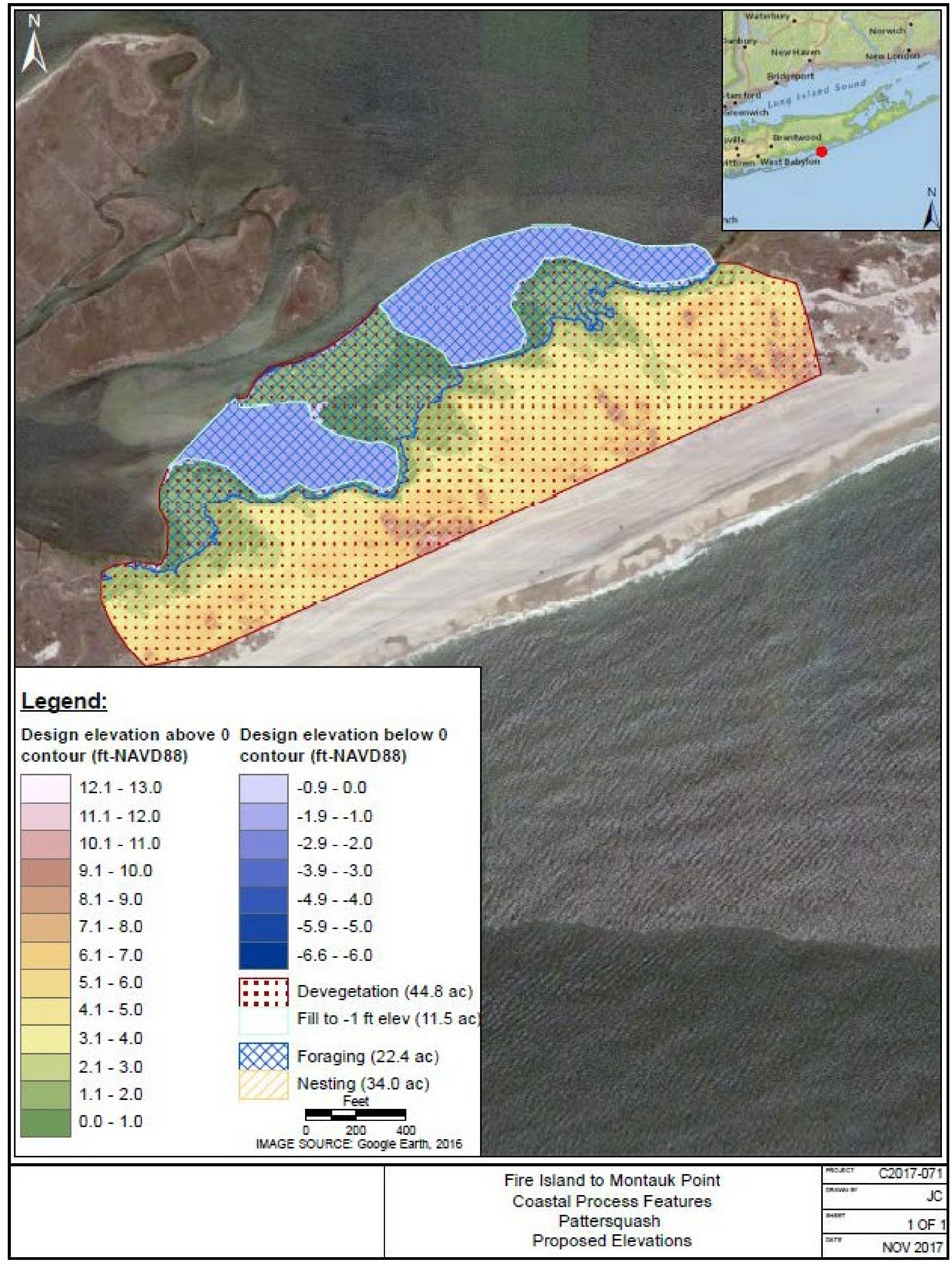


Figure 2.8 Pattersquash Proposed Elevations

CPF Site 8
New Made Island Reach

Reach MB-2A

40.753186° N / 72.80777° W

New Made Island Reach is located on the eastern portion of Fire Island on the bayside, within Smith Point County Park. New Made Island Reach lies between two inlets, Old Inlet to the west and Moriches Inlet to the east. The project area contains coastal dunes with vegetation and an historically ephemeral sand spit. This CPF design seeks to devegetate uplands to provide ESA bird habitat (foraging and nesting) as well as provide CSRM benefits by placing fill to simulate cross island transport.

CPF Cut and Fill Volumes	
Feature	**Volume (cy)**
Cut Volume	0
Fill Volume	100,583
Net Volume	100,583
Project Area	**107.9 acres**
BAYSIDE TIDAL ENVIRONMENT (ft-NAVD88) (0 ft NAVD = 1.14 ft. NGVD)	
Highest Astronomical Tide (HAT)	1.46
Mean Higher High Water (MHHW)	0.99
Mean High Water (MHW)	0.78
Mean Sea Level (MSL)	-0.11
Mean Tide Level (MTL)	-0.12
Mean Low Water (MLW)	-1.02
Mean Lower Low Water (MLLW)	-1.14
Lowest Astronomical Tide (LAT)	-1.62
Range (MHW-MLW)	1.80
Diurnal Range (MHHW - MLLW)	2.12
Largest Tidal Range (HAT-LAT)	3.08

To create early successional habitat that provides nesting and foraging for shorebirds, plans call for devegetating approximately 100.1 ac, all of which qualify as proposed habitat. All devegetation will occur north of Burma Road and will result in 28.9 ac of foraging habitat and 71.1 ac of nesting habitat. In addition, in-water sediment placement extends at a 1% slope from +1 ft-NAVD88 to the intersection with existing grade in the offshore direction. No upland regrading is anticipated.

Vehicular traffic on Burma Road presents a potential hazard for chicks and older birds. A physical barrier shall be constructed to limit the ability of birds to enter traffic lanes. Past efforts using sand/snow fencing have had limited success primarily due to pedestrian openings in the fencing. Additional types of barriers shall be considered during the PED phase of the project. Possible physical barrier components may include dredge pipe, sand/snow fencing, and elevated pedestrian cross walks to limit the number of openings through the barriers. Future detailed CPF design will be completed in close coordination with FWS, Suffolk County, and NY State Parks.

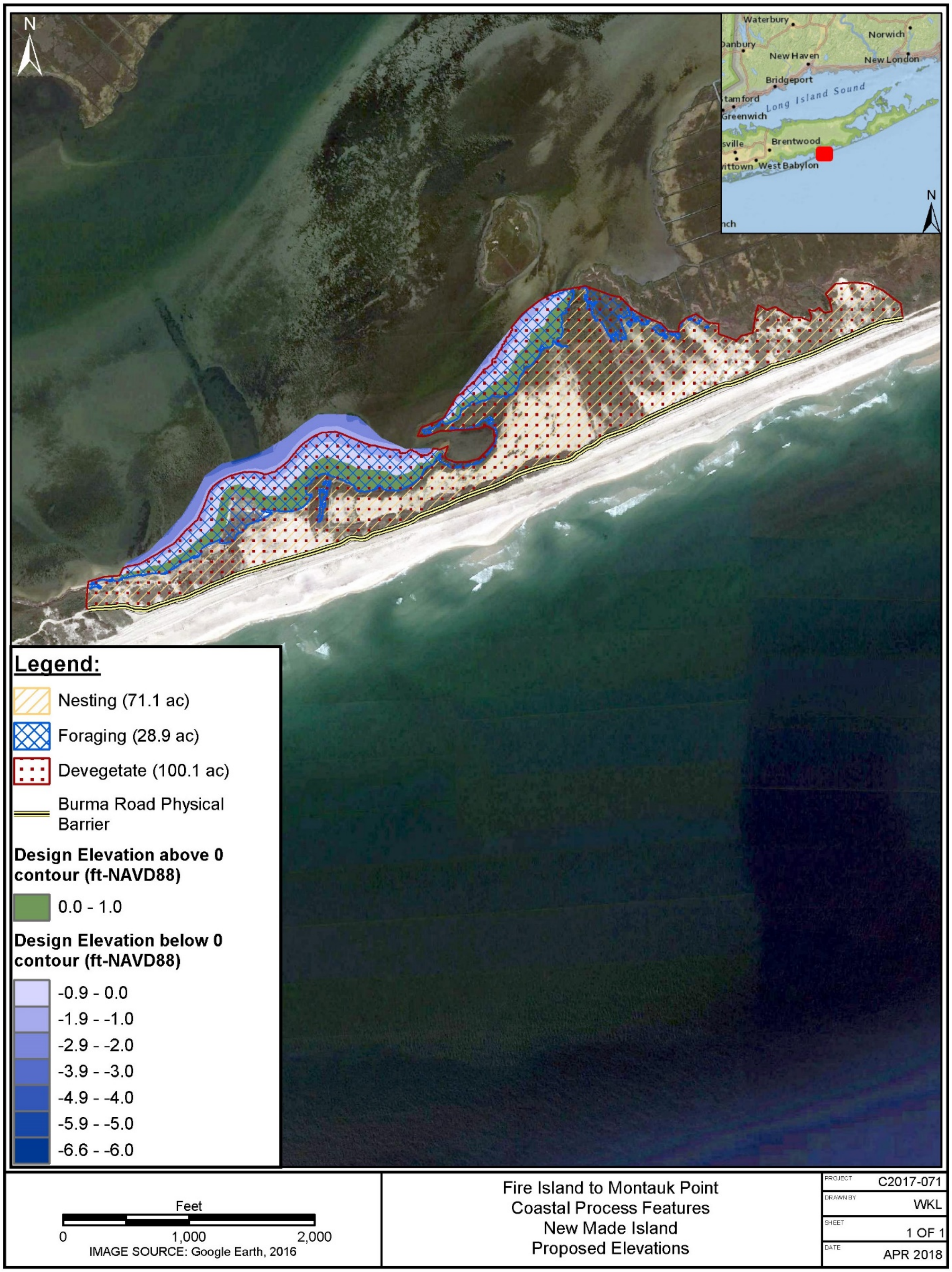


Figure 2.9 New Made Island Proposed Elevations

CPF Site 9
Smith Point County Park Marsh

Reach MB-2A

40.763611° N / 72.79122° W

Smith Point County Park Marsh is located on the eastern portion of Fire Island on the bay side, within Smith Point County Park. Smith Point County Park Marsh lies between two inlets, Old Inlet to the west and Moriches Inlet to the east. The project area contains a large coastal salt marsh with linear man-made ditches cut through the wetland. The north/south running ditches are cut at approximately 1,000 ft intervals while the east/west running ditches are cut at approximately 200 ft intervals. This CPF design seeks to add fill to provide CSRM benefits by simulating cross island transport.

CPF Cut and Fill Volumes	
Feature	**Volume (cy)**
Cut Volume	-61,523
Fill Volume	320,953
Net Volume	259,430
Project Area	**284.7 acres**
BAYSIDE TIDAL ENVIRONMENT (ft-NAVD88) (0 ft NAVD = 1.02 ft. NGVD)	
Highest Astronomical Tide (HAT)	1.53
Mean Higher High Water (MHHW)	1.06
Mean High Water (MHW)	0.84
Mean Sea Level (MSL)	-0.13
Mean Tide Level (MTL)	-0.14
Mean Low Water (MLW)	-1.11
Mean Lower Low Water (MLLW)	-1.23
Lowest Astronomical Tide (LAT)	-1.71
Range (MHW-MLW)	1.95
Diurnal Range (MHHW - MLLW)	2.28
Largest Tidal Range (HAT-LAT)	3.24

To restore cross island transport, plans call for placement of fill across 284.7 ac of salt marsh. The site will be regraded to allow for wetland vegetation reestablishment. . The ditches will be filled to reestablish a uniform marsh across the entire project area. A series of tidal channels will be established to promote tidal exchange within the interior of the marsh.

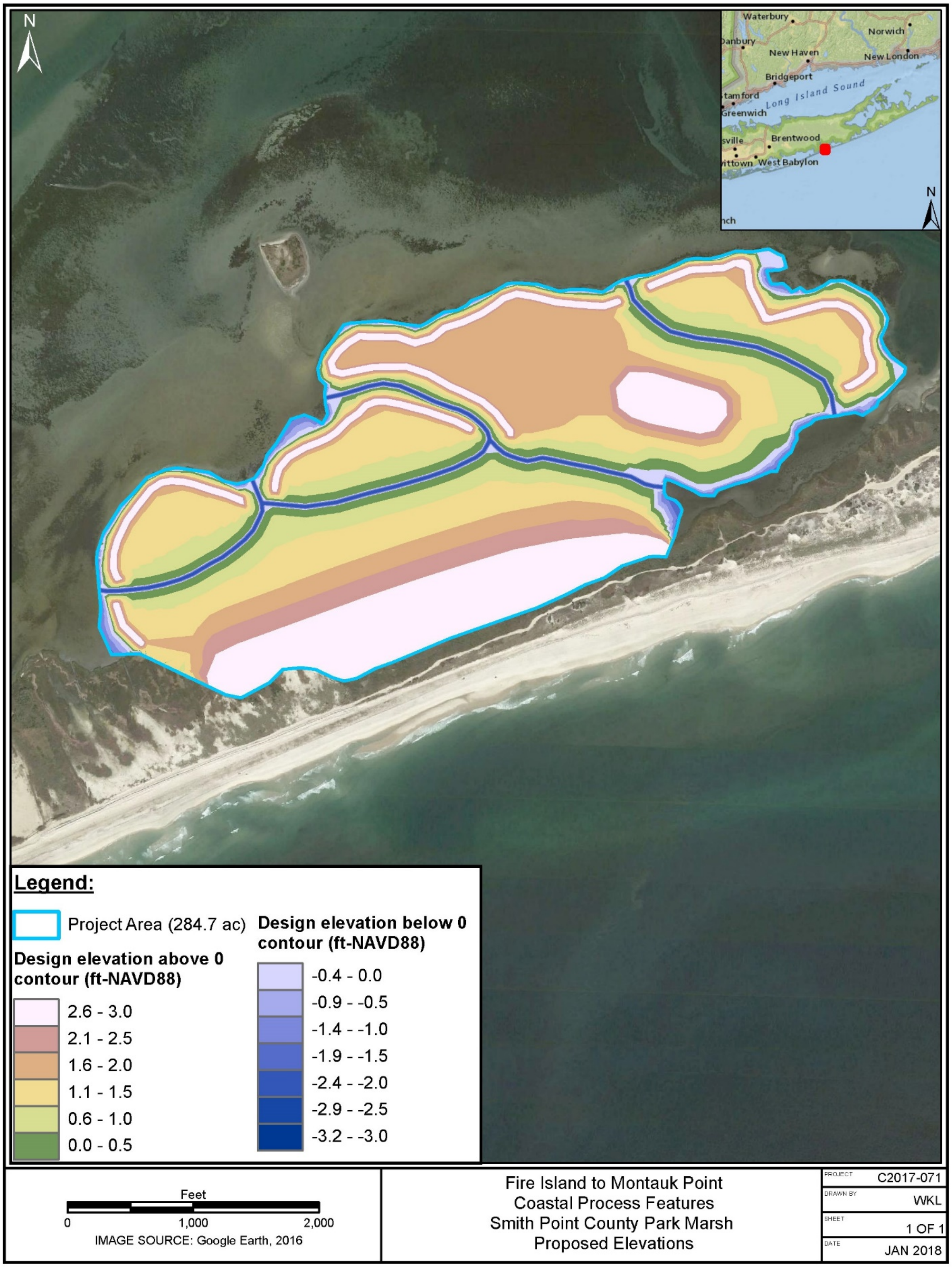


Figure 2.10 Smith Point County Park Proposed Elevations

CPF Site 10
Great Gun

Reach MB-2B

40.760937° N / 72.762574° W

Great Gun is located on the eastern portion of Fire Island on the Atlantic Ocean side within Smith Point County Park. Great Gun lies immediately west of Moriches Inlet. The project area contains coastal dunes with vegetation. This CPF design seeks to devegetate uplands to provide ESA bird habitat (foraging and nesting).

CPF Cut and Fill Volumes	
Feature	**Volume (cy)**
Cut Volume	n/a
Fill Volume	n/a
Net Volume	n/a
Project Area	**107.7 acres**
BAYSIDE TIDAL ENVIRONMENT (ft-NAVD88) (0 ft NAVD = 1.01 ft. NGVD)	
Highest Astronomical Tide (HAT)	2.67
Mean Higher High Water (MHHW)	1.73
Mean High Water (MHW)	1.45
Mean Sea Level (MSL)	-0.23
Mean Tide Level (MTL)	-0.25
Mean Low Water (MLW)	-1.94
Mean Lower Low Water (MLLW)	-2.08
Lowest Astronomical Tide (LAT)	-2.96
Range (MHW-MLW)	3.38
Diurnal Range (MHHW - MLLW)	3.80
Largest Tidal Range (HAT-LAT)	5.63

The plans call for removing vegetation from approximately 107.7 ac, resulting in 82.7 ac of nesting habitat and 6.3 ac of foraging habitat. Foraging habitat encompasses the area between the LAT and the HAT, while nesting habitat extends from the HAT to the naturally occurring +10 ft-NAVD88 elevation contour or 640 ft from the HAT. Beachfront topography will approximate the anticipated FIMP beach fill template between stations 1572+00 and 1623+00. The design template includes a high dune extending above the vertical limit for ESA bird habitat. No regrading of the site beyond the FIMP beach fill plan is anticipated.

Vehicular traffic on Burma Road presents a potential hazard for chicks and older birds. A physical barrier shall be constructed to limit the ability of birds to enter traffic lanes. Past efforts using sand/snow fencing have had limited success primarily due to pedestrian openings in the fencing. Additional types of barriers shall be considered during the PED phase of the project. Possible physical barrier components may include dredge pipe, sand/snow fencing, and elevated pedestrian cross walks to limit the number of openings through the barriers. Future detailed CPF design will be completed in close coordination with FWS, Suffolk County, and NY State Parks.

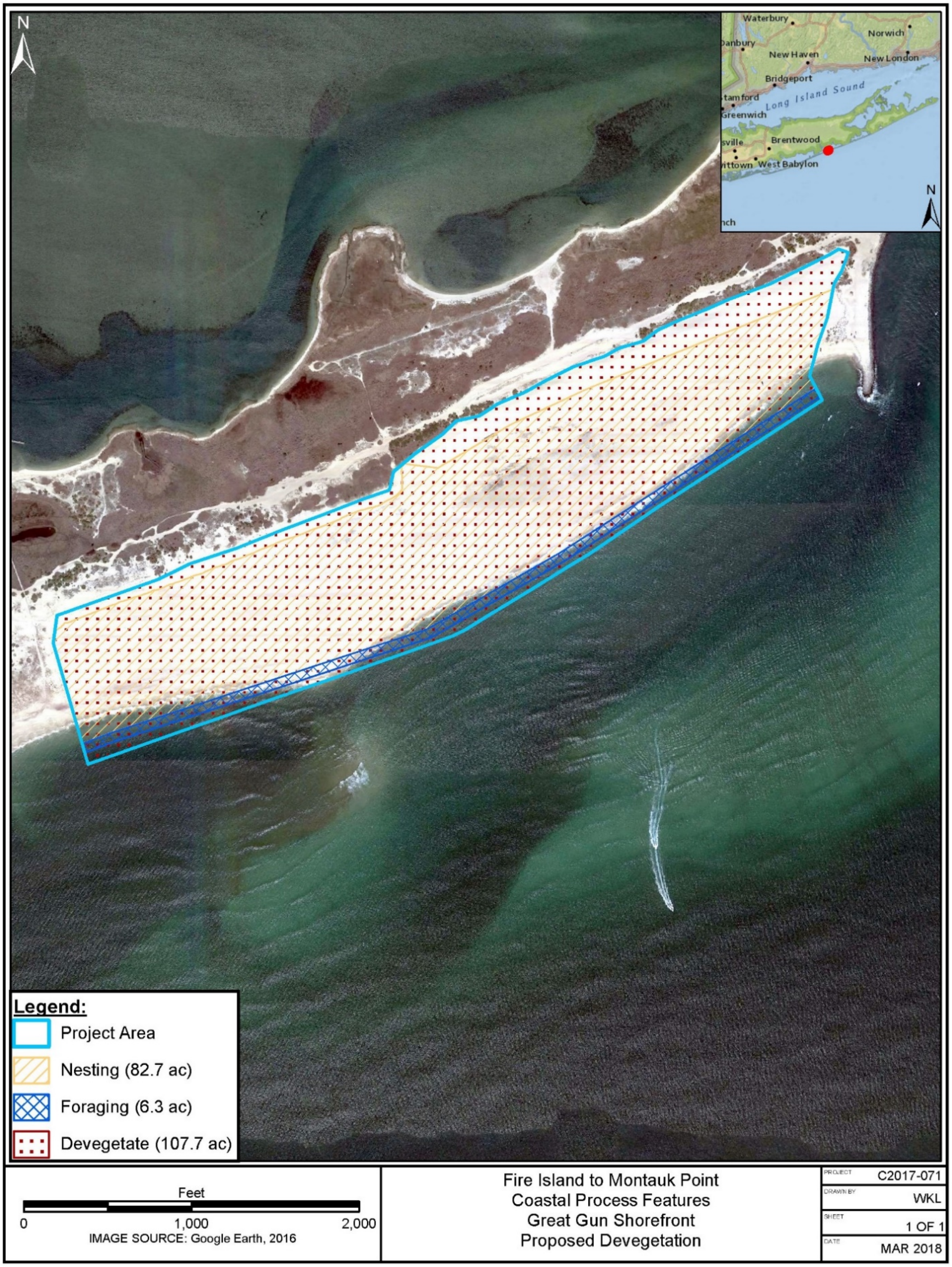


Figure 2.11 Great Gun Shorefront Proposed Devegetation

CPF Site 11
45, 47, and 51 Dune Road, East Quogue

Reach GSB-2D

40.826855° N / 72.534709° W

45, 47, and 51 Dune Road, East Quogue is located on the eastern portion of Westhampton Island, on the bayside just west of Shinnecock Inlet and Shinnecock County Park West. The average nearshore water depth on the bayside at 45, 47, and 51 Dune Road, East Quogue is approximately 3 ft with a maximum of about 6 ft.

CPF Cut and Fill Volumes	
Feature	**Volume (cy)**
Cut Volume	0
Fill Volume	49,890
Net Volume	49,890
Project Area	**10.2 acres**
BAYSIDE TIDAL ENVIRONMENT (ft-NAVD88) (0 ft NAVD = 1.01 ft. NGVD)	
Highest Astronomical Tide (HAT)	1.79
Mean Higher High Water (MHHW)	1.31
Mean High Water (MHW)	1.05
Mean Sea Level (MSL)	-0.30
Mean Tide Level (MTL)	-0.28
Mean Low Water (MLW)	-1.60
Mean Lower Low Water (MLLW)	-1.71
Lowest Astronomical Tide (LAT)	-2.19
Range (MHW-MLW)	2.66
Diurnal Range (MHHW - MLLW)	3.02
Largest Tidal Range (HAT-LAT)	3.98

To restore cross island transport, plans call for removal of the bulkheads and groins currently within the project footprint and placement of fill over 10.2 acres (ac) extending across the embayment centered on the currently bulkheaded properties. The fill template includes a 75 ft berm extending bayward from the existing HAT contour with a landward extension to the intersection with native ground. The template includes an assumed 5% slope from the bayside edge of berm to the intersection with the bay bottom. The cross shore extent of this CPF is limited due to the overall site configuration.

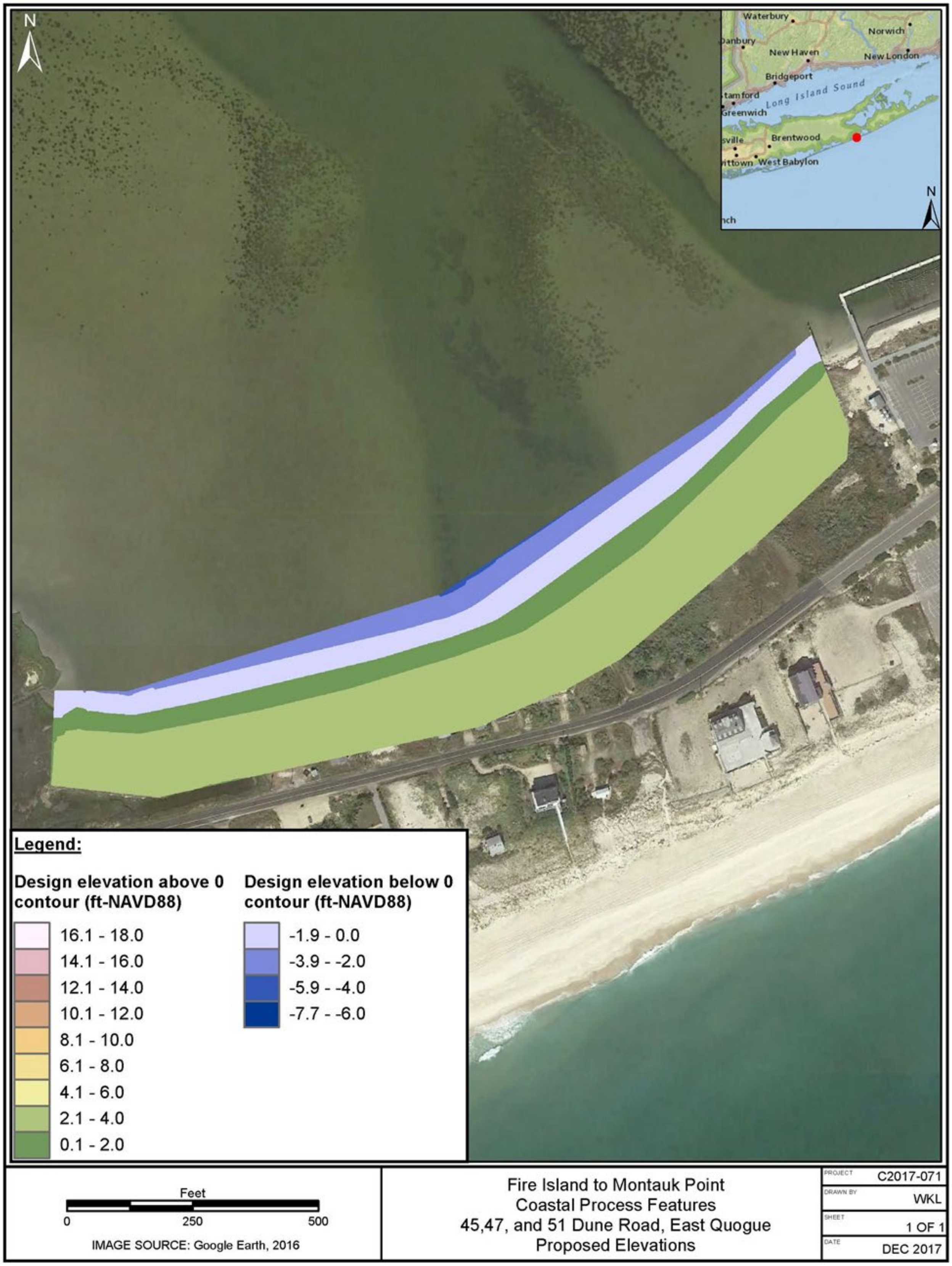


Figure 2.12 45,47, and 51 Dune Road, East Quogue Proposed Elevations

CPF Site 12
Tiana Bayside Park

Reach GSB-2D

40.828985° N / 72.530510° W

Tiana Bayside Park is located on the eastern portion of Westhampton Island on Shinnecock Bay, just west of Shinnecock Inlet and Shinnecock County Park West. The average nearshore water depth on the bayside at Tiana Bayside Park is approximately 3 ft with a maximum of 6 to 7 ft in an offshore channel. Several pile-supported and floating docks lie along the western half of the project site. A 750 ft long line of rock-filled gabions fronts the shoreline within the dock structures.

The base design includes fill placed to -3 ft-NAVD88 within the eastern half of the navigation channel immediately offshore of the project area. The total fill volume proposed in the project area is 36,647 cy.

CPF Cut and Fill Volumes	
Feature	**Volume (cy)**
Cut Volume	0
Fill Volume	36,674
Net Volume	36,674
Project Area	**12.2 acres**
BAYSIDE TIDAL ENVIRONMENT (ft-NAVD88) (0 ft NAVD = 1.01 ft. NGVD)	
Highest Astronomical Tide (HAT)	1.79
Mean Higher High Water (MHHW)	1.31
Mean High Water (MHW)	1.05
Mean Sea Level (MSL)	-0.30
Mean Tide Level (MTL)	-0.28
Mean Low Water (MLW)	-1.60
Mean Lower Low Water (MLLW)	-1.71
Lowest Astronomical Tide (LAT)	-2.19
Range (MHW-MLW)	2.66
Diurnal Range (MHHW - MLLW)	3.02
Largest Tidal Range (HAT-LAT)	3.98

The eastern 350 ft of gabions may be treated in one of three possible ways. First, they may be left as-is in place. Second, they may be removed and replaced with a small amount of fill to soften the shoreline. Finally, they may be left in place and buried beneath a small amount of fill to soften the shoreline while retaining the shoreline protection should erosion re-expose the gabions.

To restore cross island transport, plans call for the placement of fill over 12.2 acres (ac) extending from the eastern bulkhead area across the adjacent bayside shoreline to the east. The landward side of the fill profile will tie into the closer of the existing grade at +4 ft-NAVD88 or the adjacent roadway right of way. The fill template includes a berm extending bayward. The template includes an assumed 5% slope from the bayside edge of berm to the intersection with the bay bottom. The cross shore extent of this CPF is limited due to the overall site configuration. The base design includes fill placed to -3 ft-NAVD88 within the eastern half of the navigation channel immediately offshore of the project area. The total fill currently envisioned in the project area is 36,647 cy.

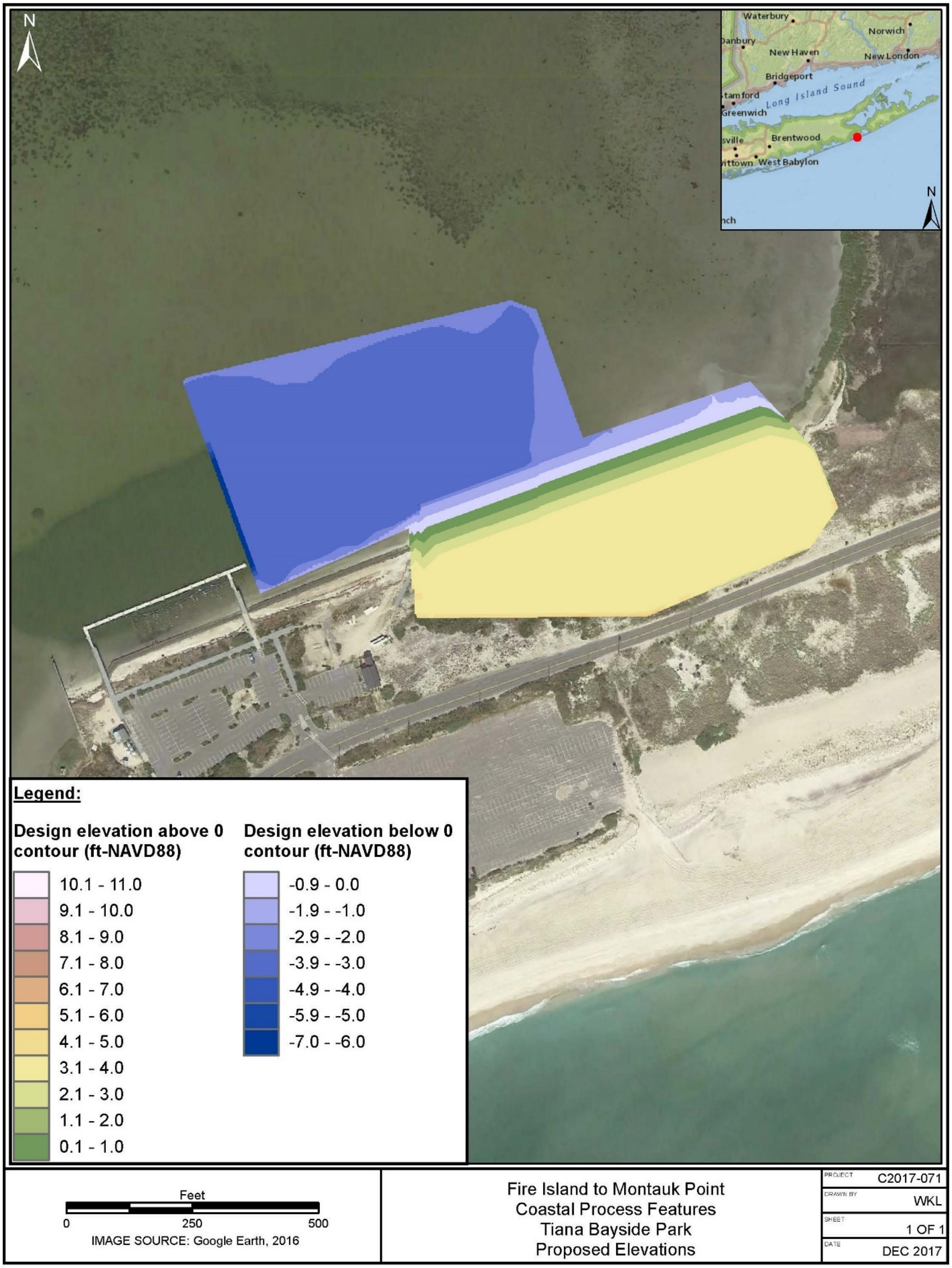


Figure 2.13 Tiana Bayside Park Proposed Elevations

CPF Site MB1

Mastic Beach 1

Town of Brookhaven, NY
east of William Floyd
Parkway & West of Pattersquash Creek
40.746981° N / -72.846617° W

Mastic Beach 1 is located on Long Island along the southern shore of the town of Town of Brookhaven, NY/ east of William Floyd Parkway & West of Pattersquash Creek bordering Narrow Bay. The project area includes undeveloped lands and eight properties targeted for buyouts as part of the non-structural plan. The undeveloped land consists primarily of common reed dominated wetlands, some existing uplands and high marsh shrub areas adjacent to medium density residential development. The project goals are to combine non-structural acquisition with restoration of natural floodplain function and to create a natural buffer to attenuate waves and reduce flooding impacts to developed areas.

CPF Cut and Fill Volumes	
Feature	**Volume (cy)**
Cut Volume	0
Fill Volume	0
Volume Difference (Fill minus Cut)	0
Project Area	~25 acres
Maritime Forest	2
High Marsh	14
Low Marsh	9
TIDAL ENVIRONMENT (ft-NAVD88; 0 ft NAVD88 = -1.17 ft- NGVD29)	
Highest Astronomical Tide (HAT)	1.50
HAT 2048 Sea Level Rise (SLR)	1.90
HAT – 2048 Intermediate SLR	2.10
Flood Frequency Data	
2 - Year	3.10
10 - Year	4.50
25 - Year	5.30
100 - Year	6.10

The conceptual CPF plan for Mastic Beach 1 consists of reestablishment of a 25-acre natural vegetation community, beginning with forested uplands adjacent to the remaining residential areas, followed by high marsh shrub, high marsh grasses and low marsh near the shoreline at appropriate elevations. Following selective acquisition, former private parcels would be restored with native vegetation suited for the site conditions, thereby enhancing the CPF function of this vegetation type by increasing the width of vegetated area. If possible, higher elevations along the shoreline, will be expanded to create and enhance a high marsh shrub vegetation community. Although not depicted on the concept plan, existing linear channels, would be altered to create more sinuous natural configurations to enhance the hydrologic function of the wetland and facilitate restoration of native vegetation. Details on existing channel configuration and natural channel restoration would be developed during the PED phase.

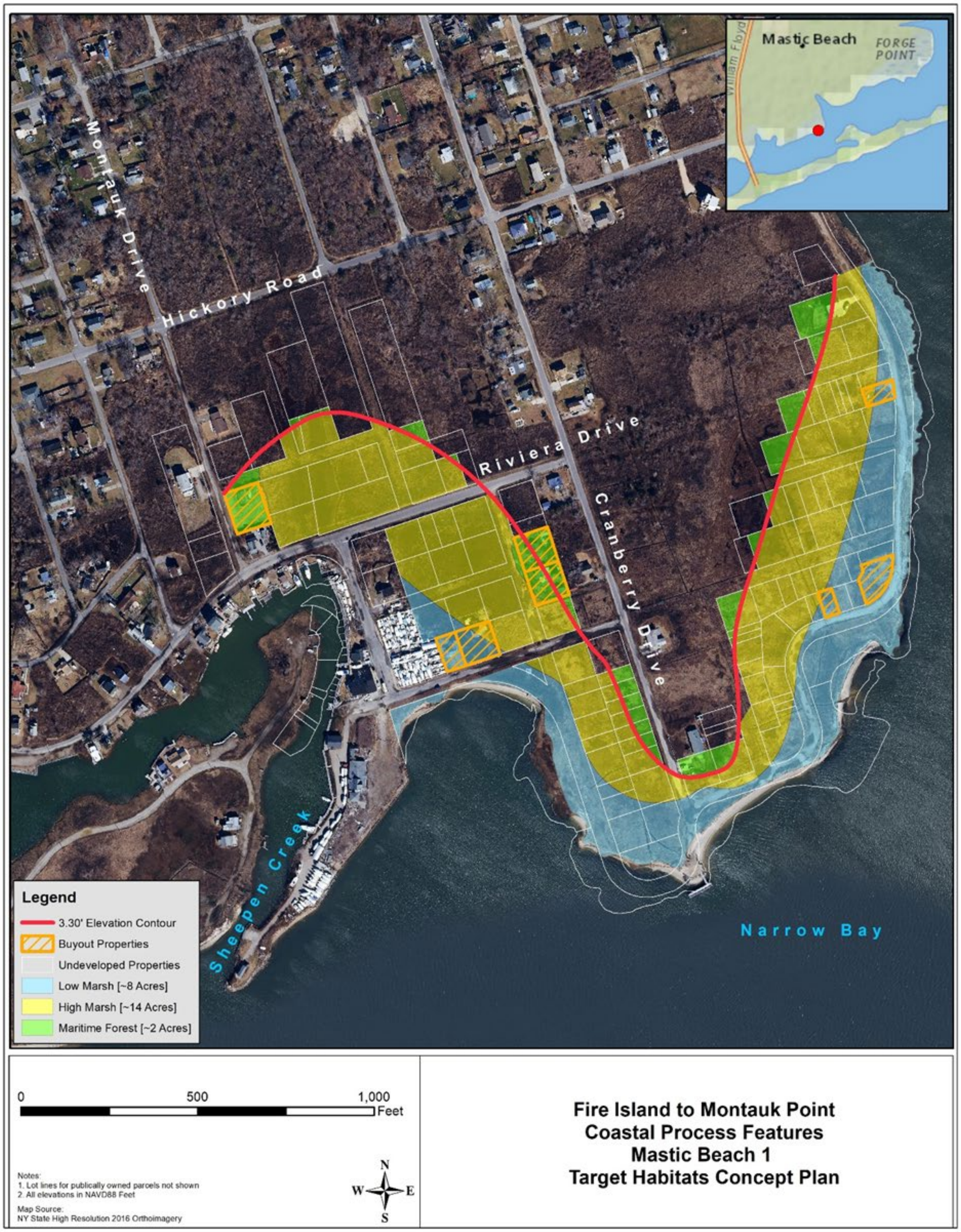


Figure 2.14 Proposed Elevations

CPF Site MB2-1
Mastic Beach 2 – Area 1

Town of Brookhaven, NY
east of Pattersquash Creek
40.7535° N / -72.840596° W

Mastic Beach 2 Area 1 is located along and east of Pattersquash Creek in the town of Brookhaven NY. The project site includes undeveloped lands and one property targeted for buyout as part of the non-structural plan. The undeveloped land, adjacent to medium density residential development, consists primarily of common reed dominated wetlands, some existing uplands and high marsh shrub areas. The common reed dominated wetlands appear to have been hydrologically altered as a result of linear channel construction and in some locations are low lying and may have restrictions to normal semi-diurnal tidal flow. Low marsh vegetation is present in lower lying areas and adjacent to channels. Uplands are present throughout and adjacent to the site. Project goals are to combine non-structural acquisition with restoration of natural floodplain function and create a natural buffer to attenuate waves and reduce flooding impacts to developed areas

CPF Cut and Fill Volumes	
Feature	**Volume (cy)**
Cut Volume	0
Fill Volume	0
Volume Difference (Fill minus Cut)	0
Project Area	~24 acres
Maritime Forest	2
High Marsh	9
Low Marsh	13
TIDAL ENVIRONMENT (ft-NAVD88; 0 ft NAVD88 = -1.17 ft- NGVD29)	
Highest Astronomical Tide (HAT)	1.50
HAT 2048 Sea Level Rise (SLR)	1.90
HAT – 2048 Intermediate SLR	2.10
Flood Frequency Data	
2 - Year	3.10
10 - Year	4.50
25 - Year	5.30
100 - Year	6.10

The conceptual CPF plan for Mastic Beach 2 - Area 1 consists of reestablishment of a natural vegetation community transition, beginning with forested uplands adjacent to the remaining residential areas, followed by high marsh shrub, high marsh grasses and low march near the shoreline at appropriate elevations. The former private parcel would be restored with suitable native vegetation increasing the width of restored vegetated area. Higher elevations within the project area would be expanded to create and enhance a high marsh shrub vegetation community. Although not depicted on the concept plan, existing linear channels, would be altered to create more sinuous natural configurations to enhance the hydrologic function of the wetland and facilitate restoration of native vegetation.

Figure 2.15 Proposed Elevations

CPF Site MB2-2
Mastic Beach 2 – Area 2

Town of Brookhaven, NY
West of Lawrence Creek
40.758649° N / -72.828377° W

Mastic Beach 2 Area 2 is located on about 7 acres along the west side of Lawrence Creek in the town of Brookhaven NY. Area 2 includes undeveloped lands and five properties targeted for buyout. The undeveloped land consists primarily of common reed dominated wetlands and high marsh shrub areas, with some adjoining uplands. The project goals are to Combine non-structural acquisition with restoration of natural floodplain function and create natural buffer to attenuate waves and reduce flooding impacts to developed areas.

CPF Cut and Fill Volumes	
Feature	**Volume (cy)**
Cut Volume	0
Fill Volume	0
Volume Difference (Fill minus Cut)	0
Project Area	~7 acres
Maritime Forest	3
High Marsh	2
Low Marsh	2
TIDAL ENVIRONMENT (ft-NAVD88; 0 ft NAVD88 = -1.17 ft- NGVD29)	
Highest Astronomical Tide (HAT)	1.50
HAT 2048 Sea Level Rise (SLR)	1.90
HAT – 2048 Intermediate SLR	2.10
Flood Frequency Data	
2 - Year	3.10
10 - Year	4.50
25 - Year	5.30
100 - Year	6.10

The conceptual CPF plan for Mastic Beach 2 - Area 2 consists of reestablishment of a natural vegetation community, beginning with forested uplands adjacent to the remaining residential areas, followed by high marsh shrub, high marsh grasses and low marsh near the shoreline. Following acquisition, former private parcels would be restored with native vegetation, increasing the width of vegetated area. Although not depicted on the concept plan, existing linear channels, would be altered to create more sinuous natural configurations to enhance the hydrologic function of the wetland and facilitate restoration of native vegetation. Details on existing channel configuration and natural channel restoration would be developed during the PED phase.

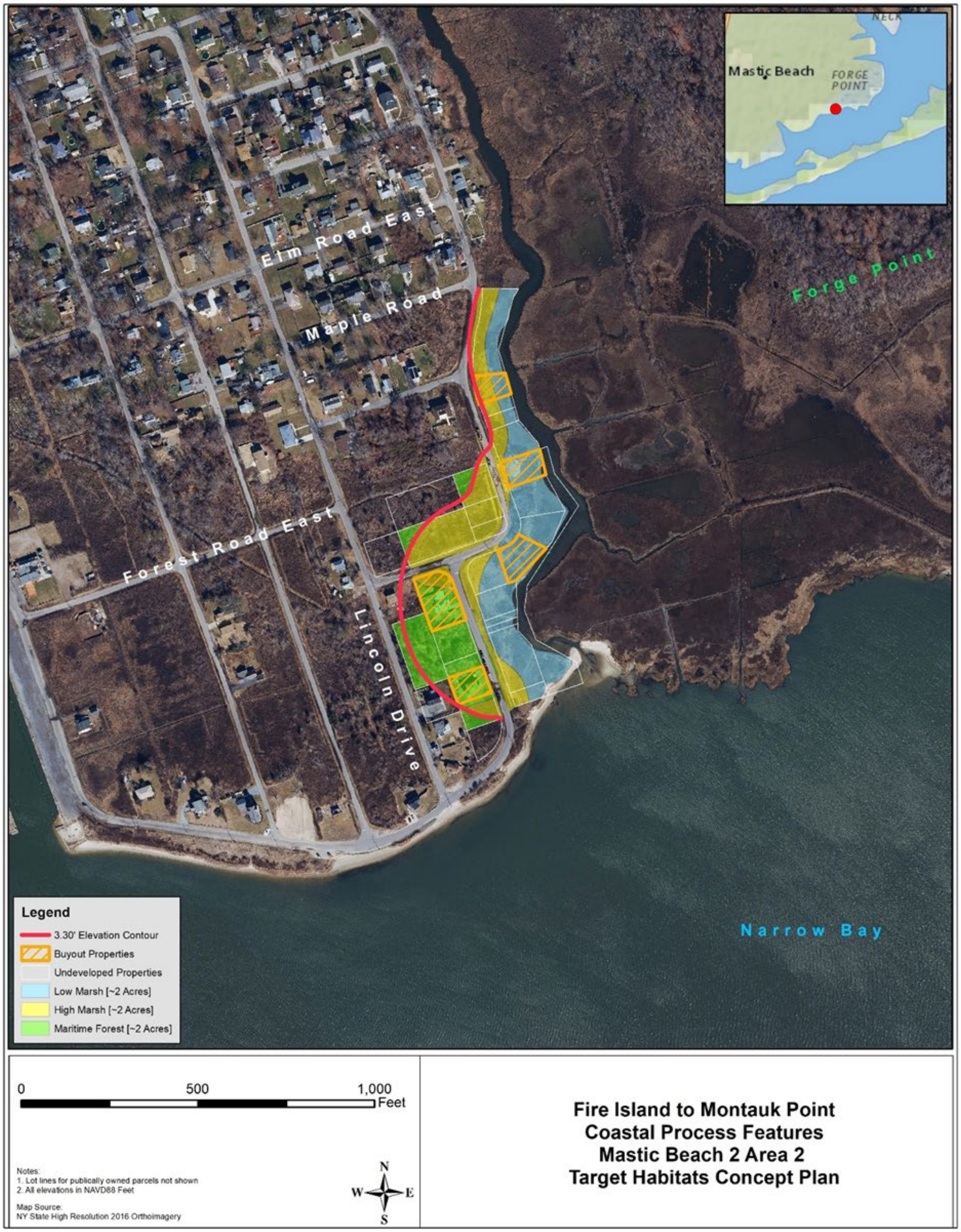


Figure 2.16 Proposed Elevations

2.3.4 Reasonably Foreseeable Future Actions

Reasonably foreseeable future actions include reestablishment of CPF design features over time in coordination with Atlantic beach renourishment cycles (nominally about 4 years), subject to monitoring to verify resolution of project objectives. The USACE will not implement vegetation management or manipulation of the sites unless conducted as an incidental action associated with future fill placement. The USACE recommends the local land management agency consider predator management in newly created CPF's. In addition, the USACE anticipates the FIIS's Off Road Vehicle policy will be implemented during nesting season.

3.0 EFH ENVIRONMENT, DESIGNATIONS AND LIFE HISTORIES

The section provides an overview of the EFH communities in the project area and discusses managed species life history details pertinent to the project actions.

3.1 Existing Regional Environment

The Long Island nearshore zone at Montauk Point is composed of eroded glacial features formed over twenty thousand years ago. A terminal glacial moraine divides the island, with a ground moraine to the north and an extensive outwash plain to the south. The nearshore bottom is a gently sloping terrace composed of a remarkably uniform sand sediment surface.

The nearshore and inshore zones of Long Island and New Jersey are shallow marine waters and estuarine waters respectively. They share several characteristics and are part of a larger ecosystem called the Mid-Atlantic Bight (MAB). Because this ecosystem is located between the boreal waters of southern New England and the semi-tropical region to the south, it is especially significant to marine species diversity.

The benthic habitat and the shallow water column habitat above it support different assemblages of organisms. The benthic zone refers to the bottom or substrate and includes sediments and other material present on the bay or nearshore seafloor. Project area benthic substrates include clean sand in open beach intertidal zones and shallow sand flats and muddy sand in subtidal zones. The pelagic zone refers to the water column and organisms within it.

3.2 Project Ecosystems and Habitats

Great South Bay is the largest shallow saltwater bay in New York State, and one the largest in the region. The Great South Bay habitat complex, including the barrier islands and Long Island shoreline, supports regionally significant populations of marine and estuarine fish, migrating and wintering waterfowl, rare plants, and other species associated with open water marshes, barrier beaches, and estuarine watersheds, and includes the largest undeveloped barrier beach in the New York Bight area.

The Coastal Process Feature projects occur within the dunes, beaches, estuarine and nearshore marine ecosystems. The focus of the EFH analysis includes the following habitats within those ecosystems: estuarine marsh (low marsh and high marsh), intertidal mud flats, subtidal benthic habitat, and subtidal water column; marine intertidal, marine nearshore benthic habitat, and marine nearshore water column.

The EFH analysis below presents a quantitative analysis of the changes to the habitat categories associated with the CPF conceptual designs and interpretation of project area EFH changes due to the CPF conceptual designs.

Except for sea turtles and birds, all biota associated with the habitats below the mean high water line are aquatic. Aquatic biota that use these habitats include fish, infaunal and epifaunal invertebrates, and marine mammals.

3.3 Marine Invertebrates

Marine benthic invertebrates are bottom-dwelling species that can be grouped into two categories: infaunal (benthic invertebrates living within the substrate) and epifaunal (benthic invertebrates living on the surface of the substrate). Benthic invertebrates are found in and on the substrate of the intertidal and subtidal habitats. Polychaetes (segmented worms with bristles) are an important component of the benthic infaunal community; epifaunal biota include amphipods, crabs, Atlantic horseshoe crabs (*Limulus polyphemus*), various univalve and bivalve mollusks such as oyster (*Crassostrea virginica*), blue mussel (*Mytilus edilus*), hardshell clams (*Mercenaria mercenaria*), surf clams (*Spisula solidissima*) on the ocean-side of the island), and echinoderms (e.g., sand dollars). Invertebrates provide an important food source for bottom feeding fish and include species that are commercially and recreationally important. The benthic invertebrates of these habitats include a variety of taxa common to the variety of sediments found in the estuaries and in the ocean shoreline (USFWS 1997).

The Atlantic horseshoe crab is a marine chelicerate arthropod found along the US Atlantic and Gulf of Mexico coasts. It merits specific attention as a significant, at risk component of the intertidal and subtidal zones in the project area. It provides food for endangered sea turtles and migrating shorebirds. It provides a key food resource for federally listed shorebird species, particularly the red knot. Horseshoe crab burrowing activities affect the habitat available for other species through bioturbation. Adult predatory activities affect the intertidal and subtidal meio- and macrofauna Undisturbed sandy beach is the crabs' optimal spawning habitat; the availability of optimal spawning habitat is considered a limiting factor on population growth. Fire Island's sandy bay beaches have long been a preferred breeding location. Spawning in the project area occurs for the most part in late spring and early summer, with the crabs arriving during high tides of full and new moons. Nearshore, shallow water, intertidal flats are considered essential habitats for development of juvenile horseshoe crabs; juveniles usually spend their first two years on the sand and mud flats just off the breeding beaches. The species is now in decline across most of its geographic range. For many decades it has been over-harvested for bait, its blood, fertilizer, and other uses. Harvesting horseshoe crab has been prohibited in New Jersey and restricted to males in Delaware. New York has an annual harvest quota and harvest gear restrictions. The bay and Atlantic Ocean beaches of the Fire Island National Seashore including all the CPF project shorelines have been closed to hand-harvest of horseshoe crab (Smith et al 2016). Project construction will temporarily disrupt intertidal habitat in the CPF footprints and may bury crabs if they are present.

3.4 Finfish

More than 60 species of marine and anadromous fish, sometimes known as shore fishes, use this ecologically productive ecosystem as a feeding area. These fish include boreal, temperate, and semi-tropical seasonally migratory species. In the spring and summer is the fish generally movement inshore and somewhat toward the north, while in the fall and winter the movement is offshore and southerly, with some species undertaking long coastal migrations to semi-tropical waters. Some examples of commercially and recreationally important species in the nearshore zone are Atlantic menhaden (*Brevoortia tyrannus*), weakfish (*Cynoscion regalis*), striped bass (*Morone saxatilis*), winter flounder (*Pleuronectes americanus*), summer flounder (*Paralichthys dentatus*), bluefish (*Pomatomus saltatrix),* *tautog (Tautoga onitis), Atlantic mackerel (Scomber scombrus), black sea bass (Centropristis striata*), Atlantic croaker (*Micropogonias undulatus*), northern kingfish (*Menticirrhus saxatilis*), spot (*Leiostomas xanthurus*), American sandlance (*Ammodytes americanus*), and silverside (*Menidia menidia*). The nearshore waters of the Bight are a natural focus or funneling area for a number of anadromous species that eventually enter the Hudson River or other coastal rivers and streams to spawn. These anadromous species include Atlantic tomcod (*Microgadus tomcod*), Atlantic sturgeon (*Acipenser oxyrhynchrus*), alewife (*Alosa pseudoharengus*), blueback herring (*Alosa aestivalis*), American shad (*Alosa sapidissima*), and striped bass (*Morone saxatilis*).

The shallow waters of Great South Bay are a highly productive and regionally significant habitat for marine finfish, shellfish, and wildlife. This productivity is due, in part, to the many salt marshes and mudflats fringing the mainland and the barrier islands; the estuarine habitats around stream and river outlets on the mainland; and the sandy shoals and seagrass (primarily *Zostera marina*) beds that characterize the open water areas of the bay. As a result, Great South Bay has a commercial and recreational fishery of regional importance, affording essential habitat to many economically valuable finfish species that are estuarine-dependent during at least one stage in their life histories. Annual fish surveys in the bays by the New York Department of Environmental Conservation have shown a great diversity of fish species; during eight years of surveys; 85 species have been identified, about 40 of which occur regularly in the bay. The most abundant fish species in the bay, accounting for over 90% of all fish caught, are silversides (*Menidia spp*.), killifish *(Fundulus spp*.), Atlantic menhaden, and bay anchovy (*Anchoa mitchilli*). Forage fish species are found throughout the various aquatic habitats in the bay at different times of the year. Atlantic silverside, the most dominant member of the ichthyofauna throughout much of the year, is found virtually everywhere in the bay. Bay anchovy is the major mid-bay water column occupant in the summer during its spawning time in late June and July. Killifishes include mummichog (*Fundulus heteroclitus*) in the salt marsh habitats, striped killifish (*Fundulus majalis*) over sandy habitat, and sheepshead minnow (*Cyprinodon variegatus*) in both habitats. Sticklebacks, including fourspine (*Apeltes quadracus*) and threespine (*Gasterosteus aculeatus*), are spring and summer spawners associated with SAV; although they are very abundant, their use as prey by other fish and birds is limited due to spines, body armor, and close association with vegetative cover. Northern pipefish (*Syngnathus fuscus*) is a zooplankton consumer preyed upon by both striped bass and summer flounder. American sandlance, probably the most abundant winter species, provides important forage for many species of special emphasis in the Bight (USFWS 1997)

3.5 Marine Mammals

The pelagic zone and beaches also provide habitat for marine mammals. During the spring, adult seals and pups recently weaned from their mothers can occasionally be seen resting on Fire Island's beaches or swimming just offshore in the ocean. Common seal species include Harbor seals (*Phoca vitulina*), harp seals (*Phoca groenlandica*), grey seals (*Halichoerus grypus*), ringed seals (*Pusa hispida*), and hooded seals (*Cystophora cristata*). These animals may come ashore to molt, get warm from the sun, avoid rough waters, or even just to rest after a long day of hunting fish. The harbor seal and the grey seal are the most commonly seen marine mammals other than porpoises along the New York state coastline (Johnston et al. 2015; NY State Department of Environmental Conservation, 2018).

3.6 Reptiles

Several species of sea turtles, including juvenile and adult loggerhead sea turtle (*Caretta*; State and Federally Threatened), Kemps Ridley turtle (*Lepidochelys kempii*, State and Federally Endangered), and juvenile and adult green sea turtle (*Chelonia mydas*; State and Federally Endangered) are found in the Great South Bay and other nearshore bays within the New York Bight area. However, no nesting occurs in the project area or in other New York waters.

3.7 Species-Specific EFH Overviews

This section describes the habitat requirements of the EFH-designated species, non-EFH designated fish and shellfish species that are important recreationally and commercially, and rare and endangered species that potentially occur within the project area.

Each species EFH summary considers two levels of EFH coverage: one associated with coverage at the 10-minute graticule square scale and the second at a finer level of detail when available. The EFH discussions consider the 10-minute graticule GIS coverages provided in NOAA (2015, 2018a)).

3.7.1 EFH 10-Minute Graticule Descriptions

<u>Grid 3 (40° 30.0’ N, 73° 10.0’ W)</u>

Square Description (i.e. habitat, landmarks, coastline markers): The waters within the square within the Atlantic Ocean and within Great South Bay estuary affecting the following: East and West Fire Island, Saltaire, NY and Democrat Pt. on Fire Island. Captree I., Sexton I., Oak I., Cedar Island Beach, Oak Beach, and the Fire Island Inlet.

<u>Grid 4 (40° 40.0’ N, 73° 00.0’ W)</u>

Square Description (i.e. habitat, landmarks, coastline markers): Atlantic Ocean waters within the square and within Great South Bay, north of Ocean Beach, and south of Sayville, NY and Boheamia, NY, from Patchogue, NY and western Patchogue Bay to just west of Nicoll Pt. on Nicoll Bay, southeast of Great River, NY, and the Connetquot River.

<u>Grid 5 (40° 30.0’ N, 73° 00.0’ W)</u>

Square Description (i.e. habitat, landmarks, coastline markers): Atlantic Ocean waters within the square within Great South Bay estuary south and north of Ocean Beach, NY on Fire Island.

<u>Grid 6 (40° 40.0’ N, 72° 50.0’ W)</u>

Square Description (i.e. habitat, landmarks, coastline markers): Atlantic Ocean waters within the square within Great South Bay estuary affecting the following: south of Great South Beach on Fire Island, within western Narrow Bay and Bellport Bay, from Mastic Beach, NY, to the Swan River in East Patchogue, NY. Also affected are eastern Patchogue Bay, and south of Bellport, NY, North Bellport, NY, Brookhaven, NY, Mastic, NY, and East Patchogue, NY.

<u>Grid 8 (40° 40.0’ N, 72° 40.0’ W)</u>

Square Description (i.e. habitat, landmarks, coastline markers): The waters within the square within the Atlantic Ocean and within Great South Bay estuary affecting the following: south of Tanner Neck, NY, East Moriches, NY, Center Moriches, NY, and within Moriches Bay and Moriches Bay Inlet, south of Eastport, NY, Speonk, NY, and Remsenberg, NY, from Apaucuck Pt. to Mastic Beach, NY, along with waters within eastern Narrow Bay.

Grid 9 (40° 40.0’ N, 72° 30.0’ W)

Square Description (i.e. habitat, landmarks, coastline markers): The waters within the square within the Atlantic Ocean and within the Great South Bay estuary affecting the following: south of Westhampton, NY, Quiogue, NY, Quogue, NY, and Tiana Beach, and within Quantuck Bay and the eastern tip of Moriches Bay.

3.7.2 GIS Data Descriptions

The GIS data used in this analysis came from three sources: NMFS (2009), NOAA (2015), and NOAA (2018a). NMFS (2009) provides site-specific EFH coverages for Atlantic Highly Migratory Species. While both NOAA (2015) and NOAA (2018a) provide EFH coverage at a 10’ x 10’ latitude/longitude scale, the NOAA (2015) dataset includes additional finer scale detail provided by The Nature Conservancy. Note that the grid square numbering shown in Figure 2.1 is the same as used for the FIMP Borrow Area EFH report.

The CPF Project Site numbers (integers) in the EFH descriptions below refer to those shown in the Preferred Alternative section (Figure 2.1).

The designs of CPF #3 (Dunefield West of Field 4) and CPF #10 (Great Gun) do not include construction below the HAT (High Annual Tide) line; these project sites include only devegetation to enhance piping plover nesting and foraging habitat. Therefore, only high marsh habitat may be impacted at these sites and they are not included in individual species EFH descriptions. Finally, EFH described at the 10’ x 10’ grid square scale used in the Borrow Area EFH analysis (for Atlantic butterfish (*Peprilus triacanthus*), Atlantic mackerel, Atlantic surf clam (*Spisula solidissima)*, black sea bass, bluefish, longfin inshore squid (*Loligo pealeii)*, ocean quahog (*Arctica islandica)*, scup (*Stenotomus chrysops)*, spiny dogfish (*Squalus acanthias)*, and summer flounder) may be inaccurate due to scale; that dataset may miss EFH at the corners of the grid square and it includes ocean-side EFH that does not apply to the CPF sites. The individual species analyses below take that into account and provide analysis of more detailed EFH where finer scale GIS data are available. Where no better information than the 10’ x 10’ grid EFH information is available, information from species literature and best professional judgement has been applied to fairly account for species EFH.

3.8 Species EFH-Summaries

The species EFH summaries are divided into bony fishes, cartilaginous fishes, and invertebrates. Life stages for each species are abbreviated as follows: eggs (E), larvae (L), Neonates (N), Juveniles (J), Adults (A). Attachment 1 provides a complete list of species and life stages by CPF locations.

3.8.1 Bony Fish Species

Atlantic butterfish (*Peprilus triacanthus*)

Grid Squares: 3, 5, 9
CPF Project Sites: 1 (E, L, J); 4, 5, 11, 12 (L)

Primary Source: Cross et al. (1999)

Butterfish are relatively small, fast-growing, short-lived, pelagic fish that form loose schools, often near the surface. Butterfish eggs and larvae are pelagic and occur from the outer continental shelf to the lower, high salinity parts of estuaries in the Mid-Atlantic Bight (MAB). Juveniles and adults are common in inshore areas, including the surf zone, as well as in sheltered bays and estuaries in the MAB during the summer and fall. Inshore EFH is the "mixing" and/or "seawater" portions of all estuaries on the Atlantic coast where butterfish eggs are common, abundant, or highly abundant, which includes the waters of the project area. Butterfish eggs are buoyant, and the larvae are nektonic. Juveniles and adults are eurythermal and euryhaline, and are frequently found over sand, mud, and mixed substrates. Smaller juveniles often aggregate under floating objects and often live in the shelter of large jellyfish. Juvenile and adult butterfish in the MAB are typically found at depths ranging from 3 – 23 meters with water temperatures ranging from 8 – 26° C, salinities ranging from 19 – 32 ppt, and DO ranging from 3 – 10 mg/l.

Project Area: All life stages except adult can be found at CPF #1 (Democrat Point West). Only larval and juvenile stages occur two other CPF sites., with summer and fall as the most likely seasons for their presence. While some impacts to larvae may occur, since adult butterfish are pelagic and even juveniles are highly mobile, only minimal impact to butterfish and EFH is expected to occur as a result of the proposed CPF designs.

Atlantic sea herring (*Clupea harengus*)

Grid Squares: 3, 4
CPF Project Sites: 1 (A); 6 (J, A)

Primary Source: Stevenson and Scott (2005)

The Atlantic sea herring (herring) is a pelagic, schooling, plankton-feeding species that inhabits both sides of the North Atlantic Ocean. In the western North Atlantic this species ranges from Labrador to Cape Hatteras and supports major commercial fisheries. Adults migrate south into southern New England and mid-Atlantic shelf waters in the winter after spawning in the Gulf of Maine, on Georges Bank, and on Nantucket Shoals. Eggs occur predominantly in offshore, well-mixed waters of 32 – 33 ppt salinity, with tidal currents between 1.5 and 3.0 knots, water temperatures below 15° C, and in depths of 20 – 80 meters. Juvenile and adult herring are abundant in coastal and mid-shelf waters from southern New England to Cape Hatteras in the winter and spring. In the spring, adults return north, but juveniles do not undertake coastal migrations. Larval herring are limited almost exclusively to Georges Bank and the Gulf of Maine waters. Larvae typically metamorphose the following spring into young-of-year (YOY) juveniles. Atlantic sea herring prefer higher salinities (26 – 32 ppt) and juveniles and adults (including spawning adults) are typically found at depths of 15 – 130 meters.

Project Area: Mapped EFH for larvae, juvenile and adult Atlantic sea herring occur variously at four CPF project sites. However, based on Stevenson and Scott (2005), larvae are unlikely to occur in the project area. EFH for these species in the project area is, with the exception of CPF #6 (Talisman), near an inlet. For CPF #6, the Atlantic sea herring EFH coverage includes only an upland portion of the site as the northern edge of the EFH coverage extends across the barrier island from the Atlantic Ocean. The life stages likely found in the project areas will occur in low numbers and, as a mobile species, the herring should be able to avoid any project construction activities. Therefore, no impact on Atlantic herring or EFH is anticipated as a result of the CPF project designs.

Atlantic mackerel (*Scomber scombrus*)

Grid Squares: 3, 4, 5, 6, 8, 9
CPF Project Sites: 4-9, 11, 12, MB1, MB2-1 (E, L, J, A); 1 (L)

Primary Source: Studholme et. al. (1999)

Atlantic mackerel is a fast swimming, pelagic schooling species distributed over the western Atlantic Ocean primarily in open water. EFH for this species is mostly pelagic waters over the continental shelf with salinities greater than 25 ppt, but Atlantic mackerel may also be found in estuarine zones. All life stages of this species are pelagic. Eggs are typically found offshore but may also occur in large bays. Juveniles may be found in varying (but typically low) abundance in bays and estuarine areas from New Jersey north to Canada; juveniles and adults are common in saline waters of the Hudson-Raritan estuary in the spring and fall. However, Atlantic mackerel are intolerant of temperatures below 5-6° C or above 15 – 16° C and they undergo substantial seasonal migrations in response to changes in seawater temperature. Atlantic mackerel are opportunistic feeders that either select individual prey organisms or filter planktonic prey organisms when abundant. Juveniles eat mostly small crustaceans such as copepods, amphipods, mysid shrimp, and decapod larvae. They also feed on small pelagic mollusks (*Spiratella* spp. and *Clione* spp.) when available. Adults feed on similar food as juveniles but on a wider assortment of organisms and larger prey items.

Project Area: While Atlantic mackerel may be present in the estuarine waters near the inlets located by some of the CPF project sites, no life stage is likely to be abundant in these waters. Eggs are buoyant, larvae and juveniles mobile. No impact to Atlantic mackerel or EFH is anticipated as a result of the proposed CPF designs.

Black sea bass (*Centropristis striata*)

Grid Squares: 3, 5, 6, 8, 9
CPF Project Sites: 1, 4, 5 (L, J, A); 2, 7, 11, 12, MB1, MB2-1 (J, A); 8, 9, MB2-2 (A)

Primary Source: Drohan et al. (2007)

The black sea bass is a warm temperate serranid that ranges from southern Nova Scotia and the Bay of Fundy to southern Florida and into the Gulf of Mexico. Black sea bass are typically found on the continental shelf in complex habitats such as reefs and shipwrecks, but YOY fish also occur in large numbers in structurally complex estuarine habitats. Their distribution changes seasonally as fish migrate from coastal areas to the outer continental shelf while water temperatures decline in the fall and from the outer shelf to inshore areas as water temperatures rise in the spring. Adult sea bass are very structure oriented, especially during their summer coastal residency. Adults only enter larger estuaries and are most abundant along the outer Atlantic coast. Spawning occurs on the continental shelf, beginning in the spring off Cape Hatteras and progressing into the fall in the MAB and off southern New England. Eggs are pelagic with high average egg densities generally located on the continental shelf in the vicinity of large estuaries. Black sea bass eggs also occur infrequently in large bays. When larvae reach 10 to 16 mm total length, they tend to settle and become demersal on structured inshore habitat such as sponge beds. In the MAB, recently settled juveniles move into coastal estuarine waters between July and September. The estuarine nursery habitat for YOY black sea bass is relatively shallow bottom with some kind of natural or man-made structure including amphipod tubes, eelgrass, sponges, and shellfish beds with salinities above 8 ppt. Black sea bass migrate offshore to avoid cold inshore winter temperatures. After overwintering they return to inshore estuaries in late spring and early summer. They are uncommon in open unvegetated sandy intertidal flats or beaches. The diet of larval black sea bass is poorly known, but probably consists of zooplankton. Juvenile black sea bass are diurnal, visual predators and often prey on small benthic crustaceans (isopods, amphipods, small crabs, sand shrimp, copepods) and other epibenthic estuarine and coastal organisms. During the summer, adult black sea bass feed on a variety of infaunal and epibenthic invertebrates, especially crustaceans.

Project Area: Project construction is not likely to impact black sea bass larvae and EFH. Juveniles and adults are motile and can avoid the fill activities in subtidal habitat within the project sites by moving to similar adjacent habitats found throughout the bay that contain their prey items. Therefore, no or minimal impact on black sea bass or EFH is anticipated as a result of the proposed CPF designs.

Bluefin tuna (*Thunnus thynnus*)

Grid Squares: 3, 4, 5, 6, 8, 9
CPF Project Sites: 1, 2, 4-9, 11, 12, MB1, MB2-1 (J)

Primary Source: Collette and Nauen (1983)

Juvenile bluefin tuna are a migratory pelagic species. In the western North Atlantic, bluefin tuna migrate seasonally from spring spawning grounds in the Gulf of Mexico to summer feeding grounds off the northeast U.S. coast. Bluefin tuna often occur over the continental shelf and in embayments, particularly during the summer months when they feed actively on herring, mackerel, and squid. Known spawning areas include the Gulf of Mexico and the Mediterranean Sea (Pew Memorial Trust 2018). Juveniles and adults are typically found in inshore and pelagic surface waters warmer than 12° C from Florida to Maine.

Project Area: Juveniles may occur in pelagic areas of the bays associated with the project areas but are unlikely to occur in the very shallow waters associated with the project construction activities. In any case they are highly mobile and can avoid construction activities associated with the CPF projects. Therefore, no impact to bluefin tuna or EFH within the project area is expected to occur as a result of the proposed CPF designs.

Bluefish (*Pomatomus saltatrix*)

Grid Squares: 3, 4, 5, 6, 8, 9
CPF Project Sites: 1, 4-9, 11, 12, MB1, MB2-1 (J, A)

Primary Source: Shepherd and Packer (2005)

Bluefish is a pelagic species that travel in schools of like-sized individuals and undertake seasonal migrations, moving into the MAB during spring and south or farther offshore during fall. Within the MAB they occur in large bays and estuaries as well as across the entire continental shelf. Bluefish spawn offshore in open ocean waters. Juvenile bluefish are found in estuaries, bays, and coastal ocean waters in the MAB and South Atlantic Bight in many habitats. Typically, they are found near shorelines, including the surf zone, during the day and in open waters at night. Like adults, they are active swimmers and feed on small forage fishes, which are commonly found in nearshore habitats. They remain inshore in water temperatures up to 30° C and return to the continental shelf in the fall when water temperatures reach approximately 15° C. Juvenile bluefish are associated mostly with sand but are also found over silt and clay bottom substrates. They usually occur at salinities of 23 – 33 ppt but can tolerate salinities as low as 3 ppt. Adults are generally pelagic.

Project Area: Juvenile and adult bluefish are pelagic species whose occurrence in large bays and estuaries may be expected and therefore could be found in the water column of the project area between the spring, summer and fall. Bluefish eggs and larvae are not expected to occur in the project area. Juveniles and adults are motile and should be able to avoid the fill activities proposed in the CPF project areas. Therefore, no impact to bluefish or EFH within the project area is expected to occur as a result of the proposed CPF designs.

Cobia (*Rachycentron canadum*)

Grid Squares: 3, 4, 5, 8
CPF Project Sites: 1, 2, 4-9, 11, 12 (E, L, J, A – *Summer Only*)

Primary Sources: NOAA (2014), EPA (2015)

Cobia is a coastal migratory pelagic species. A southern species that overwinters near the Florida Keys and migrates in the spring and summer to the mid-Atlantic states to spawn, EFH for this species in the MAB includes sandy shoals of capes and offshore bars, high profile rocky bottom, coastal inlets, and barrier island ocean-side waters (from the surf to the shelf break zone and from the Gulf Stream shoreward, including sargassum) during warm water periods (summer). In the project area, Cobia are found in water temperatures that are greater than 20° C. For cobia, EFH also includes high salinity bays, estuaries, and seagrass habitat. Cobia spawn offshore and eggs and larvae are transported by surface currents. The presence of cobia eggs or larvae in the project area would be unusual and highly seasonal.

Project Area: Cobia are pelagic, warm water species and would only be found in the project area during the summer. If present, juvenile and adult cobia would likely avoid or leave the area during disturbance events and therefore, would not be impacted by the proposed activities. Therefore, no impact to cobia and minimal impact to Cobia EFH is expected as a result of the proposed CPF designs.

Haddock (*Melanogrammus aeglefinus*)

Grid Squares: 8
CPF Project Sites: 7, 8, 9 (L)

Primary Source: Cargnelli et al. (1999d)

Haddock initially inhabit the upper reaches of the water column, feeding on pelagic prey (zooplankton). Larvae density peaks in April and May. Larvae and early stage (pelagic) juveniles are passive foragers on less motile prey such as invertebrate eggs, copepods and phytoplankton. Juveniles undergo a transformation at age 3 to 5 months, after which they are closely associated with the bottom and feed on benthic prey. Most of the larvae are likely to be encountered at greater depths (30 – 50 m). The egg and larval stages occur in the water column at depths of 10 – 50 m below the surface. Temperatures of 4 – 10° C and high salinities; the species prefers 34 – 36 ppt.

Project Area: Haddock larvae are pelagic and may be present within the project areas listed above, but most of the larvae occur in deeper waters than the estuarine nearshore affected by the project. Therefore, no impact to haddock or EFH is expected as a result of the proposed CPF designs.

Monkfish (*Lophius americanus*)

Grid Squares: 3, 5, 8, 9
CPF Project Sites: 1, 2, 4, 5, 7-9, 11, 12 (E, L)

Primary Source: Steimle et al. (1999a)

Monkfish are solitary fish that make seasonal onshore – offshore migrations in response to water temperature and can be found over a variety of substrates. All stages of monkfish are primarily oceanic. Spawning locations are not well known but are thought to be on inshore shoals and in offshore southern New England (SNE), MAB, and Gulf of Maine Shelf waters. Eggs and larvae are most abundant on the continental shelf at 30 – 90 m deep and at temperatures between 10 – 16° C. Juveniles have not been collected at depths <20 m, such as inshore along the MAB. Small numbers of adult monkfish have been collected in estuarine/inshore bottom trawl surveys. Neither juveniles or adults are typically found in the estuarine waters around Long Island or similar waters of the MAB except in very small numbers.

Project Area: Monkfish are primarily an oceanic species. Based on their range of habitat utilization, no impact on monkfish or EFH is anticipated as a result of the proposed CPF designs.

Ocean pout (*Macrozoarces americanus*)

Grid Squares: 3, 5, 8, 9
CPF Project Sites: 1, 2, 4, 5, 7-9, 11, 12 (E, L, A)

Primary Source: Steimle et al. (1999d)

Ocean pout is a bottom-dwelling species that occurs in cool waters (< 10° C), across the continental shelf from Labrador to Cape Hatteras. It is also found in coastal areas and estuaries from southern New England north. It is non-migratory but moves seasonally to remain at preferred temperatures. Adult ocean pout remains demersal and are not known to form schools or aggregations. Adult ocean pout occurs on most sediment types. Nesting and spawning habitat includes the saline parts of New England estuaries. Eggs are demersal and laid in gelatinous masses in a sheltered place on the bottom, such as rocky crevices, where they are guarded either by one or both parents until hatching. Egg development is about 2 – 3 months, but incubation time is temperature dependent and is shorter in the warmer MAB. Most of the population spawns in the fall and hatching occurs by mid-winter. The advance development stage of the new larva results in a short larval stage. Juvenile habitat includes water temperatures below 14° C, depths less than 80 meters, and salinities greater than 25‰. Juvenile ocean pout is not commonly found in Middle Atlantic Bight estuaries, but when found, they are located most commonly toward the mouths of large estuaries and at inlets. The seasonal distribution of adult ocean pout is similar to that of the juveniles. In the winter, they were collected from Georges Bank to the Middle Atlantic Bight. They were also collected in the Gulf of Maine during other seasons. Adult ocean pout is among the most abundant fish collected in coastal Cape Cod and Massachusetts Bay during the spring; the abundance and size of the fish decreased during summer and fall. Adults are commonly collected at depths < 100 m, in coastal waters of New England and in saline estuaries during most months. In the Middle Atlantic Bight, ocean pout uses rocky habitats during some seasons. Adult ocean pout feed on a variety of benthic invertebrates, including polychaetes, mollusks, crustaceans, and echinoderms.

Project Area: The project area includes EFH for eggs, larvae and adults. The New York Bight is at the southern end of the general habitat range of this species; eggs and larvae, the most commonly found life stages, may be buried during fill operations. No juveniles and few adults occur in the MAB. Therefore, no to minimal impact on ocean pout and EFH is anticipated as a result of the proposed CPF designs.

Pollock (*Pollachius virens*)

Grid Squares: 4, 6, 8
CPF Project Sites: 6, 7, MB1, MB2-1 (J)

Primary Sources: Cargnelli et al. (1999a), NOAA (2018b)

Pollock is a gadoid species inhabiting both sides of the North Atlantic. EFH for this species includes the waters from the Gulf of Maine south to New Jersey. This demersal species prefers colder water and in the northwest Atlantic it is most common on the Scotian Shelf and Georges Bank, and in the Great South Channel and the Gulf of Maine. Pollock is a schooling species and is found throughout the water column. Spawned in the ocean, eggs are pelagic, free floating, and found in waters 50 – 250 m deep. Larvae occur in the ocean between the shore and about 200 m deep. Inshore subtidal and intertidal zones are utilized by age 0+ and 1+ juveniles and serve as important habitat areas. Juvenile pollock are found over a variety of bottom habitats with aquatic vegetation or a substrate of sand, mud or rocks. Juveniles feed primarily on crustaceans with nematodes, fish and annelids also making up a portion of their diet. Individuals normally spend their first two years in nearshore coastal waters and then migrate out to deeper waters. Age 2+ juveniles move offshore, inhabiting depths of 130 – 150 m. Juveniles prefer bottom habitats with aquatic vegetation or a substrate of sand, mud or rocks and feed primarily on crustaceans with nematodes, fish and annelids.

Project Area: Intertidal and subtidal zones of the project sites may be important nursery areas. Juveniles may be present in shallow intertidal zone at all tide stages throughout summer. Juvenile pollock will likely occupy the project area when water temperatures are less than 18° C. Project construction will impact intertidal and subtidal zones of the project sites. Intertidal EFH impacts are temporary as most of the intertidal benthic community members will rapidly colonize new or disturbed habitat. Juveniles are motile and can avoid construction disturbances. Therefore, no to minimal impact on pollock and to Pollock EFH are anticipated as a result of the proposed CPF designs.

Red hake (*Urophycis chuss*)

Grid Squares: 3, 5, 6, 8, 9
CPF Project Sites: 1, 2, 4, 5, 7-9, 11, 12 MB1, MB2-1 (E, L, J)

Primary Source: Steimle et al. (1999b)

Red hake occur in continental waters from the Gulf of St. Lawrence to the Mid-Atlantic states. During warmer months, they are most common in depths less than 100 m; during colder months, they are most common in depths greater than 100 m. In the MAB, red hake occur most frequently in coastal waters in the spring and fall; then move offshore to avoid the warm summer temperatures (Bigelow and Schroeder 1953), although juveniles can be found in deep holes and channels in coastal bays during the summer. In the winter, most of the population moves offshore, but the degree of movement may depend on the severity of the winter. Winter migrants return inshore the following spring. During the summer, in the bays and estuaries south of Cape Cod juveniles (< 24 cm) usually avoid shallow waters that are warmer than about 22° C, but they do inhabit deeper bays such as Narragansett Bay, Rhode Island. Red hake spawn offshore in the MAB in the summer, primarily in southern New England. The distribution of eggs is unknown because they cannot be distinguished from other hakes. However, EFH for eggs is defined as surface temperatures less than 10° C and salinity less than 25 ppt. Hake eggs are buoyant and are common in the upper water column of the MAB from May to November with peaks in June and July. Red hake larvae are a dominant species in the ichthyoplankton in the middle to outer continental shelf of the MAB during the summer at temperatures of 8 – 23°C and depths between 10 and 200 m. After larvae metamorphose into juveniles they are pelagic for about two months before settling to the bottom. Red hake juveniles are typically found in water temperatures below 16° C, depths less than 100 meters and a salinity range from 31 – 33 ppt. Demersal settlement generally occurs between September and December with peaks in October to November. Shelter is a critical habitat requirement for red hake juveniles, which are found in bottom environments and are commonly associated with scallops, surf clam shells, and seabed depressions where they seek shelter. Note that surf clams are mostly oceanic, and their distribution is limited by salinity but can be found in some estuarine areas. Adults prefer depths from 30 – 130 m and temperatures between 2 – 22° C. They occur along coastal New England and into Canadian waters from spring to fall. Red hake eggs, larvae and juveniles are listed in the 10' by 10' squares for grid squares within the project area. Examination of more detailed GIS EFH data (NOAA 2015) revealed that no eggs or larval EFH occurs in the intertidal and immediately adjacent subtidal waters of the project area.

Project Area: While most common in shallow oceanic waters, juvenile red hake could be present in the estuarine bottom habitats of the project area between spring and fall. Fill activities are proposed where preferred juvenile shellfish shelter habitat may occur. Eggs are buoyant. Adults are motile and should be able to avoid construction-related disturbances. Therefore, minimal impact may occur to red hake juveniles and EFH as a result of the proposed CPF designs.

Scup (*Stenotomus chrysops*)

Grid squares: 3, 5, 6, 8, 9
CPF Project Sites: 1, 2, 4, 5 ,7-9, 11, 12, MB1, MB2-1, MB2-2 (J, A)

Primary Source: Steimle et al. (1999c)

Scup is considered a demersal species. It spawns along the inner continental shelf from Delaware Bay to SNE between May and August, mainly in bays and sounds in and near SNE. YOY juveniles are commonly found from the intertidal zone to depths of about 30 m in portions of bays and estuaries where salinities are above 15 ppt. Juvenile scup appear to use a variety of coastal intertidal and subtidal sedimentary habitats during their seasonal inshore residency, including sand, mud, mussel beds, and seagrass beds. Adult scup are common residents in the MAB from spring to fall and are generally found in schools on a variety of habitats, from open sandy bottom to structured habitats such as mussel beds, reefs, or rough bottom. Larger adults are found in deeper waters while smaller sized adults are typically found in bays and estuaries. Adults move inshore during early May and June between Long Island and Delaware Bay. As inshore water temperatures decline to <8 to 9° C adult and juvenile scup leave inshore waters and move to warmer waters on the outer continental shelf south of the Hudson Canyon off New Jersey and along the coast from south of Long Island to North Carolina in depths ranging from 75 – 185 m. Both juvenile and adults are demersal but have also been observed at the water surface. Juveniles and adults feed on variety of epifaunal and water column prey.

Project Area: Juvenile and adult Scup would be found in the project during the warmer seasons. Juveniles and adults migrate offshore to deeper waters when the water temperature falls. The project activities will include fill in intertidal and nearshore subtidal waters. Juveniles and adults are mobile and will move to similar adjacent benthic areas; they will not likely be impacted by fill activities. No to minimal impact on scup individuals or to scup EFH are anticipated as a result of the proposed CPF designs.

Skipjack tuna (*Katsuwonus pelamis*)

Grid squares: 3, 4, 5, 6, 8, 9
CPF Project Sites: 1, 2, 4-7 (J); 8, 9, 11, 12 MB1, MB2-1 (A)

Primary Source: Collette and Nauen (1983)

Skipjack tuna is a highly migratory, circumglobally, pelagic fish inhabiting tropical and warm-temperate waters, and generally limited by the 15° C isotherm. Skipjack tuna are often found in mixed schools with bluefin tuna of the same size. Like bluefin tuna, skipjack tuna often occurs over the continental shelf and in embayments, particularly during the summer months when they feed actively on herring, mackerel, and squid. In the MAB, adults typically occur in pelagic waters where water temperatures range from 20 – 31° C.

Project Area: Skipjack tuna are highly migratory and pelagic and may be present in the estuaries associated with the CPF projects. However, they are unlikely to be present in the very shallow subtidal areas where project construction will occur and are highly mobile. They are expected to easily avoid any CPF construction activity. Therefore, no impact on skipjack tuna or EFH is anticipated as a result of the proposed CPF designs.

Summer flounder (*Paralichthys dentatus*)

Grid squares: 3, 4, 5, 6, 8, 9
CPF Project Sites: 1, 2, 4, 6, MB1, MB2-1 (J, A); 5 (L, J, A); 7, 8, 9, 11, 12 MB2-2 (E, L, J, A)

Primary Source: Packer et al. (1999)

The geographical range of the summer flounder, or fluke, encompasses the shallow estuarine waters and outer continental shelf from Nova Scotia to Florida. Throughout the U.S. Exclusive Economic Zone (EEZ), summer flounder is managed and assessed as a single stock by the Mid-Atlantic Fishery Management Council. Spawning occurs over the open ocean areas of the continental shelf during fall and winter. Summer flounder exhibit strong inshore–offshore movements with adults and juveniles normally inhabiting shallow coastal and estuarine waters during the warmer months of the year and moving offshore during the fall and winter for growth and spawning. Summer flounder eggs are planktonic and buoyant. Summer flounder eggs are present in the highest numbers from fall to early winter. Planktonic larvae and post-larvae derived from offshore fall and winter spawning migrate inshore, entering coastal and estuarine nursery areas to complete transformation. Juveniles are distributed inshore and occupy many estuaries during spring, summer, and fall. Some juveniles remain inshore for an entire year before migrating offshore, while others move offshore in the fall and return the following spring. Juvenile summer flounder utilize several different estuarine habitats such as marsh creeks, seagrass beds, mud flats, and open bay areas. As long as other conditions are favorable, substrate preferences and prey availability are the most important factors affecting distribution. Some studies indicate that juveniles prefer mixed or sandy substrates; others show that mud and vegetated habitats are used. Adults are reported to prefer sandy habitats but can be found in a variety of habitats with both mud and sand substrates. Habitat areas of particular concern (HAPC) for summer flounder are defined as follows: "All native species of macroalgae, seagrasses, and freshwater and tidal macrophytes in any size bed, as well as loose aggregations, within adult and juvenile summer flounder EFH is HAPC. If native species of SAV are eliminated then exotic species should be protected because of functional value, however, all efforts should be made to reestablish native species."

Project Area: Given their association with sandy substrates, and that they feed on a variety of bottom-dwelling invertebrates and fish species that occupy the project area, juvenile and adult summer flounder are expected to occupy the project area during the late spring, summer and fall. Early stage juveniles may be present year-round. Older juveniles and adults are wary and very capable of high degrees of mobility and would likely avoid designs. Small juveniles tend to seek protection in structure or by "hiding in plain sight" via cryptic coloration. Juveniles in the path of the construction might be impacted. Because the project area (within or adjacent to the project footprint) may include SAV beds, for this analysis we have assumed large numbers of early stage juveniles are expected in most of the project footprints. Note however that the relatively ephemeral nature of discrete SAV patches and age of the available data could lead to erroneous conclusions regarding potential impacts, as no recent data are available for the various project locations. USACE plans to work with NMFS to develop a multi-year baseline SAV survey program to accurately establish habitat baseline conditions at the CPF project sites.

Impacts to summer flounder and EFH are expected as a result of the proposed CPF designs. As the USACE further develops the project and resolves current SAV conditions, it will modify this conclusion appropriately.

Whiting (or Silver Hake - *Merluccius bilinearis*)

Grid squares: 3, 5, 6, 8, 9
CPF Project Sites: 1, 2, 4, 5, 7-9, 11, 12, MB1, MB2-1 (E, L, J)

Primary Source: Lock and Packer (2004)

Whiting (silver hake) is distributed on the continental shelf of the northwest Atlantic Ocean from the Gulf of St. Lawrence and the southern edge of the Grand Banks, Newfoundland, Canada to Cape Fear, North Carolina, and, perhaps, as far south as South Carolina. The species spawns on the outer continental shelf, where buoyant eggs and larvae are primarily found in surface waters. Primary spawning grounds apparently occur between Cape Cod and Montauk Point, New York, on the southeastern slope of Georges Bank, and in Massachusetts Bay. Eggs may occasionally occur, particularly around inlets, within the project area. Significant egg production occurs during May to October, with a peak in August. Larvae are pelagic and settle to the bottom as they become juveniles. Juveniles are common during the spring and summer in relatively shallow waters in SNE and south of Long Island. Juvenile summer flounder make use of several different estuarine habitats including seagrass beds, mud flats and open bay areas. Coastal waters off New Jersey, Long Island and Rhode Island are centers of abundance in the fall. Juvenile and adult whiting migrate to deeper waters of the continental shelf as water temperatures decline in the autumn and return to shallow waters in spring and summer to spawn. The pattern for juveniles is similar to adults in general distribution and movements, except that the centers of juvenile abundance occur in shallower waters.

Project Area: Larvae and juveniles are identified in all CPF project areas except for CPF #6 (Talisman); which is located furthest from the inlets. Eggs may occasionally occur within the project footprint, but they are buoyant. Larvae are pelagic. Juveniles are motile and should be able to avoid fill activities. The impacted habitats within the CPF projects include only a small portion of the total available habitat within each of the bays. Therefore, no to minimal impact to whiting individuals or whiting EFH are expected as a result of the proposed CPF designs.

Windowpane flounder (*Scophthalmus aquosus*)

Grid squares: 3, 4, 5, 6, 8, 9
CPF Project Sites: 1, 2, 4-9, 11, 12 MB1, MB2-1 (E, L, J, A)

Primary Source: Chang et al. (1999)

Windowpane flounder is a shallow water mid- and inner-shelf species found primarily between Georges Bank and Cape Hatteras on bottom habitats with a substrate of mud or fine-grained sand. Spawning occurs on inner shelf waters, including many coastal bays and sounds, and on Georges Bank. Windowpane flounder eggs and larvae are often observed in the MAB from February to November with peaks in May and October. Windowpane eggs are buoyant and are found in surface waters. Larvae are initially planktonic then settle to the bottom. Juveniles and adults are similarly distributed. They are found in most bays and estuaries south of Cape Cod throughout the year at depths less than 100 meters, bottom temperatures (3 – 12° C in the spring and 9 – 12° C in the fall), and salinities (5.5 – 36 ppt). Juveniles that settle in shallow inshore waters move to deeper offshore waters as they grow. Adults occur primarily on sand substrates off SNE and MAB. Juveniles and adults are common in the MAB throughout the year. YOY and older juveniles are common within 100 feet of shore EFH for windowpane flounder is described as those areas of the coastal and offshore waters (out to the offshore boundary of the EEZ). These waters include seawater (salinity > 25.0 ppt) and brackish salinity zones (0.5 < salinity < 25.0 ppt) in South Bay and similar estuaries where the CPF projects occur. All life cycle stages (eggs, larvae, juveniles, adults, and spawning adults) may be found in these zones.

Project Area: All stages of windowpane flounder may be found on shallow, sandy substrates and are expected to occur in the project area most of the year. Eggs and larvae are expected be found in the project area at all times of the year except during the winter. Smaller, YOY juveniles prefer shallow water, and therefore are more likely to occupy the project area than older juveniles and adults. Eggs and larvae may be buried by CPF construction activities, but larger life stages should be able to move away from this disturbance. Therefore, minimal impact to windowpane flounder and EFH are expected as a result of the proposed CPF designs.

Winter flounder (*Pseudopleuronectes americanus*)

Grid squares: 3, 4, 5, 6, 8, 9
CPF Project Sites: 1, 2, 4-9, 11, 12, MB1, MB2-1 (E, L, J, A)

Primary Source: Pereira et al. (1999)

Winter flounder is a small-mouthed, right-eyed flounder that is a valuable commercial and recreational species. It is found in the northwest Atlantic coast from Labrador to Georgia. Winter flounder spawning occurs from late winter through early spring, peaking south of Cape Cod in February and March. The eggs of the winter flounder are typically found at depths of less than five meters in bottom habitats in a broad range of salinity (10 – 30 ppt), with seasonal abundance from January to May. Eggs are adhesive and demersal and are deposited on a variety of substrates, but sand is the most common; they have been found attached to vegetation and on mud and gravel. The larvae of the winter flounder are typically found at depths of less than six meters in pelagic and bottom waters in a broad range of salinity (10 – 30 ppt), with seasonal abundance from March to July. Larvae are negatively buoyant and nondispersive; they sink when they stop swimming. Thus, recently settled YOY juveniles are found close to spawning grounds and in high concentrations in depositional areas with low current speeds. YOY juveniles migrate very little in the first summer, move to deeper water in the fall, and remain in deeper cooler water for much of the following year. Habitat utilization by YOY is not consistent across habitat types and is highly variable among systems and from year to year. Several field and lab studies suggest a “preference” for muddy/fine sediment substrates where they are most likely to have been deposited by currents. Adult winter flounder prefer temperatures of 12 – 15° C, dissolved oxygen concentrations greater than 2.9 mg/l, and salinities above 22 ppt, although they have been shown to survive at salinities as low as 15 ppt. Mature adults are found in very shallow waters during the spawning season.

Project Area: The subtidal areas affected by project construction provide may provide suitable spawning and foraging habitat for eggs, larvae, juveniles and adults of this species. Adults are expected occupy the estuarine project areas during the fall, winter, and spring. Winter flounder would be expected to be present on the bottom habitats while fill activities are proposed to take place. Adults and juveniles should be able to avoid fill placement by swimming away to adjacent habitat. However, if present, eggs and larvae could be buried during fill placement. Additionally, direct impacts to subtidal areas within the CPF project footprint are expected. However, the project areas represent a small fraction of the total Great South Bay subtidal habitat suitable for this species. Therefore, minimal impacts to winter flounder and related EFH are expected because of the proposed CPF designs.

Witch flounder (*Glyptocephalus cynoglossus*)

Grid squares: 8, 9
CPF Project Sites: 7-9 (E, L); 11, 12 (L)

Primary Source: Cargnelli et. al. (1999e)

The witch flounder is a deepwater fish inhabiting ocean depths down to about 1500 m. Life cycle stages occur in marine coastal and offshore waters. Spawning occurs at or near the bottom, however the buoyant eggs rise into the water column where subsequent egg and larval development occurs. In the MAB spawning occurs from April to August, peaking in May or June and the most important spawning grounds are off Long Island. The main food items in the witch flounder diet are polychaetes and crustaceans, although mollusks and echinoderms are also important. The egg and larval stages are pelagic and generally occur over deep water at temperatures ranging from about 4 – 13° C. When metamorphosis is complete, juveniles settle to the bottom. Juveniles and adults are found at temperatures ranging from about 0 – 15°

C. They are found over mud, clay, silt, or muddy sand substrates at depths ranging from 20 – 1565 m. This close association with soft substrate may be the result of their preference for polychaete prey.

Project Area: The estuarine waters of the project area are not the preferred habitat for this species. Although eggs and larvae life stages of witch flounder may be found within the project area, because of their preference for muddy open ocean bottoms they would not likely be found in significant numbers the intertidal and shallow subtidal waters of the estuaries where the project occurs. Therefore, no impact to the witch flounder or EFH is expected as a result of the proposed CPF designs.

Yellowtail flounder (*Limanda ferruginea*)

Grid squares: 3, 5, 8, 9
CPF Project Sites: 1, 2, 4 (E); 5, 7, 8, 9 (E, L); 11, 12 (E, L, J, A)

Primary Source: Johnson et al. (1999)

The yellowtail flounder is a small- mouthed, thin bodied fish that inhabits waters along the Atlantic coast of North America from the Gulf of St. Lawrence, Labrador, and Newfoundland to the Chesapeake Bay. Yellowtail flounder occupy coastal and continental shelf bottom environments off the Atlantic coast in 20 – 50 m depths. Adults prefer sand or sand–mud sediments. Spawning takes place from March through August but occurs from March to May in the MAB. Generally, the following conditions exist where yellowtail eggs are found: sea surface temperatures below 15° C, water depths from 30 – 90 meters and a salinity range from 32.4 – 33.5 ppt. Yellowtail flounder eggs are most often observed during the months from mid-March to July, with peaks in April to June in southern New England. Eggs are buoyant, spherical, and pelagic. Larvae are initially pelagic then become benthic.

Project Area: Based on their range of habitat utilization, while eggs and larvae may occur in the project footprints, preferred yellowtail flounder habitat does not include shallow estuarine waters. If present, adults and larger juveniles should be to avoid the fill activities by swimming away and eggs and larvae would remain in the water column. Therefore, no impact to the yellowtail flounder or EFH is expected as a result of the proposed CPF designs.

3.8.2 Cartilaginous Fish Species

Blue shark (*Prionace glauca*)

Grid squares: 3, 4, 5, 6, 8, 9
CPF Project Sites: None

Primary Sources: USDOC (1999), Compagno (1984)

While the blue shark is found within the grid squares listed above, the more detailed GIS EFH coverages do not include this species in the project estuarine area. Early juvenile, late juvenile, and adult life stages for the blue shark are listed in the 10’ by 10’ grid squares within the project area. The blue shark is an oceanic–epipelagic, fringe–littoral, cosmopolitan species, occurring throughout the tropical, subtropical, and temperate open waters. Atlantic blue sharks are highly migratory with a regular clockwise trans-Atlantic migration route following the warm Gulf Stream waters. The general range of blue shark is from

Argentina to Newfoundland in the western Atlantic. The temperature preference of blue shark is between 7 – 18° C.

Project Area: EFH is designated within the project grid for the blue shark for early juveniles, late juveniles, and adults but does not occur within the project sites that are primarily on the bay side of the barrier islands. Blue sharks are a highly mobile species. Should any blue shark be present during construction, it would be able to avoid the subtidal fill activities. Therefore, no impact to blue shark or EFH is anticipated as a result of the proposed CPF designs.

Common thresher shark (*Alopias vulpinus*)

Grid squares: 3, 4, 5, 6, 8, 9
CPF Project Sites: 1, 2, 4-9, 11, 12, MB1, MB2-1 (L, J, A)

Primary Source: USDOC (1999)

The common thresher shark is an epipelagic cosmopolitan of warm, temperate, and cold waters. It is found in both coastal and oceanic waters. It is a large shark that uses its tremendously large tail to hit and stun the small schooling fishes upon which it feeds. Common thresher shark is found offshore Long Island, NY and southern New England in the northeastern United States, in pelagic waters deeper than 50 m, between 70° W and 73.5° W, south to 40° N.

Project Area: EFH is designated within the project grid for common thresher shark early juveniles, late juveniles, and adults. Common thresher sharks are a pelagic, highly mobile species and will most likely be able to avoid CPF project fill activities. Additionally, they are typically encountered at greater depths than the shallow shoreline areas where fill will occur. Therefore, no impact to common thresher shark or EFH is anticipated as a result of the proposed CPF designs.

Dusky shark (*Carcharhinus obscurus*)

Grid squares: 3
CPF Project Sites: 1 (N)

Primary Sources: USDOC (1999), Compagno (1984)

The dusky shark is a large, highly migratory species that is common in warm and temperate continental waters throughout the world. Although nursery areas are in coastal waters, dusky sharks do not prefer areas with reduced salinities and tend to avoid estuaries. Dusky sharks are viviparous. Females move inshore to drop their young and then return to deeper water. Small juveniles use nearshore coastal waters as nursery habitat in the northwest Atlantic Ocean from off New Jersey to South Carolina during the summer months (McCandless et al. 2014).

Project Area: Dusky shark neonate EFH occurs at one CPF project location, #1 (Democrat Point West), which is directly adjacent to an inlet. Although migratory and pelagic, dusky sharks spawn in nearshore waters, and therefore neonates may occur in the project area. Neonate dusky sharks are mobile and should be able to avoid any construction activities. No impact to dusky shark or EFH is anticipated as a result of the proposed CPF designs.

Little skate (*Leucoraja erinacea*)

Grid squares: 3, 5, 6, 8, 9
CPF Project Sites: 1, 4, 5, 7-9, 11, 12 MB1, MB2-1 (A)

Primary Sources: Packer et al. (2003a), Sulikowski et al. (2009)

The little skate is considered a shallow water species and occurs from the top of the subtidal zone to depths of 90 m. It has a relatively narrow distribution, found only in the northwest Atlantic from Grand Banks, Canada to Cape Hatteras, North Carolina. It is one of the dominant members of the demersal fish community of the northwest Atlantic. Its center of abundance is in the northern section of the Mid-Atlantic Bight and on Georges Bank, where it is found all year over almost the entire range of temperatures recorded for those areas. Little skate make no extensive migrations, although where it occurs inshore the species moves onshore and offshore with seasonal temperature changes. Little skate are generally found on sandy or gravelly bottoms, but also occur on mud. Skates are known to remain buried in depressions during the day, but they may feed at any time during a 24-hour period. In Long Island Sound (1984 – 1994) in spring and fall, they were most abundant on transitional and sand bottoms. Little skate deposit eggs in water not deeper than 27 m on sandy bottoms.

Project Area: The little skate may occur in the project area for all life stages, although EFH maps show only juveniles and adults. Eggs are the only non-motile life stage; juveniles and adults are highly mobile and can likely avoid the fill activities in the shallow subtidal waters of the CPF project areas. Therefore, no to minimal impact to the little skate or EFH should occur as a result of the proposed CPF designs.

Sand tiger shark (*Carchari cellarus*)

Grid squares: 8, 9
CPF Project Sites: 9, 11, 12 (N)

Primary Source: Pollard and Smith (2009)

Sand tiger sharks are commonly found in coastal embayments and nearshore waters, from the surf zone to the outer continental shelves from the surface to a minimum of 183 m. This species exhibits a preference for near-bottom habitats but often occurs in midwater or surface zones. Sand tiger sharks typically feed on bony fishes, small sharks, rays, squids, crabs, and lobsters. EFH for neonates (≤125 cm) is shallow coastal waters to 25 meters deep from Barnegat Inlet, NJ south to Cape Canaveral, FL.

Project area: Neonate sand tiger sharks may be present in the near-bottom habitats as well as other parts of the water column in the estuaries associated with the CPF projects. Neonate sand tiger sharks are mobile and should be able to avoid the CPF fill activities. No impact to sand tiger shark or EFH is anticipated as a result of the proposed CPF designs.

Sandbar shark (*Carcharinus plumbeus*)

Grid squares: 3, 4, 5, 6, 8, 9
CPF Project Sites: 1, 2, 4-9, 11, 12, MB1, MB2-1 (J, A)

Primary Sources: Compagno (1984), USDOC (1999)

The sandbar shark is an abundant, coastal–pelagic shark of temperate and tropical waters that occurs inshore and offshore. It is found on continental and insular shelves and is common at bay mouths, in harbors, inside shallow muddy or sandy bays, and at river mouths, but tends to avoid sandy beaches and the surf zone. Sandbar sharks migrate north and south along the Atlantic coast, reaching as far north as Massachusetts in the summer. Sandbar sharks bear live young in shallow Atlantic coastal waters between Great Bay, New Jersey, and Cape Canaveral, Florida. Neonates and juveniles inhabit shallow coastal nursery grounds during the summer and move offshore into deeper, warmer water in winter. Late juveniles and adults occupy coastal waters as far north as SNE and Long Island.

Project Area: Habitat preference and distribution of this species make it likely that juveniles and adults may occur at the project sites. Sandbar sharks are a mobile species and should be able to avoid the fill activities that comprise the EFH impacts. No impact to sandbar shark or EFH is anticipated as a result of the proposed CPF designs.

Scalloped hammerhead shark (*Sphyrna lewin*i)

Grid squares: 3, 4, 5
CPF Project Sites: 1, 2, 4-6 (A)

Primary Source: Baum et al. (2007)

The scalloped hammerhead shark is a coastal and semi-oceanic pelagic shark, found over continental and insular shelves, as well as nearby deep-water areas, ranging from the intertidal zone and surface to at least 275 m depth. This species has been observed close inshore and even entering estuarine habitats, as well as offshore to depths of 1,000m. In the Northwest and Western Central Atlantic, the coastal area between South Carolina and central Florida is believed to be an important nursery area and this species sometimes form large schools which migrate to higher latitudes in summer. Horizontal migration is also observed from inshore bays to a pelagic habitat as the sharks grow. Adult scalloped hammerhead sharks feed on mesopelagic fish and squids. In certain areas stingrays are the preferred food. While the grid square-scale EFH maps show no EFH for this species, detailed EFH maps show that several of the CPF project sites contain adult EFH for this species, though they are located in the northern extremity of its nearshore/inshore habitat range.

Project Area: Habitat preference and distribution of this species make it possible but not likely that this species may occur at the listed CPF project sites. Its open water feeding preference and mobility will likely result in no presence of this species in the project construction areas. Therefore, no impact to the scalloped hammerhead shark or EFH is anticipated as a result of the proposed CPF designs.

Spiny dogfish (*Squalus acanthias*)

Grid squares: 6, 8
CPF Project Sites: 7, MB1, MB2-1 (A [male], Sub-A [female])

Primary Sources: Stehlik (2007), Fordham et al. (2008)

Spiny dogfish is a marine oceanic species; however marginal adult habitats include marine neritic and estuarine waters. Birth occurs offshore in fall or winter. The pups at birth range from 20-33 cm in total length, with the majority at 26-27 cm. Spiny dogfish feed on squid and fish throughout life. They tend to eat small size classes or young fish, and as they grow they eat larger individuals of the same species. Squid are a major part of the diet in all geographical areas except for the Mid-Atlantic. Worldwide, spiny dogfish favor the temperature range of 7-15° C. Migrations may be over great distances to seek out preferred conditions. The mean salinity in locations where they are caught is 33.5 ppt. Large females are abundant on the nearshore shelf and in lower salinities, perhaps to allow maximal growth of their embryos in warmer coastal waters. Juveniles are pelagic and oceanic. Adults are demersal and pelagic, and spawning adults are pelagic or demersal on the outer continental shelf.

Project Area: Adult and sub-adult spiny dogfish may be present in the project area. However, they are highly mobile and no impact to the species or EFH should occur as a result of the proposed CPF designs.

Tiger shark (*Galeocerdo cuvieri*)

Grid squares: 3, 4, 5, 6, 8, 9
CPF Project Sites: 1, 2, 4-9, 11, 12, MB1, MB2-1 (J)

Primary Sources: Compagno (1984), USDOC (1999)

Tiger sharks typically inhabit tropical and sub-tropical waters on or adjacent to the continental and insular shelves and make seasonal migrations into warm temperate waters. This species occupies different marine habitats but seems to prefer turbid waters. The nurseries for this species appear to be in offshore areas but have not been described.

Project Area: Habitat preference and distribution of this species make it possible that juvenile tiger sharks may occur at the project site, particularly around inlets. Adult tiger sharks may also be present, although EFH maps did not identify them in the project area. Tiger sharks are a mobile species and will most likely be able to avoid the project fill activities. No to minimal impact to tiger shark or EFH is anticipated as a result of the proposed CPF designs.

White shark (*Carcharod cellatesias*)

Grid squares: 3
CPF Project Sites: 1 (L, J, A)

Primary Sources: Compagno (1984), USDOC (1999)

The white shark, an apex predator, has one of the most extensive ranges of any cartilaginous fish. Detailed EFH maps show that white sharks may occur at CPF locations nearest inlets. The white shark is a cosmopolitan, non-schooling species that is primarily a coastal and offshore inhabitant of continental and insular shelves. This species is often found close inshore to the surf line but may also occur off oceanic islands. The life cycle of this species is poorly known. It is likely that the nurseries will be found in the warmer parts of the range in deep water. Its presence is usually sporadic throughout its range. EFH for these large, apex predators include pelagic northern New Jersey and Long Island waters of depths between 25 and 100 meters. White sharks typically feed on bony fishes, other sharks, rays, seals, dolphins and porpoises, sea birds, carrion, cephalopods, crabs, and whales. The types of habitats and locations of nursery areas are unknown.

Project Area: Habitat preference and distribution of this species make it possible but not highly likely that the white shark may occur at the project site. White sharks are highly mobile and will most likely not occur in the subtidal and intertidal waters associated with CPF construction activities. Therefore, no impact to white sharks or EFH is anticipated as a result of the proposed CPF designs.

Winter Skate (*Leucora cellateata*)

Grid squares: 3, 5, 6, 8, 9
CPF Project Sites: 1, 4, 5, 7-9, 11, 12, MB1, MB2-1 (J)

Primary Sources: Packer et al. (2003b), Kulka et al. (2009)

The winter skate occurs from the south coast of Newfoundland and the southern Gulf of St. Lawrence to Cape Hatteras. Its center of abundance is on Georges Bank and in the northern section of the MAB; however, in both areas it is often second in abundance to the little skate, a sympatric species. Habitat in the MAB includes estuarine and nearshore coastal shelf waters. The winter skate is a benthic species. Habitat ranges from shoreline to 317 m, but it is most abundant at depths <150 m. Eggs of winter skate are deposited throughout the year off southern New England and from summer to autumn off Nova Scotia. Winter skate migrate to deeper colder waters during summer months in some areas and the species is sometimes termed a winter periodic. Research vessel survey data for the Scotian Shelf, however, show that winter skate appear to concentrate in deeper, warmer waters in the winter and move into shallower waters during spring and summer. Juveniles prefer sand and gravel bottoms but have been reported from muddy bottoms in the Passamaquoddy Bay. In the Long Island Sound during spring 1984-1994, it was found most abundantly on sand bottoms in the Mattituck Sill and Eastern Basin. The winter skate remains buried in depressions during the day and is more active at night. It may feed at any time during a 24-hour period.

Project Area: The CPF project areas include winter skate juvenile EFH. However, this is a motile species and should be able to avoid fill activities associated with CPF construction. No or minimal impact to this species or EFH is anticipated as a result of the proposed CPF designs.

3.8.3 Invertebrate Species

Atlantic surf clam (*Spisula solidissima*)

Grid squares: 3, 5, 9
CPF Project Sites: 1, 2, 4, 5 (J, A); 11, 12 (A)

Primary Sources: Cargnelli et al. (1999b), Fay et al. (1983)

Surf clams are the largest bivalve in the MAB and are found from the Gulf of Maine to Cape Hatteras, North Carolina. Water currents are responsible the distribution and settlement of juvenile clams. Surf clams are mostly oceanic, and their distribution is limited by salinity. The species generally occurs from the beach zone to a depth of about 200 feet, but below about 125 feet abundance is low. It prefers turbulent waters at the edge of the breaker zone. Encroachment into estuarine zones is probably limited by salinity requirements but it can be found in some estuarine areas. Juvenile clams prefer medium- to fine-grained sands that contain low levels of organics. Adults prefer medium- to coarse-grained sand and gravel and bury themselves just below the sediment surface. Most surf clam beds of the MAB are located from the beach zone to a depth of 44 m off Long Island, and to a depth of 60 m off New Jersey.

Project Area: Juvenile and adult surf clams do not typically occur in the estuarine beaches of the project area. However, if present in the CPF project construction areas they would likely be buried by the fill component of CPF project plans. The "seeding" mechanisms of the surf clam are at work continuously and establish populations regularly. Surf clams will reestablish after the fill activities are completed. Therefore, no to minimal impact to the Atlantic surf clam or EFH is anticipated as a result of the proposed CPF designs.

Longfin inshore squid (*Loligo pealeii*)

Grid squares: 3, 5, 6, 8, 9
CPF Project Sites: 1, 4, 5, 7-9, 11, 12, MB1, MB2-1 (E, J)

Primary Source: Jacobson (2005)

The longfin inshore squid is a schooling species of the molluscan family Loliginidae. It is distributed in continental shelf and slope waters from Newfoundland to the Gulf of Venezuela and occurs in commercial abundance from southern Georges Bank to Cape Hatteras. The squid is commonly encountered throughout Long Island Sound in late spring, though it appears more dispersed in summer. In fall, small squid are abundant and distributed throughout the Sound. During the fall, abundance tends to increase with depth, highest over mud bottom; abundance over transitional and sand bottoms rank second and third respectively. Although the abundance of squid is very low in November, it is still commonly encountered throughout the Sound (65% occurrence).

Eggs generally inhabit shallow waters, <50 m deep and near shore. Larvae and juveniles are found in coastal and inshore waters, with eggs and larvae at the surface and juveniles in the upper 10 m of the water column. Adults may be found in shallow inshore waters up to 180 m deep from March to October. Adults are typically found over mud or sandy mud bottoms, and have been found at surface temperatures ranging from 9 – 21° C and bottom temperatures ranging from 8 – 16° C.

Project Area: Based on their range of habitat utilization, the longfin inshore squid may be expected to seasonally occur in the project area for all life stages, although EFH maps show only eggs and juveniles. Since the eggs float, and the other life stages are motile and occur in open water, no to minimal impact on longfin squid or EFH is anticipated as a result of the proposed CPF designs.

Ocean quahog (*Arctica islandica*)

Grid squares: 3, 5, 9
CPF Project Sites: 1, 2, 4, 5, 11, 12 (J, A)

Primary Source: Cargnelli et al. (1999c)

The ocean quahog species occurs on both sides of the North Atlantic. Ocean quahogs are extremely slow-growing and long-lived marine bivalves found buried in sandy and muddy sediments from the low intertidal zone down to 400 m in the Atlantic Ocean and saline portions of bays and estuaries. Distribution in the western Atlantic ranges generally from 10 – 250 m. Ocean quahogs are rarely found where bottom water temperatures exceed 16° C and occur progressively further offshore between Cape Cod and Cape

Hatteras. Adults are usually found in dense beds in medium- to fine-grained sand, sandy–mud, and silty sand. Spawning, in the ocean, is protracted, lasting from spring to fall, and eggs are found in depths from 1 – 30 m. Juveniles are typically found offshore in sandy substrates but may survive in muddy intertidal waters of protected from predators.

Project Area: Due to the summer temperature ranges in the intertidal and shallow waters where project construction will occur, it is likely that few ocean quahogs will be found there. If present, however, most will be buried by the fill activities. Because of the lack of habitat due to the temperatures of the shallow shoreline waters where project activities will occur, no to minimal impact to ocean quahog and no impact to EFH is anticipated as a result of the proposed CPF designs.

4.0 IMPACTS

4.1 Introduction

Natural coastal vegetation communities are declining components of the regional shoreline and barrier island ecosystems. The CPF projects work within these communities to create and enhance some of those community and habitat types. The potential of project 10% designs to impact some other existing communities and habitats and potential impacts are quantified in this section. Some disturbance of intertidal wetlands may occur during construction only, which may last a few months. As the projects are further developed USACE will work with all stakeholders to avoid and minimize the potential impacts identified below. The USACE will work with NMFS to develop sampling plans that may be required to better inform CPF design during the Pre-Construction Engineering and Design (PED) phase of work

4.2 Impacts – General

The proposed CPF actions at each site are described in Section 2.3 Preferred Alternative. The dunes, beaches, estuarine, and nearshore marine ecosystems where the CPFs are located are described in Section 3.1 Existing Regional Environment. Most of the assessed 10% CPF project designs focus on enhancing and creating piping plover/shorebird habitat. The designs create unvegetated uplands for nesting, connected to gently sloping intertidal foraging areas. Where possible, devegetation is proposed as the primary or sole activity (CPF #3 Dunefield West of Field 4 and CPF #10 Great Gun). The other sites use some combination of devegetation, regrading, and fill to create the upland and altered intertidal habitats within the project footprints. Creation of intertidal habitat increases the elevations of existing intertidal and subtidal zones. This is a major component of CPF Site 10 Smith Point County Park. The Mastic Beach site designs (Mastic Beach 1, Mastic Beach 2 Area 1 and Mastic Beach 2 Area 2) focus on wetland restoration as their primary purpose.

Where possible, existing sand will be graded to provide material needed to create different elevations. Fill from offsite borrow areas, when employed, will have physical (grain size, color, etc.) characteristics similar to the existing beach sediments, typically with a low fines fraction. The USACE expects that most of the fine material that would be suspended by the construction activities in the Great South Bay and Moriches Bay water columns would rapidly settle out in nearby adjacent waters and would not adversely affect the designated habitat areas outside of the project footprints. We have therefore assumed no impacts based on the granulometric characteristics of imported sediments.

Subtidal areas within the project footprints will be converted to intertidal beach and uplands. In these CPFs, currently existing intertidal beach will be converted into uplands except for a small area along the shoreline at either end of the project boundary. In most cases, the proposed intertidal beach area will increase in size relative to the currently existing intertidal beach area. Likewise, the subtidal portions of the projects will decrease.

4.3 Impact Calculation Methods

We calculated potential impacts to intertidal and subtidal habitat areas for 10% designs. We identified potential impacts by elevation (intertidal and subtidal) and vegetation community (low marsh). The available data identified no hardbottom or mud flat habitat within the project footprints.

Intertidal and Subtidal Area Changes

For each project site, existing elevations for the HAT and LAT provided the data to calculate existing subtidal and intertidal areas. The locations of the proposed HAT and design LAT for each proposed CPF design (Section 2.3.3) allowed quantification of proposed intertidal and subtidal areas at each site. The differences between existing and proposed areas between HAT and LAT (intertidal) and below the existing and proposed LAT (subtidal) quantify changes in those habitat areas. For purposes of this assessment, intertidal area is equivalent to “Beach Habitat”

Wetland Habitat Area Changes

Proposed fill would also impact wetland habitat within some project sites. Wetland impact area calculations used the wetland GIS coverages available from NALCC (2013). Wetland impacts included intertidal wetlands.

Consideration of Other Community Types

With the exception of the Mastic Beach CPF sites, no tidal creeks, mud flats, or sandflats were identified in the available data of the immediate project areas (where direct or indirect impacts might be considered). The Mastic Beach CPF sites will include some restoration of sinuous channels from existing linear drainage ditch footprints, restoring the same open water in a natural tidal creek topography. Available SAV coverages were reviewed as part the analysis; the data were relatively old (data was based on 2002 imagery (Greenhorne and O’Mara 2003), 2004 imagery (Wang and Trager 2013)) and, on the recommendation of USACE, were not used as part of impact calculations. The USACE has a policy of wetland impact avoidance and will work closely with NMFS to obtain timely subtidal habitat data and refine project footprints based on that information as the project design efforts progress. The relatively ephemeral nature of discrete SAV patches and age of the data could lead to erroneous conclusions regarding potential impacts; USACE plans to work with NMFS to develop a multi-year baseline SAV survey program to accurately establish habitat baseline conditions at the CPF project sites.

4.4 Direct Impacts: Intertidal and Subtidal Habitats

Some intertidal beach and subtidal area will be converted to supratidal beach. The remaining subtidal area will be converted to intertidal beach elevations. Estimated impacts to intertidal and subtidal EFH were calculated for all sites (Table 4.1). The 10% project designs will, with a few exceptions, reduce existing area of subtidal habitat by filling those areas to intertidal or supratidal elevations. Most of the intertidal wetland impacts occur in one location, Smith Point County Park, where the current 10% design converts 119.69 acres of existing intertidal marsh is converted to upland habitat (Table 4.1 CPF #9). The proposed design at the Mastic Beach Sites (MB1, MB2-1 and and MB2-2) may result in some intertidal and subtidal temporary impacts as the drainage ditches and some areas of existing intertidal and subtidal are reshaped and regraded to optimize those habitat elevations. As the design efforts progress, USACE will work closely with NMFS to ensure that changes in the areas of subtidal and intertidal habitats will have an insignificant effect on the South Bay ecosystem. The impact of unvegetated subtidal conversion to intertidal habitat on local forage habitat area would be minor, as there is extensive similar habitat nearby this and all the CPF sites.

Table 4.1 Estimated Impacts to Intertidal and Subtidal Areas for 10% Coastal Process Feature Design Level

CPF #	CPF Name	Intertidal Acres			Subtidal Acres		
		Existing	Proposed	Difference	Existing	Proposed	Difference
1	Democrat Point West	34.45	45.94	11.49	13.41	5.89	-7.52
2	Democrat Point East	2.12	5.38	3.26	0.41	0.44	0.03
3	Dunefield West of Field 4	3.90	3.90	0.00	0.61	0.61	0.00
4	Clam Pond	3.49	5.39	1.90	7.93	1.60	-6.33
5	Atlantique to Corneille	0.36	4.25	3.89	8.82	1.63	-7.19
6	Talisman’	0.63	6.95	6.32	14.76	2.03	-12.73
7	Pattersquash Reach’	15.02	19.83	4.81	5.81	1.00	-4.81
8	New Made Island Reach	8.30	26.32	18.02	26.03	7.91	-18.12
9	Smith Point County Park Marsh	269.04	149.35	-119.69	4.36	5.74	1.38
10	Great Gun	6.34	6.34	0.00	5.08	5.08	0.00
11	45, 47, and 51 Dune Road	4.30	3.45	-0.86	0.49	0.17	-0.32
12	Tiana Bayside Park	2.74	1.55	-1.19	6.78	6.11	-0.67
MB1	Mastic Beach 1	8.22	8.22	0	**	**	**
MB2 -1	Mastic Beach 2 Area 1	12.77	12.77	0	**	**	**
MB2-2	Mastic Beach 2 Area 2	2.41	2.41	0	**	**	**
	Totals	**374.09**	**302.05**	**-72.05**	**94.49**	**38.21**	**-56.28**

*Difference= Proposed-Existing

**Some subtidal areas may be in drainage ditches may be reshaped to tidal creek characteristics but no quantification of that potential effort has yet been performed.

4.5 Wetland Direct and Indirect Impacts

The project designs include potential direct and indirect wetland impacts to low marsh communities (Table 4.2). Direct wetland impacts will result from fill placement and regrading of the existing surface. Indirect impacts could occur outside the project footprint to those wetlands that could be cut off from the bay due to creation of upland elevations between the wetland and the adjacent intertidal zone. As discussed earlier, as the project designs are further refined USACE will work closely with NMFS to further minimize and avoid such impacts. Note that the 10% design for Smith Point County Park Marsh, which accounts for almost all wetland impacts, temporary impacts are associated with the grading of the marsh surface to optimize intertidal elevations across the entire project footprint, and indirect impacts are associated with small areas at the edges; (as at New Made island Reach). Similarly, as part of the Mastic Beach CPF sites, temporary impacts will occur in order to restore estuarine marsh wetland topography and a small wetland area of MB1 is cut off by the maritime forest footprint. As the designs are refined, USACE will work to eliminate such impacts, as they are primarily associated with the coarse level of detail developed at the 10% design level. At the Mastic Beach sites, redesign of existing drainage ditches to a more natural pattern will result in roughly the same open water area currently associated with the drainage ditches. This activity is not expected to significantly reduce wetland area. Grading to create appropriate marsh elevations may occur in some areas of each project footprint. Specific design of natural channel restoration and marsh grading would be developed during the PED phase. USACE will work closely with NMFS to reduce and eliminate the various impacts and increase the quality and quantity of marsh areas as they advance the designs.

Table 4.2 Potential Low Marsh Direct and Indirect Wetland Impacts of 10% Coastal Process Feature Designs

		Low Marsh Acres				
CPF #	CPF Name	Existing*	Proposed*	Direct Impact*	Indirect Impact**	Temporary Impact
4	Clam Pond	0.1	0	0.1	0	0
7	Pattersquash Reach	1.2	0	1.17	0	0
8	New Made Island Reach	2.38	0	2.4	0.3	0
9	Smith Point County Park Marsh	261.2	127.75	119.7	1.2	133.46
11	45, 47, and 51 Dune Road	0.86	0.02	0.84	0	0
12	Tiana Bayside Park	2.01	0	2.01		0
MB1	Mastic Beach 1	16.75	16.75	0	0.22	***
MB2 -1	Mastic Beach 2 Area 1	19.01	19.01	0	0	***
MB2-2	Mastic Beach 2 Area 2	3.76	3.76	0	0	***
	Totals	**307.22**	**167.29**	**126.22**	**1.72**	**133.46**

*Acres within design footprint
**Acres outside design footprint
***Temporary impact areas not yet defined

4.6 Direct Impacts - EFH-Designated Species

The project will result in direct impacts to some intertidal and subtidal habitat. However, since the total area of these impacts represent a small portion of these habitats in the region, the impact on the affected species would be minimal; the primary species-specific impact would occur to species with non-motile life stages that use habitats buried during construction.

For non-motile individuals, particularly benthic infauna, we assume that burial, the primary source of impact to the benthos, is permanent. Some species (particularly bivalves) may be able to move upward through the new sediment fast enough to regain the necessary position at the sediment water interface before lack of oxygen is fatal. However, most individuals likely will die. The reproductive mechanisms of most of the smaller invertebrates is such that recolonization is typically rapid and relatively complete within a few months to years. Some larger species, such as some of the bivalves that may occur in the area, are most often slower growing and will have longer recovery periods. Species for which the project sites are considered marginal habitat may recover over longer periods of time, as few recruits arrive and survive to adulthood. Eggs and demersal larvae of all species present in an area being filled to create intertidal habitat may also be buried.

Table 4.3 Potential Impacts for EFH-Designated Species and Life History Stages at the Project Sites

EFH-Designated Species	Life Stage	Potential Impacts
		Bony Fish Species
Atlantic butterfish	E, L, J	Eggs buoyant; No impact. Larvae nektonic, other life stages fully mobile. Minimal impact to Atlantic butterfish and EFH.
Atlantic sea herring	J, A	Pelagic oceanic species occasional near inlets, mobile life stages. No impact on Atlantic sea herring or EFH.
Atlantic mackerel	E, L, J, A	All life stages are pelagic. No impact to Atlantic mackerel or EFH.
Black sea bass	L, J, A	Fish feed primarily on more mobile benthic epifaunal species and small fish available in adjacent areas of habitat. No or minimal impact to black sea bass and EFH.
Bluefin tuna	J	Not likely to occur in the project area. No impact to bluefin tuna or EFH.
Bluefish	J, A	Temporary displacement of fish and their prey (forage fish). No impact to bluefish or EFH.
Cobia	E, L, J, A (summer only)	Present during summer in some subtidal areas. No impact to cobia, minimal impact to EFH.
Haddock	L	Pelagic species that may occur in the general project area. No impact to haddock or EFH.
Monkfish	E, L	Not likely to occur in the project area. No impact to monkfish or EFH.
Ocean pout	E, L, A	Eggs and larvae are demersal. Potential to be impacted by filling operations. No to minimal impact on ocean pout and EFH.
Pollock	J	No to minimal impact for pollock or pollock EFH.
Red hake	E, L, J	Eggs buoyant, pelagic; juveniles demersal. Bottom burial may impact juveniles, EFH. Minimal impact to red hake and EFH.
Scup	J, A	No to minimal impact on scup or scup EFH
Skipjack tuna	J, A	Pelagic species probably rare in the project area. No impact to skipjack tuna or EFH.
Summer flounder	E, L, J, A	All life stages abundant in the project area; Impacts to summer flounder and EFH.
Whiting	E, L, J	Eggs are buoyant, larvae and juveniles motile. Adjacent areas provide alternative EFH locations. No to minimal impact to whiting; impact to EFH.

EFH-Designated Species	Life Stage	Potential Impacts
Windowpane flounder	E, L, J, A	Eggs, larvae have potential to be buried during fill activities. Later life stages motile and can avoid the activities. Minimal impact to windowpane flounder and EFH.
Winter flounder	E, L, J, A	Project may impact spawning, and foraging habitat for eggs, larvae and YOY juveniles. Minimal impacts to winter flounder and EFH.
Witch flounder	E, L	No preferred habitat. Not likely found in project waters. No impact to witch flounder or EFH.
Yellowtail flounder	E, L, J, A	No preferred habitat, some eggs and larvae buoyant and pelagic, other life stages motile. No impact to yellowtail flounder or EFH.
Cartilaginous Fish Species		
Blue shark	J, A	Oceanic–epipelagic, fringe–littoral, cosmopolitan species not likely to occur in project area. No impact to blue shark or EFH.
Common thresher shark	L, J, A	Highly mobile, pelagic species. No impact to thresher shark or EFH.
Dusky shark	N	Neonates may occur at sites near inlets but are highly mobile. No impact to dusky shark or EFH.
Little skate	A	Eggs may be buried, juveniles motile. No to minimal impact on little skate and EFH.
Sand tiger shark	N	Neonates are motile and able to avoid construction. Extensive EFH next to project sites. No impact to sand tiger shark or EFH.
Sandbar shark	J, A	Juveniles and adults are mobile; extensive EFH adjacent to project sites. No impact to sandbar shark or EFH.
Scalloped hammerhead shark	A	Pelagic feeder able to avoid construction. No impact to scalloped hammerhead shark or EFH.
Spiny dogfish	A (male), Sub-A (female)	Highly mobile, pelagic. No impact to spiny dogfish or EFH.
Tiger shark	J	Motile species mostly near inlets. No to minimal impact on tiger shark and EFH.
White shark	L, J, A	Possible but not likely presence; pelagic feeder. No impact to white shark and EFH.
Winter skate	J	Spring summer resident in shallow waters. Motile species able to avoid construction. No to minimal impact on winter skate and EFH.
Invertebrate Species		
Atlantic surf clam	J, A	Uncommon in project area; those present may be buried. No to minimal impact on Atlantic surf clam and EFH.
Longfin inshore squid	E, J	Seasonal occupant, eggs buoyant and juveniles motile. No to minimal impact on longfin inshore squid and EFH.
Ocean quahog	J, A	Limited environmental suitability, but if present may be buried. No to minimal impact to ocean quahog; no impact to EFH.
Key: E = eggs, L = larvae, J = juveniles, N = neonates, A = adults, Sub-A = subadults		

4.7 Indirect Impacts – EFH Designated Species

For all motile individuals, construction-related impacts below the HAT during construction would be temporary. These individuals can move away from the temporary disturbances. No long-lasting impacts to the water quality in or adjacent to the project area are expected. Turbidity plumes generated by filling and regrading are temporary and the sediment used for fill is expected to have low levels of fines, which constitute the large majority of turbidity plumes. When settled (which will occur relatively quickly in and outside the project footprint), the fines should be insufficient in volume to impact adjacent vegetation or sessile benthic infauna. Additionally, the fill will be primarily sand (with some shells), without any significant amount of organic matter. Therefore, the project anticipates no significant release of nutrients or lowering of oxygen concentrations (through increased biological oxygen demand).

One of the common impacts of the CPFs on EFH in the project area would be the trophic effects caused by the temporary elimination of infaunal prey organisms and some epifaunal prey organisms for bottom-feeding, EFH-designated species. Infauna and smaller, less motile epifauna would be buried as a result of fill placement or regrading to achieve the desired additional intertidal habitat. Most of these organisms would be invertebrates. Some would be able to reestablish themselves, but we would expect most individuals to die. Rapid reproduction and recolonization from immediately adjacent undisturbed habitat are characteristic features of many invertebrate epi- and infauna that will contribute to the temporary nature of these impacts. The impact of unvegetated subtidal conversion to intertidal habitat on local forage habitat area would be minor, as there is extensive similar habitat nearby all the CPF sites

Species that feed primarily on intertidal infauna organisms are most likely to be affected during the site construction period and a short-time thereafter. The negative effects of infauna prey removal would be temporary, lasting as long as it takes for benthic invertebrates to re-colonize the bottom once the project is complete. Studies conducted on offshore sand borrow areas off the outer New Jersey coast indicate that benthic communities were re-established within 8 to 9 months (USACE 1999). Greene (2002) cited literature and literature reviews of recolonization studies on a wide latitudinal range of east coast beaches, reporting recovery between 2 and 7 months and “quick” recovery times. USACE (2013) indicated that recovery in a borrow area near New York Harbor takes 1-5 years. Intertidal habitat recovery is particularly rapid (perhaps one to two growing seasons), as this community is disturbance regulated and the species there have high reproductive and growth rates to compensate for a continually disturbed environment. Re-colonization of infaunal species will be stimulated by adult populations that inhabit similar environments adjacent to the project area. Construction duration at most sites is short (a few months at most) and recolonization can begin as soon as the project is completed. Both benthic and pelagic foragers would likely expand their forage area until a sufficient prey patch is located. Additionally, mobile foragers could resume feeding in the same location as soon as the construction activities cease. Finally, project area represents a very small percentage of the extensive foraging grounds within the bay, thus the overall indirect impacts to EFH species and EFH will be minimal.

The temporary loss of benthic prey resources caused by burial during fill and grading activities would not have serious adverse effects on EFH for any species that feeds primarily on more motile epifaunal organisms (e.g., crabs, mysids, sand shrimp) or fish, since these motile organisms could move to avoid fill activities and could re-occupy the filled area very soon after sand placement and grading is completed.

The 4-year average nourishment cycle for the CPF sites is well beyond the expected recolonization rates for the intertidal habitats, and site-specific erosion rate estimates (reported elsewhere) suggest that a longer management interval may be appropriate at many of the CPF sites, Therefore, no cumulative impacts to intertidal EFH are expected as a result of long-term site management activities.

4.8 Indirect Impacts – Marsh

Low estuarine marshes are an important habitat for many invertebrates that form the bottom of the heterotrophic food web. Impacts to this wetland type would be significant due to the importance of this habitat to much of the ecosystem food web and energy system. Loss of this habitat and other coastal marsh habitat types is ongoing throughout the region (Narragansett Bay Estuary Program 2017). The enhancement and creation of intertidal wetlands at Smith Point County Park, Mastic Beach 1 and Mastic Beach 2 project areas are valuable enhancement locally and regionally.

5.0 MITIGATION

The CPF project designs assessed here focus on enhancing and creating critical habitat for federally listed avian species, in part by creating nesting and foraging habitat from intertidal and subtidal elevations. The cooperative efforts of all stakeholders will help develop final designs that provide the necessary level of benefits to the listed avian species while avoiding impacts, minimizing unavoidable impacts, and if necessary, by identifying appropriate mitigations for unavoidable impacts to EFH.

6.0 CONCLUSION

This EFH evaluation of 10% conceptual designs of CPF projects has identified no to minimal potential adverse impacts to EFH-designated species and EFH in the project area. EFH-designated species that feed on more motile epifaunal organisms or on small forage fish would not be seriously affected. For any bottom-feeding EFH species, the impact of unvegetated subtidal conversion to intertidal habitat on local forage habitat area would be minor, as there is extensive similar habitat nearby all the CPF sites. The New York District will continue coordination with NOAA and other stakeholders to develop practicable solutions acceptable to the stakeholder and protective of the environment.

7.0 REFERENCES

Baum, J., Clarke, S., Domingo, A., Ducrocq, M., Lamonaca, A.F., Gaibor, N., Graham, R., Jorgensen, S., Kotas, J.E., Medina, E., Martinez-Ortiz, J., Monzini Taccone di Sitizano, J., Morales, M.R., Navarro, S.S., Perez, J.C., Ruiz, C., Smith, W., Valenti, S.V. & Vooren, C.M. 2007. *Sphyrna lewini* (Northwest and Western Central Atlantic subpopulation). The IUCN Red List of Threatened Species 2007:e.T165293A6000960. http://dx.doi.org/10.2305/IUCN.UK.2007.RLTS.T165293A6000960.en

Bigelow and Schroeder. 1953. Fishes of the Gulf of Maine. Fish. Bull. 53:1-577. Paper URL: http://www.gma.org/fogm/

Cargnelli, L.M., S.J. Griesbach, D.B. Packer, P.L. Berrien, D.L. Johnson, and W.W. Morse. 1999a. Essential fish habitat source document: pollack, *Pollachius virens*, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-131. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. 38 pp.

Cargnelli, L.M., S.J. Griesbach, D.B. Packer, and E. Weissberger. 1999b. Essential fish habitat source document: Atlantic surf clam, *Spisula solidissima*, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-142. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. 22 pp.

Cargnelli, L.M., S.J. Griesbach, D.B. Packer, and E. Weissberger. 1999c. Essential fish habitat source document: ocean quahog, *Arctica islandica*, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-148. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. 11 pp

Cargnelli, L.M., S.J. Griesbach, D.B. Packer, and P. Berrien. 1999d. Essential fish habitat source document: haddock, *Melanogrammus aeglefinus*, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-128. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. 40 pp.

Cargnelli, L.M., S.J. Griesbach, D.B. Packer, and P. Berrien. 1999e. Essential fish habitat source document: Witch Flounder, *Glyptocephalus cynoglossus*, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-139. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. 38 pp.

Chang S., P.L. Berrien, D.L. Johnson, and W.W. Morse. 1999. Essential fish habitat source document: windowpane, *Scophthalmus aquosus*, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-137. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA: 32 pp. Accessed April 2018 at: https://www.nefsc.noaa.gov/publications/tm/tm137/tm137.pdf

Collette, B.B. and C.E. Nauen. 1983. FAO species catalogue. Vol. 2. Scombrids of the world. An annotated and illustrated catalogue of tunas, mackerels, bonitos and related species known to date. FAO Fish. Synopsis, (125) Vol. 2:137 p.

Compagno, L.J.V. 1984. FAO species catalogue. Sharks of the world. An annotated and illustrated catalogue of shark species known to date. FAO Fisheries Synopsis No. 125, Vol. 4, Part 1 (Hexanchiformes to Lamniformes) and Part 2 (Carchariniformes). United Nations Fisheries and Agriculture Organization, Rome, Italy. 655 pp.

Cross, J.N., C.A. Zetlin, P.L. Berrien, D.L. Johnson, and C. McBride. 1999. Essential Fish Habitat Source Document: Butterfish, *Peprilus triacanthus*, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-145. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA: 42 pp.

Drohan AF, Manderson JP, Packer DB. 2007. Essential fish habitat source document: Black sea bass, *Centropristis striata*, life history and habitat characteristics, 2nd edition. NOAA Tech Memo NMFS NE 200; 68 p.

EPA 2015. Supplemental Environmental Impact Statement for the Designation of Dredged Material Disposal Site(s) in Eastern Long Island Sound, Connecticut and New York: Appendix H Essential Fish Habitat Assessment. Prepared by Louis Berger for United States Environmental Protection Agency. December 2015. Accessed April 2018 at: https://www.epa.gov/sites/production/files/2016-04/documents/elis_dseis_appendix_h_-_essential_fish_habitat_assessment.pdf

Fay, C.W., R.J. Neves, and G.B. Pardue. 1983. Species profiles, life histories and environmental requirements of coastal fishes and invertebrates (Mid-Atlantic) --surf clam. U.S. Fish and Wildlife Service, Division of Biological Services, FWS/OBS-82/11.13. U. S. Army Corps of Engineers, TR EL-82-4. 23 pp. Accessed April 2018 at: https://www.nwrc.usgs.gov/wdb/pub/species_profiles/82_11-013.pdf

Fordham, S., Fowler, S.L., Coelho, R., Goldman, K.J. & Francis, M. 2008. *Squalus acanthias* (Northwest Atlantic subpopulation), Spiny Dogfish. The IUCN Red List of Threatened Species™ ISSN 2307-8235 (online) IUCN 2008: T44169A10866950. Accessed April 2018 at: http://www.iucnredlist.org/details/44169/0

Greene, Karen, 2002. Beach Nourishment: A Review of the Biological and Physical Impacts. ASMFC Habitat Management Series # 7. By Atlantic States Marine Fisheries Commission 1444 Eye Street, NW, Sixth Floor Washington, DC 20005 November 2002. Accessed April 2018 at: http://www.asmfc.org/uploads/file/beachNourishment.pdf

Greenhorne and Omara. 2003. Long Island Benthic Habitat (FINAL_POLY) METADATA. Accessed at http://gis.ny.gov/gisdata/metadata/dos.sshabitats.htm?nysgis=

Jacobson, L.D. 2005. Essential fish habitat source document (2nd edition): longfin inshore squid, *Loligo pealei*, life history and habitat characteristics. NOAA Technical Memorandum MNFS-NE-193. U.S.

Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. 52 pp.

Johnson, D.L., W.W. Morse, P.L. Berrien, and J.J. Vitaliano. 1999. Essential fish habitat source document: yellowtail flounder, *Limanda ferruginea*, life history and habitat characteristics. NOAA Technical Memorandum MNFS-NE-140.

Johnston DW, Frungillo J, Smith A, Moore K, Sharp B, and Schuh J 2015. Trends in Stranding and By-Catch Rates of Gray and Harbor Seals along the Northeastern Coast of the United States: Evidence of Divergence in the Abundance of Two Sympatric Phocid Species? PLoS ONE 10(7): e0131660. https://doi.org/10.1371/journal.pone.0131660

Kulka, D.W., Sulikowski, J. and Gedamke, T. 2009. *Leucoraja ocellata.* The IUCN Red List of Threatened Species 2009: e.T161631A5468670. Accessed at http://dx.doi.org/10.2305/IUCN.UK.2009-2.RLTS.T161631A5468670.en. In April 2018.

Lock MC and Packer PB. 2004. Essential fish habitat source document: Silver hake, *Merluccius bilinearis*, life history and habitat characteristics, 2nd edition. NOAA Tech Memo NMFS NE 186; 68 p.

McCandless, C.T., Conn, P., Cooper, P., Cortés, E., Laporte, S.W., and M. Nammack. 2014. Status review report: northwest Atlantic dusky shark (*Carcharhinus obscurus*). Report to National Marine Fisheries Service, Office of Protected Resources. October 2014. 72 pp.

North Atlantic Landscape Conservation Cooperative (NALCC). 2013. Coastal Update to the National Wetlands Inventory. Accessed at: https://www.northeastoceandata.org/data-download/?data=Habitat on December 15, 2017.

Narragansett Bay Estuary Program 2017. Salt Marsh. Draft April 2017. Accessed April 2018 at http://www.nbep.org/publications/StatusandTrends/Salt_Marsh.pdf

New York State Department of Conservation. 2018. Marine Mammals of New York. Website accessed May 2018. https://www.dec.ny.gov/animals/108573.html

National Marine Fisheries Service (NMFS). 2009. Essential Fish Habitat GIS Shapefiles for Atlantic Highly Migratory Species. Accessed April 2017 at http://www.nmfs.noaa.gov/sfa/hms/documents/fmp/am1/shapefiles.html.

National Oceanic and Atmospheric Administration (NOAA). 2014. Essential Fish Habitat for Coastal Migratory Pelagics. Accessed on April 2014 at: http://www.greateratlantic.fisheries.noaa.gov/hcd/mackcobia.htm.

National Oceanic and Atmospheric Administration (NOAA). 2015. EFH Overlay for Multiple Species. Accessed at: https://www.northeastoceandata.org/data-download/?data=Fish on December 15, 2017.

National Oceanic and Atmospheric Administration (NOAA). 2018a. GIS Data for Essential Fish Habitat – Mid Atlantic Region. Accessed at: https://www.habitat.noaa.gov/protection/efh/newInv/index.html on February 26, 2018.

National Oceanic and Atmospheric Administration (NOAA) 2018b Summary of Essential Fish Habitat (EFH) and General Habitat Parameters for Federally Managed Species (. Accessed April 2018 at:
https://www.greateratlantic.fisheries.noaa.gov/hcd/efhtables.pdf

Packer, David B, Sara J. Griesbach, Peter L. Berrien, Christine A. Zetlin, Donna L. Johnson, and Wallace W. Morse. NOAA Technical Memorandum NMFS-NE-151 1999. Summer Flounder, *Paralichthys dentatus*, Life History and Habitat Characteristics. Accessed April 2018 at: https://www.nefsc.noaa.gov/publications/tm/tm151/tm151.pdf

Packer, D.B., C.A. Zetlin, and J.J. Vitaliano. 2003a. Essential fish habitat source document: little skate, *Leucoraja erinacea*, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-175. U.S. Department of Commerce, National Oceanic and Atmospheric administration Northeast Fisheries Science Center Woods Hole ,MA. 76 pp.

Packer, David B., Christine A. Zetlin, and Joseph J. Vitaliano 2003b. Essential Fish Habitat Source Document: Winter Skate, *Leucoraja ocellata*, Life History and Habitat Characteristics. NOAA Technical Memorandum NMFS-NE-179. U.S. Department of Commerce, March 2003. Accessed at: https://www.nefsc.noaa.gov/publications/tm/tm175/tm175.pdf April 2018.

Pereira, J.J., R. Goldberg, J.J. Ziskowski, P.L. Berrien, W.W. Morse, and D.L. Johnson. 1999. Essential fish habitat source document: winter flounder, *Pseudopleuronectes americanus*, life listory and habitat characteristics. NOAA Technical Memorandum NMFS-NE-138. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. 39 pp.

Pew Memorial Trust, 2018. Science Brief: Conserving Atlantic Bluefin Tuna with Spawning Sanctuaries. Ocean Science Series October 2010. Access April 2018 at: http://www.pewtrusts.org/~/media/legacy/uploadedfiles/wwwpewtrustsorg/reports/protecting_ocean_life/osdspawningsciencebrieffinalsinglea4pdf.pdf

Pollard, D. & Smith, A. 2009. *Carcharias taurus*. The IUCN Red List of Threatened Species 2009: e.T3854A10132481. http://dx.doi.org/10.2305/IUCN.UK.2009-2.RLTS.T3854A10132481.en. Downloaded April 2018.

Shepherd GR and Packer DB. 2005. Essential fish habitat source document: Bluefish, *Pomatomus saltatrix*, life history and habitat characteristics (2nd Edition). NOAA Tech Memo NMFS NE 198; 89 p.

Smith, D.R., Beekey, M.A., Brockmann, H.J., King, T.L., Millard, M.J. & Zaldívar-Rae, J.A. 2016. *Limulus polyphemus*. The IUCN Red List of Threatened Species 2016: e.T11987A80159830.http://dx.doi.org/10.2305/IUCN.UK.2016-1.RLTS.T11987A80159830.en Accessed at http://www.iucnredlist.org/details/11987/0 April 2018.

Stehlik, L. 2007, Essential fish habitat source document: Spiny Dogfish, *Squalus acanthias*, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-203. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. 52 pp.

Steimle, F.W., W.W. Morse, and D.L. Johnson. 1999a. Essential fish habitat source document: goosefish, *Lophius americanus*, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-127. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. September 1999. 31 pp. Accessed April 2018 at: https://www.nefsc.noaa.gov/publications/tm/tm127/tm127.pdf

Steimle, F.W., W.W. Morse, P.L. Berrien, and D.L. Johnson. 1999b. Essential fish habitat source document: red hake, *Urophycis chuss*, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-133. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. 34 pp

Steimle, F.W., C.A. Zetlin, P.L. Berrien, D.L. Johnson, and S. Chang. 1999c. Essential fish habitat source document: scup, *Stenotomus chrysops*, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-149. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. 39 pp.

Steimle, F.W., W.W. Morse, P.L. Berrien, D.L. Johnson, and C. Zetlin. 1999d. Essential fish habitat source document: Ocean Pout, *Macrozoarces americanus*, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-129. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. 34 pp. Accessed April 2018 at https://www.greateratlantic.fisheries.noaa.gov/hcd/ocean-pout.pdf

Stevenson and Scott 2005.Essential fish habitat source document: Atlantic herring, *Clupea harengus*, life history and habitat characteristics (2nd edition). NOAA Tech Memo NMFS NE 192; 84 p.

Studholme, Anne L., David B. Packer, Peter L. Berrien, Donna L. Johnson, Christine A. Zetlin, and Wallace W. Morse 1999. Essential Fish Habitat Source Document: Atlantic Mackerel, *Scomber scombrus*, Life History and Habitat Characteristics. NOAA Technical Memorandum NMFS-NE-141 . U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. 34 pp. access April 2018 at: https://www.nefsc.noaa.gov/publications/tm/tm141/

Sulikowski, J., Kulka, D.W. & Gedamke, T. 2009. *Leucoraja erinacea*. The IUCN Red List of Threatened Species 2009: e.T161418A5419226. http://dx.doi.org/10.2305/IUCN.UK.2009-2.RLTS.T161418A5419226.en Accessed April 2018 at http://www.iucnredlist.org/details/161418/0

United States Army Corps of Engineers (USACE).1999. Biological Monitoring Program for the New York and New Jersey Harbor Navigation Study Final Report. U.S. Army Corps of Engineers – New York District, New York, NY.

USACE 2009. West of Shinnecock Inlet and "Bypass Area" shore protection projects: post-construction monitoring - final finfish/epibenthic invertebrate data report (2004-2008). 205 pp.

USACE. 2013. Benthic Recovery Report 2012. New York and New Jersey Harbor Deepening Project. US Army Corps of Engineers New York District. Prepared under Contract #: W912DS-11-D-0008 – Task Order # 5. Final Report June 2013.

United States Department of Commerce (USDOC). 1999. Final Fishery Management Plan for Atlantic Tunas, Swordfish and Sharks. Vol. II, Chapter 6: Highly Migratory Species (HMS) Essential Fish Habitat (EFH) Provisions. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Office of Sustainable Fisheries, Silver Spring, MD. 302 pp

USFWS 1997. Significant Habitats and Habitat Complexes of The New York Bight Watershed Great South Bay Complex #14. In: Significant Habitats and Habitat Complexes of The New York Bight Watershed U.S. Fish and Wildlife Service Southern New England - New York Bight Coastal Ecosystems Program Charlestown, Rhode Island. P.O. Box 307 Charlestown, Rhode Island 02813. Completed November 1996 Published November 1997 https://nctc.fws.gov/pubs5/web_link/text/gsb_form.htm. accessed April 2018

Wang, Y. Q., C. M. Traber. 2013. Remote sensing of terrestrial and submerged aquatic vegetation at Fire Island National Seashore: Long-term resource management and monitoring. Natural Resource Technical Report NPS/NCBN/NRTR—2013/742. National Park Service, Fort Collins, Colorado.

ATTACHMENT 1

EFH-Designated Species and Life Stages for the 15 Coastal Process Features Locations

Species	Life Stage*	Democrat Point West	Democrat Point East	Dunefield West of Field 4	Clam Pond	Atlantique to Corneille	Talisman	Pattersquash Reach	New Made Island Reach	Smith Point County Park Marsh	Great Gun	45, 47, and 51 Dune Road	Tiana Bayside Park	Mastic Beach 1	Mastic Beach 2 Area 1	Mastic Beach 2 Area 2
Atlantic Herring	A	X	-	-	-	-	X	-	-	-	-	-	-	-	-	-
Atlantic Mackerel	A	-	-	-	X	X	X	X	X	X	-	X	X	X	X	-
Black Sea Bass	A	X	X	-	X	X	-	X	X	X	-	X	X	X	X	X
Bluefish	A	X	-	-	X	X	X	X	X	X	-	X	X	X	X	-
Cobia	A	X	X	-	X	X	X	X	X	X	-	X	X	-	-	-
Ocean Pout	A	X	X	-	X	X	-	X	X	X	-	X	X	-	-	-
Scup	A	X	X	-	X	X	-	X	X	X	-	X	X	X	X	X
Skipjack Tuna	A	-	-	-	-	-	-	-	X	X	-	X	X	X	X	-
Summer Flounder	A	X	X	-	X	X	X	X	X	X	-	X	X	X	X	X
Window Pane Flounder	A	X	X	-	X	X	X	X	X	X	-	X	X	X	X	-
Winter Flounder	A	X	X	-	X	X	X	X	X	X	-	X	X	X	X	-
Yellowtail Flounder	A	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-
Common Thresher Shark	A	X	X	-	X	X	X	X	X	X	-	X	X	X	X	-
Little Skate	A	X	-	-	X	X	-	X	X	X	-	X	X	X	X	-
Sandbar Shark	A	X	X	-	X	X	X	X	X	X	-	X	X	X	X	-
Scalloped Hammerhead	A	X	X	-	X	X	X	-	-	-	-	-	-	-	-	-
Spiny Dogfish	A (Male)	-	-	-	-	-	-	X	-	-	-	-	-	X	X	-
White Shark	A	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Atlantic Surf Clam	A	X	X	-	X	X	-	-	-	-	-	X	X	-	-	-
Ocean Quahog	A	X	X	-	X	X	-	-	-	-	-	X	X	-	-	-
Atlantic Butterfish	E	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Atlantic Mackerel	E	-	-	-	X	X	X	X	X	X	-	X	X	X	X	-
Cobia	E	X	X	-	X	X	X	X	X	X	-	X	X	-	-	-
Monkfish	E	X	X	-	X	X	-	X	X	X	-	X	X	-	-	-
Ocean Pout	E	X	X	-	X	X	-	X	X	X	-	X	X	-	-	-
Red Hake	E	X	X	-	X	X	-	X	X	X	-	X	X	X	X	-
Summer Flounder	E	-	-	-	-	-	-	X	X	X	-	X	X	-	-	X
Whiting	E	X	X	-	X	X	-	X	X	X	-	X	X	X	X	-
Window Pane Flounder	E	X	X	-	X	X	X	X	X	X	-	X	X	X	X	-
Winter Flounder	E	X	X	-	X	X	X	X	X	X	-	X	X	X	X	-
Witch Flounder	E	-	-	-	-	-	-	X	X	X	-	-	-	-	-	-
Yellowtail Flounder	E	X	X	-	X	X	-	X	X	X	-	X	X	-	-	-
Longfin Inshore Squid	E	X	-	-	X	X	-	X	X	X	-	X	X	X	X	-
Atlantic Butterfish	J	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Atlantic Herring	J	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-
Atlantic Mackerel	J	-	-	-	X	X	X	X	X	X	-	X	X	X	X	-
Black Sea Bass	J	X	X	-	X	X	-	X	-	-	-	X	X	X	X	-
Bluefin Tuna	J	X	X	-	X	X	X	X	X	X	-	X	X	X	X	-
Bluefish	J	X	-	-	X	X	X	X	X	X	-	X	X	X	X	-
Cobia	J	X	X	-	X	X	X	X	X	X	-	X	X	-	-	-

Species	Life Stage*	Democrat Point West	Democrat Point East	Dunefield West of Field 4	Clam Pond	Atlantique to Corneille	Talisman	Pattersquash Reach	New Made Island Reach	Smith Point County Park Marsh	Great Gun	45, 47, and 51 Dune Road	Tiana Bayside Park	Mastic Beach 1	Mastic Beach 2 Area 1	Mastic Beach 2 Area 2
Pollock	J	-	-	-	-	-	X	X	-	-	-	-	-	X	X	-
Red Hake	J	X	X	-	X	X	-	X	X	X	-	X	X	X	X	-
Scup	J	X	X	-	X	X	-	X	X	X	-	X	X	X	X	X
Skipjack Tuna	J	X	X	-	X	X	X	X	-	-	-	-	-	-	-	-
Summer Flounder	J	X	X	-	X	X	X	X	X	X	-	X	X	X	X	X
Whiting	J	X	X	-	X	X	-	X	X	X	-	X	X	X	X	-
Window Pane Flounder	J	X	X	-	X	X	X	X	X	X	-	X	X	X	X	-
Winter Flounder	J	X	X	-	X	X	X	X	X	X	-	X	X	X	X	-
Yellowtail Flounder	J	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-
Common Thresher Shark	J	X	X	-	X	X	X	X	X	X	-	X	X	X	X	-
Sandbar Shark	J	X	X	-	X	X	X	X	X	X	-	X	X	X	X	-
Tiger Shark	J	X	X	-	X	X	X	X	X	X	-	X	X	X	X	-
White Shark	J	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Winter Skate	J	X	-	-	X	X	-	X	X	X	-	X	X	X	X	-
Atlantic Surf Clam	J	X	X	-	X	X	-	-	-	-	-	-	-	-	-	-
Longfin Inshore Squid	J	X	-	-	X	X	-	X	X	X	-	X	X	X	X	-
Ocean Quahog	J	X	X	-	X	X	-	-	-	-	-	X	X	-	-	-
Atlantic Butterfish	L	X	-	-	X	X	-	-	-	-	-	X	X	-	-	-
Atlantic Mackerel	L	X	-	-	X	X	X	X	X	X	-	X	X	X	X	-
Black Sea Bass	L	X	-	-	X	X	-	-	-	-	-	-	-	-	-	-
Cobia	L	X	X	-	X	X	X	X	X	X	-	X	X	-	-	-
Haddock	L	-	-	-	-	-	-	X	X	X	-	-	-	-	-	-
Monkfish	L	X	X	-	X	X	-	X	X	X	-	X	X	-	-	-
Ocean Pout	L	X	X	-	X	X	-	X	X	X	-	X	X	-	-	-
Red Hake	L	X	X	-	X	X	-	X	X	X	-	X	X	X	X	-
Summer Flounder	L	-	-	-	-	X	-	X	X	X	-	X	X	-	-	X
Whiting	L	X	X	-	X	X	-	X	X	X	-	X	X	X	X	-
Window Pane Flounder	L	X	X	-	X	X	X	X	X	X	-	X	X	X	X	-
Winter Flounder	L	X	X	-	X	X	X	X	X	X	-	X	X	X	X	-
Witch Flounder	L	-	-	-	-	-	-	X	X	X	-	X	X	-	-	-
Yellowtail Flounder	L	-	-	-	-	X	-	X	X	X	-	X	X	-	-	-
Common Thresher Shark	L	X	X	-	X	X	X	X	X	X	-	X	X	X	X	-
White Shark	L	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dusky Shark	N	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sand Tiger Shark	N	-	-	-	-	-	-	-	-	X	-	X	X	-	-	-
Spiny Dogfish	Sub-A (Female)	-	-	-	-	-	-	X	-	-	-	-	-	X	X	-

*A – Adult; E – Egg; J – Juvenile; L – Larva; N – Neonate; Sub-A – Sub-Adult

APPENDIX D

ESSENTIAL FISH HABITAT

D.1 INTRODUCTION

D.1.1 Fire Island Inlet to Montauk Point EIS (Project)

This Project evaluates the reasonable alternatives that would help define a long-term solution to the risk imposed by coastal storms and their associated damage to human life and property, while maintaining, enhancing, and restoring the ecosystem integrity of coastal biodiversity. The key components to the proposed action are: Beach Restoration (Beach and Dune Fill), Sediment Management (including Inlet Modification), Groins (including Groin Modification), Breach Response Plan (BRP), Coastal Process Features, Non-Structural Methods, and Adaptive Management. This report presents the Essential Fish Habitat (EFH) assessment for the FIMP Tentative Selected (TSP). The FIMP study area is described in Section D.2.1.

D.1.2 Essential Fish Habitat Assessment Background

In accordance with the Magnuson-Stevens Fishery Conservation and Management Act (MFCMA), an EFH assessment must be completed which identifies potential impacts to fishery resources and habitat that resulting from activities proposed for the Fire Island Stabilization Project. The MFCMA, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104- 267), requires that regional fishery management councils and other federal agencies identify and protect important marine and anadromous fish habitat. Federal agencies that fund, permit, or carry out activities that may adversely impact EFH are required to consult with National Marine Fisheries Service (NMFS) regarding the potential effects of their actions on EFH. According to USDOC (1999a), the contents of an EFH assessment should include:

- A description of the proposed action;
- Analysis of the effects of the proposed action on EFH, the managed fish species, and major prey species;
- The Federal agency’s views regarding the effects of the action on EFH; and,
- Proposed mitigation, if applicable.

This EFH assessment includes:

- A description of the proposed activity.
- A description of the existing project area environment.
- A listing of EFH-designated species for the project area.
- Information relating to the habitat suitability and relative abundance of EFH-designated species and life history stages in the project area.
- A summary of the diets of EFH species (i.e., prey species) in the project area.
- A summary of available survey data for benthic prey species in the vicinity of the project area.
- An analysis of the potential impacts of project activities on EFH-designated species and species of special interest in the project area.
- An analysis of the direct, indirect, and synergistic impacts as a result of the activities in the project area.

D.2 PROJECT DESCRIPTION

D.2.1 Project Study Area

D.2.1.1 *Fire Island Inlet to Montauk Point Study Area*

The Study Area extends from Fire Island Inlet east to Montauk Point along the Atlantic Coast of Suffolk County, Long Island, New York (Figure D-1). The majority of Fire Island lies within the legislative boundaries of the Fire Island National Seashore (FIIS). The study area includes the barrier island chain from Fire Island Inlet to Southampton inclusive of the Atlantic Ocean shorelines, and adjacent back-bay areas along Great South, Moriches, and Shinnecock Bays. The study area continues to the east including the Atlantic Ocean shoreline along the mainland of Long Island extending from Southampton to Montauk Point. This area includes the entire Atlantic Coast of Suffolk County covering a shoreline length of approximately 83 miles. The study area also includes over 200 additional miles of shoreline within the estuary system. The study area includes areas on the mainland that are vulnerable to flooding, which generally extend as far landward as Montauk Highway, for an approximate area of 126 square miles.

This Study Area represents a complex mosaic of ocean fronting shorelines, barrier islands, tidal inlets, estuaries, and back bay mainland area. The study area functions as an interconnected system driven by large scale processes with respect to hydrodynamic and sediment exchange, supporting diverse biological and natural resources. Within the study area, ocean shoreline sand generally moves east to west alongshore, in response to waves, and currents during normal conditions and during storms. This alongshore movement of sand maintains the prevailing shoreline conditions. In addition to alongshore movement, sediment is also exchanged in the cross-shore direction, through erosion and accretion of the beach and dune, exchange of sand through tidal inlets, and during large storm events through the episodic transport of sand over the island through overwash or breaching.

Public lands throughout the Barrier Island Segment provide areas where natural resources are protected to the greatest extent possible. The Nation Park Service (NPS) managed FIIS is located along the Atlantic Ocean on the Fire Island barrier island, Great South Bay, and Moriches Bay shoreline. The NPS seeks, as part of its Mission Statement for FIIS, to preserve natural processes and protect ecological resources.

Along the barrier islands storm damages to developed areas are due to wave attack, erosion of the beach and dune, and tidal flooding of infrastructure on the barrier island that occurs when the beach and dune elevations are exceeded due to hurricanes and nor'easters. There is a long history of building destruction during storms. But in addition to storms impacting infrastructure on the barrier island, the barrier island itself is also vulnerable to storms which can erode the beach and dune system and create breaches (new inlets) of the barrier island. When a breach occurs, it impacts both the barrier island and back bay system not only during the storm, but for an extended period after the storm. When a breach opens, it tends to be relatively small, but if not closed quickly, will grow rapidly over time. As these breaches grow they also may migrate (move along the island) and can destroy buildings and other infrastructure on the barrier island. Breaches also impact the hydraulic stability of the existing inlets, which can result in increased sediment deposition in the inlet channels, and compromised navigability of the inlet. Of greatest impact however, is the hydrodynamic impact on the back bay. When a breach occurs, it increases flooding in the back bay environment due to water levels and storm activity, and this effect continues to increase as the breach grows.

Figure D-1. FIMP Study Area

D.2.2 Proposed Action

The key components to the proposed action are: Beach Restoration (Beach and Dune Fill), Sediment Management (including Inlet Modification), Groins (including Groin Modification), Breach Response Plan (BRP), Coastal Process Features, Non-Structural Methods, and Adaptive Management.

D.2.2.1 *Problem Identification*

The problems along the shorefront include storm damages due to erosion, wave attack, and flooding. Along the barrier island there is also the threat of barrier island overwash and breaching. Along the back bay, there is the threat of tidal flooding during no-breach conditions. Tidal flooding becomes worse when there is a breach of the barrier island, which allows for more storm surge from the ocean. These problems have occurred repeatedly in the past, resulting in damages to the built environment.

The principal problems are associated with extreme tides and waves that can cause extensive flooding and erosion both within barrier island and mainland communities. Breaching and/or inundation of the barrier islands also can lead to increased flood damages, especially along the mainland communities bordering Shinnecock, Moriches and Great South Bays. The following general conclusions can be made:

1. The greatest potential damages in the study area are along the mainland floodplain;
2. Among the mainland floodplain areas, Great South Bay is the most vulnerable to storm damages;
3. Along the mainland floodplain areas, specific measures need to be considered to address localized flooding;
4. The barrier island provides a high degree of protection to the mainland, which can be compromised by a breach. Specific measures need to be considered to address maintaining a stable barrier island;
5. Along the shorefront area, the area of greatest threat to storm damages under current conditions is Fire Island;
6. Along the shorefront, the potential for damages increases dramatically in all areas in the future;
7. It is clear from past degradation that storm damage reduction measures and coastal process features must be evaluated in conjunction to reestablish system functioning;
8. It is clear that reestablishment of longshore transport should be given priority, as feature over all other processes is contingent upon a balanced sediment transport system.

D.2.2.2 *Project Authorization*

The Fire Island Inlet to Montauk Point, New York, Combined Beach Erosion Control and Hurricane Coastal Strom Risk Management Project was originally authorized by the River and Harbor Act of 14 July 1960, and subsequently modified in accordance with Section 103 of the River and Harbor Act of 12 October 1962, Section 31 of the Water Resources Development Act (WRDA) of 1974, and Sections 103, 502, and 934 of the WRDA of 1986 (P.L. 99-662). This report is being prepared in response to Public Law (PL) 113-2 of January 29, 2013, Disaster Relief Appropriations.

D.2.2.3 *Preferred Alternative (Tentatively Selected Plan)*

Recent storm events, such as Hurricane Sandy and Hurricane Irene, have the left the dune and berm system along the south shore of Fire Island vulnerable, increasing the potential for overwash and breaching during future storm events. The proposed action has been developed to reinforce the existing dune and berm system along the island.

The key components to the proposed action are: Beach Restoration (Beach and Dune Fill), Sediment Management (including Inlet Modification), Groins (including Groin Modification), Breach Response Plan (BRP), Coastal Process Features, Non-Structural Methods, and Adaptive Management. A brief discussion of these key components follows.

Inlets: Fire Island, Moriches, Shinnecock

At Fire Island Inlet, Moriches Inlet, and Shinnecock Inlet, the TSP would authorize the continuation of current management along with ebb shoal dredging, outside the navigational channel, with downdrift placement. The deposition basin is a dredged area designed to capture sediment so that shoaling in navigable regions (e.g., the channel) would be minimized. Placement of a +13 foot dune and berm would occur in identified placement areas, as needed.

- Provides for sufficient sand bypassing across the three (3) inlets to ensure the natural longshore transport along the barrier islands.
- Continues the scheduled O&M dredging of the navigation channels at Fire Island, Moriches and Shinnecock Inlets, along with additional dredging of 73,000 to 379,000 cy from the ebb shoals of each inlet, outside of navigation channel, to obtain the required volume of sand needed for the by-passing.
- Bypassed sand is used to construct and maintain a +13 ft. NGVD dune and 90 ft. berm width in identified placement areas

Provides for monitoring to facilitate adaptive management changes in the future.

Mainland Non-Structural

The mainland non-structural plan consists of non-structural building retrofits, flood proofing, relocation, acquisition of approximately 4,400 structures (consisting of approximately 44 in Shinnecock Bay, 857 in Moriches Bay, and 3,110 in Great South Bay), and road raising in four locations totaling 5.91 miles in length, which will reduce flooding to 1,020 houses. The non-structural plan involves a 100-year level of protection for all structures inside the 10-year floodplain. Building retrofit measures are proposed, and could include limited relocation or buyouts based upon structure type and condition. The proposed TSP provides protection to each building identified as having a ground elevation below the baseline condition 10-year flood elevation. For each building identified for protection, the design flood elevation is the baseline condition 100-year flood elevation plus one foot of freeboard.

Barrier Islands

A variety of measures are proposed for the barrier islands, as described below.

Beach Restoration (Beach and Dune Fill, Berms, and/or Sand Bypassing). The TSP would include a nearly continuous beach and dune fill area along the developed shorefront areas that front Great South Bay and Moriches Bay. The minimum real estate impact baseline is proposed as the layout of TSP beachfill plan. This beach fill alignment closely follows the "natural" dune alignment and includes a realignment of the dune farther seaward in areas where multiple structures would need to be relocated or acquired in a more landward alignment. These areas include most of the developed communities in Fire Island with the exception of Cherry Grove and Water Island. Beachfill, berms, and sand bypassing are proposed as follows:

Fire Island at Developed Locations:
- +15 foot dune with berm, with post-Sandy optimized alignment;

Fire Island at Undeveloped Locations:
- @ Lighthouse (+13 foot dune and berm);
- @ Smith Point County Park East - sand bypassing;
- @ Smith Point County Park West – short-term beachfill in western, developed section;

Westhampton:

- Beachfill (+l5 foot dune with berm) fronting Moriches Bay.

Not all design subreaches are appropriate for beach fill. In areas where there is either an insignificant risk of breaching, no oceanfront structures, or relatively few structures, and/or lack of public access, beach fill was not considered. Subreaches where beach fill was not considered include Sailors Haven, Wilderness Area- West, Great Gun, Hampton Beach; and most of the shoreline between Shinnecock Inlet and Montauk Beach. The total initial fill for the TSP would be approximately 6.44 million cubic yards (see Table D-1). A 30-year commitment of Federal and non-Federal renourishment is proposed, which recognizes the potential for variable beach conditions between renourishment cycles. After 30 years, the Federal and non-Federal commitment would transition to a breach response plan for the remainder of the 50 years.

Table D-1. TSP Fill Volumes

Location	Plan	Volume (cubic yards)
Fire Island Inlet	Inlet Management	2,341,000
Moriches and Shinnecock Inlets	Inlet Management	1,061,000
Tiana Beach Area	Proactive BCP	1,326,000
Potato Road and Montauk	Sediment Management	240,000
Westhampton	Beachfill	923,000
Fire Island	Beachfill	549,000
Total		**6,440,000**

Breach Response Plan (BRP). The BRP recommends the Conditional BRP (consisting of a +9.5 foot berm only) in undeveloped areas of Fire Island. For areas along Shinnecock Bay, a Proactive and Reactive BRP (consisting of a +13 foot berm, with dune) is proposed. This plan includes restoring the template to the design condition when the shoreline is degraded to an effective width of 50 feet. This plan is created for areas where a breach is imminent.

- Proactive Breach Response is a plan where action is triggered when the breach and dune are lowered below a 25 year design level of risk reduction, and provides for restoration to the design condition (+13 ft. NGVD dune and 90 ft. berm). This plan is included on Fire Island in vicinity of the FIIS Lighthouse Tract, and in Smith Point County Park (to supplement when needed the sand bypassing), and Smith Point County Park West and also along the barrier island fronting Shinnecock Bay.

- Reactive Breach Response - is a plan where action is triggered when a breach has occurred, e.g. the condition where there is an exchange of ocean and bay water during normal tidal conditions. It will be utilized as needed when a breach occurs.

- Conditional Breach Response – is a plan that applies to the large, federally-owned tracts within Fire Island National Seashore, where the breach response team determines whether a breach should be closed. Conditional Breach closure provides for a 90 ft wide berm at elevation 9.5 ft. NGVD only.

Groin Modification Plan. Groin modification within the TSP would result in the tapering of the existing Westhampton groins and existing Ocean Beach groins, and the shortening of groins 1 through 13 in Westhampton, where 15 groins currently exist. Groins 1-8 would be shortened to 380 feet. Groins 9-13 would be shortened to 386 feet, 392 feet, 398 feet, 402 feet, and 410 feet, respectively. The shortening of 13 groins varying between 70-100 feet could release up to 2 million cubic yards of sand to be transported to the west. Therefore, this proactive plan could reduce the renourishment requirements for the shoreline downdrift of the groins.

Sediment Management Plans (including Inlet Modification Plan). Two high damaged areas, Downtown Montauk and Potato Road, were identified for a sediment management plan over a conventional beach nourishment project due to the lack of economic viability. This sediment management alternative will maintain the current coastal storm risk management and reduce conditions from getting worse by adding fill at each location every four years for 30 years. The material would be placed as advance fill on the seaward side of the berm which would serve as feeder beaches for locations farther to the west. The TSP recommended plan for inlet management includes the continuation of the authorized project at each inlet with increased sediment bypassing from the ebb shoal to offset the downdrift deficit. A long-term, monitoring and adaptive management plan, which is describe below, would allow for future changes or improvements to inlet management, over time.

Coastal Process Features. Collaborative planning supported by the IRG established specific objectives through the development of a Restoration Framework (USACE 2009). In a natural ecosystem, features such as barrier islands and dunes protect coastal lands and property, and reduce danger to human life, stemming from flooding and erosion, while establishing habitats important to coastal species. This framework called for the reestablishment of five coastal processes that are critical to the development and sustainability of the various coastal features (such as beaches, dunes, barrier islands and bluffs), which together form the natural system. The five Coastal Processes identified by the Framework as vital to maintain the natural coastal features are: Longshore Sediment Transport; Cross Island Sediment Transport; Dune Development and Evolution; Estuarine Circulation; and Bayside Shoreline Processes (USACE 2009).

Project Features that contribute to coastal storm risk management through the reestablishment of the coastal processes are included at six locations as follow:

- Sunken Forest – Reestablishes coastal protective features by reestablishing the natural conditions of dune, upper beach and bay shoreline by removing bulkhead adjacent to marina and existing boardwalk, regrading and stabilizing disturbed areas using bioengineering and shoreline.

- Reagan Property – Reestablishes coastal protective features by improving natural conditions of dune, upper beach and shoreline by burying bulkhead, regrading and stabilizing disturbed areas using bioengineering, and creating intertidal areas.

- Great Gunn – Reestablishes salt marsh features by reestablishing hydrologic connections and disturbances.
- Tiana – Reestablishes the bay shoreline natural protective features by reestablishing the dune, salt marsh, and enhancing the SAV beds.
- WOSI – Reestablishes the bay shoreline natural protective features by reestablishing the existing salt marsh.

Corneille Estates – Reestablishes bay shoreline natural storm risk management features including bayside beach habitat.

D.3 EXISTING ENVIRONMENT

The following sections provide a description of the invertebrate, finfish, bird, mammal, amphibian, and reptile species/communities that are in the same area as the proposed action.

D.3.1 Marine Offshore Ecosystem

The borrow areas are within the Marine Offshore Ecosystem. The Marine Offshore Ecosystem includes the Marine Offshore habitat, which consists of the deeper water areas of the Atlantic Ocean within the study area. With the exception of sea turtles and birds, all biota associated with the Marine Offshore habitat are exclusively aquatic. Aquatic biota that utilize the Marine Offshore habitat primarily include fish and benthic invertebrates, as well as marine mammals.

D.3.1.1 *Physical Description*

The Marine Offshore habitat is an oceanic area with water depths ranging from 10 to 30 m. The habitat is relatively homogeneous throughout the entire southern Long Island coastline from Rockaway Inlet, through FIIS and east to Montauk Point. The habitat includes pelagic and benthic zones which support different assemblages of organisms. The pelagic zone refers to the water column and organisms within it, whereas the benthic zone refers to the bottom or substrate and includes sediments and other material present on the ocean floor. The benthic zone substrate is primarily sand within the study area. Through geotechnical analyses, sand suitable for beach nourishment has been identified within the borrow areas.

D.3.1.2 *Marine Invertebrates*

Marine benthic invertebrates are bottom-dwelling species that can be grouped into two categories: infaunal (i.e., benthic invertebrates living within the substrate) and epifaunal (i.e., benthic invertebrates living on the surface of the substrate). Benthic invertebrates are found in the substrate of the borrow areas. Polychaetes (segmented worms with bristles) are an important component of the benthic infaunal community; epifaunal biota include amphipods, crabs, horseshoe crabs (*Limulus polyphemus*), echinoderms (e.g., sea stars, sand dollars), and bivalves (e.g., surf scallops [*Aequipecten sp.*], surf clams [*Spisula solidissima*]). Marine invertebrates provide an important food source for bottom feeding fish and also include species that are commercially and recreationally important. The benthic invertebrates of the Marine Offshore habitat include a variety of taxa common to generally clean, well-oxygenated, coarse sandy marine habitats.

D.3.1.3 *Finfish*

The Marine Offshore habitat supports a variety of pelagic and benthic finfish, some of which are recreationally or commercially important. The pelagic zone contains few truly resident fish populations; rather it is dominated primarily by a variety of migratory and highly mobile species including red hake (*Urophycis chuss*), scup (*Stenotomus chrysops*), Atlantic butterfish (*Peprilus triacanthus*), bluefish (*Pomatomus saltatrix*), and striped bass (*Morone saxatilis*). Similarly, benthic fish species that occur in the Marine Offshore habitat are largely mobile and migratory; important benthic species include both summer flounder (*Paralichthys dentatus*) and winter flounder (*Pseudopleuronectes americanus*).

D.3.1.4 *Marine Mammals*

The pelagic zone also provides habitat for marine mammals. The harbor seal (*Phoca vitulina*), which is listed as a protected species by New York State is the only marine mammal expected to frequent the Marine Offshore habitat within the study area. Marine mammals such as the right whale (*Eubalaena glacialis*; Federally Endangered) and pygmy-sperm whale (*Kogia breviceps*) may also use this habitat from time to time. Gray seals (*Halichoerus grypus*) may also be found in this habitat

D.3.1.5 *Reptiles*

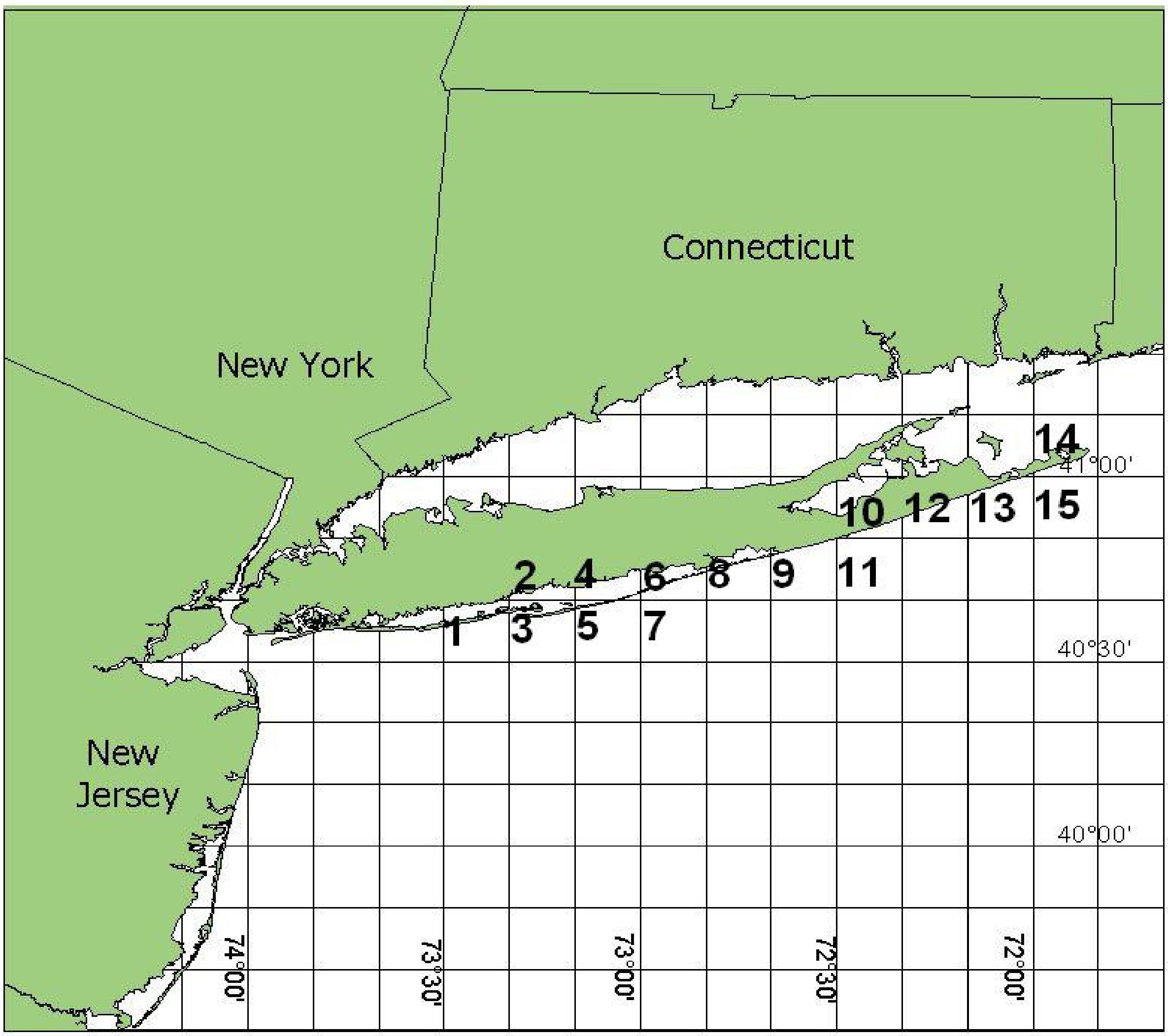
Several species of sea turtles, including Kemps Ridley turtle (*Lepidochelys kempii*, State and Federally Endangered), green sea turtle (*Chelonia mydas*; State and Federally Endangered), and loggerhead sea turtle (*Caretta caretta*; State and Federally Threatened) may also pass through the Marine Offshore habitat from time to time.

D.4 EFH SPECIES OVERVIEWS

This section describes the habitat requirements of the EFH-designated species, non-EFH designated fish and shellfish species that are important recreationally and commercially, and rare and endangered species that potentially occur within the project area. Specifically, Section D.4.1.1 provides individual species assessment of EFH-designated species.

D.4.1 EFH-Designated Species

EFH-designated species and life history stages in the project area were identified based on the lists in the NOAA Guide to EFH Designations in the Northeastern United States (NOAA 2008a) for the 10- minute by 10-minute areas of latitude and longitude (10’ by 10’ square) where project activity is proposed. The Study Area contains EFH for various life stages for up to 38 species of managed fish and protected invertebrate species. The NMFS has created a grid map overlay for areas that contain EFH within their jurisdiction, and provides species information for each species afforded EFH (NOAA 2008a). A map showing the fifteen grid squares associated with the Project study area and corresponding latitude and longitude coordinates is provided as Figure D-2. EFH descriptions for the species contained in the project area and life stages found within each grid square are provided in the below text. Species and life stages contained for each of the 15 grid squares within the project is provided as Attachment 1.



Source: NOAA 2008a

Figure D-2. Essential Fish Habitat Grids within the Project Study Area

D.4.1.1 *Bony Fishes*

Atlantic butterfish (*Peprilus triacanthus*)
Grid squares: 1-6, 8, 9, 10 All stages [Egg (E), Larvae (L), Juvenile (J), Adult (A)], 7 (E), 13 (L), 15 (J)

Primary Source: EFH Source Document by Cross et al. (1999)

All life stages are listed for Atlantic butterfish in the 10' by 10' squares. Butterfish are relatively small, fast-growing, short-lived, pelagic fish that form loose schools, often near the surface. Juveniles and adults are common in inshore areas, including the surf zone, as well as in sheltered bays and estuaries in the Mid-Atlantic Bight (MAB) during the summer and fall. Juveniles and adults are eurythermal and euryhaline, and are frequently found over sand, mud, and mixed substrates. Smaller juveniles often aggregate under floating objects and often live in the shelter of large jellyfish. Juvenile and adult butterfish in the MAB are typically found at depths ranging from 3 to 23 meters with water temperatures ranging from 8 to 26°C, salinities ranging from 19 to 32 ppt, and DO ranging from 3 to 10 mg/l. Butterfish eggs are buoyant and the larvae are nektonic.

Project Area: Juvenile and adult butterfish are common inhabitants of the water column in shallow water over sandy substrates in the MAB in the summer and fall and are therefore likely to occupy the project area during those seasons. However, butterfish are pelagic and even juveniles are highly mobile. In addition the dredging activities would be conducted in the late fall, winter and spring when Atlantic butterfish would less likely to be present. Therefore, no more than minimal impact to butterfish EFH is expected to occur as a result of the dredging activities associated with the proposed Project.

Atlantic salmon (*Salmo salar*)
Grid squares: 1-9 (A); 10 (J, A)

Primary Source: Page and Burr (1991)

Juvenile and adult Atlantic salmon are listed in the 10' by 10' grid squares within the project area. This species can be found in the temperate and arctic zones of the Atlantic Ocean in northern hemisphere. In the western Atlantic, they are distributed in coastal drainages from northern Quebec, Canada, to Connecticut, USA. In the eastern Atlantic, they are found in drainages from the Baltic States to Portugal. Accounts of landlocked stocks have been documented in Russia, Finland, Sweden, Norway, and North America. Atlantic salmon typically inhabit cooler waters (< 25°) with strong to moderate flow. Young remain in freshwater for 1 to 6 years, migrate to the ocean, and reside there for 1 to 4 years before returning to the river of their origin to spawn. After spawning, they return to sea. A diurnal species, juveniles feed mainly on aquatic insects, mollusks, crustaceans and fish, and adults at sea feed mainly on squid, shrimp, and fish. Adults approaching the reproductive stage do not feed once they enter the freshwater environment.

Project Area: These life stages of Atlantic salmon prefer colder waters (< 25°) and are generally observed in pelagic areas from Long Island Sound to the Gulf of Maine, which is outside the proposed dredging/nourishment areas. Therefore, little to no impact on Atlantic salmon or EFH is anticipated as a result of the dredging activities associated with the proposed Project.

Atlantic sea herring (*Clupea harengus*)
Grid squares: 1-6, 10-13 (J, A); 3 (A), 8 (L, J), 9 (J)

Primary Source: EFH Source Document by Stevenson and Scott (2005) –

Larvae, Juvenile and Adult Atlantic sea herring are listed in the 10’ by 10’ grid squares within the project area. The Atlantic herring is a small, pelagic, schooling, plankton-feeding species that inhabits both sides of the North Atlantic Ocean. Adult Atlantic sea herring migrate south into southern New England and mid-Atlantic shelf waters in the winter after spawning in the Gulf of Maine, on Georges Bank, and Nantucket Shoals. Juvenile and adult herring are abundant in coastal and mid-shelf waters from southern New England to Cape Hatteras in the winter and spring. In the spring, adults return north, but juveniles do not undertake coastal migrations. Larval herring are limited almost exclusively to Georges Bank and the Gulf of Maine waters. Larvae typically metamorphose the following spring into young-of-year (YOY) juveniles.

Project Area: Atlantic herring are pelagic species. During these life stages, Atlantic herring prefer higher salinities (26–32 ppt) and juveniles and adults (including spawning adults) are typically found at depths (15–130 meters) considerably deeper than the project depth. Therefore, no more than minimal impact on Atlantic sea herring or EFH is anticipated as a result of the dredging activities associated with the proposed Project.

Atlantic Mackerel (*Scomber scombrus*)
Grid squares: 1-6, 8, 9, 10 (All stages); 11E

Primary Source: EFH Source Document by Studholme, et. al. (1999)

All life stages of Atlantic mackerel are listed in the 10’ by 10’ grid squares within the project area. Atlantic mackerel are a fast swimming, pelagic schooling species that are distributed over the western Atlantic ocean in primarily open water. All life stages of this species are pelagic. EFH for this species is mostly pelagic waters over the Continental Shelf with salinities of greater than 25 ppt. However, Atlantic mackerel may be found in estuarine seawater zones. Juveniles may be found at varying levels of abundance in bays and estuarine areas from New Jersey north to Canada, and juveniles and adults are common in saline waters of the Hudson-Raritan estuary in the spring and fall. Atlantic mackerel are intolerant of temperatures below 5-6^{o}C or above 15-16^{o}C and undergo substantial seasonal migrations in response to changes in seawater temperature. In the fall Atlantic mackerel migrate to deeper offshore waters and return to inshore waters in the spring. Atlantic mackerel are opportunistic feeders that either select individual prey organisms or feed by filtering planktonic prey organisms when they are abundant. Juveniles eat mostly small crustaceans such as copepods, amphipods, mysid shrimp, and decapod larvae. They also feed on small pelagic mollusks (Spiratella and Clione) when available. Adults feed on the same food as juveniles but on a wider assortment of organisms and larger prey items. For example, euphausid, pandalid, and crangonid shrimp are common prey; chaetognaths, larvaceans, pelagic polychaetes and larvae of many marine species have been identified in Atlantic mackerel stomachs. Larger prey such as squid and a variety of fishes (silver hake, sand lance, herring, hakes, and sculpins) are not uncommon, especially for large Atlantic mackerel.

Project Area: In the fall Atlantic mackerel migrate to deeper offshore waters and would most likely not be present when in the dredging activities are to be conducted. All life stages of the Atlantic mackerel are pelagic and no more than minimal impact on Atlantic mackerel EFH is anticipated as a result of the dredging activities associated with the proposed Project.

Black sea bass (Centropristis striata)
Grid squares: 1,2,4,8 (A); 3 (L,J); 6,9,13,15 (J,A); 10, 11, 12, 14 (J)

Primary Source: EFH Source Document by Drohan et al. (2007)

Adult black sea bass are usually strongly associated with structured, sheltering habitats such as reefs and ship wrecks on the continental shelf. Their distribution changes seasonally as fish migrate from coastal areas to the outer continental shelf while water temperatures decline in the fall and from the outer shelf to inshore areas as water temperatures rise in the spring. Adult sea bass are very structure oriented, especially during their summer coastal residency. Adults only enter larger estuaries and are most abundant along the outer Atlantic coast. Larger fish tend to be found in deeper water than smaller fish. Adults on the Atlantic coast occupy waters greater than 65 feet MLW in the fall and 260 to 460 feet MLW in the winter and spring. Spawning occurs on the continental shelf, beginning in the spring off Cape Hatteras and progressing into the fall in the MAB and off southern New England. When larvae reach 10 to 16 mm total length (TL), they tend to settle and become demersal on structured inshore habitat such as sponge beds. In the MAB, recently settled juveniles move into coastal estuarine nursery areas between July and September. The estuarine nursery habitat of YOY black sea bass is relatively shallow, hard bottom with some kind of natural or man-made structure including amphipod tubes, eelgrass, sponges, and shellfish beds with salinities above 8 ppt. Black sea bass do not tolerate cold inshore winter conditions. Following an overwintering period presumably spent on the continental shelf, older juveniles return to inshore estuaries in late spring and early summer. They are uncommon in open, unvegetated, sandy intertidal flats or beaches.

Project Area: Due to the absence of three-dimensional structures in the borrow areas adult black sea bass are unlikely to occupy the borrow areas in significant numbers. Black sea bass migrate to deeper waters on the outer continental shelf in the fall and return in the spring and would likely to not be present during the time of the dredging activities. Therefore, no more than minimal impact on black sea bass or EFH is anticipated as a result of the dredging activities associated with the proposed Project.

Bluefin tuna (*Thunnus thynnus*)
Grid squares: 3,5,6-9,11-15 (J,A)

Source: Colette and Nauen (1983)

Adult and juvenile bluefin tuna are listed in the 10’ by 10’ grid squares within the project area. Juvenile bluefin tuna are a migratory pelagic species. In the western North Atlantic, bluefin tuna migrate seasonally from spring spawning grounds in the Gulf of Mexico to summer feeding grounds off the northeast U.S. coast. Bluefin tuna often occur over the continental shelf and in embayments, particularly during the summer months when they feed actively on herring, mackerel, and squids. Juveniles and adults are typically found in inshore and pelagic surface waters warmer than 12^{o}C from the Florida to Maine.

Project Area: The dredging activities are proposed during the fall, winter and spring seasons when juvenile and adult bluefin tuna would not be present in the borrow areas. Therefore, little to no impact on bluefin tuna or EFH is anticipated as a result of the dredging activities associated with the proposed Project.

Bluefish (Pomatomus saltatrix)
Grid squares: 1-3,5,6,8,10,12-15(J,A); 4,7(J); 11 (E,J,A); 9 (L,J,A)

Source: EFH Source Document by Shepherd and Packer (2006)
Eggs, juvenile and adult life stages are listed for bluefish are listed in the 10’ by 10’ grid squares within the project area. Bluefish are a pelagic species that travel in schools of like-sized individuals and undertake seasonal migrations, moving into the MAB during spring and south or farther offshore during fall. Within the MAB they occur in large bays and estuaries as well as across the entire continental shelf. Bluefish spawn offshore in open ocean waters. Juvenile bluefish are found in estuaries, bays, and coastal ocean waters in the MAB and South Atlantic Bight in many habitats. Typically they are found near shorelines, including the surf zone, during the day and in open waters at night. Like adults, they are active swimmers and feed on small forage fishes, which are commonly found in nearshore habitats. They remain inshore in water temperatures up to 30^{o}C and return to the continental shelf in the fall when water temperatures reach approximately 15^{o}C. Juvenile bluefish are associated mostly with sand, but are also found over silt and clay bottom substrates. They usually occur at salinities of 23 to 33 ppt, but can tolerate salinities as low as 3 ppt. Adults are generally oceanic but are found near shore as well as offshore. Adults usually prefer warm water (at least 14 to 16^{o}C) and full salinity. Juveniles and adults are present in the fall and prefer depths greater than 35 feet MLW. Eggs and larvae are present in the MAB during the summer and are more commonly found at depths greater than 100 feet MLW.

Project Area: Juvenile and adult bluefish are pelagic species and are expected to occupy the water column of the project area between the spring, summer and fall. Bluefish eggs and larvae would are not expected to occur in the project area. The dredging activities are proposed during the fall, winter and spring seasons when juvenile and adult bluefish would less likely to be present in the borrow areas. Therefore, no more than minimal impact to bluefish or EFH within the project area is expected to occur as a result of the dredging activities associated with the proposed Project.

Cobia (*Rachycentron canadum*)
Grid squares: 1-15 (All stages)

Primary Sources: Richards (1967), National Audubon Society (1983)

All life stages for cobia are listed in the 10’ by 10’ grid squares within the project area. Cobia is a southern species that overwinters near the Florida Keys and migrates in the spring and summer to the mid-Atlantic states to spawn. Adults are rarely found as far north as Massachusetts. EFH for this species is the South Atlantic and mid-Atlantic Bights. Cobia prefer coastal waters to the edge of the Continental Shelf and along the edge of the Gulf Stream around sandy shoals, offshore bars, high profile rock bottoms, barrier island ocean-side waters and coastal inlets. EFH for cobia has also been designated within high salinity bays, estuaries and seagrass habitat. Cobia are found in water temperatures that are greater than 20°C.

Project Area: Cobia are pelagic, warm water species and would only be found in the project area during the summer. This species is mobile, not demersal and, therefore, adults and juveniles would not subject to potential entrainment. The project area is the northern temperature limit for this species, therefore an occasional adult cobia may occur in the borrow areas during the summer, but other life history stages of this species are not likely to be found at the project area. The dredging activities are proposed during the fall, winter and spring seasons when the water temperatures are too cold for cobia to be present. Therefore, little to no impact to cobia or EFH is expected as a result of the proposed dredging activities associated with proposed Project.

Haddock (*Melanogrammus aeglefinus*)
Grid squares: 8,11,12,15 (L)

Primary Sources: EFH Source Document by Cargnelli et al. (1999d)

The larvae stage for Haddock are listed in the 10' by 10' grid squares within the project area. Larvae range in size from 2.0-4.99 mm in length. Haddock initially inhabit the upper reaches of the water column, feeding on pelagic prey (zooplankton). Larvae and early stage (pelagic) juveniles are passive foragers on less motile prey such as invertebrate eggs, copepods and phytoplankton. Juveniles undergo a transformation at age 3 to 5 months, after which they are closely associated with the bottom and feed on benthic prey. The egg and larval stages occur in the water column at depths of 10-50 m below the surface. Temperatures of 4-10^{o}C and high salinities, 34-36 ppt are preferred.

Project Area: Haddock larvae are not very mobile, and pelagic. Larvae density peaks in April and May. They may be present during with the project area; however, most of the larvae are likely to be encountered at greater depths (30-50 m). Therefore, minimal impact is expected to Haddock.

King and Spanish mackerel (*Scomberomorus cavalla and S. maculatus*)
Grid squares: 1-15 (All stages)

Primary Sources: Godcharles and Murphy (1986), Collette and Nauen (1983)

All life stages are listed for the King and Spanish mackerels are listed in the 10' by 10' grid squares within the project area. King and Spanish mackerels are highly migratory, epipelagic, neritic fish that migrate north from Florida as far as the Gulf of Maine in the summer and fall. King mackerel spawn in coastal waters of the Gulf of Mexico and off the South Atlantic coast. Thus, only a few adults of this species would be expected to inhabit MAB coastal waters. In contrast, Spanish mackerel spawn as far north as Sandy Hook and Long Island in late August to late September. King and Spanish mackerel are found in water temperatures that are greater than 20°C.

Project Area: Due to the migratory and epipelagic nature of the Spanish and king mackerels and their regional distribution pattern, it is unlikely that adult Spanish and king mackerels will pass through the project area, and occurrences of early life stages of these species would be rare in the project area. The dredging activities are proposed during the fall, winter and spring seasons when the water temperatures are too cold for king and Spanish mackerel to be present. Therefore, little to no impact to king and Spanish mackerel or EFH is expected as a result of the proposed dredging activities associated with proposed Project.

Monkfish (*Lophius americanus*)
Grid squares: 1-15 (E,L)

Primary Source: EFH Source Document by Steimle et al. (1999a)

The egg and larvae life stages of the monkfish (also known as goosefish) are listed in the 10’ by 10’ grid squares within the project area. Monkfish are solitary fish that make seasonal onshore–offshore migrations in response to water temperature and can be found over a variety of substrates. Spawning locations are not well known but are thought to be on inshore shoals and in offshore SNE, MAB, and Gulf of Maine shelf waters. Monkfish eggs are contained in long mucus veils that float at or near the surface between March and September and are found in waters ranging from 15 to 1000 m deep. They are rarely collected in surveys but have been reported in open coastal bays and sounds (e.g., Long Island Sound) in low numbers. Monkfish larvae are a common component of the ichthyoplankton community in the MAB and southern New England (SNE) areas. Larvae have been collected in offshore waters in the MAB during March and April and are most often observed in water depths between 25 and 1000 m. Larvae have been found off southern New Jersey, south of Long Island, in the MAB at depths of 30 to 300 feet MLW, and off SNE.

Project Area: Based on their range of habitat utilization, and that these life stages are not typically found in waters of depths < 15 meter. The dredging activities are proposed during the fall, winter and spring seasons when the likelihood of monkfish eggs and larvae occurring in the borrow areas is minimal. Therefore, no more than minimal impact on monkfish or EFH is anticipated as a result of the proposed dredging activities associated with proposed Project.

Ocean pout (*Macrozoarces americanus*)
Grid squares: 1-3,5,7-13,15 (E,L)

Primary Source: EFH Source Document by Steimle et al. (1999d)

Eggs and larvae of Ocean pout are listed in the 10’ by 10’ grid squares within the project area. Ocean pout is a bottom-dwelling species that occurs in cool waters (< 10^{o}C) across the continental shelf from Labrador to Cape Hatteras It is non-migratory, but it will move seasonally to remain at preferred temperatures. The eggs are demersal and laid in gelatinous masses in a sheltered place on the bottom, such as rocky crevices, where they are guarded either by one or both parents until hatching. Egg development is about 2-3 months, but incubation time is temperature dependent and is shorter in the warmer MAB. Most of the population spawns in the fall and hatching occurs by mid-winter. The larvae are about 30 mm long at hatching and are relatively advanced in development. Adult ocean pout remain demersal and are not known to form schools or aggregations. In the Middle Atlantic Bight, ocean pout uses rocky habitats during some seasons. Adult ocean pout feed on a variety of benthic invertebrates, including polychaetes, mollusks, crustaceans, and echinoderms. Although ocean pout moves seasonally among habitats within a region, this species is considered nonmigratory.

Project Area: Ocean pout eggs and larvae would be found in the project area. Because the eggs and larvae are demersal, it is likely that they would be impacted by dredging operations.

Pollock (*Pollachius virens*)
Grid squares: 1-6,10 (J)

Primary Source: EFH Source Document by Cargnelli et al. (1999b)

Juvenile pollock are listed in the 10’ by 10’ grid squares within the project area. EFH for this species includes the waters from the Gulf of Maine south to New Jersey. This demersal species prefers colder (<18°C) pelagic waters and are observed from surface depths to 365 meters. Individuals normally spend their first two years in nearshore coastal waters and then migrate out to deeper waters. Juvenile pollock are found over a variety of bottom habitats with aquatic vegetation or a substrate of sand, mud or rocks. Juveniles feed primarily on crustaceans with nematodes, fish and annelids also making up a portion of their diet.

Project Area: Juvenile pollock will likely occupy the project area when water temperatures are less than 18°C. The dredging activities are proposed during the fall, winter and spring seasons when juvenile pollock are likely to be present. This species is heavily fished commercially and has demonstrated ongoing resilience therefore, no more than minimal impact on pollock or EFH is anticipated to occur within the proposed project area.

Red hake (*Urophycis chuss*)
Grid squares: 1,3,5,8-11,13,15 (E,L,J); 7(E,L); 6(J)

Primary Source: EFH Source Document by Steimle et al. (1999b)

Red hake eggs, larvae and juveniles are listed in the 10’ by 10’ squares for grid squares within the project area. Red hake occur in continental waters from the Gulf of St. Lawrence to the mid-Atlantic States. Red hake spawn offshore in the MAB in the summer, primarily in southern New England. The distribution of eggs is unknown because they cannot be distinguished from other hakes. However, EFH for eggs is defined as surface temperatures less than 10°C and salinity less than 25 ppt. Hake eggs are buoyant and are common in the upper water column of the MAB from May to November with peaks in June and July. Red hake larvae are a dominant species in the ichthyoplankton in the middle to outer continental shelf of the MAB during the summer at temperatures of 8 to 23°C and depths between 10 and 200 m. After larvae metamorphose into juveniles they are pelagic for about two months before settling to the bottom. Demersal settlement generally occurs between September and December with peaks in October to November. Juveniles are found in bottom environments and are commonly associated with scallops, surf clam shells, and seabed depressions where they seek shelter. Red hake juveniles are typically found in water temperatures below 16° C, depths less than 100 meters and a salinity range from 31 to 33 ppt. Adults prefer depths from 100 to 425 feet and temperatures between 2 to 22°C. Adults are typically associated with sand-mud bottom in holes and depressions. Both juveniles and adults make seasonal migrations in response to changes in water temperatures.

Project Area: Although red hake eggs (including eggs of other hake species) are found in the project area from May to November they are buoyant and would therefore not be present on the bottom where the dredging activities would take place. Red hake larvae are pelagic and would also not be present on the bottom where the dredging activities would take place. Juvenile red hake would be present in the bottom habitats during the time of year when the dredging activities are proposed and could therefore be impacted by the dredging activities.

Scup (*Stenotomus chrysops*)
Grid squares: 1-9, 11-15(J,A); 10(All stages)

Source: EFH Source Document by Steimle et al. (1999c)
The juvenile and adult life stages for scup are listed in the 10’ by 10’ grid squares within the project area. Scup spawn along the inner continental shelf from Delaware Bay to SNE between May and August, mainly in bays and sounds in and near SNE. YOY juveniles are commonly found from the intertidal zone to depths of about 30 m in portions of bays and estuaries where salinities are above 15 ppt. Juvenile scup appear to use a variety of coastal intertidal and subtidal sedimentary habitats during their seasonal inshore residency, including sand, mud, mussel beds, and eelgrass beds. Adult scup are common residents in the MAB from spring to fall and are generally found in schools on a variety of habitats, from open sandy bottom to structured habitats such as mussel beds, reefs or rough bottom. Larger adults are found in deeper waters while smaller sized adults are typically found in bays and estuaries. Adults move inshore during early May and June between Long Island and Delaware Bay. As inshore water temperatures decline to < 8 to 9^{o}C adult and juvenile scup leave inshore waters and move to warmer waters on the outer continental shelf south of the Hudson Canyon off New Jersey and along the coast from south of Long Island to North Carolina in depths ranging from 75- 185 m. Both juvenile and adults are demersal but have also been observed at the water surface.

Project Area: Adult and juvenile scup would be found in the borrow areas during the warmer seasons but migrate offshore to deeper waters when the water temperature falls. The dredging activities are proposed during the fall, winter and spring seasons when juvenile and adult scup are less likely to be present. Therefore, no more than minimal impact on scup or EFH is anticipated as a result of the proposed project.

Skipjack tuna (_Katsuwonus pelamis_)
Grid squares: 1,3-13,15(A)

Source: Colette and Nauen (1983)

Adult skipjack tuna are listed in the 10’ by 10’ grid squares within the project area. Skipjack tuna are a highly migratory, circumglobal pelagic fish that inhabit tropical and warm-temperate waters and are generally limited by the 15°C isotherm. Skipjack tuna are often found in mixed schools with bluefin tuna of the same size. Like bluefin tuna, skipjack tuna often occur over the continental shelf and in embayments, particularly during the summer months when they feed actively on herring, mackerel, and squid. In the MAB, adults typically occur in pelagic waters where water temperatures range from 20 to 31°C.

Project Area: Skipjack tuna are highly migratory and pelagic, and may be present in the project area during the warmer summer months when the water temperature is above 20°C. The dredging activities are proposed during the fall, winter and spring seasons when adult skipjack tuna are not likely to be present. Therefore no impact on skipjack tuna or EFH is anticipated as a result of the proposed project.

Summer flounder (*Paralichthys dentatus*)
Grid squares: 1-4,11,14 (J,A); 7,12,13,15 (A); 5,10 (L,J,A); 6,8,9 (All stages)

Primary Source: EFH Source Document by Packer et al. (1999)
Larvae, juvenile and adult summer flounder are listed in the grid squares within the project area. Summer flounder exhibit strong inshore–offshore movements with adult and juveniles normally inhabiting shallow coastal and estuarine waters during the warmer months of the year and moving offshore during the fall and winter. Summer flounder eggs are planktonic and buoyant. Summer flounder eggs were collected in the highest numbers from fall to early winter. Planktonic larvae and post-larvae derived from offshore fall and winter spawning migrate inshore, entering coastal and estuarine nursery areas to complete transformation. Juveniles are distributed inshore and occupy many estuaries during spring, summer, and fall. Some juveniles remain inshore for an entire year before migrating offshore, while others move offshore in the fall and return the following spring. Juvenile summer flounder utilize several different estuarine habitats such as marsh creeks, seagrass beds, mud flats, and open bay areas. As long as other conditions are favorable, substrate preferences and prey availability are the most important factors affecting distribution. Some studies indicate that juveniles prefer mixed or sandy substrates, others show that mud and vegetated habitats are used. Adults are reported to prefer sandy habitats, but can be found in a variety of habitats with both mud and sand substrates. Habitat areas of particular concern (HAPC) for summer flounder include, "All native species of macroalgae, seagrasses, and freshwater and tidal macrophytes in any size bed, as well as loose aggregations, within adult and juvenile summer flounder EFH is HAPC. If native species of SAV are eliminated then exotic species should be protected because of functional value, however, all efforts should be made to reestablish native species."

Project Area: Given their association with sandy substrates and the fact that they feed on a variety of bottom-dwelling invertebrates and fish species that occupy the project area, juvenile and adult summer flounder are expected to occupy the project area during the late spring, summer and fall. Early stage juveniles may be present year round. Older juveniles and adults are wary and very capable of high degrees of mobility and would likely avoid the dredge by swimming away. Small juveniles tend to seek protection in structure or by "hiding in plain sight" via cryptic coloration. Juveniles in the path of the dredge might be impacted. Because the project area does not offer SAV or other types of cover large numbers of early stage juveniles are not expected. Therefore, no more than minimal impact on summer flounder or EFH is anticipated as a result of the proposed dredging activities associated with proposed Project.

Whiting (*Merluccius bilinearis*)
Grid squares: 1,3,5-9,11,13-15(E,L,J); 10 (All stages); 12 (E,L)

Primary Source: EFH Source Document by Lock and Packer (2004)

Egg, larval and juvenile life stages for whiting are listed for the 10' by 10' grid squares within the project area. Whiting, or silver hake, spawn on the outer continental shelf where eggs and larvae are primarily found in surface waters. Primary spawning grounds apparently occur between Cape Cod and Montauk Point, New York, on the southeastern slope of Georges Bank, and in Massachusetts Bay. Significant egg production occurs during May to October, with a peak in August. Whiting eggs are pelagic and hatch in about two days. Juveniles are common during spring and summer in relatively shallow waters in SNE and south of Long Island. Coastal waters off New Jersey, Long Island, and Rhode Island are centers of abundance in the fall. During spring and summer, whiting move into nearshore waters in the Gulf of Maine, to the northern edge of Georges Bank, and northward in the Middle Atlantic Bight. Juvenile and adult whiting migrate to deeper waters of the continental shelf as water temperatures decline in the autumn and return to shallow waters in spring and summer to spawn. The pattern for juveniles is similar to adults in general distribution and movements, except that the centers of juvenile abundance occur in shallower waters. Generally, the following conditions exist where most whiting juveniles are found: water temperatures below 21° C, depths between 20 and 270 meters and salinities greater than 20‰. Juveniles as well as adults utilize bottom habitats of all substrate types.

Project Area: Eggs and larvae are typically dispersed in deeper water, and therefore are not likely to occur in the project area in significant numbers. Based on their range of habitat utilization, juvenile whiting can be expected to occupy the bottom habitats in project area in the spring and summer. The dredging activities are proposed during the fall, winter and spring seasons when juvenile whiting would be less likely to be present in the project area. Therefore, no more than minimal impact on whiting or EFH is anticipated as a result of the dredging activities associated with proposed Project.

Windowpane flounder (*Scophthalmus aquosus*)
Grid squares: 1-12,15 (All stages); 13 (E,J,A); 14 (J,A)

Primary Source: EFH Source Document by Chang et al. (1999)

All life stages for windowpane flounder are listed in the 10’ by 10’ grid squares within the project area. Windowpane flounder are a shallow water mid- and inner-shelf species found primarily between Georges Bank and Cape Hatteras on bottom habitats with a substrate of mud or fine grained sand. Spawning occurs on inner shelf waters, including many coastal bays and sounds, and on Georges Bank. Windowpane flounder eggs and larvae are often observed in the MAB from February to November with peaks in May and October. Windowpane eggs are buoyant and are found in surface waters. Larvae are initially planktonic then settle to the bottom. Juveniles and adults are similarly distributed. They are found in most bays and estuaries south of Cape Cod throughout the year at depths less than 100 meters, bottom temperatures (3 to 12°C in the spring and 9 to 12°C in the fall), and salinities (5.5 to 36 ppt). Juveniles that settle in shallow inshore waters move to deeper offshore waters as they grow. Adults occur primarily on sand substrates off SNE and MAB. Juveniles and adults are common in the MAB throughout the year. YOY and older juveniles are common within 100 feet of shore.

Project Area: Juvenile and adult windowpane are commonly found on shallow, sandy substrates and are expected to occupy the project area throughout the year. Since this species spawns in inner shelf and nearshore waters, eggs and larvae are expected be found in the project area at all time of the year except during the winter. Smaller, YOY juveniles prefer shallow water, and therefore are less likely to occupy the project area than adults and older juveniles. No more than minimal impact to windowpane or EFH within the project area is expected to occur as a result of the dredging activities associated with the proposed Project.

Winter flounder (*Pseudopleuronectes americanus*)
Grid squares: 1-15 (All stages)

Primary Source: EFH Source Document by Pereira et al. (1999)

All life stages for winter flounder are listed in the 10' by 10' grid squares within the project area. Winter flounder are a small-mouthed, right-eyed flounder that is a valuable commercial and recreational species. They are found in the northwest Atlantic coast from Labrador to Georgia. Winter flounder spawning occurs from late winter through early spring, peaking south of Cape Cod in February and March. The eggs of the winter flounder are typically found at depths of less than five meters in bottom habitats in a broad range of salinity (10–30 ppt), with seasonal abundance from January to May. Eggs are adhesive and demersal and are deposited on a variety of substrates, but sand is the most common; they have been found attached to vegetation and on mud and gravel. The larvae of the winter flounder are typically found at depths of less than six meters in pelagic and bottom waters in a broad range of salinity (10–30 ppt), with seasonal abundance from March to July. Larvae are negatively buoyant and nondispersive; they sink when they stop swimming. Thus, recently settled YOY juveniles are found close to spawning grounds and in high concentrations in depositional areas with low current speeds. YOY juveniles migrate very little in the first summer, move to deeper water in the fall, and remain in deeper cooler water for much of the following year. Habitat utilization by YOY is not consistent across habitat types and is highly variable among systems and from year to year. Several field and lab studies suggest a "preference" for muddy/fine sediment substrates where they are most likely to have been deposited by currents. Adult winter flounder prefer temperatures of 12 to 15° C; DO concentrations greater than 2.9 mg/l, and salinities above 22 ppt, although they have been shown to survive at salinities as low as 15 ppt. Mature adults are found in very shallow waters during the spawning season.

Project Area: The sandy habitat of the borrow areas may provide suitable spawning habitat for this species. In addition, winter flounder would also spawn on the neighboring shoal areas. Due to their range of habitat utilization, juveniles may also be found in the borrow areas throughout the year. Adults are expected to occupy the borrow areas during the fall, winter, and spring, and migrate offshore during the summer. Winter flounder would be expected to be present on the bottom habitats while dredging activities are proposed to take place. Adults and larger juveniles may be able to avoid the hydraulic dredge by swimming away. However, if present, eggs and larvae would most likely be entrained by the hydraulic dredge.

Witch flounder (*Glyptocephalus cynoglossus*)
Grid squares: 11,12,15 (L); 8,9(E)

Primary Source: EFH Source Document by Cargnelli et. al. (1999e)
Eggs and larvae life stages of witch flounder are listed in the 10' by 10' grid squares within the project area. Spawning occurs at or near the bottom, however the buoyant eggs rise into the water column where subsequent egg and larval development occurs. In the MAB spawning occurs from April to August, peaking in May or June and the most important spawning grounds are off Long Island. The main food items in the witch flounder diet are polychaetes and crustaceans, although mollusks and echinoderms are also important. The witch flounder is a deep water fish inhabiting depths down to approximately 1500 m. The egg and larval stages are pelagic, generally over deep water, at temperatures ranging from about 4 to 13oC. When metamorphosis is complete, juveniles settle to the bottom. Juveniles and adults are found at temperatures ranging from about 0 to 15°C. They are found over mud, clay, silt, or muddy sand substrates at depths ranging from 20 to 1565 m. This close association with soft substrate may be the result of their preference for polychaete prey.

Project Area: Although eggs and larvae life stages of Witch flounder may be found within the project area, eggs are pelagic and larvae are pelagic until eye development occurs and they become demersal. Because of their preference for muddy bottoms, they would not likely be found in the clean sand areas that would be used for dredging. Thus, the witch flounder would not likely be impacted by dredging operations.

Yellowtail flounder (*Limanda ferruginea*)
Grid squares: 5,7,13 (E,A); 12 (E,L); 3 (E); 9,11,15 (All stages); 8 (E,L)

Primary Source: EFH Source Document by Johnson et al. (1999)

All life stages for yellowtail flounder are listed in the grid squares within the project area. The yellowtail flounder is a small- mouthed, thin bodied fish that inhabits waters along the Atlantic coast of North America from the Gulf of St. Lawrence, Labrador, and Newfoundland to the Chesapeake Bay. Yellowtail flounder occupy continental shelf bottom environment on the Atlantic coast between depths typically being from 20 to 50 meters. Adults prefer sand or sand–mud sediments. Spawning takes place from March through August, but occurs during March to May in the MAB. Generally, the following conditions exist where yellowtail eggs are found: sea surface temperatures below 15° C, water depths from 30 to 90 meters and a salinity range from 32.4 to 33.5 ppt. Yellowtail flounder eggs are most often observed during the months from mid-March to July, with peaks in April to June in southern New England. Eggs are buoyant, spherical and are pelagic. Larvae are initially pelagic then become benthic.

Project Area: Based on their range of habitat utilization, all life stages for yellowtail flounder can occur in the project areas. Yellowtail flounder would be expected to be present on the bottom habitats while dredging activities are proposed to take place. Adults and larger juveniles may be able to avoid the hydraulic dredge by swimming away. However, if present, eggs and larvae would most likely be entrained by the hydraulic dredge.

Yellowfin Tuna (*Thunnus albacares*)
Grid squares: 15 (J,A)
Source: USDOC (1999b)

Juvenile and adult yellowfin tuna are listed in the 10’ by 10’ grid squares within the project area. Atlantic yellowfin tuna are circumglobal in tropical and temperate waters. In the west Atlantic they range from 45° N to 40° S. Yellowfin tuna is an epipelagic, oceanic species, found in water temperatures between 18° and 31° C. It is a schooling species, with juveniles found in schools at the surface, Larger fish are found in deeper water and also extend their ranges into higher latitudes. Atlantic yellowfin tuna are opportunistic feeders. Stomachs have been found to contain a wide variety of fish and invertebrates Yellowfin tuna are believed to feed primarily in surface waters down to a depth of 100 m.

Project area: Yellowfin Tuna are highly migratory and epipelagic, and may be present in the project area. No impact on yellowfin tuna or EFH is anticipated as a result of the proposed project.

D.4.1.2 *Cartilaginous Fishes*

Basking shark (*Cetorhinus maximus*)
Grid squares: 13, 15 (J)
Source: USDOC (1999b)

Late juvenile life stages for the basking shark are listed in the 10’ by 10’ grid squares within the project area. The basking shark is the second largest fish in the world, and is a filter-feeding plankton eater. It is a migratory species of the subpolar and cold temperate seas throughout the world, spending the summer in high latitudes and moving into warmer water in winter. In spite of its size and local abundance in summer, its habits are very poorly known. Late juvenile basking sharks are found offshore the mid-Atlantic United States south of Nantucket Shoals at 70° W to the north edge of Cape Hatteras, NC at 35.5° N in waters 50 to 200 m deep; associated with boundary conditions created by the western edge of the Gulf Stream.

Project Area: EFH is designated within the project grid for basking shark late juveniles. Basking sharks are a cosmopolitan migratory, slow-moving pelagic species and will most likely be able to avoid the hydraulic dredge. Therefore, little to no impact to basking shark or EFH is anticipated as a result of the dredging activities associated with the proposed Project.

Blue shark (*Prionace glauca*)
Grid squares: 3,5,7,9,11,13,14,15 (L,J,A); 1,2,4,10,12(A); 6,8 (L,A)

Source: USDOC (1999b) and Compagno (1984)

Early juvenile, late juvenile and adult life stages for the blue shark are listed in the 10’ by 10’ grid squares within the project area. Blue shark is an oceanic–epipelagic, fringe–littoral, cosmopolitan species, occurring throughout the tropical, subtropical, and temperate open waters. Atlantic blue sharks are highly migratory with a regular clockwise trans-Atlantic migration route following the warm Gulf Stream waters. The general range of blue shark is from Argentina to Newfoundland in the western Atlantic. The temperature preference of blue shark is between 7 to 18°C.

Project Area: EFH is designated within the project grid for blue shark early juveniles, late juveniles, and adults. Blue sharks are a pelagic, highly mobile species and will most likely be able to avoid the hydraulic dredge. Therefore, little to no impact to blue shark or EFH is anticipated as a result of the dredging activities associated with the proposed Project.

Common Thresher Shark (*Alopias vulpinus*)
Grid squares: 3,5,7,9,11,13,15 (L,J,A)

Source: USDOC (1999b)

Early juvenile, late juvenile and adult life stages for the common thresher shark are listed in the 10' by 10' grid squares within the project area. The common thresher shark is cosmopolitan in warm and temperate waters. It is found in both coastal and oceanic waters. It is a large shark that uses its tremendously large tail to hit and stun the small schooling fishes upon which it feeds. Common thresher shark is found Offshore Long Island, NY and southern New England in the northeastern United States, in pelagic waters deeper than 50 m, between 70° W and 73.5° W, south to 40° N.

Project Area: EFH is designated within the project grid for common thresher shark early juveniles, late juveniles, and adults. Common thresher sharks are a pelagic, highly mobile species and will most likely be able to avoid the hydraulic dredge. Additionally, they are typically encountered at greater depths than where dredging will occur. Therefore, little to no impact to common thresher shark or EFH is anticipated as a result of the dredging activities associated with the proposed Project.

Dusky Shark (*Carcharhinus obscurus*)
Grid squares: 1,3,5-9, 11,12,14,15 (L,J); 2,4,10,13 (L)

Source: USDOC (1999b) and Compagno (1984)

Early juvenile and late juvenile life stages for the dusky shark are listed in the 10' by 10' grid squares within the project area. The dusky shark is a large, highly migratory species that is common in warm and temperate continental waters throughout the world. Although nursery areas are in coastal waters, dusky sharks do not prefer areas with reduced salinities and tend to avoid estuaries. Dusky sharks are viviparous. Females move inshore to drop their young and then return to deeper water.

Project Area: Although migratory and pelagic, dusky sharks spawn in nearshore waters, and therefore juveniles may occur in the project area. Juvenile dusky sharks are a mobile species and will most likely be able to avoid the hydraulic dredge. No more than minimal impact to dusky shark or EFH is anticipated as a result of the dredging activities associated with the proposed Project.

Sand tiger shark (*Carcharias taurus*)
Grid squares: 1-15(L)

Source: Compagno (1984) and USDOC (1999b)

The early juvenile life stage for the sand tiger shark is listed in the 10' by 10' squares for both borrow areas. Sand tiger sharks are commonly found in coastal embayments and nearshore waters from the surf zone to the outer continental shelves from the surface to a minimum of 600 feet. This species exhibits a preference for near-bottom habitats but often occurs in midwater or surface zones. Sand tiger sharks typically feed on bony fishes, small sharks, rays, squids, crabs, and lobsters. EFH for early juveniles (≤125 cm) is shallow coastal waters to 25 meters deep from Barnegat Inlet, NJ south to Cape Canaveral, FL.

Project Area: Early juvenile sand tiger sharks can be present in the near-bottom habitats as well as other parts of the water column in the location of the three borrow areas. Early juvenile sand tiger sharks are a mobile species and will most likely be able to avoid the hydraulic dredge. No more than minimal impact to sand tiger shark or EFH is anticipated as a result of the dredging activities associated with the proposed Project.

Sandbar shark (*Carcharinus plumbeus*)
Grid squares: 1-15 (L,J,A)

Source: Compagno (1984) and USDOC (1999b)

Early juvenile, late juvenile and adult life stages for the sandbar shark are listed in the 10' by 10' grid squares within the project area. The sandbar shark is an abundant, coastal–pelagic shark of temperate and tropical waters that occurs inshore and offshore. It is found on continental and insular shelves and is common at bay mouths, in harbors, inside shallow muddy or sandy bays, and at river mouths, but tends to avoid sandy beaches and the surf zone. Sandbar sharks migrate north and south along the Atlantic coast, reaching as far north as Massachusetts in the summer. Sandbar sharks bear live young in shallow Atlantic coastal waters between Great Bay, New Jersey, and Cape Canaveral, Florida. The young inhabit shallow coastal nursery grounds during the summer and move offshore into deeper, warmer water in winter. Late juveniles and adults occupy coastal waters as far north as southern New England and Long Island.

Project Area: Habitat preference and distribution of this species make it possible that adults and juveniles may occur at the project site. Sandbar sharks are a mobile species and will most likely be able to avoid the hydraulic dredge. No more than minimal impact to sandbar shark or EFH is anticipated as a result of the dredging activities associated with the proposed Project.

Shortfin mako shark (*Isurus oxyrichus*)
Grid squares: 1,12,14(J); 3,5,7,11,15 (L,J,A); 8,9,13 (L,J)

Sources: Compagno (1984) and USDOC (1999b)

Early juvenile, late juvenile and adult life stages for the shortfin mako shark are listed in the grid squares within the project area. Shortfin mako shark is a common, extremely active, offshore littoral and epipelagic species found in tropical and warm temperate waters that is seldom found in waters below 16°C. In the extreme northern and southern parts of its range, this species migrates with warm water masses in the summer. Very little is known about the life history of this species, but nursery areas are believed to be located in deep tropical waters.

Project Area: Habitat preference and distribution of this species make it possible that adults and juveniles may occur at the project site. Shortfin mako sharks are a mobile species and will most likely be able to avoid the hydraulic dredge. No more than minimal impact to shortfin mako shark or EFH is anticipated as a result of the dredging activities associated with the proposed Project.

Spiny dogfish (*Squalus acanthias*)
Grid squares: 14 (J,A); 15(J)

Source: Stehlik 2007

Birth occurs offshore in fall or winter. The pups at birth range from 20-33 cm in total length, with the majority at 26-27 cm. Spiny dogfish feed on squid and fish throughout life. They tend to eat small size classes or young fish, and as they grow they eat larger individuals of the same species. Squid are a major part of the diet in all geographical areas except for the Mid-Atlantic. Worldwide, spiny dogfish favor the temperature range of 7-15°C . Migrations may be over great distances in order to seek out preferred conditions. The mean salinity in locations where they are caught is 33.5 ppt. Large females are abundant on the nearshore shelf and in lower salinities, perhaps to allow maximal growth of their embryos in warmer coastal waters. Juveniles are mainly pelagic and oceanic. Adults are demersal and pelagic, and spawning adults are pelagic or demersal on the outer continental shelf.

Project Area: Juvenile and adult Spiny dogfish may be present if the project area. However, they are mobile and would not likely be impacted by dredging operations.

Tiger shark (*Galeocerdo cuvieri*)
Grid squares: 3,5,6-9,11-13,15 (L,J); 10 (J); 1 (L)

Sources: Compagno (1984) and USDOC (1999b)

Early juvenile and late juvenile life stages for the tiger shark are listed in the 10’ by 10’ grid squares within the project area. Tiger sharks typically inhabit tropical and sub-tropical waters on or adjacent to the continental and insular shelves and makes seasonal migrations into warm temperate waters. This species occupies different marine habitats, but seems to prefer turbid waters. The nurseries for this species appear to be in offshore areas, but have not been described.

Project Area: Habitat preference and distribution of this species make it possible that juvenile tiger shark may occur at the project site. Tiger sharks are a mobile species and will most likely be able to avoid the hydraulic dredge. No more than minimal impact to tiger shark or EFH is anticipated as a result of the dredging activities associated with the proposed Project.

White shark (*Carcharodon carcharias*)
Grid squares: 3,5-13,15(J)

Sources: Compagno (1984) and USDOC (1999b)

The late juvenile life stage for the white shark is listed in the 10' by 10' grid squares within the project area. EFH for these large, apex predators includes pelagic northern New Jersey and Long Island waters of depths between 25 and 100 meters. The white shark is a cosmopolitan, non-schooling species that is primarily a coastal and offshore inhabitant of continental and insular shelves. This species is often found close inshore to the surf line but may also occur off oceanic islands. White sharks typically feed on bony fishes, other sharks, rays, seals, dolphins and porpoises, sea birds, carrion, cephalopods, crabs and whales.

Project Area: Habitat preference and distribution of this species make it possible that late juvenile white shark may occur at the project site. White sharks are a highly mobile species and will most likely be able to avoid the hydraulic dredge. Therefore, no impact to white shark or EFH is anticipated as a result of the dredging activities associated with the proposed Project.

D.4.1.3 *Invertebrate Species*

Atlantic surf clam (*Spisula solidissima*)
Grid squares: 1,3,5,7,13,15 (J,A); 9,11 (A)

Primary Source: EFH Source Document by Cargnelli et al. (1999b)

Juvenile and adult life stages for the Atlantic surf clam are listed in the 10' by 10' grid squares within the project area. Surf clams are the largest bivalve in the mid-Atlantic Bight and are found from the Gulf of Maine to Cape Hatteras, North Carolina. Water currents are responsible the distribution and settlement of juvenile clams. Surf clams generally occur from the beach zone to a depth of about 200 feet, but beyond about 125 feet abundance is low. Surf clams are mostly oceanic and their distribution is limited by salinity. They prefer turbulent waters at the edge of the breaker zone but can be found in some estuarine areas. Juvenile clams prefer medium- to fine-grained sands that contain low levels of organics. Adults prefer medium- to coarse-grained sand and gravel and bury themselves just below the sediment surface. Surf clams are filter feeders and feed on plankton during all life stages. They have two temperature- dependent spawning periods; the first occurs in mid-July and continues through early August, and the second begins in mid-October and lasts through early November, and these periods are believed to be synchronous across an entire bed.

Project Area: Juvenile and adult surf clams occur in the project area. Where present in the borrow areas during dredging most will be lost. The "seeding" mechanisms of the surf clam are at work continuously and will establish populations regularly and will be reestablished after the dredging activities are completed. Therefore, no more than minimal impact to Atlantic surf clam or EFH is anticipated as a result of the dredging activities associated with the proposed Project.

Longfin inshore squid (*Loligo pealeii*)
Grid squares: 6,7,11-13,15 (J,A); 1,3,9,10,14(J)

Primary Source: EFH Source Document by Jacobson (2005)

Pre-recruit and recruit life stages for the longfin squid are listed in the 10' by 10' grid squares within the project area. Pre-recruits and recruits are stock assessment terms used by the Northeast Fisheries Science Center (NEFSC) and correspond roughly to the life history stages juveniles and adults, respectively. Longfin squid pre-recruits are less than or equal to 8 cm and recruits are greater than 8 cm. Longfin inshore squid are a pelagic schooling species that can be found in continental shelf and slope waters from Newfoundland to the Gulf of Venezuela. Juveniles inhabit the upper 10 m of the water column over water 50 to 150 meters deep on continental shelf. Juveniles are typically found in coastal inshore waters in spring/fall while migrating to offshore waters in winter. Juveniles have a temperature preference of 10 to 26°C and salinities of 31.5 to 34.0 ppt. Adult longfin inshore squid inhabit the continental shelf and upper continental shelf slope to depths of 400 m. Adults are typically found over mud or sandy mud bottoms, and have been found at surface temperatures ranging from 9 to 21°C and bottom temperatures ranging from 8 to 16°C.

Project Area: Based on their range of habitat utilization longfin squid may be expected to seasonally occur in the project area. This species is mobile and it is unlikely that it will be subjected to potential entrainment in the dredge or burial during dredging operations. Given the spatial distribution pattern and habits of this species little to no impact on longfin squid or EFH is anticipated to result from the proposed Project.

Shortfin squid (*Illex illecebrosus*)
Grid squares: 15 (J)

Primary Source: EFH Document by Hendrickson and Holmes (2004)

Pre-recruit and recruit life stages for the shortfin squid are listed in the 10' by 10' grid squares within the project area. Generally, pre-recruit and recruit shortfin squid are collected from shore to 200 meters and temperatures between 2°C and 23°C. Like many squid species shortfin squid live for less than one year, has a high natural mortality rate, and exhibits a protracted spawning season whereby overlapping "microcohorts" enter the population throughout the year and exhibit variable growth rates. During spring, squid migrate onto the continental shelf between Newfoundland and Cape Hatteras. During late autumn, squid migrate off the continental shelf, presumably to a winter spawning site.

Project Area: Based on their range of habitat utilization shortfin squid may be expected to seasonally occur within the project area. This species is mobile and it is unlikely that it will be subjected to potential entrainment in the dredge or burial during dredging operations. Given the spatial distribution pattern and habits of this species little to no impact on shortfin squid or EFH is anticipated to result from the proposed Project.

Ocean quahog (*Arctica islandica*)

Grid squares: 3,7,9,11,13,15 (J,A); 5(A)

Primary Source: EFH Source Document by Cargnelli et al. (1999c)

Juvenile and adult life stages for the ocean quahog are listed in the grid squares within the project area. Ocean quahogs are extremely slow-growing and long-lived marine bivalves. Distribution in the western Atlantic ranges in depths from 10 meters to about 250 meters. Ocean quahogs are rarely found where bottom water temperatures exceed 16°C, and occur progressively further offshore between Cape Cod and Cape Hatteras. Adults are usually found in dense beds in medium- to fine-grained sand, sandy– mud, and silty sand. Spawning is protracted, lasting from spring to fall. It has been reported to last from September to November, and sometimes until January, off New Jersey.

Project Area: Juvenile and adult ocean quahogs are likely to occur in the project area. Where present in the borrow areas during dredging most will be lost. The "seeding" mechanisms of the ocean quahog are at work continuously and will establish populations regularly and will be reestablished after the dredging activities are completed. Therefore, no more than minimal impact to ocean quahog or EFH is anticipated as a result of the dredging activities associated with the proposed Project.

D.5 IMPACTS

This section identifies the potential direct and indirect impacts of the proposed sand dredging and placement on the relevant life history stages of EFH-designated species and their habitats. Significant impacts are not anticipated for the majority of species and life history stages. Table D-2 identifies potential direct and indirect impacts for each EFH-designated species. There will be temporary impacts to the habitat and associated prey species for the duration of the construction phase of the Project. However, since the project area is a small portion of this type of habitat in the region, the overall impact on the effected species will be minimal relative to the region.

D.5.1 Habitat Impacts

The proposed dredging activities at the offshore borrow areas are described in Section D.2.2.3. The Marine Offshore ecosystem where the borrow areas are located is described in Section D.3. The proposed dredging activities associated with the project initial construction would be conducted in the offshore borrow sites. In these locations the circulation, flushing rates, and dissolved oxygen levels are relatively high. The beach nourishment or dredge material (comprised primarily of clean, coarse-grained sand and gravel) would be hydraulically dredged and pumped to down drift beaches on the Atlantic coast of the Fire Island barrier island. The borrow area sand consists almost entirely of clean, coarse-grained sand and gravel with a small percentage of fines. Most of the fine material that would be suspended by the activities in the Atlantic Ocean water column would settle out in nearby Atlantic Ocean waters and would not adversely affect the designated habitat areas. Sediment taken from the borrow areas would be extracted to a depth no greater than 20 feet below the existing bottom, in order to minimize impacts on existing coastal processes and avoid anoxic conditions. The existing benthic invertebrate community would be removed as a result of the dredging. However, once the dredging is complete the ocean bottom would be colonized with invertebrates from the nearby benthic habitats.

D.5.2 Direct Impacts

The following subsections provide a general impact assessment for EFH-designated species (Table D-2). For all species, the impacts during dredging would be temporary and non-significant for the following reasons:

- Turbidity plumes generated at the dredged site are not expected to be significant given that the type of dredge proposed is designed to minimize turbidity. Additionally, the sediment being mined is coarse-grained sand, which contains only trace amounts of fine-grained material. Also, the project site is under the direct influence of the inlet currents which are very powerful throughout most of each tidal cycle. These currents will quickly disperse any turbidity generated by the project operation. There are not expected to be any long lasting impacts to the water quality in or adjacent to the project area. Additionally, bottom sediments are predominantly sand without any significant amount of organic matter, therefore no significant release of nutrients or contaminants or lowering of oxygen concentrations (biological oxygen demand) is expected.

- Entrainment of demersal species may occur, however, hydraulic dredging equipment generally digs below the bottom substrate, gives noticeable warning of their approach (e.g., vibrations, etc.), and covers relatively small widths of the bottom at a time.

- Due to the dominance of sand in the borrow areas, sedimentation and turbidity resulting from the proposed Project are expected to settle quickly out of the water column or be dispersed by currents at the project area, and therefore would have a minimal impact on fish and invertebrate species (gill damage/suffocation or inhibition of sight feeding predators)

- The relatively small change in depth and the small size of the project foot print with a regional area with abundant similar resources result in minimal impacts to EFH-designated species. Direct impacts to EFH habitat is also expected to be minimal, especially since the bottom habitat is a dynamic area known to change by both small and large increments.

Table D-2. Potential Impacts for EFH-Designated Species and Life History Stages in the Project Site

EFH-Designated Species	Life Stage	Potential Impacts
Bony Fish Species		
Atlantic butterfish	E/L	Not likely to occur in the project area. No significant impact
	J/A	Pelagic, zooplankton-feeding species. No significant impact.

EFH-Designated Species	Life Stage	Potential Impacts
Atlantic mackerel	E/L/J/ A	All life stages are pelagic. No significant impact.
Atlantic salmon	J/A	Not likely to occur in the project area. No significant impact
Atlantic sea herring	L/J/A	Pelagic, zooplankton-feeding species. No significant impact.
Black sea bass	J	Loss of benthic infaunal prey organisms would have minimal impact because fish feed primarily on more mobile benthic epifaunal species and small fish.
	L/A	
Bluefin tuna	J/A	Not likely to occur in the project area. No significant impact
Bluefish	E, L	Probably rare in the project area. No significant impact.
	J	Temporary displacement of fish and their prey (forage fish). No significant impact.
	A	Temporary displacement of fish and their prey (forage fish). No significant impact.
Cobia	E/L/J/ A	Transient pelagic species. Not likely to occur in the project area. No significant impact.
Haddock	L	Pelagic, may occur in the project area. No signifcant impact.
King and Spanish mackerel	E/L/J/ A	Transient pelagic species. Not likely to occur in the project area. No significant impact.
Monkfish	E/L	Not likely to occur in the project area. No significant impact.
Ocean pout	E/L	Eggs and larvae are demersal, potential to be impacted by dredging operations.
Pollock	J	Not likely to occur in the project area. No significant impact.
Red hake		Not expected to occur in great densities but may be adversely impacted by dredging/placement activities. No significant impact.
	E	
	L/J	Not likely to occur in the project area. No significant impact.
Scup	E/L	Not likely to occur in the project area. No significant impact.
	J/A	Loss of benthic infaunal prey organisms would have minimal impact because fish also feed on pelagic prey organisms.
Skipjack tuna	A	Probably rare in the project area. No significant impact.
Summer flounder	E/L	Not likely to occur in the project area. No significant impact.

EFH-Designated Species	Life Stage	Potential Impacts
	J/A	Loss of benthic infaunal prey organisms would have minimal impact because fish also feed on pelagic prey organisms and larger, more mobile benthic epifauna (e.g., crabs).
Windowpane flounder	E/L	May be adversely impacted by dredging/placement activities.
	J	Smaller YOY juveniles vulnerable to mortality from dredge. No significant impact from loss of benthic infaunal species because primary prey are more mobile epifaunal species.
	A	No significant impact from loss of benthic infaunal species because primary prey are more mobile epifaunal species.
Winter flounder	E	Dredge would cause mortality of demersal eggs during January-April spawning season.
	L	Dredge would cause mortality of recently-hatched larvae near the bottom, but have no significant impact on larvae in surface waters.
	J	Loss of benthic infaunal prey organisms would cause larger juveniles to relocate to nearby, unaffected areas; smaller YOY juveniles are less able to relocate and vulnerable to mortality from dredge.
	A	Loss of benthic infaunal prey organisms would cause adults to relocate to nearby, unaffected areas to feed; dredging during spawning season would cause females to move to nearby, unaffected areas to spawn, but should have no significant impact on egg production.
Whiting	E/L/J	
Witch flounder	L	Not likely to occur in the project area. No significant impact.
Yellowtail flounder	E/L	Probably rare in the project area. No significant impact.
Cartilaginous Fish Species		
Blue shark	EJ/LJ/ A	Not likely to occur in the project area. No significant impact.

EFH-Designated Species	Life Stage	Potential Impacts
Common thresher shark	EJ/LJ/ A	Not likely to occur in the project area. No significant impact.
Dusky shark	EJ/LJ	Dredging activities would not affect most prey species.
Sand tiger shark	EJ	Not likely to occur in the project area. No significant impact.
Sandbar shark	EJ	Probably rare in the project area. No significant impact.
	LJ/A	Dredging would not affect most prey species and adults would move out of affected area; no significant impact.
Shortfin mako shark	EJ/LJ/A	Not likely to occur in the project area. No significant impact.
Spiny dogfish	J/A	May occur in the the project area. No significant impact.
Tiger shark	EJ/LJ	Not likely to occur in the project area. No significant impact.
White shark	LJ	Not likely to occur in the project area. No significant impact.
Invertebrate Species		
Atlantic surf clam	J/A	May occur at sand placement site but would suffer minimal impact from sand placement activities.
Longfin inshore squid	J/A	No significant impact from loss of benthic infaunal species because primary prey are fish and mobile epifaunal species.
Shortfin squid	J	No significant impact from loss of benthic infaunal species because primary prey are fish and mobile epifaunal species.
Ocean quahog	J/A	Not likely to occur in the project area. No significant impact.
Key: E = eggs, L = larvae, J = juveniles, A = adults, EJ = early juveniles, LJ = late juveniles		

D.5.3 Indirect Impacts

The most significant impact of sand dredging on EFH in the project area would be the indirect trophic effects caused by the removal of benthic infaunal prey organisms, and some epifaunal prey organisms, for bottom-feeding EFH-designated species. Any benthic organism that lives in the sand (infauna) and the smaller, less motile organisms that live on the bottom (epifauna) and are not capable of avoiding the suction effect of the dredge, would become entrained. Most of these organisms would be invertebrates, but burrowing fish would also be drawn into the dredge.

The negative effects of prey removal would be temporary, lasting only as long as it takes for benthic invertebrates to re-colonize the bottom once the project is complete. Studies conducted on offshore sand borrow areas off the outer New Jersey coast indicate that benthic communities were re-established within 8 to 9 months (USACE 1999a). Re-colonization of the infaunal species will be stimulated by neighboring adult populations that inhabit similar environments adjacent to the project area. However, because the project area is under the direct influence of inlet currents carrying eggs, larvae and instar forms of many invertebrate species the project area may recover much faster than these other areas. Nevertheless, some parts the project area will remain in a semi-disturbed state throughout the lifespan of the project. This represents a loss of some prey resources to some bottom feeding EFH-designated species. The degree to which sand extraction from the project area impacts benthic prey resources depends a great deal on how large of an area is selected for removal. Because bottom-feeding fish and crustaceans consume epifaunal organisms living on the bottom and infaunal organisms in the top several inches of the sediment, removal of surficial sediments over a large area would have a much greater impact on EFH than removal of the same volume of sand dredging a smaller area to a relatively greater depth. The project area represents a very small percentage of foraging grounds within the bay thus the overall indirect impact of the sand mining to EFH species will be minimal.

The temporary loss of benthic prey resources caused by dredging would not have any serious adverse effects on EFH for any species that feeds primarily on more motile epifaunal organisms (e.g., crabs, mysids, sand shrimp) or fish, since these organisms would re-occupy the dredged area almost immediately after sand was removed. For this reason, most of the EFH species in the project area would probably continue to feed there even after the dredge passed through.

The activities in the project area may have short-term benefits to some EFH-designated. Brinkhuis (1980) conducted a literature assessment on the biological effects of sand and gravel mining in the Lower Bay of New York Harbor and found that during dredging, and immediately after an area has been dredged, fish are attracted to the area to feed on infaunal organisms that are dislodged from the bottom. Due to the composition of the benthic infaunal organisms, bottom feeding fish species would be the primary benefactors as a result of the disturbance and certain opportunistic species such as striped bass would also benefit. Types of species attracted to the Project activity would be limited to highly mobile juveniles and adults, which presumably would be capable of avoiding entrainment.

Species that feed primarily on benthic infaunal organisms are most likely to be affected during the entire life of the Project. However, both benthic and pelagic foragers would likely expand their forage parameters until a sufficient prey patch is located, which in this case would mean re-locating to adjacent unaffected areas of similar habitat. Additionally, mobile foragers could resume feeding in the same location as soon as the dredge activities cease.

D.6 CONCLUSION

This assessment concludes that the overall potential adverse impacts to EFH-designated species and EFH in the project area will be minimal. Most EFH-designated species feed on more motile epifaunal organisms or on small forage fish and would not be seriously affected. For any bottom-feeding EFH species, the impact of dredging on local forage habitat area would be temporary, lasting only until the dredged area is re-colonized by new benthic organisms. There is also available data showing that disturbance to the sediments due to dredging can be short term benefit to many species of various life stages due to redistribution of prey items and detritus. The majority of dredging operations are expected to occur during the time period when most species are not active in the project area. For these reasons, it is concluded that the dredging of the offshore borrow areas and subsequent placement of dredged material on beaches will not cause adverse effects to

EFH-designated species or EFH. The New York District will continue coordination with NOAA to get to a mutual understanding agreement on this policy.

D.7 REFERENCES

Brinkhuis 1980	Brinkhuis, B.H. 1980. Biological effects of sand and gravel mining in the Lower Bay of New York Harbor: an assessment from the literature. Marine Science Research Center, State University of New York at Stony Brook, Special Report 34, Reference No. 80-1. 138 pp.
Cargnelli et. al. 1999a	Cargnelli, L.M., S.J. Griesbach, D.B. Packer, P.L. Berrien, D.L. Johnson, and W.W. Morse. 1999a. Essential fish habitat source document: pollack, Pollachius virens, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-131. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. 38 pp.
Cargnelli et. al. 1999b	Cargnelli, L.M., S.J. Griesbach, D.B. Packer, and E. Weissberger. 1999b. Essential fish habitat source document: Atlantic surf clam, Spisula solidissima, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-142. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. 22 pp.
Cargnelli et. al. 1999c	Cargnelli, L.M., S.J. Griesbach, D.B. Packer, and E. Weissberger. 1999c. Essential fish habitat source document: ocean quahog, Arctica islandica, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-148. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. 11 pp.
Cargnelli et. al. 1999d	Cargnelli, L.M., S.J. Griesbach, D.B. Packer, and P. Berrien. 1999d. Essential fish habitat source document: haddock, Melanogrammus aeglefinus, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-128. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. 40 pp.
Cargnelli et. al. 1999e	Cargnelli, L.M., S.J. Griesbach, D.B. Packer, and P. Berrien. 1999e. Essential fish habitat source document: Witch Flounder, Glyptocephalus cynoglossus, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-139. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. 38 pp.

Chang et. al. 1999	Chang S., P.L. Berrien, D.L. Johnson, and W.W. Morse. 1999. Essential fish habitat source document: windowpane, Scophthalmus aquosus, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-137. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA: 32 pp.
Collette and Nauen 1983	Collette, B.B. and C.E. Nauen. 1983. FAO species catalogue. Vol. 2. Scombrids of the world. An annotated and illustrated catalogue of tunas, mackerels, bonitos and related species known to date. FAO Fish. Synopsis, (125) Vol. 2:137 p.
Compagno 1984	Compagno, L.J.V. 1984. FAO species catalogue. Sharks of the world. An annotated and illustrated catalogue of shark species known to date. FAO Fisheries Synopsis No. 125, Vol. 4, Part 1 (Hexanchiformes to Lamniformes) and Part 2 (Carchariniformes). United Nations Fisheries and Agriculture Organization, Rome, Italy. 655 pp.
Cross et. al. 1999	Cross, J.N., C.A. Zetlin, P.L. Berrien, D.L. Johnson, and C. McBride. 1999. Essential Fish Habitat Source Document: Butterfish, Peprilus triacanthus, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-145. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA: 42 pp.
Drohan et. al. 2007	Drohan AF, Manderson JP, Packer DB. 2007. Essential fish habitat source document: Black sea bass, Centropristis striata, life history and habitat characteristics, 2nd edition. NOAA Tech Memo NMFS NE 200; 68 p.
Godcharles and Murphy 1986	Godcharles, M.F. and M.D. Murphy. 1986. Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (south Florida) – king mackerel and Spanish mackerel. U.S. Fish and Wildlife Service, Biological Report 82(11.58). U.S. Army Corps of Engineers, TR EL-82-4, Waterways Experiment Station, Vicksburg, MS. 18 pp.
Hendrickson and Holmes 2004	Hendrickson, L.C. and Holmes, E.M. 2004. Essential fish habitat source document (2nd edition): northern shortfin squid, Illex illecebrosus, life history and habitat characteristics. NOAA Technical Memorandum MNFS-NE-191. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine

	Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. 46 pp.
Jacobson 2005	Jacobson, L.D. 2005. Essential fish habitat source document (2nd edition): longfin inshore squid, Loligo pealei, life history and habitat characteristics. NOAA Technical Memorandum MNFS-NE-193. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. 52 pp.
Johnson et. al. 1999	Johnson, D.L., W.W. Morse, P.L. Berrien, and J.J. Vitaliano. 1999. Essential fish habitat source document: yellowtail flounder, Limanda ferruginea, life history and habitat characteristics. NOAA Technical Memorandum MNFS-NE-140.
Lock 2004	Lock MC, Packer PB. 2004. Essential fish habitat source document: Silver hake, Merluccius bilinearis, life history and habitat characteristiscs, 2nd edition. NOAA Tech Memo NMFS NE 186; 68 p.
Luca et. al. 1999	Luca, M.C., S.J. Griesbach, D.B. Packer, P.L. Berrien, W.W. Morse, and D.L. Johnson. 1999. Essential fish habitat source document: witch flounder, Glyptocephalus cynoglossus, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-139. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. 29 pp.
NOAA 2008a	NOAA 2008a National Oceanic and Atmospheric Administration (NOAA). 2008. Guide to Essential Fish Habitat Designations in the Northeastern United States. Accessed at: http://www.greateratlantic.fisheries.noaa.gov/hcd/STATES4/ConnNYNJ.htm on October 1, 2008.
Packer et. al. 1999	Packer, D.B., S.J. Griesbach, P.L. Berrien, C.A. Zetlin, D.L. Johnson, and W.W. Morse. 1999. Essential fish habitat source document: summer flounder, Paralichthys dentatus, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-151. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. 88 pp.
Packer et. al. 2003a	Packer, D.B., C.A. Zetlin, and J.J. Vitaliano. 2003a. Essential fish habitat source document: little skate, Leucoraja erinacea, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-175. U.S. Department of Commerce, National Oceanic and

	Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. 76 pp.
Packer et. al. 2003b	Packer, D.B., C.A. Zetlin, and J.J. Vitaliano. 2003b. Essential fish habitat source document: winter skate, Leucoraja ocellata, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-179. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. 68 pp.
Pereira et. al. 1999	Pereira, J.J., R. Goldberg, J.J. Ziskowski, P.L. Berrien, W.W. Morse, and D.L. Johnson. 1999. Essential fish habitat source document: winter flounder, Pseudopleuronectes americanus, life listory and habitat characteristics. NOAA Technical Memorandum NMFS-NE-138. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. 39 pp.
Richards 1967	Richards, C.E. 1967. Age, growth and fecundity of the cobia, Rachycentron canadum, from the Chesapeake Bay and adjacent Mid-Atlantic waters. Trans. Amer. Fish. Soc. 96:343-350.
Shepherd and Packer 2005	Shepherd GR, Packer DB. 2005. Essential fish habitat source document: Bluefish, Pomatomus saltatrix, life history and habitat characteristics (2nd Edition). NOAA Tech Memo NMFS NE 198; 89 p.
Stehlik 2007	Stehlik, L. 2007, Essential fish habitat source document: Spiny Dogfish, Squalus acanthias, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-203. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. 52 pp.
Steimle et. al. 1999a	Steimle, F.W., W.W. Morse, and D.L. Johnson. 1999a. Essential fish habitat source document: goosefish, Lophius americanus, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-127. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. 31 pp.
Steimle et. al. 1999b	Steimle, F.W., W.W. Morse, P.L. Berrien, and D.L. Johnson. 1999b. Essential fish habitat source document: red hake, Urophycis chuss, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-133. U.S. Department of Commerce, National Oceanic and

	Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. 34 pp.
Steimle et. al. 1999c	Steimle, F.W., C.A. Zetlin, P.L. Berrien, D.L. Johnson, and S. Chang. 1999c. Essential fish habitat source document: scup, Stenotomus chrysops, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-149. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. 39 pp.
Steimle et. al. 1999d	Steimle, F.W., W.W. Morse, P.L. Berrien, D.L. Johnson, and C. Zetlin. 1999d. Essential fish habitat source document: Ocean Pout, Macrozoarces americanus, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-129. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. 34 pp.
Stevenson and Scott 2005	Stevenson DK, Scott ML. 2005. Essential fish habitat source document: Atlantic herring, Clupea harengus, life history and habitat characteristics (2nd edition). NOAA Tech Memo NMFS NE 192; 84 p.
USACE 2001	USACE 2001. "The New York District's Biological Monitoring Program for the Atlantic Coast of New Jersey, Asbury Park to Manasquan Section Beach Erosion Control Project. Final Report". U.S. Army Engineer District, New York and U.S. Army Engineer Research and Development Center, Waterways Experiment Station.
USACE 2009	USACE 2009. West of Shinnecock Inlet and "Bypass Area" shore protection projects: post-construction monitoring - final finfish/epibenthic invertebrate data report (2004-2008). 205 pp.
USDOC 1999a	United States Department of Commerce (USDOC). 1999a. Guide to essential fish habitat designations in the Northeastern United States. U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Regional Office, Gloucester, MA. Internet accessible at: www.nero.nmfs.gov/ro/doc.
USDOC 1999b	United States Department of Commerce (USDOC). 1999b. Final Fishery Management Plan for Atlantic Tunas, Swordfish and Sharks. Vol. II, Chapter 6: Highly Migratory Species (HMS) Essential Fish Habitat (EFH) Provisions. U.S. Department of Commerce, National

Oceanic and Atmospheric Administration, National Marine Fisheries Service, Office of Sustainable Fisheries, Silver Spring, MD. 302 pp

ATTACHMENT 1

SPECIES AND LIFE STAGES FOR THE 15 GRID SQUARES

Grid 1 (40° 30.0’ N, 73° 20.0’ W)

Square Description (i.e. habitat, landmarks, coastline markers): Atlantic Ocean waters within the square affecting the following: south of Amityville, NY, Lindenhurst, NY, Copiague, NY, Seaford, NY, Massapequa, NY, Biltmore Shores, NY, and Nassau Shores, NY, Seaford Creek and Amityville Creek. These waters are also within Great South Bay affecting the following: Jones Beach Island, Toby Beach, and Cedar Island from the western half of Cedar Island Beach to Jones Beach State Park. Also, these waters affect Zachs Bay, eastern Hempstead Bay and southern Oyster Bay, and around the following Islands: South Line, North Line, Goose, and Gilgo.

Species	Eggs	Larvae	Juveniles	Adults
Atlantic Salmon *(Salmo salar)*				x
Pollock (Pollachius virens)			x	
Whiting (Merluccius bilinearis)	x	x	x	
Red Hake (Urophycis chuss)	x	x	x	
Winter Flounder (Pseudopleuronectes americanus)	x	x	x	x
Windowpane Flounder (Scopthalmus aquosus)	x	x	x	x
Ocean Pout (Zoarces americanus)	x	x		x
Atlantic Sea Herring *(Clupea harengus)*			x	x
Monkfish (Lophius americanus)	x	x		
Bluefish (Pomatomus saltatrix)			x	x
Long-finned Squid *(Loligo pealei)*	n/a	n/a	x	
Short-finned Squid (Illex illecebrosus)	n/a	n/a		
Atlantic Butterfish (Peprilus triacanthus)	x	x	x	x
Atlantic Mackerel *(Scomber scombrus)*	x	x	x	x
Summer Flounder (Paralicthys dentatus)			x	x
Scup (Stenotomus chrysops)	n/a	n/a	x	x
Black Sea Bass (Centropristus striata)	n/a			x
Surf Clam (Spisula solidissima)	n/a	n/a	x	x
Ocean Quahog (Artica islandica)	n/a	n/a		
Spiny Dogfish (Squalus acanthias)	n/a	n/a		
King Mackerel (Scomberomorus cavalla)	x	x	x	x
Spanish Mackerel (Scomberomorus maculatus)	x	x	x	x
Cobia (Rachycentron canadum)	x	x	x	x
Sand Tiger Shark (Odontaspis taurus)		x		
Blue Shark (Prionace glauca)				x
Dusky Shark (Charcharinus obscurus)		x	x	
Sandbar Shark (Charcharinus plumbeus)		x	x	x
Shortfin Mako Shark *(Isurus oxyrhyncus)*			x	
Tiger Shark (Galeocerdo cuvieri)		x		
Skipjack Tuna (Katsuwonus pelamis)				x

Source: NOAA 2008
Notes: Boundary coordinates: North: 40° 40.0’ N, East: 73° 20.0’ W, South: 40° 30.0’ N, West: 73° 30.0’ W.
n/a = these species either have no data available on the designated lifestages, or those lifestages are not present in the species' reproductive cycle.

Grid 2 (40° 40.0' N, 73° 10.0' W)

Square Description (i.e. habitat, landmarks, coastline markers): Atlantic Ocean waters within the square within Great South Bay, south of East Islip, NY, Islip, NY, Bay Shore, NY, Great Cove, and Babylon, NY, from west of Nicoll Pt. to Bergen Pt.

Species	Eggs	Larvae	Juveniles	Adults
Atlantic Salmon *(Salmo salar)*				x
Pollock (Pollachius virens)			x	
Redfish (Sebastes fasciatus)	n/a			
Winter Flounder (Pseudopleuronectes americanus)	x	x	x	x
Windowpane Flounder (Scopthalmus aquosus)	x	x	x	x
Atlantic Sea Herring *(Clupea harengus)*			x	x
Monkfish (Lophius americanus)	x	x		
Bluefish (Pomatomus saltatrix)			x	x
Long-finned Squid *(Loligo pealei)*	n/a	n/a		
Short-finned Squid (Illex illecebrosus)	n/a	n/a		
Atlantic Butterfish (Peprilus triacanthus)	x	x	x	x
Atlantic Mackerel *(Scomber scombrus)*	x	x	x	x
Summer Flounder (Paralicthys dentatus)			x	x
Scup (Stenotomus chrysops)	n/a	n/a	x	x
Black Sea Bass (Centropristus striata)	n/a			x
Surf Clam (Spisula solidissima)	n/a	n/a		
Ocean Quahog (Artica islandica)	n/a	n/a		
Spiny Dogfish (Squalus acanthias)	n/a	n/a		
King Mackerel (Scomberomorus cavalla)	x	x	x	x
Spanish Mackerel (Scomberomorus maculatus)	x	x	x	x
Cobia (Rachycentron canadum)	x	x	x	x
Sand Tiger Shark (Odontaspis taurus)		x		
Blue Shark (Prionace glauca)				x
Dusky Shark (Charcharinus obscurus)		x		
Sandbar Shark (Charcharinus plumbeus)		x	x	x

Source: NOAA 2008

Notes: Boundary coordinates: North: 40° 50.0' N, East: 73° 10.0' W, South: 40° 40.0' N, West: 73° 20.0' W.

n/a = these species either have no data available on the designated lifestages, or those lifestages are not present in the species' reproductive cycle.

Grid 3 (40° 30.0’ N, 73° 10.0’ W)

Square Description (i.e. habitat, landmarks, coastline markers): The waters within the square within the Atlantic Ocean and within Great South Bay estuary affecting the following: East and West Fire Island, Saltaire, NY and Democrat Pt. on Fire Island. Captree I., Sexton I., Oak I., Cedar Island Beach, Oak Beach, and the Fire Island Inlet.

Species	Eggs	Larvae	Juveniles	Adults
Atlantic Salmon *(Salmo salar)*				x
Pollock (Pollachius virens)			x	
Whiting (Merluccius bilinearis)	x	x	x	
Red Hake (Urophycis chuss)	x	x	x	
Winter Flounder (Pseudopleuronectes americanus)	x	x	x	x
Yellowtail Flounder (Limanda ferruginea)	x			
Windowpane Flounder (Scopthalmus aquosus)	x	x	x	x
Ocean Pout (Zoarces americanus)	x	x		x
Atlantic Sea Herring *(Clupea harengus)*				x
Monkfish (Lophius americanus)	x	x		
Bluefish (Pomatomus saltatrix)			x	x
Long-finned Squid *(Loligo pealei)*	n/a	n/a	x	
Atlantic Butterfish (Peprilus triacanthus)	x	x	x	x
Atlantic Mackerel *(Scomber scombrus)*	x	x	x	x
Summer Flounder (Paralicthys dentatus)			x	x
Scup (Stenotomus chrysops)	n/a	n/a	x	x
Black Sea Bass (Centropristus striata)	n/a	x	x	x
Surf Clam (Spisula solidissima)	n/a	n/a	x	x
Ocean Quahog (Artica islandica)	n/a	n/a	x	x
Spiny Dogfish (Squalus acanthias)	n/a	n/a		
King Mackerel (Scomberomorus cavalla)	x	x	x	x
Spanish Mackerel (Scomberomorus maculatus)	x	x	x	x
Cobia (Rachycentron canadum)	x	x	x	x
Sand Tiger Shark (Odontaspis taurus)		x		
Common Thresher Shark *(Alopias vulpinus)*		x	x	x
Blue Shark (Prionace glauca)		x	x	x
White Shark (Charcharadon carcharias)			x	
Tiger Shark (Galeocerdo cuvieri)		x	x	
Dusky Shark (Charcharinus obscurus)		x	x	
Sandbar Shark (Charcharinus plumbeus)		x	x	x
Shortfin Mako Shark *(Isurus oxyrhyncus)*		x	x	x
Bluefin Tuna (Thunnus thynnus)			x	x
Skipjack Tuna (Katsuwonus pelamis)				x

Source: NOAA 2008
Notes: Boundary coordinates: North: 40° 40.0’ N, East: 73° 10.0’ W, South: 40° 30.0’ N, West: 73° 20.0’ W.
n/a = these species either have no data available on the designated lifestages, or those lifestages are not present in the species' reproductive cycle.

Grid 4 (40° 40.0’ N, 73° 00.0’ W)

Square Description (i.e. habitat, landmarks, coastline markers): Atlantic Ocean waters within the square and within Great South Bay, north of Ocean Beach, and south of Sayville, NY and Boheamia, NY, from Patchogue, NY and western Patchogue Bay to just west of Nicoll Pt. on Nicoll Bay, southeast of Great River, NY, and the Connetquot River.

Species	Eggs	Larvae	Juveniles	Adults
Atlantic Salmon *(Salmo salar)*				x
Pollock (Pollachius virens)			x	
Redfish (Sebastes fasciatus)	n/a			
Winter Flounder (Pseudopleuronectes americanus)	x	x	x	x
Windowpane Flounder (Scopthalmus aquosus)	x	x	x	x
Atlantic Sea Herring *(Clupea harengus)*			x	x
Bluefish (Pomatomus saltatrix)			x	x
Long-finned Squid *(Loligo pealei)*	n/a	n/a		
Short-finned Squid (Illex illecebrosus)	n/a	n/a		
Atlantic Butterfish (Peprilus triacanthus)	x	x	x	x
Atlantic Mackerel *(Scomber scombrus)*	x	x	x	x
Summer Flounder (Paralicthys dentatus)			x	x
Scup (Stenotomus chrysops)	n/a	n/a	x	x
Black Sea Bass (Centropristus striata)	n/a			x
Surf Clam (Spisula solidissima)	n/a	n/a		
Ocean Quahog (Artica islandica)	n/a	n/a		
Spiny Dogfish (Squalus acanthias)	n/a	n/a		
King Mackerel (Scomberomorus cavalla)	x	x	x	x
Spanish Mackerel (Scomberomorus maculatus)	x	x	x	x
Cobia (Rachycentron canadum)	x	x	x	x
Sand Tiger Shark (Odontaspis taurus)		x		
Blue Shark (Prionace glauca)				x
Dusky Shark (Charcharinus obscurus)		x		
Sandbar Shark (Charcharinus plumbeus)		x	x	x
Skipjack Tuna (Katsuwonus pelamis)				x

Source: NOAA 2008

Notes: Boundary coordinates: North: 40° 50.0’ N, East: 73° 00.0’ W, South: 40° 40.0’ N, West: 73° 10.0’ W.

n/a = these species either have no data available on the designated lifestages, or those lifestages are not present in the species' reproductive cycle.

Grid 5 (40° 30.0’ N, 73° 00.0’ W)

Square Description (i.e. habitat, landmarks, coastline markers): Atlantic Ocean waters within the square within Great South Bay estuary south and north of Ocean Beach, NY on Fire Island.

Species	Eggs	Larvae	Juveniles	Adults
Atlantic Salmon *(Salmo salar)*				x
Pollock (Pollachius virens)			x	
Whiting (Merluccius bilinearis)	x	x	x	
Red Hake (Urophycis chuss)	x	x	x	
Redfish (Sebastes fasciatus)	n/a			
Winter Flounder (Pseudopleuronectes americanus)	x	x	x	x
Yellowtail Flounder (Limanda ferruginea)	x			x
Windowpane Flounder (Scopthalmus aquosus)	x	x	x	x
Atlantic Sea Herring *(Clupea harengus)*			x	x
Monkfish (Lophius americanus)	x	x		
Bluefish (Pomatomus saltatrix)			x	x
Long-finned Squid *(Loligo pealei)*	n/a	n/a		
Atlantic Butterfish (Peprilus triacanthus)	x	x	x	x
Atlantic Mackerel *(Scomber scombrus)*	x	x	x	x
Summer Flounder (Paralicthys dentatus)		x	x	x
Scup (Stenotomus chrysops)	n/a	n/a	x	x
Black Sea Bass (Centropristus striata)	n/a	x		x
Surf Clam (Spisula solidissima)	n/a	n/a	x	x
Ocean Quahog (Artica islandica)	n/a	n/a		x
Spiny Dogfish (Squalus acanthias)	n/a	n/a		
King Mackerel (Scomberomorus cavalla)	x	x	x	x
Spanish Mackerel (Scomberomorus maculatus)	x	x	x	x
Cobia (Rachycentron canadum)	x	x	x	x
Sand Tiger Shark (Odontaspis taurus)		x		
Common Thresher Shark *(Alopias vulpinus)*		x	x	x
Blue Shark (Prionace glauca)		x	x	x
White Shark (Charcharadon carcharias)			x	
Tiger Shark (Galeocerdo cuvieri)		x	x	
Dusky Shark (Charcharinus obscurus)		x	x	
Sandbar Shark (Charcharinus plumbeus)		x	x	x
Shortfin Mako Shark *(Isurus oxyrhyncus)*		x	x	x
Bluefin Tuna (Thunnus thynnus)			x	x
Skipjack Tuna (Katsuwonus pelamis)				x

Source: NOAA 2008

Notes: Boundary coordinates: North: 40° 40.0’ N, East: 73° 00.0’ W, South: 40° 30.0’ N, West: 73° 10.0’ W.

n/a = these species either have no data available on the designated lifestages, or those lifestages are not present in the species' reproductive cycle.

Grid 6 (40° 40.0’ N, 72° 50.0’ W)

Square Description (i.e. habitat, landmarks, coastline markers): Atlantic Ocean waters within the square within Great South Bay estuary affecting the following: south of Great South Beach on Fire Island, within western Narrow Bay and Bellport Bay, from Mastic Beach, NY, to the Swan River in East Patchogue, NY. Also affected are eastern Patchogue Bay, and south of Bellport, NY, North Bellport, NY, Brookhaven, NY, Mastic, NY, and East Patchogue, NY.

Species	Eggs	Larvae	Juveniles	Adults
Atlantic Salmon *(Salmo salar)*				x
Pollock (Pollachius virens)			x	
Whiting (Merluccius bilinearis)	x	x	x	
Red Hake (Urophycis chuss)			x	
Redfish (Sebastes fasciatus)	n/a			
Winter Flounder (Pseudopleuronectes americanus)	x	x	x	x
Windowpane Flounder (Scopthalmus aquosus)	x	x	x	x
Atlantic Sea Herring *(Clupea harengus)*			x	x
Bluefish (Pomatomus saltatrix)			x	x
Long-finned Squid *(Loligo pealei)*	n/a	n/a	x	
Short-finned Squid (Illex illecebrosus)	n/a	n/a		
Atlantic Butterfish (Peprilus triacanthus)	x	x	x	x
Atlantic Mackerel *(Scomber scombrus)*	x	x	x	x
Summer Flounder (Paralicthys dentatus)	x	x	x	x
Scup (Stenotomus chrysops)	n/a	n/a	x	x
Black Sea Bass (Centropristus striata)	n/a		x	x
Surf Clam (Spisula solidissima)	n/a	n/a		
Ocean Quahog (Artica islandica)	n/a	n/a		
Spiny Dogfish (Squalus acanthias)	n/a	n/a		
King Mackerel (Scomberomorus cavalla)	x	x	x	x
Spanish Mackerel (Scomberomorus maculatus)	x	x	x	x
Cobia (Rachycentron canadum)	x	x	x	x
Sand Tiger Shark (Odontaspis taurus)		x		
Blue Shark (Prionace glauca)		x		x
White Shark (Charcharadon carcharias)			x	
Dusky Shark (Charcharinus obscurus)		x	x	
Sandbar Shark (Charcharinus plumbeus)		x	x	x
Tiger Shark (Galeocerdo cuvieri)		x	x	
Bluefin Tuna (Thunnus thynnus)			x	x
Skipjack Tuna (Katsuwonus pelamis)				x

Source: NOAA 2008

Notes: Boundary coordinates: North: 40° 50.0’ N, East: 72° 50.0’ W, South: 40° 40.0’ N, West: 73° 00.0’ W.

n/a = these species either have no data available on the designated lifestages, or those lifestages are not present in the species' reproductive cycle.

Grid 7 (40° 30.0' N, 72° 50.0' W)

Square Description (i.e. habitat, landmarks, coastline markers): The waters within the square within the Atlantic Ocean one square south of the square affecting Great South Beach on Fire Island, and Mastic Beach, NY, East Patchogue, NY, Bellport, NY, North Bellport, NY, Brookhaven, NY, Mastic, NY, and East Patchogue, NY.

Species	Eggs	Larvae	Juveniles	Adults
Whiting (Merluccius bilinearis)	x	x	x	
Red Hake (Urophycis chuss)	x	x		
Winter Flounder (Pseudopleuronectes americanus)	x	x	x	x
Yellowtail Flounder (Limanda ferruginea)	x			x
Windowpane Flounder (Scopthalmus aquosus)	x	x	x	x
Atlantic Sea Herring *(Clupea harengus)*			x	x
Monkfish (Lophius americanus)	x	x		
Bluefish (Pomatomus saltatrix)			x	
Long-finned Squid *(Loligo pealei)*	n/a	n/a	x	x
Atlantic Butterfish (Peprilus triacanthus)	x			
Summer Flounder (Paralicthys dentatus)				x
Scup (Stenotomus chrysops)	n/a	n/a	x	x
Black Sea Bass (Centropristus striata)	n/a			x
Surf Clam (Spisula solidissima)	n/a	n/a	x	x
Ocean Quahog (Artica islandica)	n/a	n/a	x	x
Spiny Dogfish (Squalus acanthias)	n/a	n/a		
King Mackerel (Scomberomorus cavalla)	x	x	x	x
Spanish Mackerel (Scomberomorus maculatus)	x	x	x	x
Cobia (Rachycentron canadum)	x	x	x	x
Sand Tiger Shark (Odontaspis taurus)		x		
Common Thresher Shark *(Alopias vulpinus)*		x	x	x
Blue Shark (Prionace glauca)		x	x	x
White Shark (Charcharadon carcharias)			x	
Tiger Shark (Galeocerdo cuvieri)		x	x	
Dusky Shark (Charcharinus obscurus)		x	x	
Sandbar Shark (Charcharinus plumbeus)		x	x	x
Shortfin Mako Shark *(Isurus oxyrhyncus)*		x	x	x
Bluefin Tuna (Thunnus thynnus)			x	x
Skipjack Tuna (Katsuwonus pelamis)				x

Source: NOAA 2008

Notes: Boundary coordinates: North: 40° 40.0' N, East: 72° 50.0' W, South: 40° 30.0' N, West: 73° 00.0' W.

n/a = these species either have no data available on the designated lifestages, or those lifestages are not present in the species' reproductive cycle.

Grid 8 (40° 40.0’ N, 72° 40.0’ W)

Square Description (i.e. habitat, landmarks, coastline markers): The waters within the square within the Atlantic Ocean and within Great South Bay estuary affecting the following: south of Tanner Neck, NY, East Moriches, NY, Center Moriches, NY, and within Moriches Bay and Moriches Bay Inlet, south of Eastport, NY, Speonk, NY, and Remsenberg, NY, from Apaucuck Pt. to Mastic Beach, NY, along with waters within eastern Narrow Bay.

Species	Eggs	Larvae	Juveniles	Adults
Atlantic Salmon *(Salmo salar)*				x
Haddock (Melanogrammus aeglefinus)		x		
Whiting (Merluccius bilinearis)	x	x	x	
Red Hake (Urophycis chuss)	x	x	x	
Witch Flounder (Glyptocephalus cynoglossus)	x			
Winter Flounder (Pseudopleuronectes americanus)	x	x	x	x
Yellowtail Flounder (Limanda ferruginea)	x	x		
Windowpane Flounder (Scopthalmus aquosus)	x	x	x	x
Ocean Pout (Zoarces americanus)	x	x		x
Atlantic Sea Herring *(Clupea harengus)*		x	x	
Monkfish (Lophius americanus)	x	x		
Bluefish (Pomatomus saltatrix)			x	x
Long-finned Squid *(Loligo pealei)*	n/a	n/a		
Short-finned Squid (Illex illecebrosus)	n/a	n/a		
Atlantic Butterfish (Peprilus triacanthus)	x	x	x	x
Atlantic Mackerel *(Scomber scombrus)*	x	x	x	x
Summer Flounder (Paralicthys dentatus)	x	x	x	x
Scup (Stenotomus chrysops)	n/a	n/a	x	x
Black Sea Bass (Centropristus striata)	n/a			x
Surf Clam (Spisula solidissima)	n/a	n/a		
Ocean Quahog (Artica islandica)	n/a	n/a		
Spiny Dogfish (Squalus acanthias)	n/a	n/a		
King Mackerel (Scomberomorus cavalla)	x	x	x	x
Spanish Mackerel (Scomberomorus maculatus)	x	x	x	x
Cobia (Rachycentron canadum)	x	x	x	x
Sand Tiger Shark (Odontaspis taurus)		x		
Blue Shark (Prionace glauca)		x		x
White Shark (Charcharadon carcharias)			x	
Dusky Shark (Charcharinus obscurus)		x	x	
Shortfin Mako Shark *(Isurus oxyrhyncus)*		x	x	
Sandbar Shark (Charcharinus plumbeus)		x	x	x
Tiger Shark (Galeocerdo cuvieri)		x	x	
Bluefin Tuna (Thunnus thynnus)			x	x
Skipjack Tuna (Katsuwonus pelamis)				x

Source: NOAA 2008
Notes: Boundary coordinates: North: 40° 50.0’ N, East: 72° 40.0’ W, South: 40° 40.0’ N, West: 72° 50.0’ W.
n/a = these species either have no data available on the designated lifestages, or those lifestages are not present in the species' reproductive cycle.
Grid 9 (40° 40.0’ N, 72° 30.0’ W)

Square Description (i.e. habitat, landmarks, coastline markers): The waters within the square within the Atlantic Ocean and within the Great South Bay estuary affecting the following: south of Westhampton, NY, Quiogue, NY, Quogue, NY, and Tiana Beach, and within Quantuck Bay and the eastern tip of Moriches Bay.

Species	Eggs	Larvae	Juveniles	Adults
Atlantic Salmon *(Salmo salar)*				x
Whiting (Merluccius bilinearis)	x	x	x	
Red Hake (Urophycis chuss)	x	x	x	
Witch Flounder (Glyptocephalus cynoglossus)	x			
Winter Flounder (Pseudopleuronectes americanus)	x	x	x	x
Yellowtail Flounder (Limanda ferruginea)	x	x	x	x
Windowpane Flounder (Scopthalmus aquosus)	x	x	x	x
Ocean Pout (Zoarces americanus)	x	x		x
Atlantic Sea Herring *(Clupea harengus)*			x	
Monkfish (Lophius americanus)	x	x		
Bluefish (Pomatomus saltatrix)		x	x	x
Long-finned Squid *(Loligo pealei)*	n/a	n/a	x	
Short-finned Squid (Illex illecebrosus)	n/a	n/a		
Atlantic Butterfish (Peprilus triacanthus)	x	x	x	x
Atlantic Mackerel *(Scomber scombrus)*	x	x	x	x
Summer Flounder (Paralicthys dentatus)	x	x	x	x
Scup (Stenotomus chrysops)	n/a	n/a	x	x
Black Sea Bass (Centropristus striata)	n/a		x	x
Surf Clam (Spisula solidissima)	n/a	n/a		x
Ocean Quahog (Artica islandica)	n/a	n/a	x	x
Spiny Dogfish (Squalus acanthias)	n/a	n/a		
King Mackerel (Scomberomorus cavalla)	x	x	x	x
Spanish Mackerel (Scomberomorus maculatus)	x	x	x	x
Cobia (Rachycentron canadum)	x	x	x	x
Sand Tiger Shark (Odontaspis taurus)		x		
Common Thresher Shark *(Alopias vulpinus)*		x	x	x
Blue Shark (Prionace glauca)		x	x	x
White Shark (Charcharadon carcharias)			x	
Dusky Shark (Charcharinus obscurus)		x	x	
Shortfin Mako Shark *(Isurus oxyrhyncus)*		x	x	
Tiger Shark (Galeocerdo cuvieri)		x	x	
Sandbar Shark (Charcharinus plumbeus)		x	x	x
Bluefin Tuna (Thunnus thynnus)			x	x
Skipjack Tuna (Katsuwonus pelamis)				x

Source: NOAA 2008
Notes: Boundary coordinates: North: 40° 50.0’ N, East: 72° 30.0’ W, South: 40° 40.0’ N, West: 72° 40.0’ W.
n/a = these species either have no data available on the designated lifestages, or those lifestages are not present in the species' reproductive cycle.
Grid 10 (40° 50.0’ N, 72° 20.0’ W)

Square Description (i.e. habitat, landmarks, coastline markers): Atlantic Ocean waters within the square within Gardiners Bay, western Little Peconic Bay and eastern Great Peconic Bay affecting the following: southwest of New Suffolk, NY, Cutchogue, NY, southern Nassau Pt., Robins I., along with and north of North Sea, NY, Sebonac Neck, NY, Southampton , NY, and Shinecock Hills, NY, from Shinecock Canal to south of Jessup Neck. Also, within the Atlantic Ocean south of Southampton, NY, from south of Mecox Bay to just west of the Shinnecock Inlet, within eastern Shinecock Bay. Also, waters within Great South Bay estuary can be found at the very bottom of the square.

Species	**Eggs**	**Larvae**	**Juveniles**	**Adults**
Atlantic Salmon *(Salmo salar)*			x	x
Pollock (Pollachius virens)			x	
Whiting (Merluccius bilinearis)	x	x	x	x
Red Hake (Urophycis chuss)	x	x	x	
Winter Flounder (Pseudopleuronectes americanus)	x	x	x	x
Windowpane Flounder (Scopthalmus aquosus)	x	x	x	x
Ocean Pout (Zoarces americanus)	x	x		x
Atlantic Sea Herring *(Clupea harengus)*			x	x
Monkfish (Lophius americanus)	x	x		
Bluefish (Pomatomus saltatrix)			x	x
Long-finned Squid *(Loligo pealei)*	n/a	n/a	x	
Short-finned Squid (Illex illecebrosus)	n/a	n/a		
Atlantic Mackerel *(Scomber scombrus)*	x	x	x	x
Summer Flounder (Paralicthys dentatus)		x	x	x
Scup (Stenotomus chrysops)	x	x	x	x
Black Sea Bass (Centropristus striata)	n/a		x	
Surf Clam (Spisula solidissima)	n/a	n/a		
Ocean Quahog (Artica islandica)	n/a	n/a		
Spiny Dogfish (Squalus acanthias)	n/a	n/a		
King Mackerel (Scomberomorus cavalla)	x	x	x	x
Spanish Mackerel (Scomberomorus maculatus)	x	x	x	x
Cobia (Rachycentron canadum)	x	x	x	x
Sand Tiger Shark (Odontaspis taurus)		x		
Blue Shark (Prionace glauca)				x
White Shark (Charcharadon carcharias)			x	
Dusky Shark (Charcharinus obscurus)		x		
Sandbar Shark (Charcharinus plumbeus)		x	x	x
Tiger Shark (Galeocerdo cuvieri)			x	
Skipjack Tuna (Katsuwonus pelamis)				x

Source: NOAA 2008

Notes: Boundary coordinates: North: 41° 00.0’ N, East: 72° 20.0’ W, South: 40° 50.0’ N, West: 72° 30.0’ W.

n/a = these species either have no data available on the designated lifestages, or those lifestages are not present in the species' reproductive cycle.

Grid 11 (40° 40.0' N, 72° 20.0' W)

Square Description (i.e. habitat, landmarks, coastline markers): Atlantic Ocean waters within the square one square south of the square affecting the following: western Little Peconic Bay and eastern Great Peconic Bay, southwest of New Suffolk, NY, Cutchogue, NY, North Sea, NY, Sebonac Neck, NY, and within the Atlantic Ocean, waters affecting Southampton , NY, and Shinecock Hills, NY, and Southampton, NY.

Species	Eggs	Larvae	Juveniles	Adults
Haddock (Melanogrammus aeglefinus)		x		
Whiting (Merluccius bilinearis)	x	x	x	
Red Hake (Urophycis chuss)	x	x	x	
Witch Flounder (Glyptocephalus cynoglossus)		x		
Winter Flounder (Pseudopleuronectes americanus)	x	x	x	x
Yellowtail Flounder (Limanda ferruginea)	x	x	x	x
Windowpane Flounder (Scopthalmus aquosus)	x	x	x	x
Ocean Pout (Zoarces americanus)	x	x		x
Atlantic Sea Herring *(Clupea harengus)*			x	x
Monkfish (Lophius americanus)	x	x		
Bluefish (Pomatomus saltatrix)	x		x	x
Long-finned Squid *(Loligo pealei)*	n/a	n/a	x	x
Short-finned Squid (Illex illecebrosus)	n/a	n/a		
Atlantic Mackerel *(Scomber scombrus)*	x			
Summer Flounder (Paralicthys dentatus)			x	x
Scup (Stenotomus chrysops)	n/a	n/a	x	x
Black Sea Bass (Centropristus striata)	n/a		x	
Surf Clam (Spisula solidissima)	n/a	n/a		x
Ocean Quahog (Artica islandica)	n/a	n/a	x	x
Spiny Dogfish (Squalus acanthias)	n/a	n/a		
King Mackerel (Scomberomorus cavalla)	x	x	x	x
Spanish Mackerel (Scomberomorus maculatus)	x	x	x	x
Cobia (Rachycentron canadum)	x	x	x	x
Sand Tiger Shark (Odontaspis taurus)		x		
Common Thresher Shark *(Alopias vulpinus)*		x	x	x
Blue Shark (Prionace glauca)		x	x	x
White Shark (Charcharadon carcharias)			x	
Tiger Shark (Galeocerdo cuvieri)		x	x	
Dusky Shark (Charcharinus obscurus)		x	x	
Shortfin Mako Shark *(Isurus oxyrhyncus)*		x	x	x
Sandbar Shark (Charcharinus plumbeus)		x	x	x
Bluefin Tuna (Thunnus thynnus)			x	x
Skipjack Tuna (Katsuwonus pelamis)				x

Source: NOAA 2008
Notes: Boundary coordinates: North: 40° 50.0' N, East: 72° 20.0' W, South: 40° 40.0' N, West: 72° 30.0' W.
n/a = these species either have no data available on the designated lifestages, or those lifestages are not present in the species' reproductive cycle.

Grid 12 (40° 50.0’ N, 72° 10.0’ W)

Square Description (i.e. habitat, landmarks, coastline markers): Waters within the square affecting the following: from south of East Hampton, NY, to half way through Mecox Bay, east of Southampton, NY, including south of Wainscott, NY, and Bridgehampton, NY, within the Atlantic Ocean.

Species	Eggs	Larvae	Juveniles	Adults
Haddock (Melanogrammus aeglefinus)		x		
Whiting (Merluccius bilinearis)	x	x		
Red Hake (Urophycis chuss)	x	x	x	
Redfish (Sebastes fasciatus)	n/a			
Witch Flounder (Glyptocephalus cynoglossus)		x		
Winter Flounder (Pseudopleuronectes americanus)	x	x	x	x
Yellowtail Flounder (Limanda ferruginea)	x	x		
Windowpane Flounder (Scopthalmus aquosus)	x	x	x	x
Ocean Pout (Zoarces americanus)	x	x		x
Atlantic Sea Herring *(Clupea harengus)*			x	x
Monkfish (Lophius americanus)	x	x		
Bluefish (Pomatomus saltatrix)			x	x
Long-finned Squid *(Loligo pealei)*	n/a	n/a	x	x
Short-finned Squid (Illex illecebrosus)	n/a	n/a		
Summer Flounder (Paralicthys dentatus)				x
Scup (Stenotomus chrysops)	n/a	n/a	x	x
Black Sea Bass (Centropristus striata)	n/a		x	
Surf Clam (Spisula solidissima)	n/a	n/a		
Ocean Quahog (Artica islandica)	n/a	n/a		
Spiny Dogfish (Squalus acanthias)	n/a	n/a		
King Mackerel (Scomberomorus cavalla)	x	x	x	x
Spanish Mackerel (Scomberomorus maculatus)	x	x	x	x
Cobia (Rachycentron canadum)	x	x	x	x
Sand Tiger Shark (Odontaspis taurus)		x		
Blue Shark (Prionace glauca)				x
White Shark (Charcharadon carcharias)			x	
Dusky Shark (Charcharinus obscurus)		x	x	
Shortfin Mako Shark *(Isurus oxyrhyncus)*			x	
Sandbar Shark (Charcharinus plumbeus)		x	x	x
Tiger Shark (Galeocerdo cuvieri)		x	x	
Bluefin Tuna (Thunnus thynnus)			x	x
Skipjack Tuna (Katsuwonus pelamis)				x

Source: NOAA 2008

Notes: Boundary coordinates: North: 41° 00.0’ N, East: 72° 10.0’ W, South: 40° 50.0’ N, West: 72° 20.0’ W.

n/a = these species either have no data available on the designated lifestages, or those lifestages are not present in the species' reproductive cycle.

Grid 13 (40° 50.0’ N, 72° 00.0’ W)

Square Description (i.e. habitat, landmarks, coastline markers): Atlantic Ocean waters within the square within Long Island Sound affecting north of Devon Yacht Club and Amagansett, NY, along with affecting south of Long Island from just southeast of Hither Hills State Park to southeast of East Hampton, NY.

Species	Eggs	Larvae	Juveniles	Adults
Whiting (Merluccius bilinearis)	x	x	x	
Red Hake (Urophycis chuss)	x	x	x	
Redfish (Sebastes fasciatus)	n/a			
Winter Flounder (Pseudopleuronectes americanus)	x	x	x	x
Yellowtail Flounder (Limanda ferruginea)	x			x
Windowpane Flounder (Scopthalmus aquosus)	x		x	x
Ocean Pout (Zoarces americanus)	x	x		x
Atlantic Sea Herring *(Clupea harengus)*			x	x
Monkfish (Lophius americanus)	x	x		
Bluefish (Pomatomus saltatrix)			x	x
Long-finned Squid *(Loligo pealei)*	n/a	n/a	x	x
Short-finned Squid (Illex illecebrosus)	n/a	n/a		
Atlantic Butterfish (Peprilus triacanthus)		x		
Summer Flounder (Paralicthys dentatus)				x
Scup (Stenotomus chrysops)	n/a	n/a	x	x
Black Sea Bass (Centropristus striata)	n/a		x	x
Surf Clam (Spisula solidissima)	n/a	n/a	x	x
Ocean Quahog (Artica islandica)	n/a	n/a	x	x
Spiny Dogfish (Squalus acanthias)	n/a	n/a		
King Mackerel (Scomberomorus cavalla)	x	x	x	x
Spanish Mackerel (Scomberomorus maculatus)	x	x	x	x
Cobia (Rachycentron canadum)	x	x	x	x
Sand Tiger Shark (Odontaspis taurus)		x		
Common Thresher Shark *(Alopias vulpinus)*		x	x	x
Blue Shark (Prionace glauca)		x	x	x
White Shark (Charcharadon carcharias)			x	
Dusky Shark (Charcharinus obscurus)		x		
Shortfin Mako Shark *(Isurus oxyrhyncus)*		x	x	
Sandbar Shark (Charcharinus plumbeus)		x	x	x
Tiger Shark (Galeocerdo cuvieri)		x	x	
Bluefin Tuna (Thunnus thynnus)			x	x
Skipjack Tuna (Katsuwonus pelamis)				x
Basking Shark (Cetorhinus maximus)			x	

Source: NOAA 2008

Notes: Boundary coordinates: North: 41° 00.0’ N, East: 72° 00.0’ W, South: 40° 50.0’ N, West: 72° 10.0’ W.

n/a = these species either have no data available on the designated lifestages, or those lifestages are not present in the species' reproductive cycle.

Grid 14 (41° 00.0’ N, 71° 50.0’ W)

Square Description (i.e. habitat, landmarks, coastline markers): Atlantic Ocean waters within the square affecting the northeast tip of Long Island from just west of Rocky Point on the north side around Fort Pond Bay, past Lake Montauk, Shagwong Pt., False Pt., Montauk Pt., and Montauk, NY, to just east of Hither Hills State Park.

Species	Eggs	Larvae	Juveniles	Adults
Whiting (Merluccius bilinearis)	x	x	x	
Redfish (Sebastes fasciatus)	n/a			
Winter Flounder (Pseudopleuronectes americanus)	x	x	x	x
Windowpane Flounder (Scopthalmus aquosus)			x	x
Ocean Pout (Zoarces americanus)	x	x		x
Bluefish (Pomatomus saltatrix)			x	x
Long-finned Squid *(Loligo pealei)*	n/a	n/a	x	
Short-finned Squid (Illex illecebrosus)	n/a	n/a		
Summer Flounder (Paralicthys dentatus)			x	x
Scup (Stenotomus chrysops)	n/a	n/a	x	x
Black Sea Bass (Centropristus striata)	n/a		x	
Surf Clam (Spisula solidissima)	n/a	n/a		
Ocean Quahog (Artica islandica)	n/a	n/a		
Spiny Dogfish (Squalus acanthias)	n/a	n/a	x	x
King Mackerel (Scomberomorus cavalla)	x	x	x	x
Spanish Mackerel (Scomberomorus maculatus)	x	x	x	x
Cobia (Rachycentron canadum)	x	x	x	x
Sand Tiger Shark (Odontaspis taurus)		x		
Blue Shark (Prionace glauca)		x	x	x
Dusky Shark (Charcharinus obscurus)		x	x	
Shortfin Mako Shark *(Isurus oxyrhyncus)*			x	
Sandbar Shark (Charcharinus plumbeus)		x	x	x
Bluefin Tuna (Thunnus thynnus)			x	x

Source: NOAA 2008

Notes: Boundary coordinates: North: 41° 10.0’ N, East: 71° 50.0’ W, South: 41° 00.0’ N, West: 72° 00.0’ W.

n/a = these species either have no data available on the designated lifestages, or those lifestages are not present in the species' reproductive cycle.

Grid 15 (40° 50.0’ N, 71° 50.0’ W)

Square Description (i.e. habitat, landmarks, coastline markers): The waters within the square within the Atlantic Ocean one square south of the eastern most tip of Long Island, south one square.

Species	Eggs	Larvae	Juveniles	Adults
Haddock (Melanogrammus aeglefinus)		x		
Whiting (Merluccius bilinearis)	x	x	x	
Red Hake (Urophycis chuss)	x	x	x	
Redfish (Sebastes fasciatus)	n/a			
Witch Flounder (Glyptocephalus cynoglossus)		x		
Winter Flounder (Pseudopleuronectes americanus)	x	x	x	x
Yellowtail Flounder (Limanda ferruginea)	x	x	x	x
Windowpane Flounder (Scopthalmus aquosus)	x	x	x	x
Ocean Pout (Zoarces americanus)	x	x		x
Atlantic Sea Herring *(Clupea harengus)*		x	x	x
Monkfish (Lophius americanus)	x	x		
Bluefish (Pomatomus saltatrix)			x	x
Long-finned Squid *(Loligo pealei)*	n/a	n/a	x	x
Short-finned Squid (Illex illecebrosus)	n/a	n/a	x	
Atlantic Butterfish (Peprilus triacanthus)			x	
Summer Flounder (Paralicthys dentatus)				x
Scup (Stenotomus chrysops)	n/a	n/a	x	x
Black Sea Bass (Centropristus striata)	n/a		x	x
Surf Clam (Spisula solidissima)	n/a	n/a	x	x
Ocean Quahog (Artica islandica)	n/a	n/a	x	x
Spiny Dogfish (Squalus acanthias)	n/a	n/a	x	
King Mackerel (Scomberomorus cavalla)	x	x	x	x
Spanish Mackerel (Scomberomorus maculatus)	x	x	x	x
Cobia (Rachycentron canadum)	x	x	x	x
Sand Tiger Shark (Odontaspis taurus)		x		
Blue Shark (Prionace glauca)		x	x	x
White Shark (Charcharadon carcharias)			x	
Dusky Shark (Charcharinus obscurus)		x	x	
Shortfin Mako Shark *(Isurus oxyrhyncus)*		x	x	x
Sandbar Shark (Charcharinus plumbeus)		x	x	x
Tiger Shark (Galeocerdo cuvieri)		x	x	
Bluefin Tuna (Thunnus thynnus)			x	x
Yellowfin Tuna (Thunnus albacares)			x	x
Skipjack Tuna (Katsuwonus pelamis)				x
Common Thresher Shark *(Alopias vulpinus)*		x	x	x
Basking Shark (Cetorhinus maximus)			x	

Source: NOAA 2008

Notes: Boundary coordinates: North: 41° 00.0’ N, East: 71° 50.0’ W, South: 40° 50.0’ N, West: 72° 00.0’ W.

n/a = these species either have no data available on the designated lifestages, or those lifestages are not present in the species' reproductive cycle.

CPF Site 1 Democrat Point West	West of Jetty-Reach GSB-1A
	40.625280° N / 73.307751° W

CPF SITE GOALS

- Earthwork to meet target elevations and slopes for ESA credit
- Maximum elevation target = 8.33 ft-NAVD88 (9.5 ft-NGVD29)
- Fill pond to reduce depth and improve overall productivity and funtionality of existing wetland and create new foraging habitat
- Conserve sand volume on site
- Devegetate area to meet ESA goals

Democrat Point West is located on the western end of Fire Island within Robert Moses State Park. Democrat Point West defines the south and east boundary of Fire Island Inlet with Oak Beach to the north and west. Democrat Point West is a complex coastal area. At the western end lies a continuously evolving sand spit. A rock jetty spanning the width of the island defines the east boundary of Democrat Point West. Democrat Point West contains heavily vegetated dunes near the center of the site. These dunes taper in elevation toward the water on the north, west, and south sides. A small tidal pond, located just east of the Point's center, is surrounded by wetlands.

Foraging habitat is defined as the intertidal area that is intermittently submerged and exposed during tidal induced water surface fluctuations. As a proxy for the local spring tide range, the following discussion applies NOAA's reported Lowest Astronomical Tide (LAT) as the lower bound and Highest Astronomical Tide (HAT) as the upper bound for foraging habitat.

Nesting habitat is located immediately upland of foraging habitat and extends from the HAT elevation to +8.3 ft-NAVD88 at Democrat Point. Establishing the maximum elevation at +8.3 ft-NAVD88 should allow overwash of the site to occur multiple times a year.

To create early successional habitat that provides nesting and foraging for shorebirds, plans call for regrading and devegetating approximately 69.6 acres (ac) of proposed habitat. The regrading template includes a 3% slope extending from the lowest astronomical tidal (LAT) elevation and/or the wetland boundary to the +7 ft-NAVD88 contour. Along the spine of the site, a raised dune feature will extend to +8.3 ft-NAVD88 (+9.5 ft-NGVD29). Foraging habitat (81.4 ac) encompasses the area between the LAT and the highest astronomical tide (HAT), while nesting habitat (52.1 ac) extends from the HAT to an elevation of +8.33 ft-NAVD88. The migrating sand spit (35.9 ac) along the western side of the CPF is considered foraging habitat. On the eastern side of the project area a 23.4 ac wetland and tidal pond exists. The pond will be filled to an elevation of -2.0 ft-NAVD88 to improve the wetland's overall productivity and functionality and establish the area as foraging habitat. Connectivity to bayside foraging habitat is maintained along the shallow creek on the northeast corner of the pond. Through the proposed activities at Democrat Point West, early successional habitat will be created.

FIMP designates the Democrat Point West CPF as a species protection zone and recommends prohibiting installation of beach stabilization features. The USACE recommends the local land management agency consider predator management in newly set-aside areas.

Sand placement at the CPF sites will be performed in coordination with renourishment cycles of the beachfill features and subject to monitoring to ensure the resolution of project objectives. The USACE will not implement vegetation management or manipulation of the sites unless conducted as an incidental action associated with future sediment placement.

CPF Site 1 Democrat Point West	West of Jetty-Reach GSB-1A 40.625280° N / 73.307751° W

CPF PARAMETERS	
Feature	ESA
Cut Volume (cy)	-187,017
Fill Volume (cy)	168,514
Net Volume (cy)	-18,503
Acreage (Nesting\Foraging\Devegetation)	139.5 (52.1\81.4\69.6)
Activity	Regrade & de-vegetate
DATA SOURCES	
Topographic	USGS, 2016
Bathymetric	USGS, 2016
Aerial Imagery	Google Earth, 2016
Vegetation	N/A*
REAL ESTATE INFORMATION	
Property Owner	New York State Fire Island State Park
Municipality	Islip
County	Suffolk
CBRA	NY-59, System Unit

*up to date vegetation data were not available for the study area

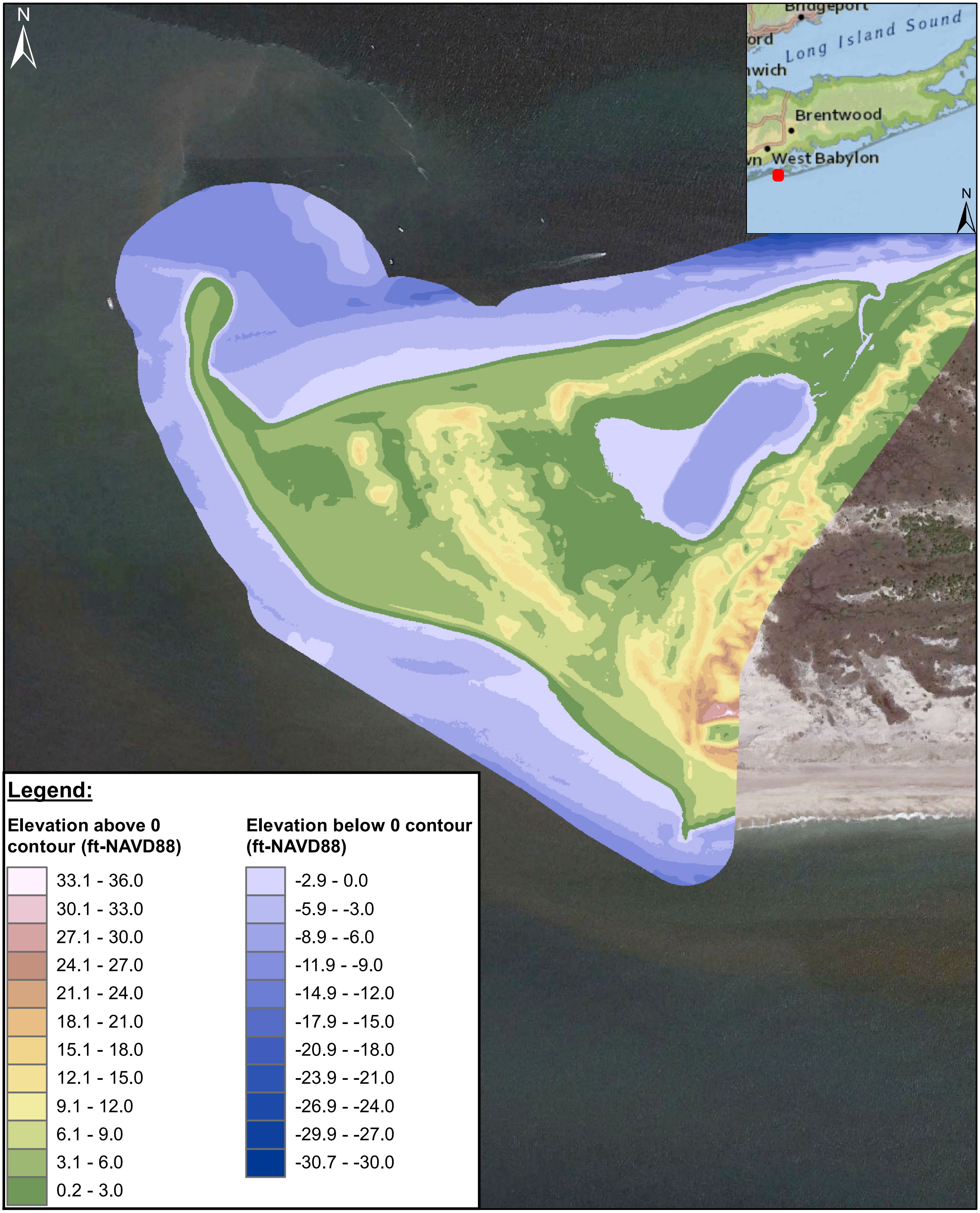
BAYSIDE TIDAL ENVIRONMENT (ft-NAVD88)			
Closest Tidal Benchmark	Fire Island, NY	Highest Astronomical Tide (HAT)	2.79
		Mean Higher High Water (MHHW)	1.85
Coordinates	40.627811° N 73.306047° W	Mean High Water (MHW)	1.58
		Mean Sea Level (MSL)	-0.16
0 ft-NAVD	1.17 ft-NGVD	Mean Tide Level (MTL)	-0.24
Range (MHW-MLW)	3.64	Mean Low Water (MLW)	-2.06
Diurnal Range (MHHW - MLLW)	4.06	Mean Lower Low Water (MLLW)	-2.22
Largest Tidal Range (HAT-LAT)	5.89	Lowest Astronomical Tide (LAT)	-3.10

BAYSIDE WAVE ENVIRONMENT					
Return Period	Fetch (ft)	Wave Height (ft)	Wind Setup (ft)	Wave Setup (ft)	HAT + Setup + Wave Height (ft)
1-year	10,059	2.3	0.05	1.02	6.16
5-year	10,059	2.9	0.08	1.23	7.00
10-year	10,059	3.2	0.10	1.31	7.40

CPF Site 1 Democrat Point West				West of Jetty-Reach GSB-1A
				40.625280° N / 73.307751° W
OCEANSIDE TIDAL ENVIRONMENT (ft-NAVD88)				
Closest Tidal Benchmark	Fire Island, NY		Highest Astronomical Tide (HAT)	3.00
			Mean Higher High Water (MHHW)	2.06
Coordinates	40.62171º N 73.308894 º W		Mean High Water (MHW)	1.76
			Mean Sea Level (MSL)	-0.18
0 ft-NAVD	1.17 ft-NGVD		Mean Tide Level (MTL)	-0.22
Range (MHW-MLW)		3.96	Mean Low Water (MLW)	-2.20
Diurnal Range (MHHW - MLLW)		4.41	Mean Lower Low Water (MLLW)	-2.36
Largest Tidal Range (HAT-LAT)		6.24	Lowest Astronomical Tide (LAT)	-3.24

OCEANSIDE WAVE ENVIRONMENT

Return Period	Deep Water Wave Height (ft)	Surf Zone Wave Height (ft)	Wind Setup (ft)	Wave Setup (ft)	HAT + Setup + Surf Zone Wave Height (ft)
1-year	14.2	6.8	1.00	0.92	11.51
5-year	19.4	7.1	1.83	2.01	13.73
10-year	21.7	7.2	2.32	2.48	14.79



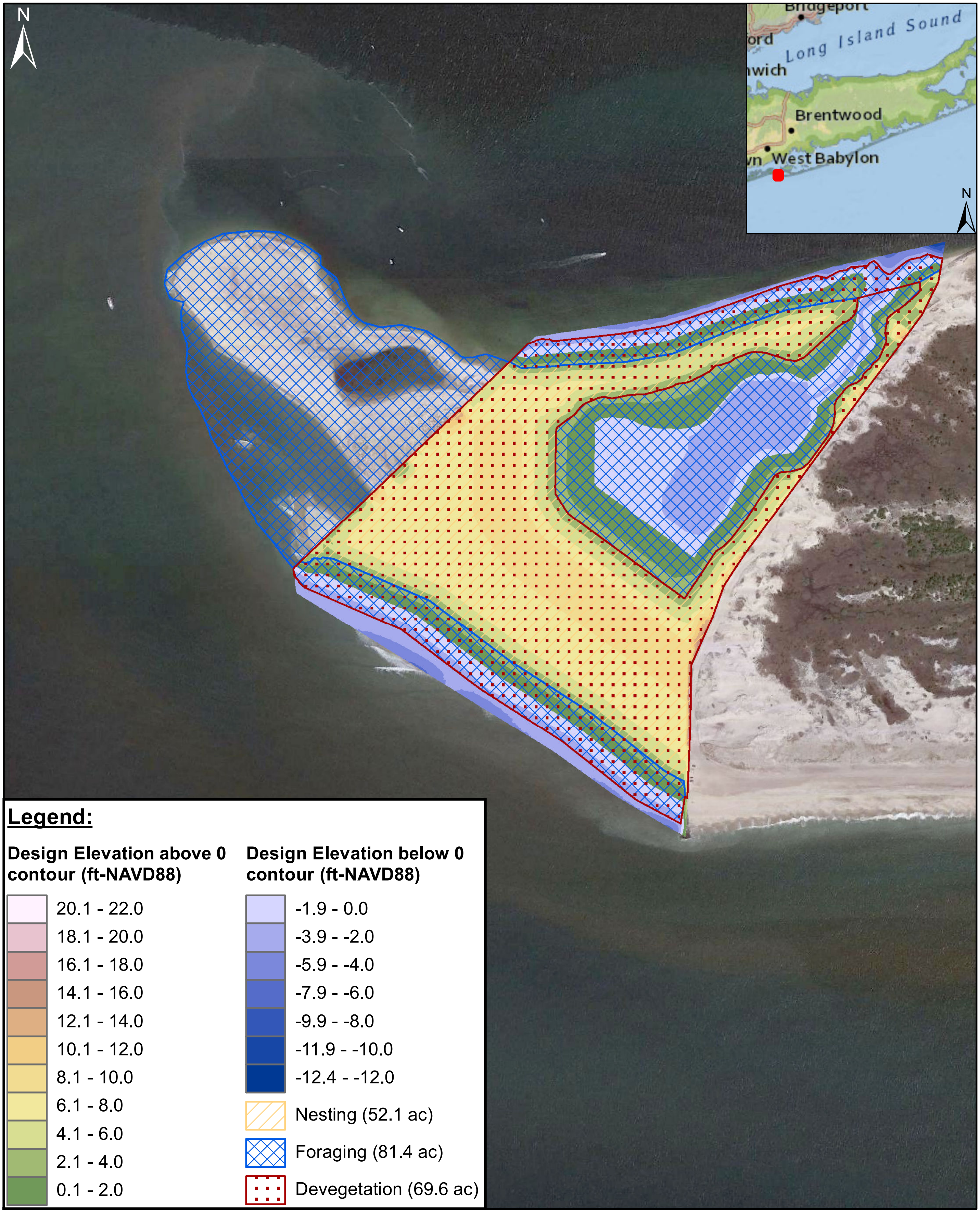
Feet

0 800 1,600

IMAGE SOURCE: Google Earth, 2016

Fire Island to Montauk Point
Coastal Process Features
Democrat Point West
Existing Conditions

PROJECT	C2017-071
DRAWN BY	WKL
SHEET	1 OF 1
DATE	MAR 2018



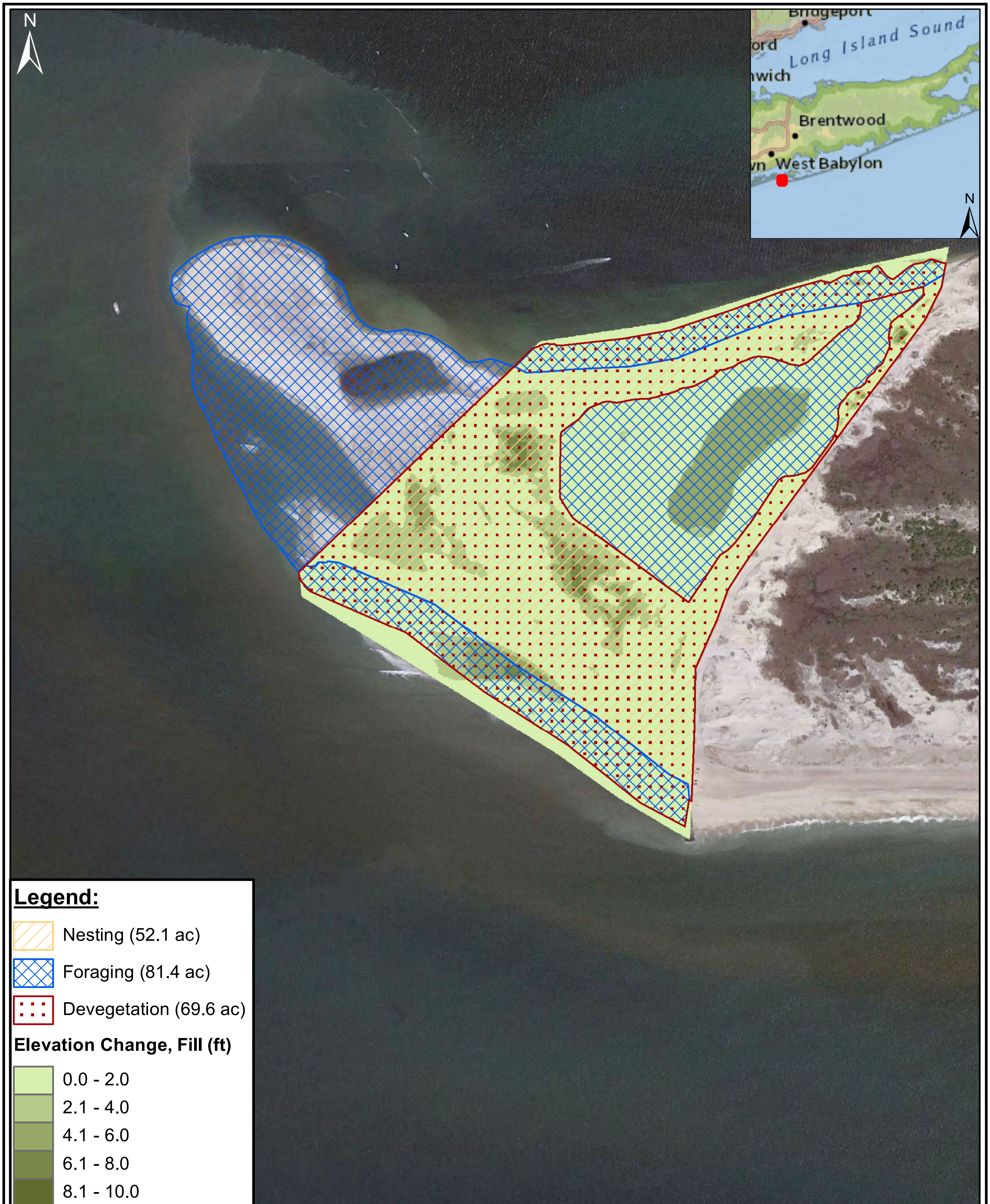
Feet

0 800 1,600

IMAGE SOURCE: Google Earth, 2016

Fire Island to Montauk Point
Coastal Process Features
Democrat Point West
Proposed Elevations

PROJECT	C2017-071
DRAWN BY	WKL
SHEET	1 OF 1
DATE	APR 2018



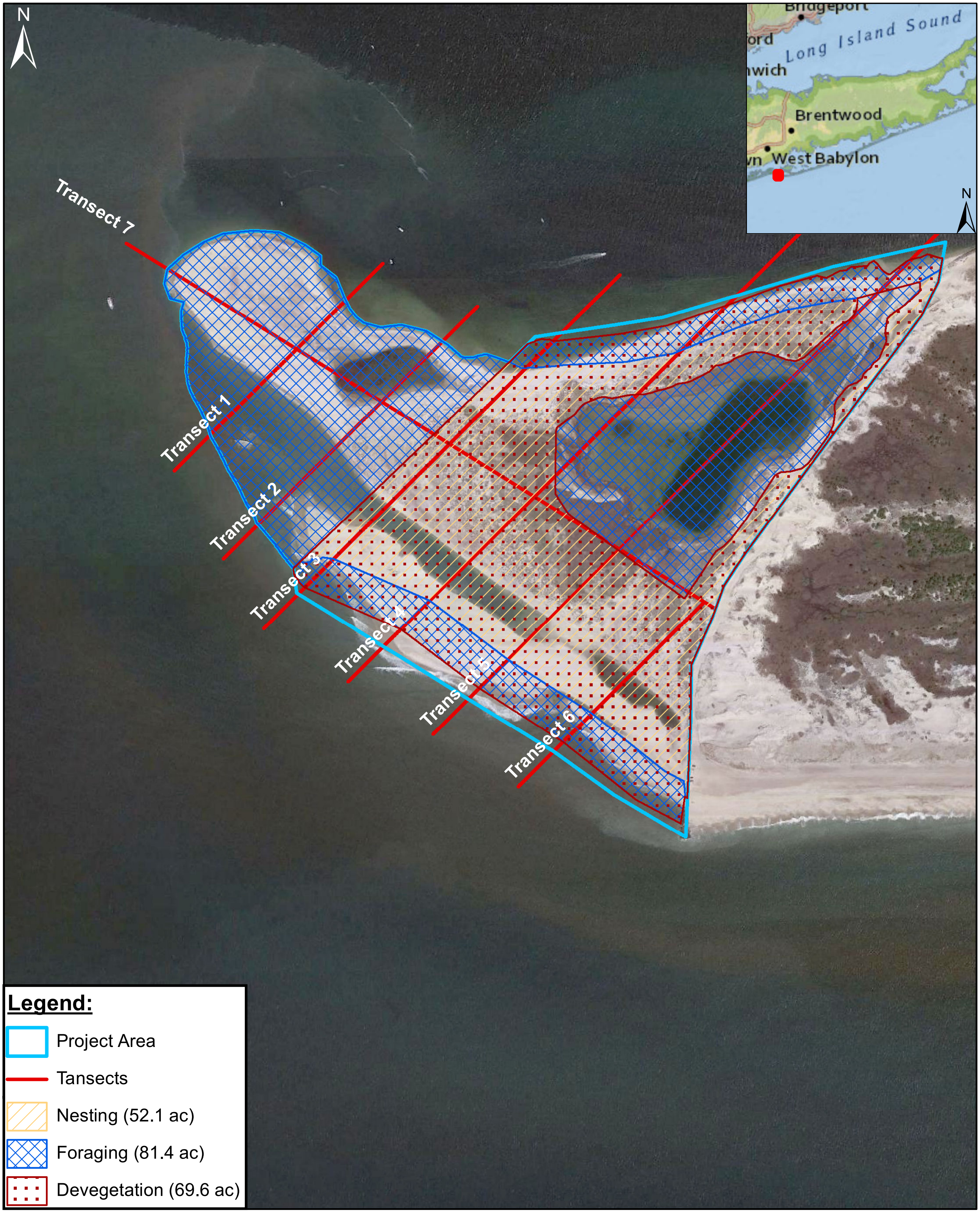
Feet

0 800 1,600

IMAGE SOURCE: Google Earth, 2016

Fire Island to Montauk Point
Coastal Process Features
Democrat Point West
Proposed Elevation Changes

PROJECT	C2017-071
DRAWN BY	WKL
SHEET	1 OF 1
DATE	APR 2018



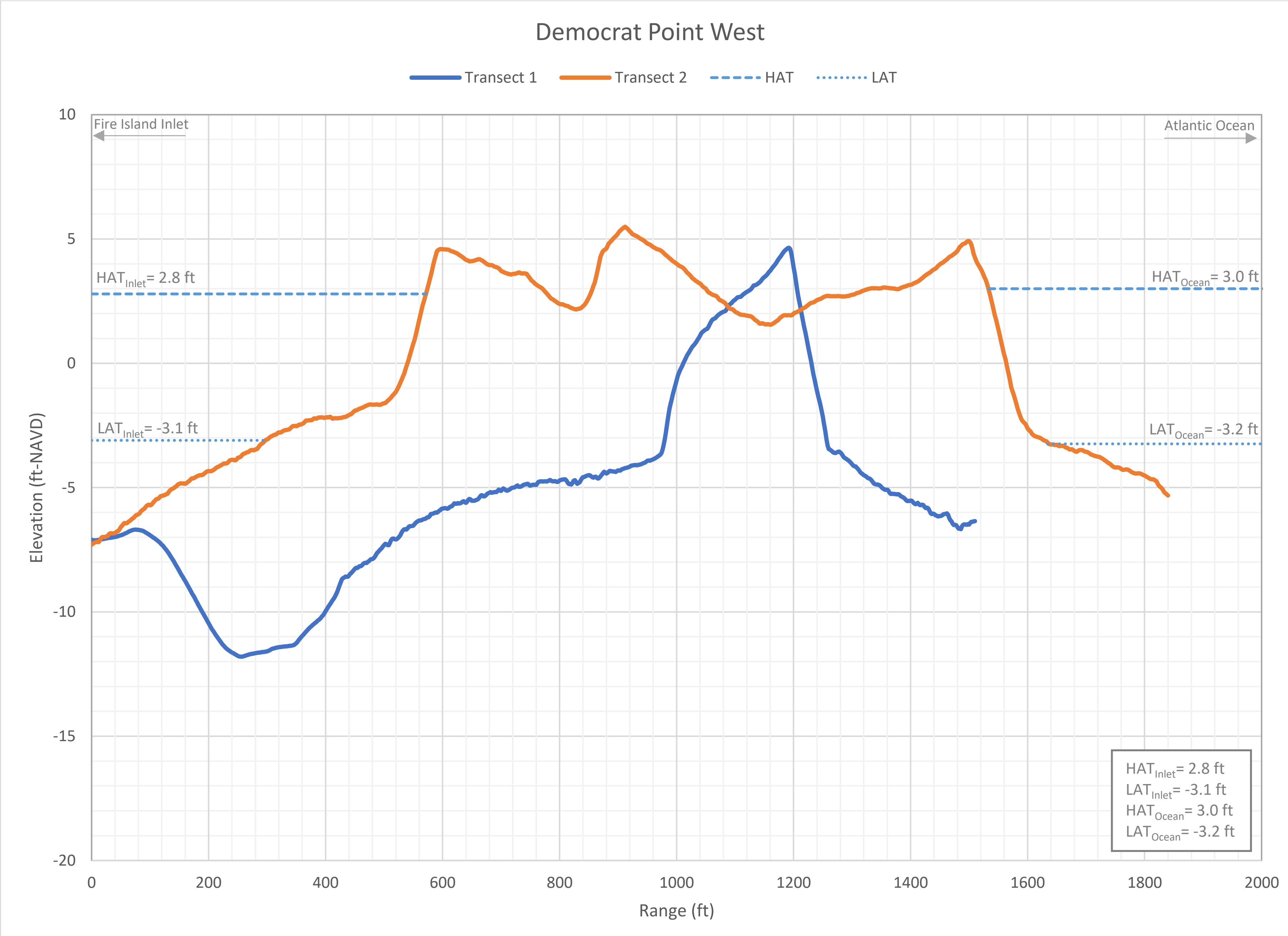
Feet

0 800 1,600

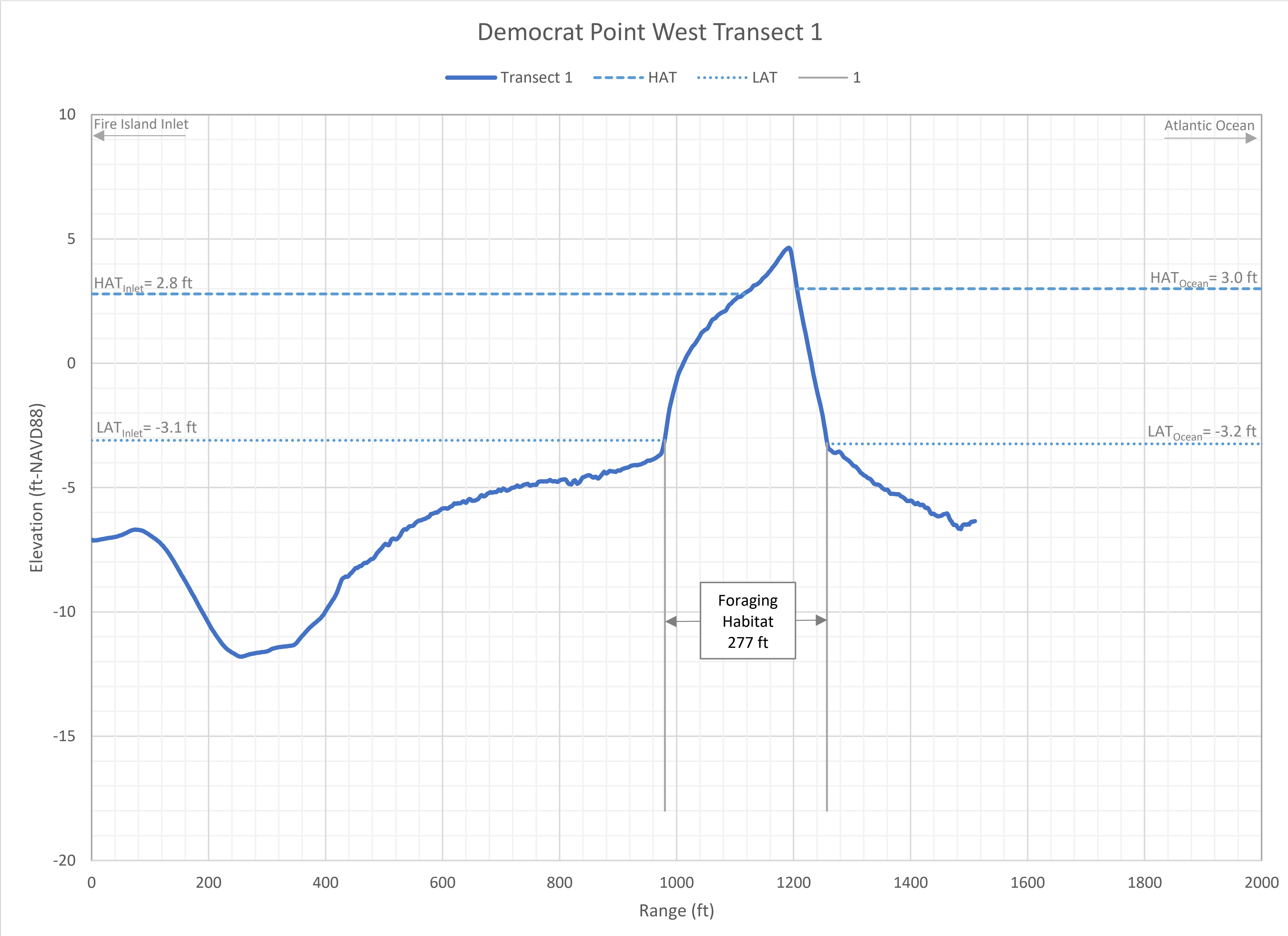
IMAGE SOURCE: Google Earth, 2016

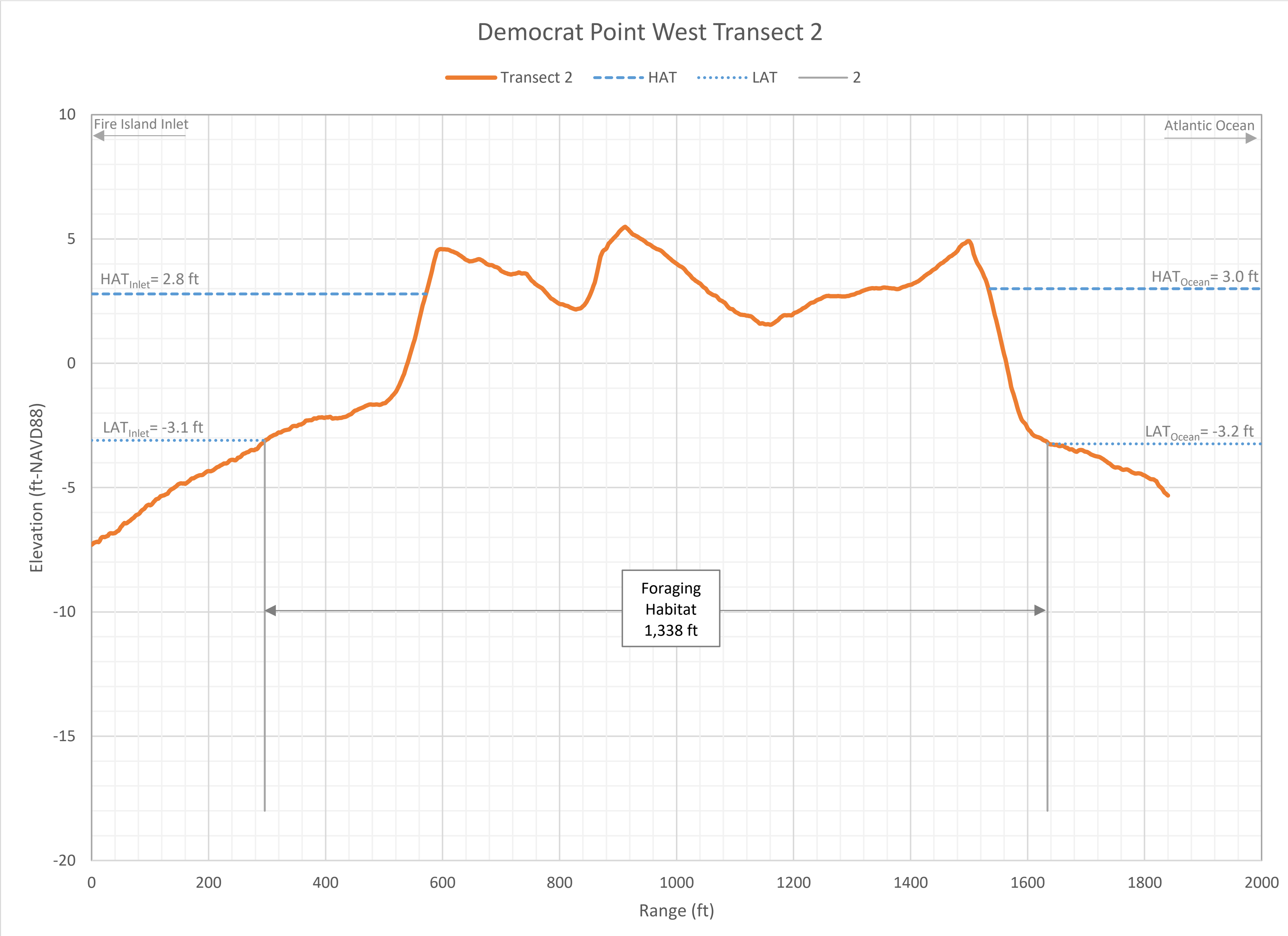
Fire Island to Montauk Point
Coastal Process Features
Democrat Point West
Transect Locations

PROJECT	C2017-071
DRAWN BY	WKL
SHEET	1 OF 1
DATE	APR 2018

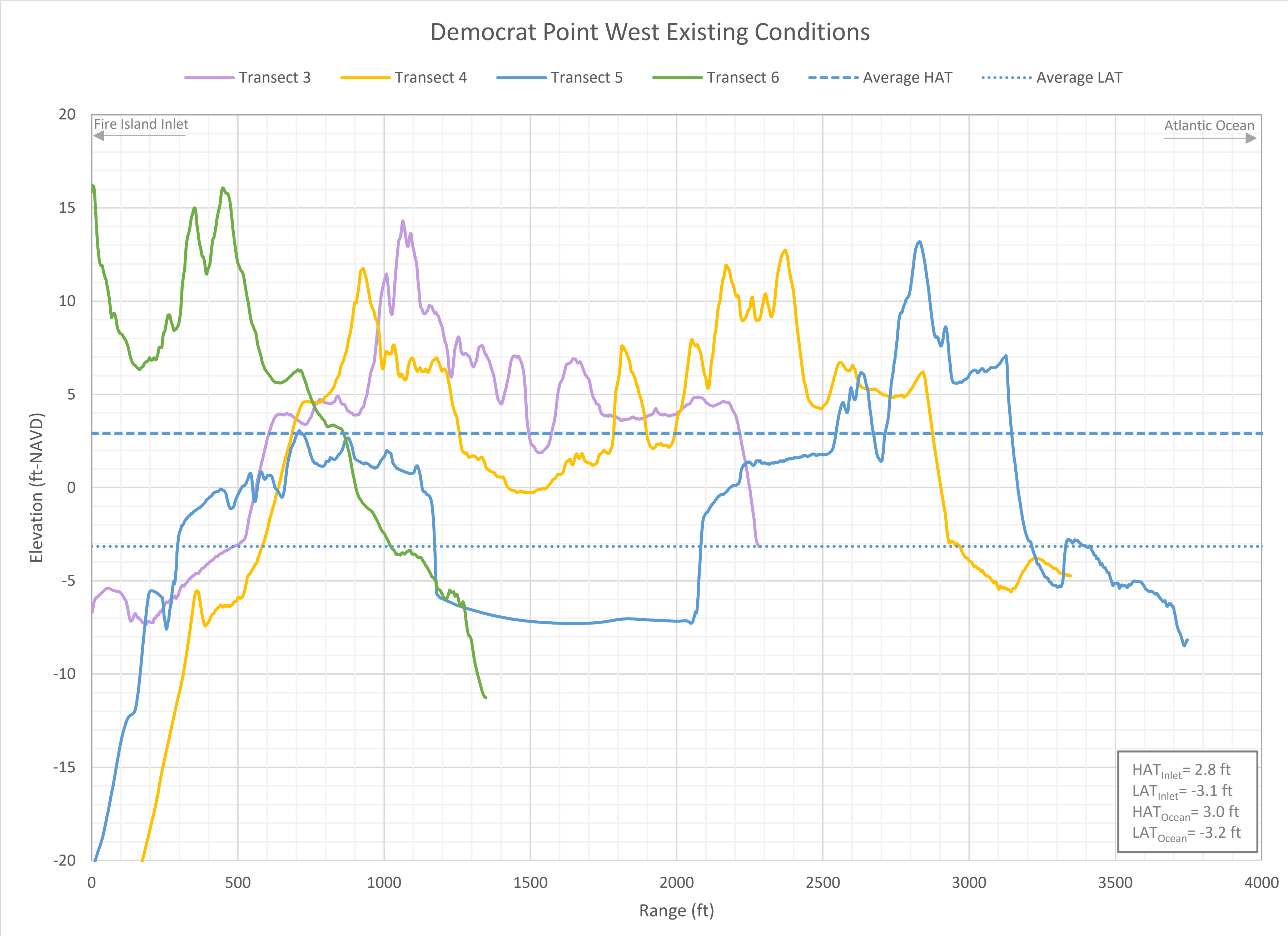


Democrat Point West
Transect 1
Transect 2
HAT
LAT
Fire Island Inlet
Atlantic Ocean
HAT Inlet= 2.8 ft
LAT Inlet= -3.1 ft
HAT Ocean= 3.0 ft
LAT Ocean= -3.2 ft
Elevation (ft-NAVD)
Range (ft)
10
5
0
-5
-10
-15
-20
0
200
400
600
800
1000
1200
1400
1600
1800
2000
HAT Inlet= 2.8 ft
LAT Inlet= -3.1 ft
HAT Ocean= 3.0 ft
LAT Ocean= -3.2 ft

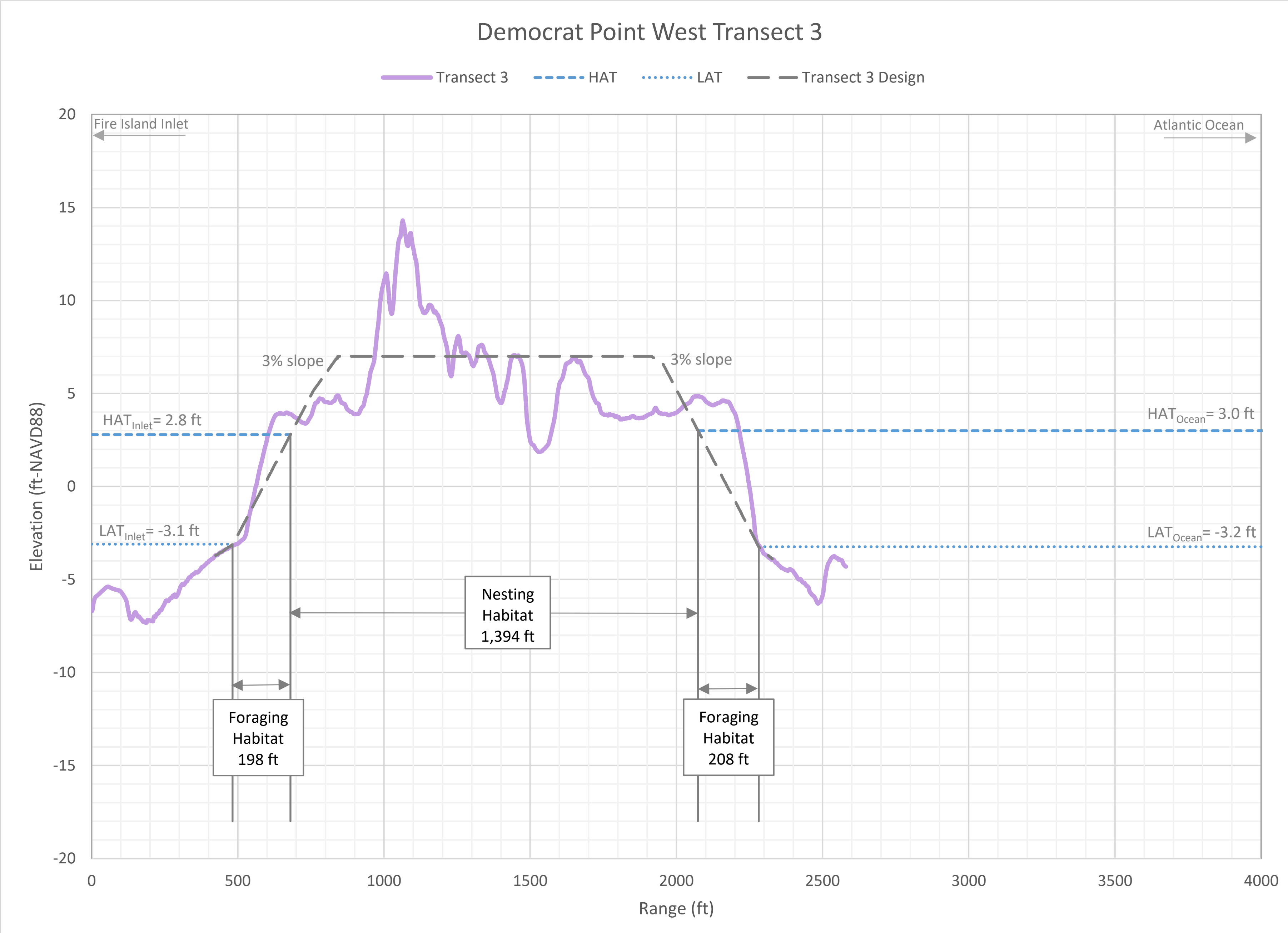

Democrat Point West Transect 1
Transect 1
HAT
LAT
1
Fire Island Inlet
Atlantic Ocean
HAT_Inlet = 2.8 ft
HAT_Ocean = 3.0 ft
LAT_Inlet = -3.1 ft
LAT_Ocean = -3.2 ft
Foraging Habitat 277 ft
Elevation (ft-NAVD88)
Range (ft)
10
5
0
-5
-10
-15
-20
0
200
400
600
800
1000
1200
1400
1600
1800
2000

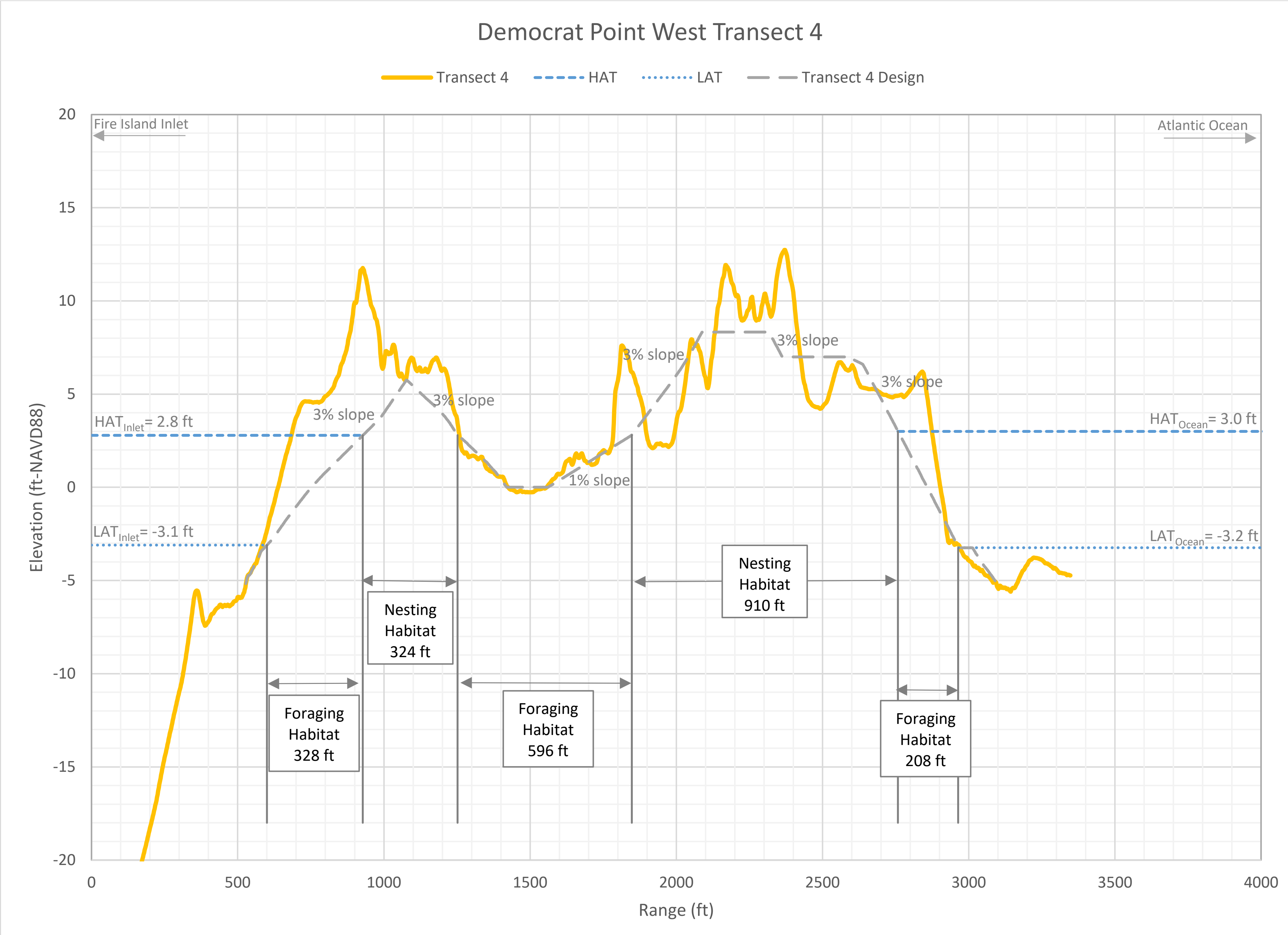


Democrat Point West Transect 2
Transect 2
HAT
LAT
2
Fire Island Inlet
Atlantic Ocean
HAT Inlet= 2.8 ft
HAT Ocean= 3.0 ft
LAT Inlet= -3.1 ft
LAT Ocean= -3.2 ft
Foraging Habitat 1,338 ft
Elevation (ft-NAVD88)
Range (ft)
10
5
0
-5
-10
-15
-20
0
200
400
600
800
1000
1200
1400
1600
1800
2000

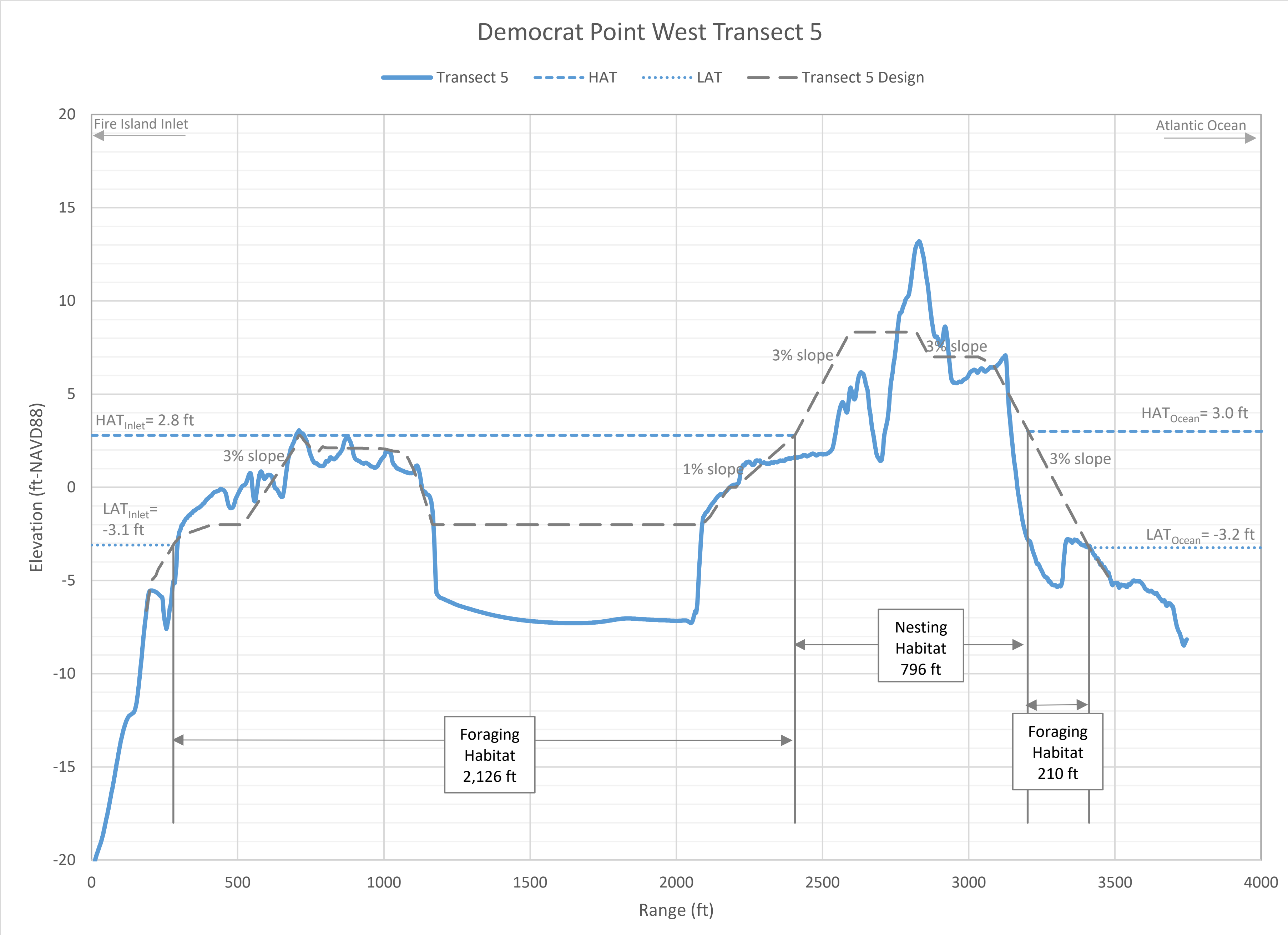


Democrat Point West Existing Conditions
Transect 3
Transect 4
Transect 5
Transect 6
Average HAT
Average LAT
Fire Island Inlet
Atlantic Ocean
Elevation (ft-NAVD)
Range (ft)
20
15
10
5
0
-5
-10
-15
-20
0
500
1000
1500
2000
2500
3000
3500
4000
HAT Inlet= 2.8 ft
LAT Inlet= -3.1 ft
HAT Ocean= 3.0 ft
LAT Ocean= -3.2 ft

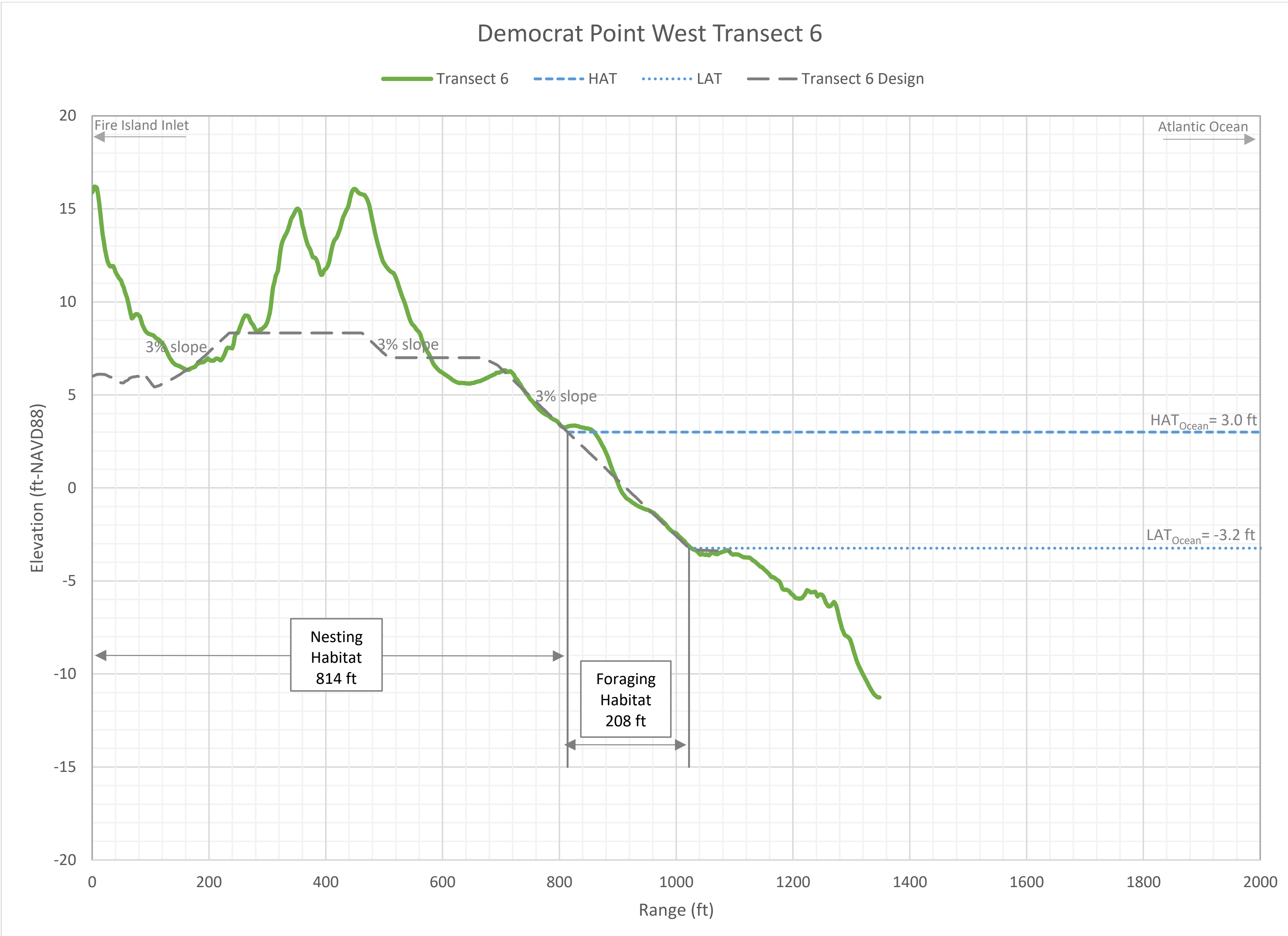

Democrat Point West Transect 3
Transect 3
HAT
LAT
Transect 3 Design
Fire Island Inlet
Atlantic Ocean
3% slope
3% slope
HAT Inlet= 2.8 ft
LAT Inlet= -3.1 ft
HAT Ocean= 3.0 ft
LAT Ocean= -3.2 ft
Nesting Habitat 1,394 ft
Foraging Habitat 198 ft
Foraging Habitat 208 ft
Elevation (ft-NAVD88)
Range (ft)
20
15
10
5
0
-5
-10
-15
-20
0
500
1000
1500
2000
2500
3000
3500
4000

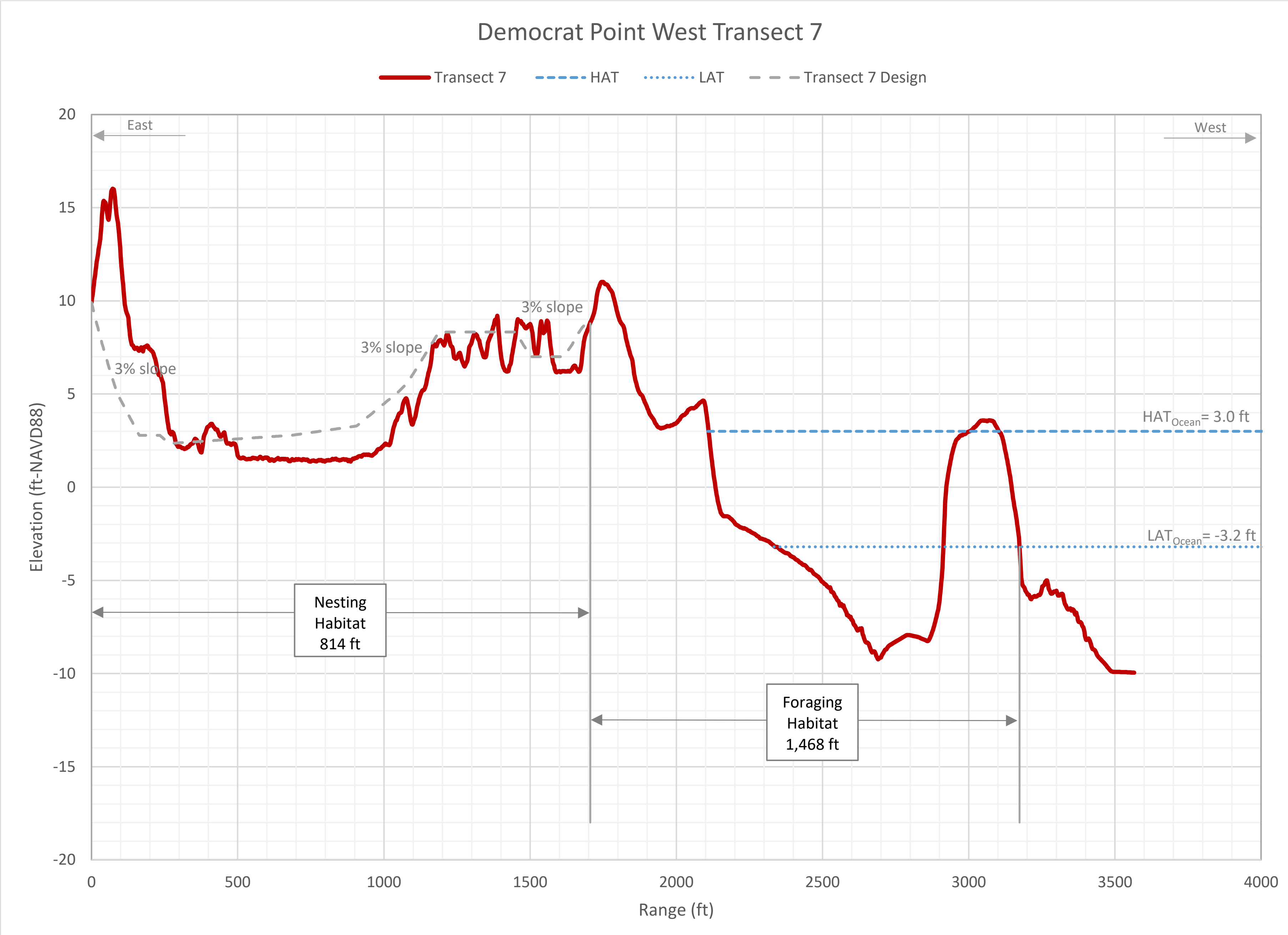


Democrat Point West Transect 4
Transect 4
HAT
LAT
Transect 4 Design
Fire Island Inlet
Atlantic Ocean
HAT Inlet = 2.8 ft
LAT Inlet = -3.1 ft
HAT Ocean = 3.0 ft
LAT Ocean = -3.2 ft
3% slope
3% slope
3% slope
3% slope
3% slope
1% slope
Nesting Habitat 324 ft
Nesting Habitat 910 ft
Foraging Habitat 328 ft
Foraging Habitat 596 ft
Foraging Habitat 208 ft
Elevation (ft-NAVD88)
Range (ft)
20
15
10
5
0
-5
-10
-15
-20
0
500
1000
1500
2000
2500
3000
3500
4000



Democrat Point West Transect 5
Transect 5
HAT
LAT
Transect 5 Design
Fire Island Inlet
Atlantic Ocean
HAT$_{Inlet}$= 2.8 ft
LAT$_{Inlet}$= -3.1 ft
HAT$_{Ocean}$= 3.0 ft
LAT$_{Ocean}$= -3.2 ft
3% slope
1% slope
3% slope
3% slope
3% slope
Nesting Habitat 796 ft
Foraging Habitat 2,126 ft
Foraging Habitat 210 ft
Elevation (ft-NAVD88)
Range (ft)
20
15
10
5
0
-5
-10
-15
-20
0
500
1000
1500
2000
2500
3000
3500
4000


Democrat Point West Transect 6
Transect 6
HAT
LAT
Transect 6 Design
Fire Island Inlet
Atlantic Ocean
3% slope
3% slope
3% slope
HAT_{Ocean} = 3.0 ft
LAT_{Ocean} = -3.2 ft
Nesting Habitat 814 ft
Foraging Habitat 208 ft
Elevation (ft-NAVD88)
Range (ft)
20
15
10
5
0
-5
-10
-15
-20
0
200
400
600
800
1000
1200
1400
1600
1800
2000



Democrat Point West Transect 7
Transect 7
HAT
LAT
Transect 7 Design
East
West
3% slope
3% slope
3% slope
HAT$_{Ocean}$= 3.0 ft
LAT$_{Ocean}$= -3.2 ft
Nesting Habitat 814 ft
Foraging Habitat 1,468 ft
Elevation (ft-NAVD88)
Range (ft)
20
15
10
5
0
-5
-10
-15
-20
0
500
1000
1500
2000
2500
3000
3500
4000

CPF Site 2 Democrat Point Bayside East of Jetty	East of Jetty-Reach GSB-1A 40.626794° N / 73.293164° W

CPF SITE GOALS

- Earthwork to meet target elevations and slopes for ESA credit
- Shift existing sand stockpile to form barrier between recreational use (east) and ESA areas (west)
- Converve sand volume on site by adding any surplus to stockpile and/or back areas
- Devegetate area to meet ESA goals

Democrat Point (East of Jetty) is located on the western end of Fire Island within Robert Moses State Park. Democrat Point (East of Jetty) lies just east of the Fire Island Inlet with Oak Beach to the north and west. Democrat Point (East of Jetty) is a sandy bayside beach, where sand was previously stockpiled after dredging projects in the vicinity. The project area contains coastal dunes with sporadic vegetation.

Foraging habitat is defined as the intertidal area that is intermittently submerged and exposed during tidal induced water surface fluctuations. As a proxy for the local spring tide range, the following discussion applies NOAA's reported Lowest Astronomical Tide (LAT) as the lower bound and Highest Astronomical Tide (HAT) as the upper bound for foraging habitat.

Nesting habitat is located immediately upland of foraging habitat and extends from the HAT elevation to +5 ft-NAVD88 at Democrat Point (East of Jetty) as depicted in the Proposed Elevation figure.

To create early successional habitat that provides nesting and foraging for shorebirds, plans call for regrading and devegetating approximately 27.0 acres (ac). This includes 5.1 ac of foraging habitat and 19.3 ac of nesting habitat. The regrading template includes a 2% slope on the north bank to allow for viable shorebird habitat. Foraging habitat encompasses the area between the LAT and the HAT, while nesting habitat extends from the HAT to a constructed elevation of +5 ft-NAVD88.

Sand placement at the CPF sites will be performed in coordination with renourishment cycles of the beachfill features and subject to monitoring to ensure resolution of project objectives. The USACE will not implement vegetation management or manipulation of the sites unless conducted as an incidental action associated with future placement. The USACE recommends the local land management agency consider predator management in newly created CPF's. In addition, the USACE anticipates the park's ORV policy will be implemented during nesting season.

CPF Site 2 Democrat Point Bayside East of Jetty	East of Jetty-Reach GSB-1A 40.626794° N / 73.293164° W

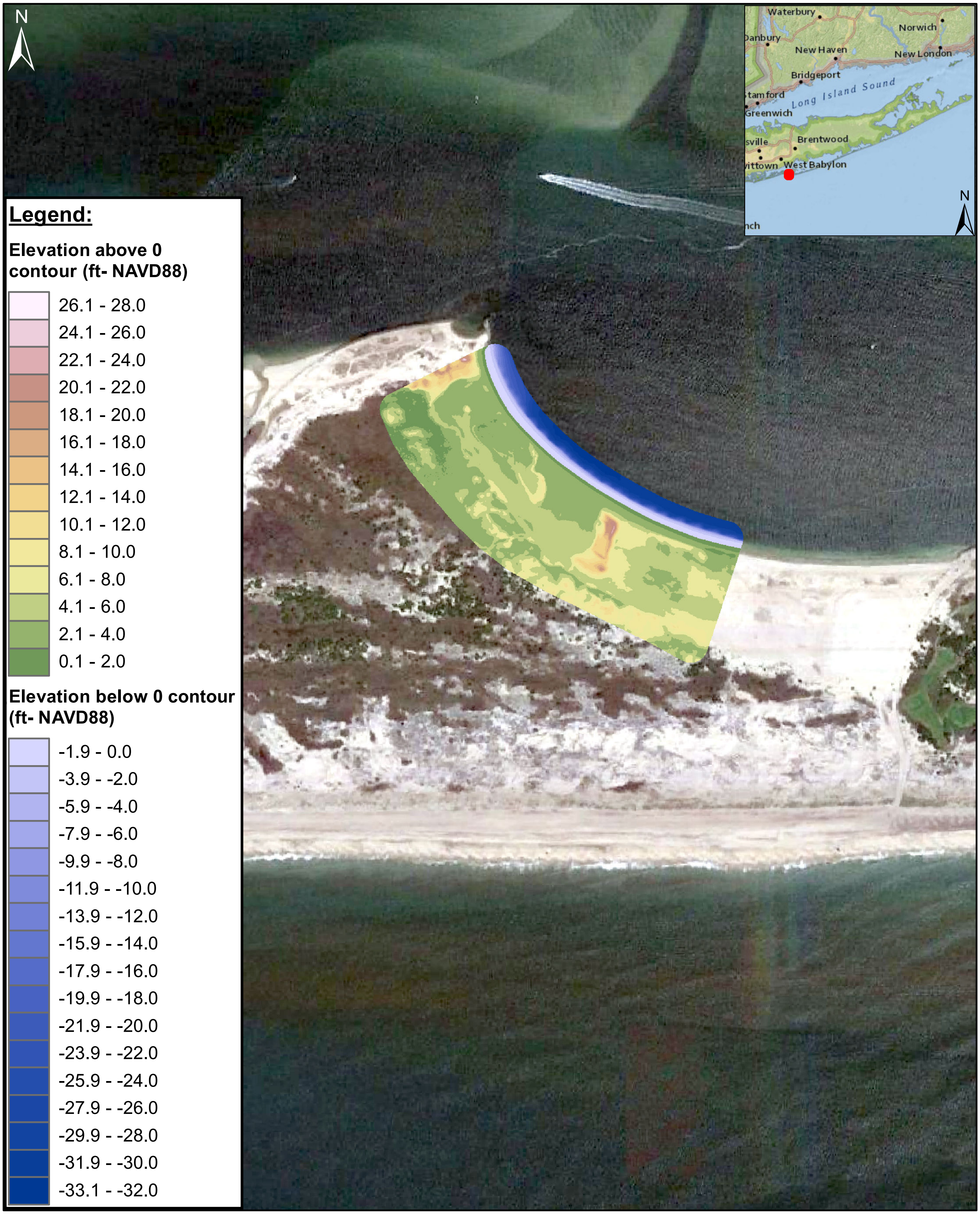
CPF PARAMETERS	
Feature	ESA
Cut Volume (cy)	-42,997
Fill Volume (cy)	40,428
Net Volume (cy)	-2,569
Acreage (Nesting\Foraging\Devegetation)	27.0 (19.3\5.1\27.0)
Activity	Regrade / Devegetate

DATA SOURCES	
Topographic	USGS, 2016
Bathymetric	USGS, 2016
Aerial Imagery	Google Earth, 2016
Vegetation	NPS, 2010

REAL ESTATE INFORMATION	
Property Owner	New York State Fire Island State Park
Municipality	Islip
County	Suffolk
CBRA	NY-59, System Unit

BAYSIDE TIDAL ENVIRONMENT (ft-NAVD88)			
Closest Tidal Benchmark	Fire Island, NY	Highest Astronomical Tide (HAT)	2.01
		Mean Higher High Water (MHHW)	1.54
Coordinates	40.626667° N 73.260000° W	Mean High Water (MHW)	1.30
		Mean Sea Level (MSL)	-0.14
0 ft-NAVD = 1.16 ft-NGVD		Mean Tide Level (MTL)	-0.15
Range (MHW-MLW)	2.89	Mean Low Water (MLW)	-1.59
Diurnal Range (MHHW - MLLW)	3.26	Mean Lower Low Water (MLLW)	-1.72
Largest Tidal Range (HAT-LAT)	4.21	Lowest Astronomical Tide (LAT)	-2.20

BAYSIDE WAVE ENVIRONMENT					
Return Period	Fetch (ft)	Wave Height (ft)	Wind Setup (ft)	Wave Setup (ft)	HAT + Setup + Wave Height (ft-NAVD88)
1-year	9,404	2.2	0.06	1.08	5.35
5-year	9,404	2.9	0.11	1.33	6.35
10-year	9,404	3.2	0.13	1.44	6.78



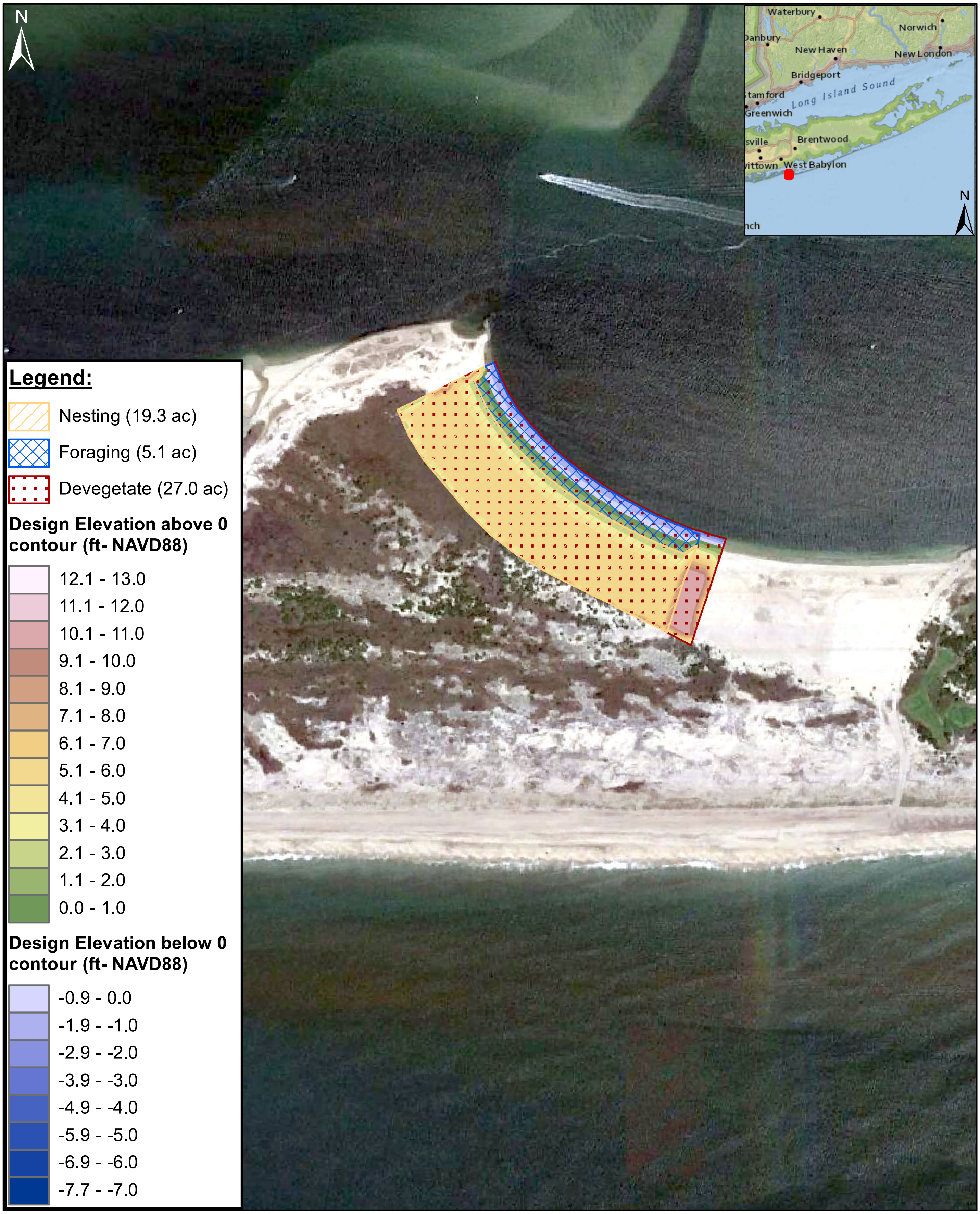
Feet

0 500 1,000

IMAGE SOURCE: Google Earth, 2016

Fire Island to Montauk Point
Coastal Process Features
Democrat Point East
Existing Conditions

PROJECT	C2017-071
DRAWN BY	WKL
SHEET	1 OF 1
DATE	APR 2018



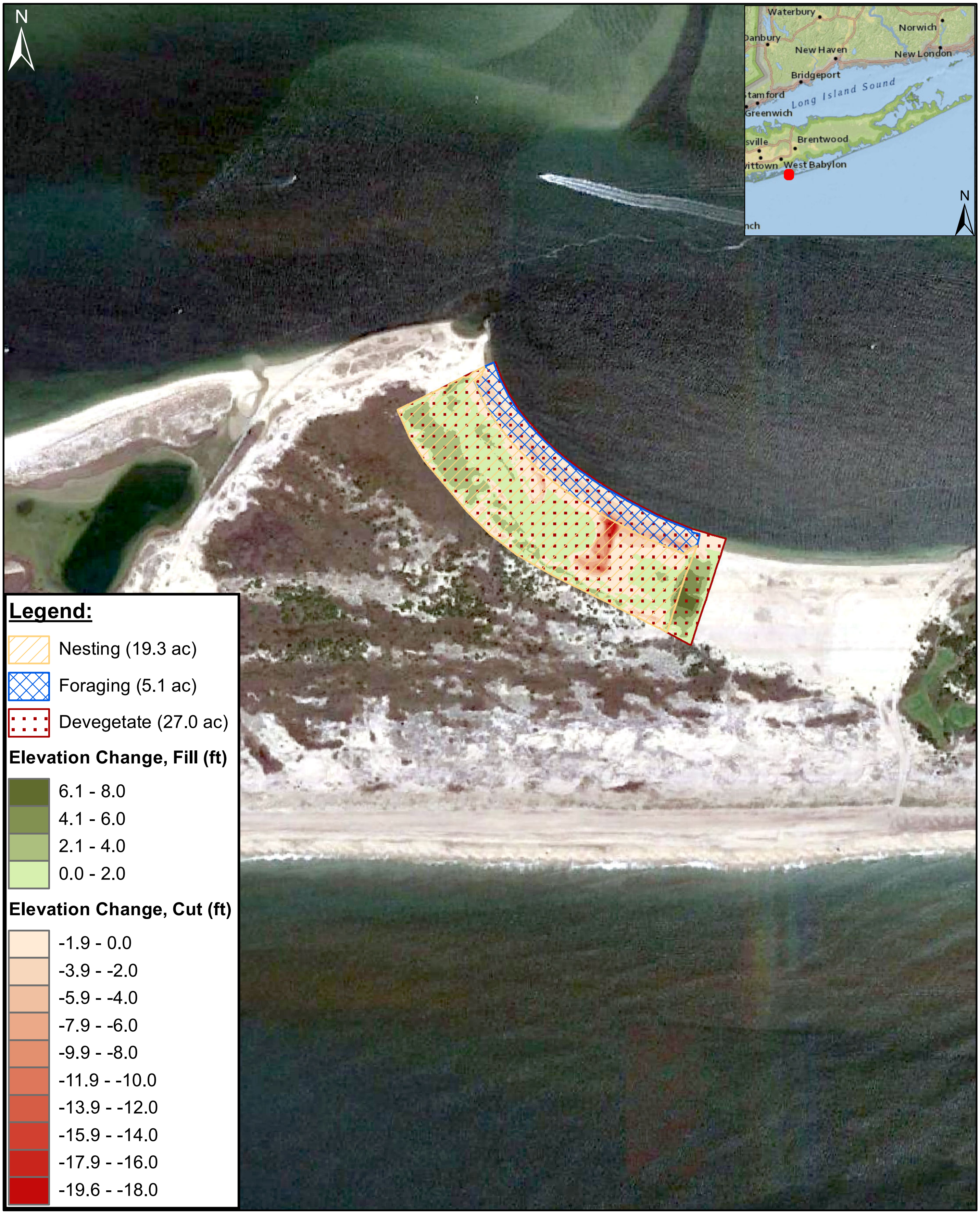
Feet

0 500 1,000

IMAGE SOURCE: Google Earth, 2016

Fire Island to Montauk Point
Coastal Process Features
Democrat Point East
Proposed Elevations

PROJECT	C2017-071
DRAWN BY	WKL
SHEET	1 OF 1
DATE	APR 2018



Feet
0 500 1,000
IMAGE SOURCE: Google Earth, 2016

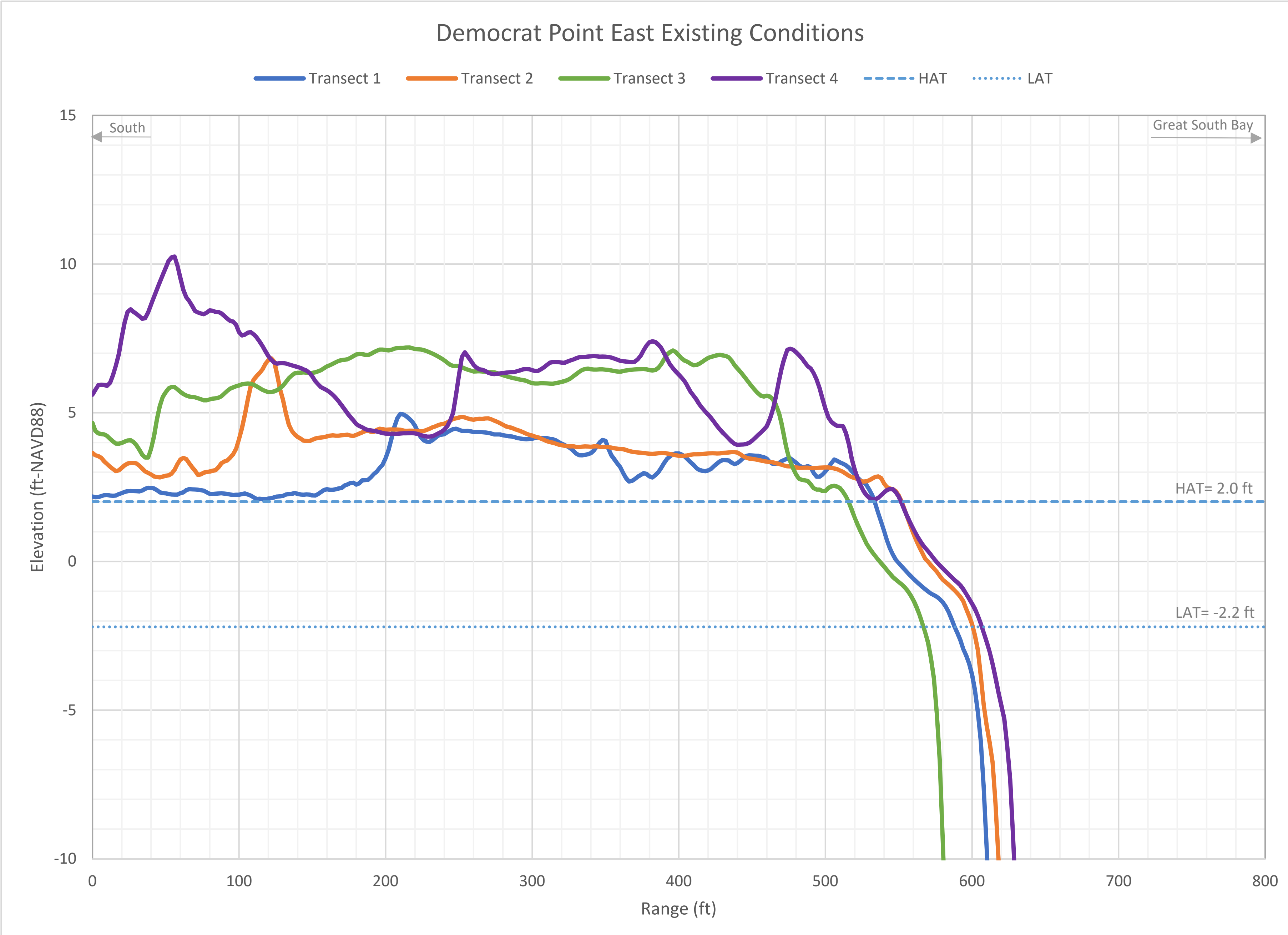
Fire Island to Montauk Point
Coastal Process Features
Democrat Point East
Proposed Elevation Changes

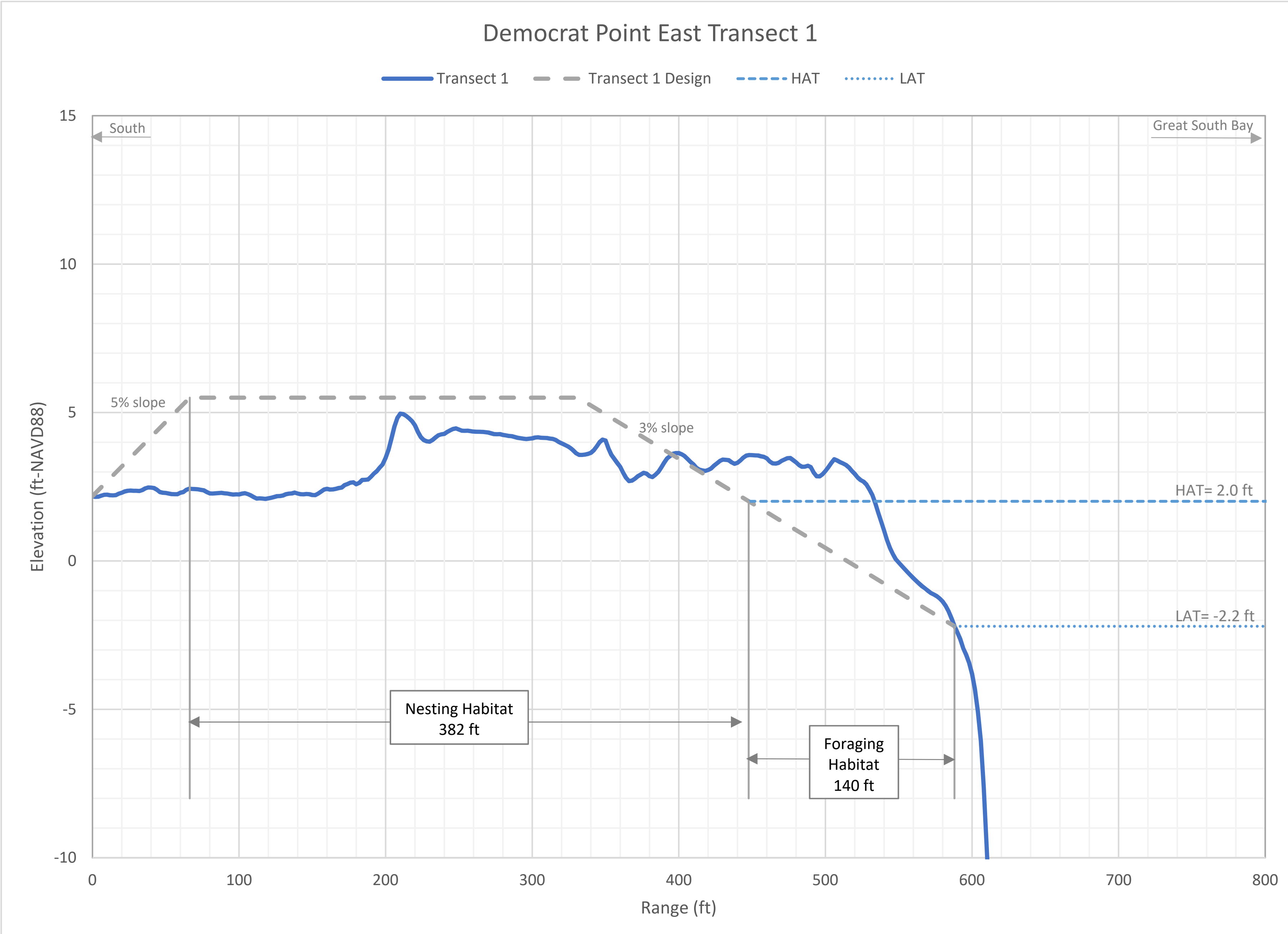
PROJECT	C2017-071
DRAWN BY	WKL
SHEET	1 OF 1
DATE	APR 2018

Feet
0 500 1,000
IMAGE SOURCE: Google Earth, 2016

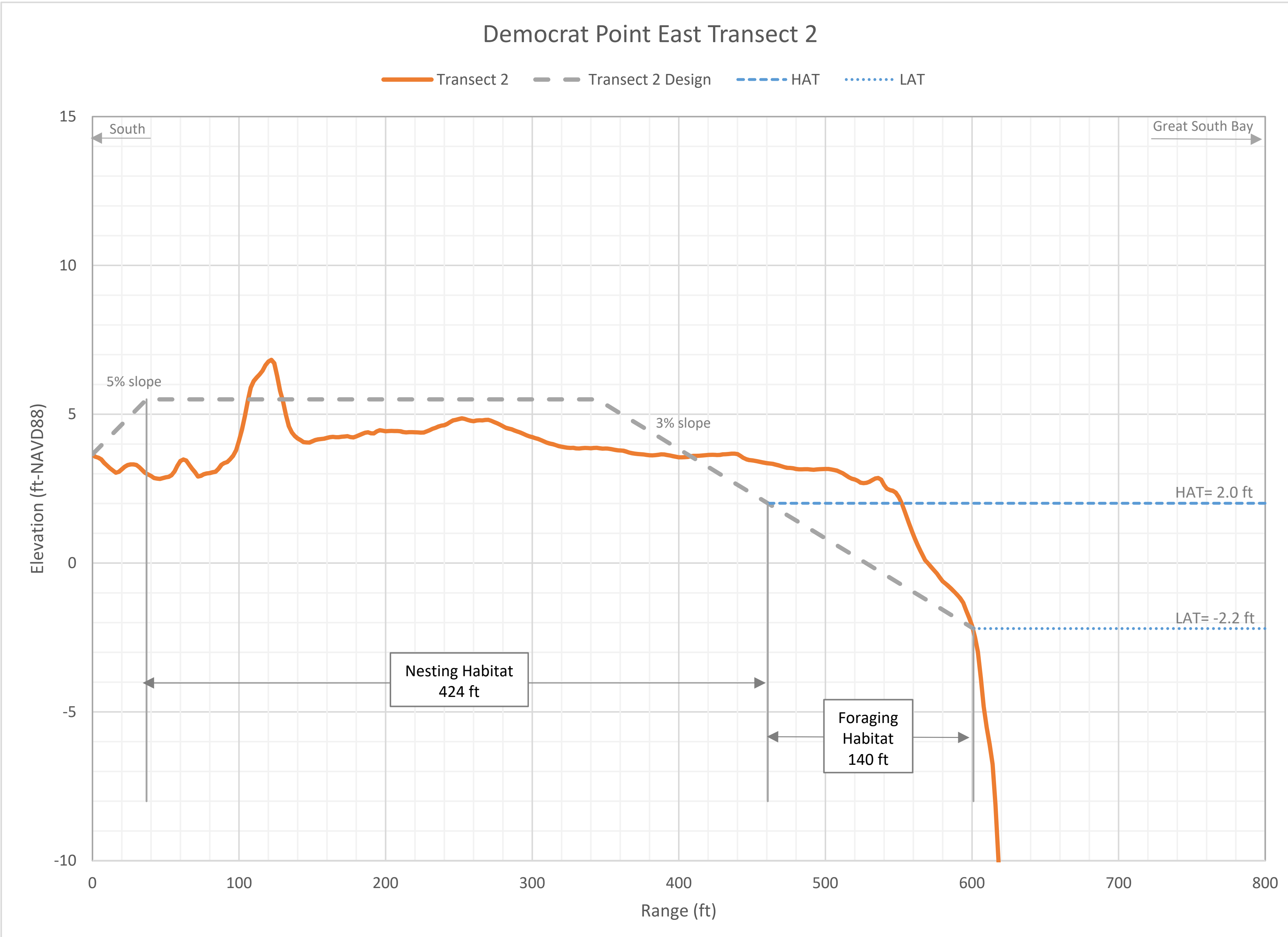
Fire Island to Montauk Point
Coastal Process Features
Democrat Point East
Transect Locations

PROJECT	C2017-071
DRAWN BY	WKL
SHEET	1 OF 1
DATE	APR 2018

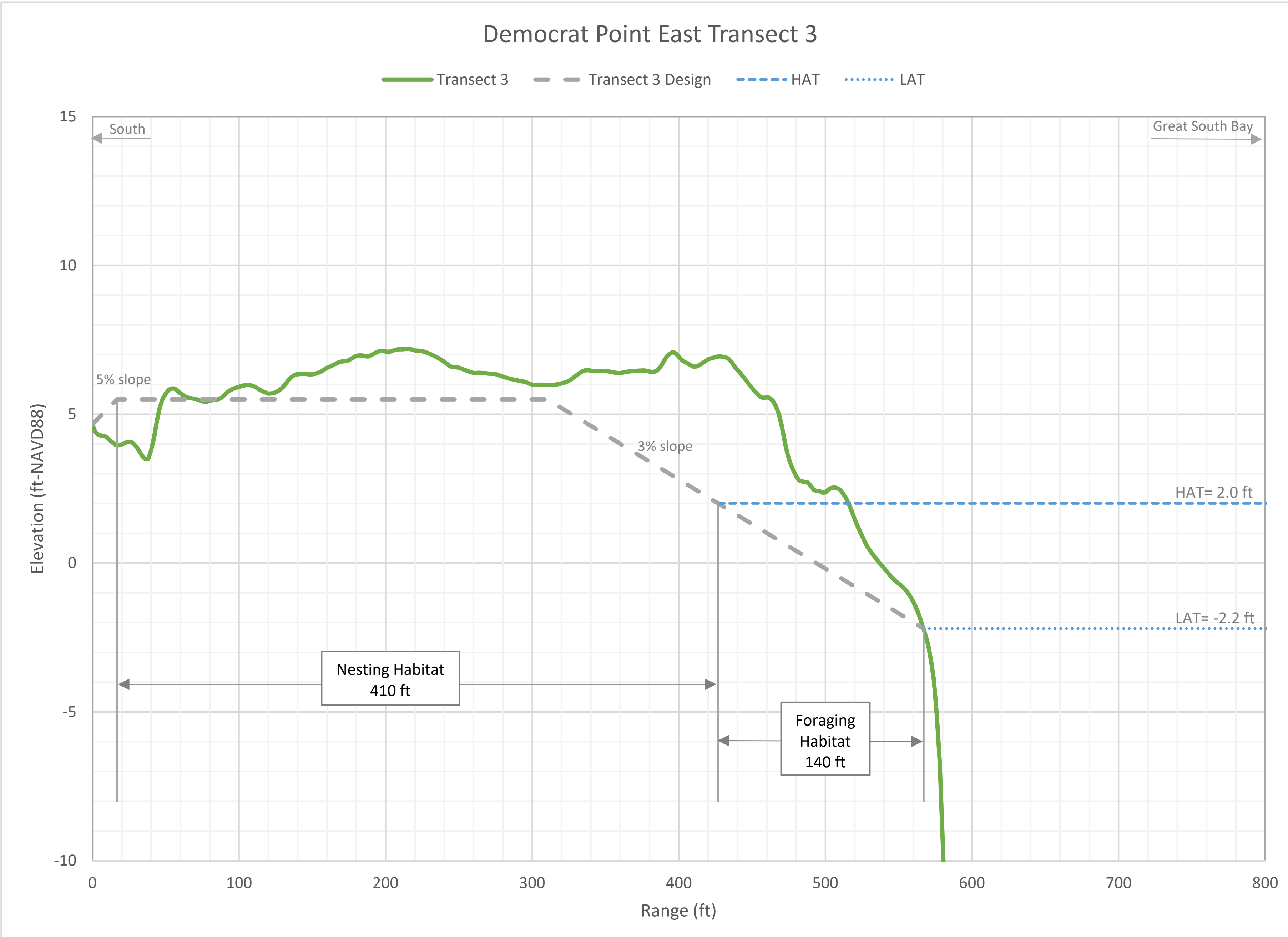

Democrat Point East Existing Conditions
Transect 1
Transect 2
Transect 3
Transect 4
HAT
LAT
South
Great South Bay
HAT= 2.0 ft
LAT= -2.2 ft
Elevation (ft-NAVD88)
Range (ft)
15
10
5
0
-5
-10
0
100
200
300
400
500
600
700
800



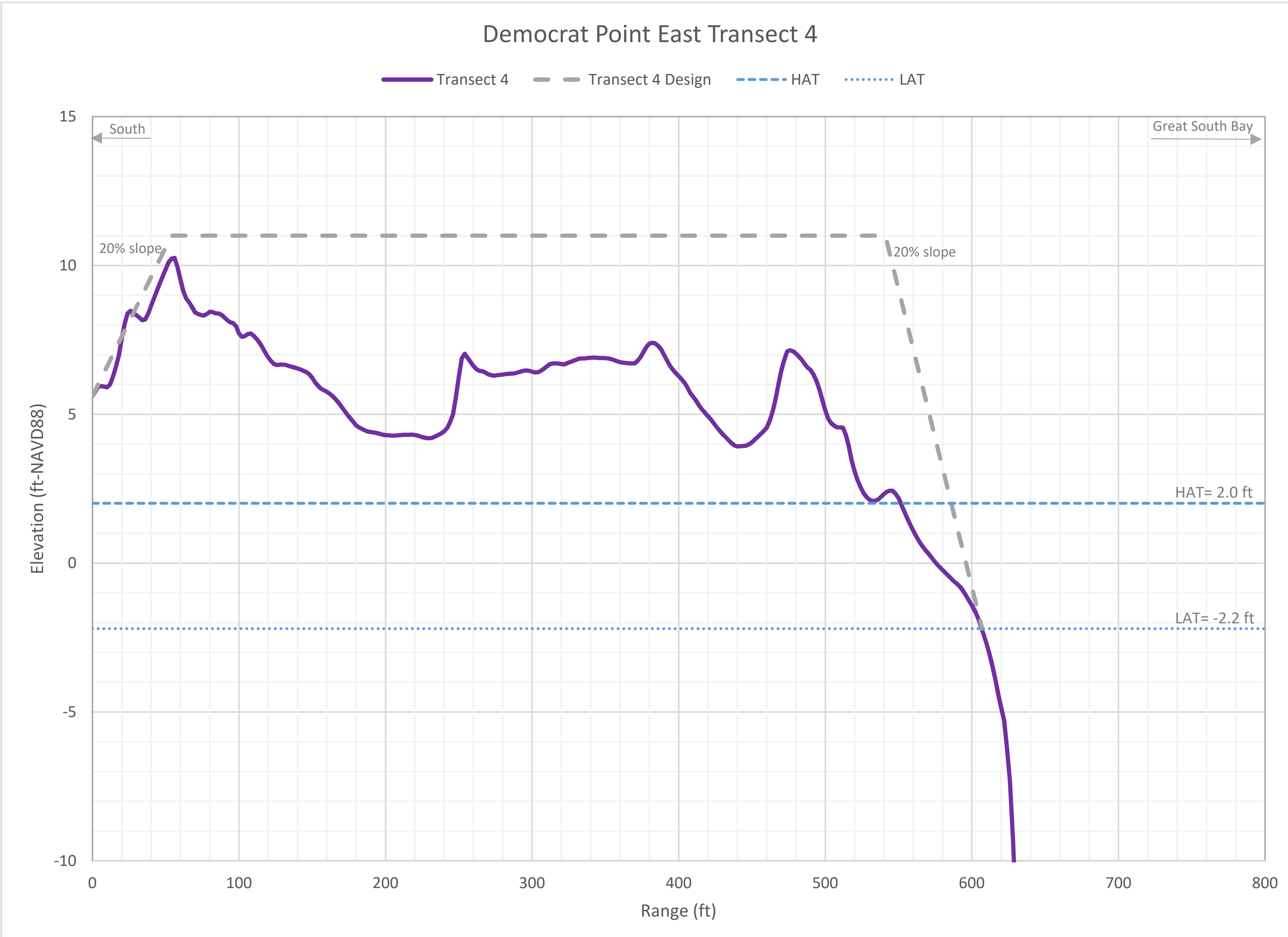
Democrat Point East Transect 1
Transect 1
Transect 1 Design
HAT
LAT
South
Great South Bay
5% slope
3% slope
HAT= 2.0 ft
LAT= -2.2 ft
Nesting Habitat
382 ft
Foraging
Habitat
140 ft
Elevation (ft-NAVD88)
Range (ft)
15
10
5
0
-5
-10
0
100
200
300
400
500
600
700
800



Democrat Point East Transect 2
Transect 2
Transect 2 Design
HAT
LAT
South
Great South Bay
5% slope
3% slope
HAT= 2.0 ft
LAT= -2.2 ft
Nesting Habitat
424 ft
Foraging
Habitat
140 ft
Elevation (ft-NAVD88)
Range (ft)
15
10
5
0
-5
-10
0
100
200
300
400
500
600
700
800



Democrat Point East Transect 3
Transect 3
Transect 3 Design
HAT
LAT
15
10
5
0
-5
-10
Elevation (ft-NAVD88)
South
Great South Bay
5% slope
3% slope
HAT= 2.0 ft
LAT= -2.2 ft
Nesting Habitat
410 ft
Foraging
Habitat
140 ft
0
100
200
300
400
500
600
700
800
Range (ft)


Democrat Point East Transect 4
Transect 4
Transect 4 Design
HAT
LAT
South
Great South Bay
20% slope
20% slope
HAT= 2.0 ft
LAT= -2.2 ft
15
10
5
0
-5
-10
0
100
200
300
400
500
600
700
800
Elevation (ft-NAVD88)
Range (ft)

CPF Site 3 Dunefield West of Field 4	Reach GSB-1A 40.622158° N / 73.252615° W

CPF SITE GOALS

- Devegetate area to meet ESA goals
- Maintain vegetation buffer on north side between road and site to discourage offroad parking

Dunefield West of Field 4 is located on the western end of Fire Island, southeast of the Robert Moses Causeway, within Robert Moses State Park on the oceanside. Dune Field West of Field 4 contains dunes with areas of heavy vegetation. This CPF design seeks to devegetate uplands to provide ESA bird habitat (foraging and nesting).

To create early successional habitat that provides nesting and foraging for shorebirds, plans call for removing vegetation from approximately 18.7 acres (ac). Beachfront topography will approximate the anticipated FIMP beach fill template between stations 139+00 and 160+00. A high elevation dune exists on the eastern side of the project area behind the FIMP beach fill template. No regrading of the site beyond the FIMP beach fill plan is anticipated.

Foraging habitat is defined as the intertidal area that is intermittently submerged and exposed during tide-induced water surface fluctuations. As a proxy for the local spring tide range, the following discussion applies NOAA's reported Lowest Astronomical Tide (LAT) as the lower bound and Highest Astronomical Tide (HAT) as the upper bound for foraging habitat.

Nesting habitat is located immediately upland of foraging habitat and extends from the HAT elevation to +10 ft-NAVD88 at Dune Field West of Field 4 as depicted in the Proposed Devegetation figure.

To create early successional habitat that provides nesting and foraging for shorebirds, plans call for devegetating approximately 18.7 acres (ac). This results in 3.9 ac of foraging habitat and 11.4 ac of nesting habitat within the project site. Foraging habitat encompasses the area between the LAT and the HAT, while nesting habitat extends from the HAT to the +10 ft-NAVD88 elevation contour.

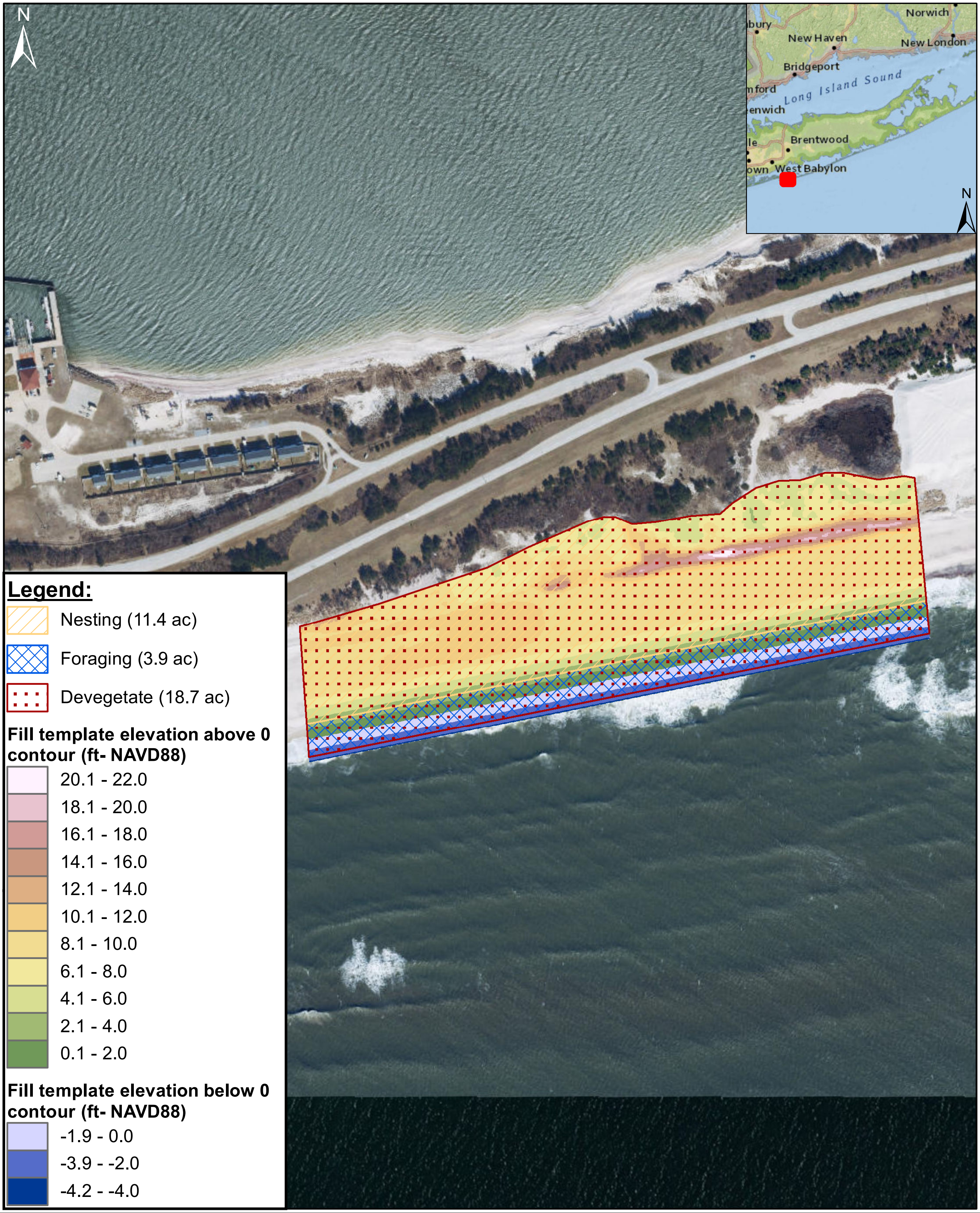
Maintenance activities at the CPF sites will be performed in coordination with renourishment cycles of the beachfill features and are subject to monitoring to ensure resolution of project objectives. The USACE will not implement vegetation management or manipulation of the sites unless conducted as an incidental action associated with future placement. The USACE recommends the local land management agency consider predator management in newly established CPF's.

CPF Site 3 Dunefield West of Field 4		Reach GSB-1A 40.622158° N / 73.252615° W
CPF PARAMETERS		
Feature	Total Project Area	
Cut Volume (cy)	n/a	
Fill Volume (cy)	n/a	
Net Volume (cy)	n/a	
Acreage (Nesting\Foraging\Devegetation)	19.4 (11.4\3.9\18.7)	
Activity	Devegetate	

DATA SOURCES	
Topographic	USGS, 2016
Bathymetric	USGS, 2016
Aerial Imagery	Google Earth, 2017
Vegetation	NPS, 2010
REAL ESTATE INFORMATION	
Property Owner	New York State Robert Moses State Park
Municipality	Islip
County	Suffolk
CBRA	NY-59, System Unit

OCEANSIDE TIDAL ENVIRONMENT (ft-NAVD88)			
Closest Tidal Benchmark	Fire Island, NY	Highest Astronomical Tide (HAT)	2.97
		Mean Higher High Water (MHHW)	2.03
Coordinates	40.626667° N 73.260000° W	Mean High Water (MHW)	1.72
		Mean Sea Level (MSL)	-0.22
0 ft-NAVD = 1.16 ft-NGVD		Mean Tide Level (MTL)	-0.25
Range (MHW-MLW)	3.93	Mean Low Water (MLW)	-2.21
Diurnal Range (MHHW - MLLW)	4.40	Mean Lower Low Water (MLLW)	-2.37
Largest Tidal Range (HAT-LAT)	6.22	Lowest Astronomical Tide (LAT)	-3.25

OCEANSIDE WAVE ENVIRONMENT					
Return Period	Deep Water Wave Height (ft)	Surf Zone Wave Height (ft)	Wind Setup (ft)	Wave Setup (ft)	HAT + Setup + Surf Zone Wave Height (ft)
1-year	14.2	6.8	1.00	0.92	11.71
5-year	19.4	7.1	1.83	2.01	13.93
10-year	21.7	7.2	2.32	2.48	14.99



Feet
0 500 1,000
IMAGE SOURCE: ESRI, 2018

Fire Island to Montauk Point
Coastal Process Features
Dunefield West of Field 4
Design Elevations

PROJECT	C2017-071
DRAWN BY	WKL
SHEET	1 OF 1
DATE	MAR 2018

Feet

0 500 1,000

IMAGE SOURCE: ESRI, 2018

Fire Island to Montauk Point
Coastal Process Features
Dunefield West of Field 4
Proposed Devegetation

PROJECT	C2017-071
DRAWN BY	WKL
SHEET	1 OF 1
DATE	MAR 2018

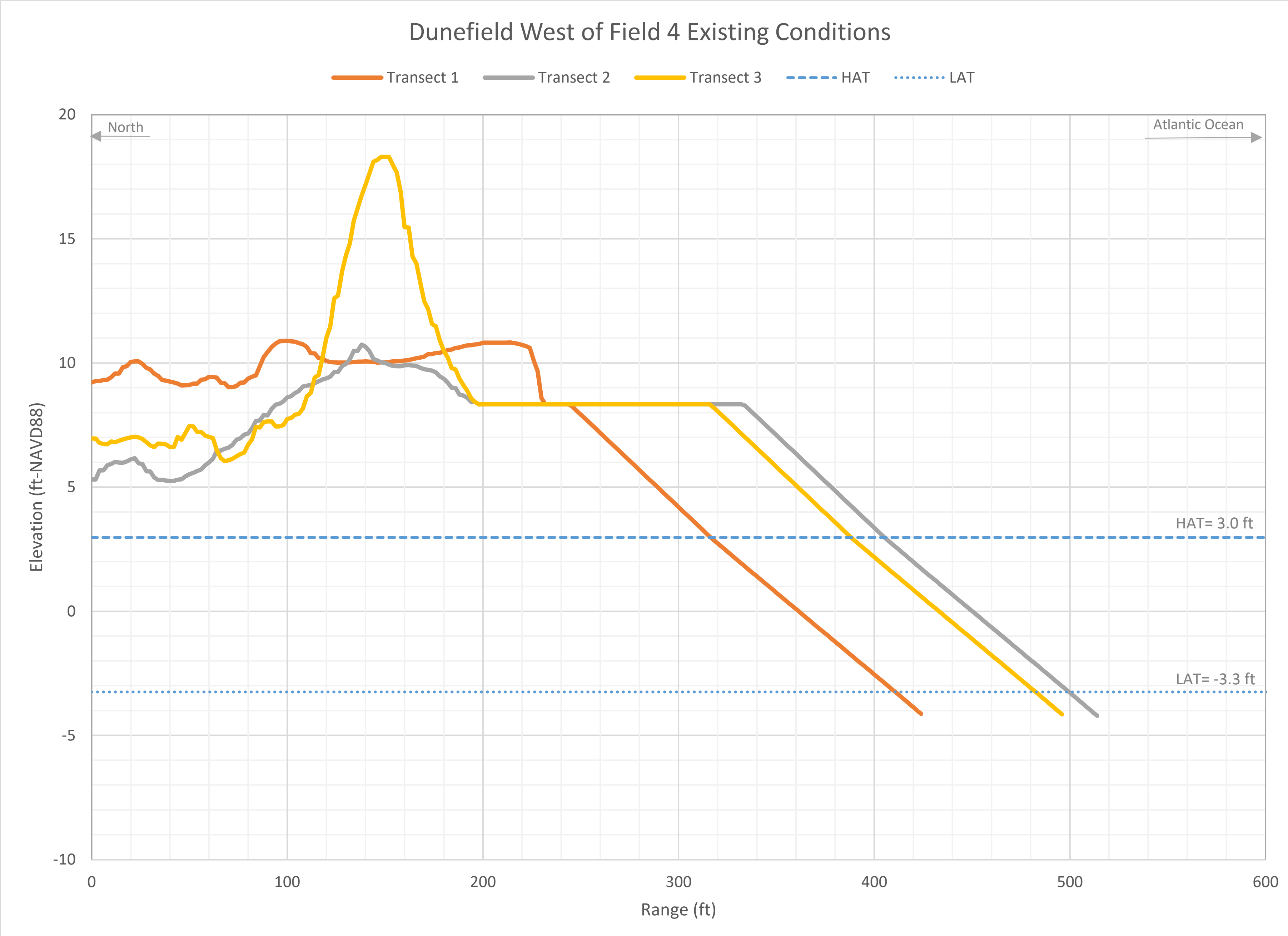
Feet

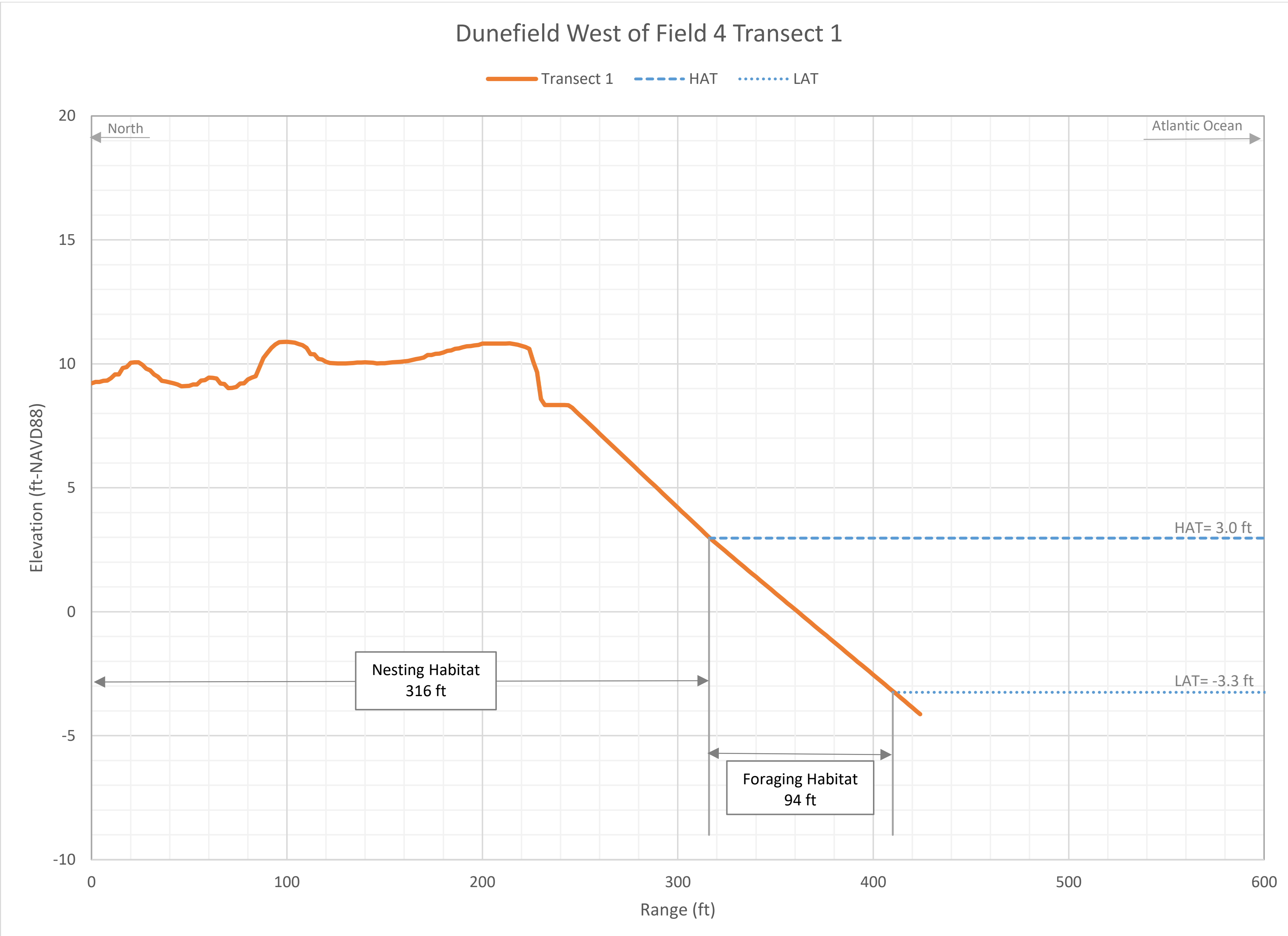
0 500 1,000

IMAGE SOURCE: ESRI, 2018

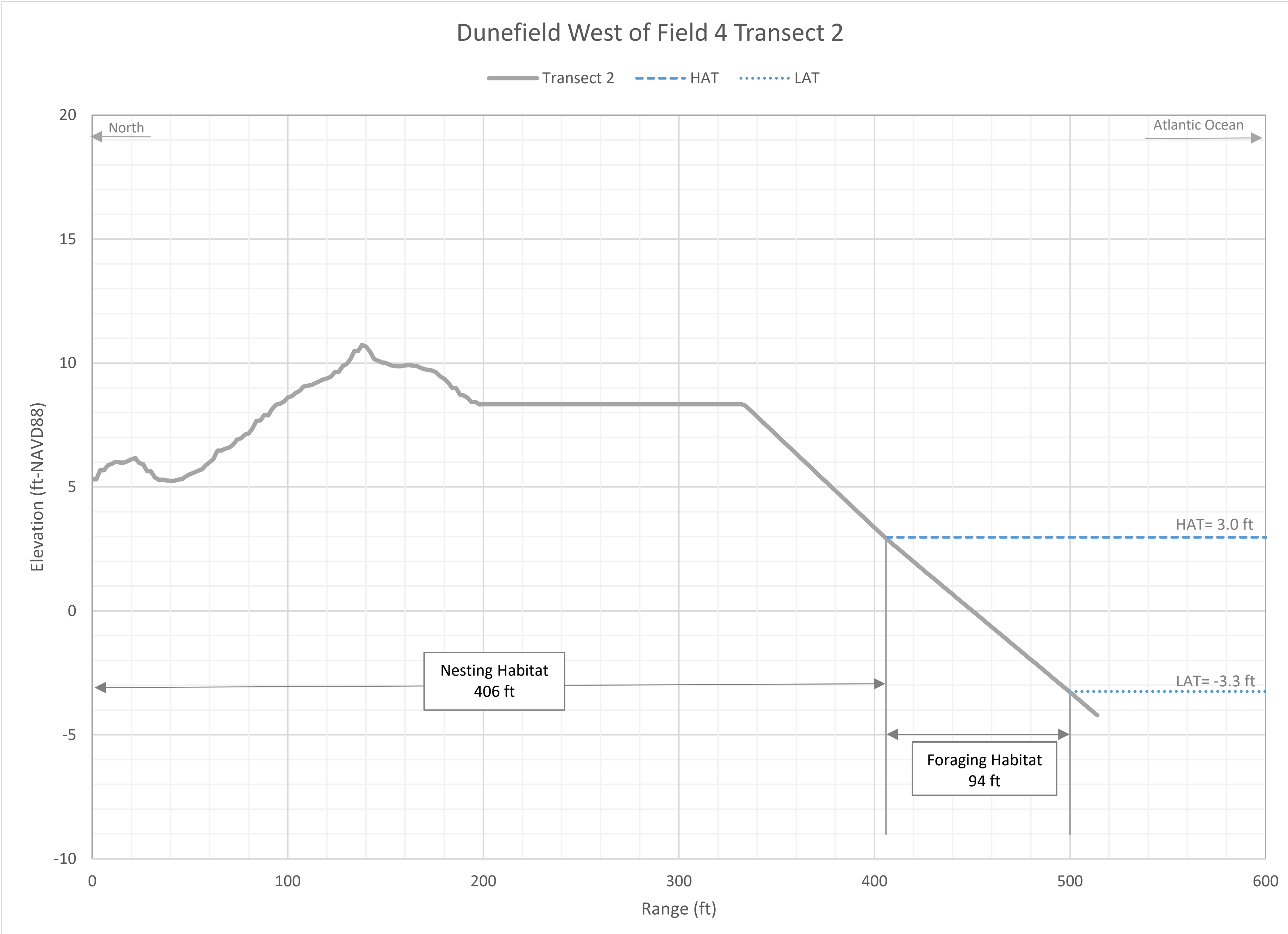
Fire Island to Montauk Point
Coastal Process Features
Dunefield West of Field 4
Transect Locations

PROJECT	C2017-071
DRAWN BY	WKL
SHEET	1 OF 1
DATE	MAR 2018

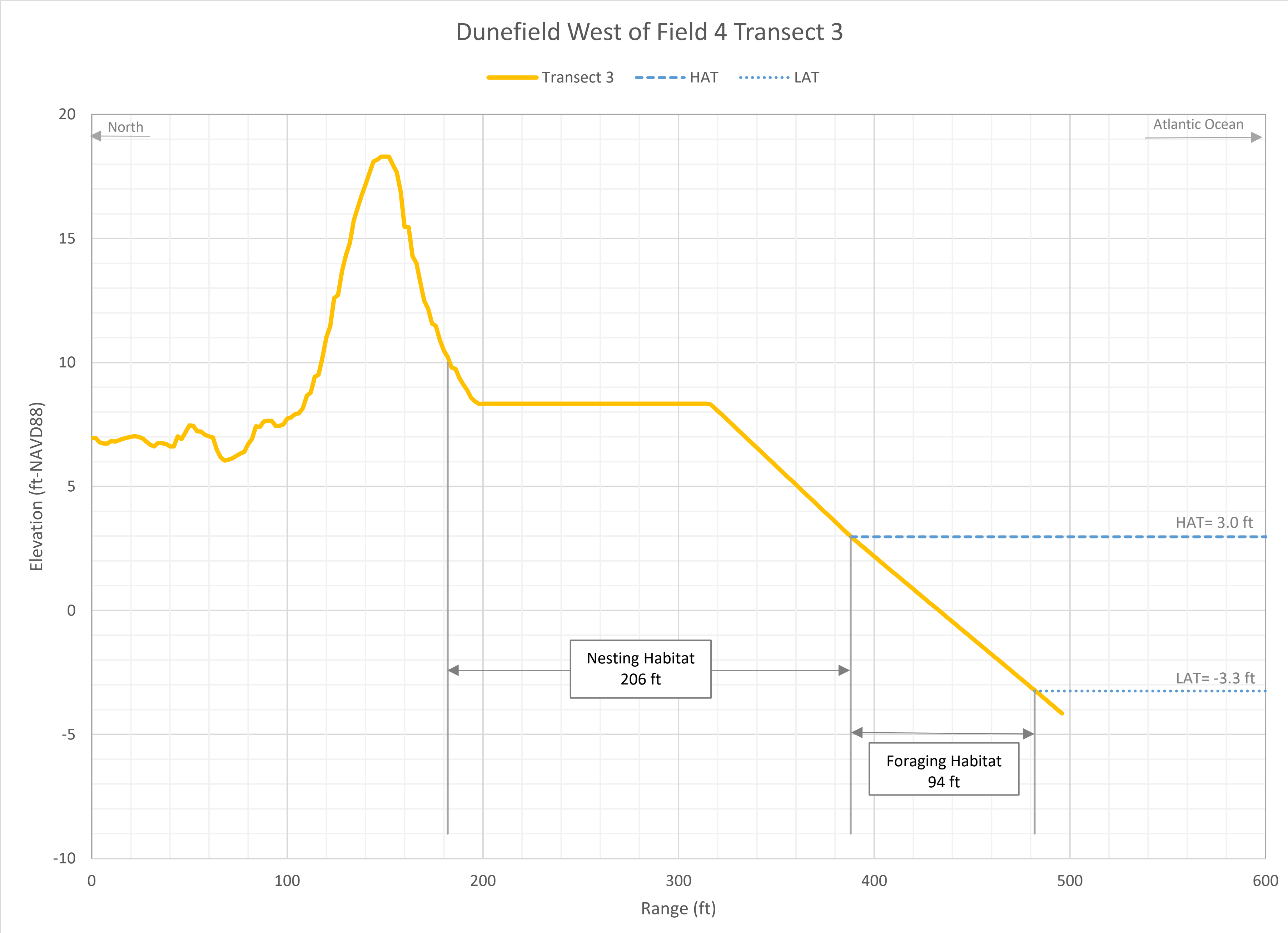

Dunefield West of Field 4 Existing Conditions
Transect 1
Transect 2
Transect 3
HAT
LAT
North
Atlantic Ocean
HAT= 3.0 ft
LAT= -3.3 ft
Elevation (ft-NAVD88)
Range (ft)
20
15
10
5
0
-5
-10
0
100
200
300
400
500
600



Dunefield West of Field 4 Transect 1
Transect 1
HAT
LAT
20
15
10
5
0
-5
-10
Elevation (ft-NAVD88)
North
Atlantic Ocean
HAT= 3.0 ft
LAT= -3.3 ft
Nesting Habitat
316 ft
Foraging Habitat
94 ft
0
100
200
300
400
500
600
Range (ft)



Dunefield West of Field 4 Transect 2
Transect 2
HAT
LAT
North
Atlantic Ocean
HAT= 3.0 ft
LAT= -3.3 ft
Nesting Habitat
406 ft
Foraging Habitat
94 ft
Elevation (ft-NAVD88)
Range (ft)
20
15
10
5
0
-5
-10
0
100
200
300
400
500
600



Dunefield West of Field 4 Transect 3
Transect 3
HAT
LAT
North
Atlantic Ocean
HAT= 3.0 ft
LAT= -3.3 ft
Nesting Habitat
206 ft
Foraging Habitat
94 ft
Elevation (ft-NAVD88)
Range (ft)
20
15
10
5
0
-5
-10
0
100
200
300
400
500
600

CPF Site 4 Clam Pond	Clam Pond-Reach GSB-2B 40.642437° N / 73.191492° W

CPF SITE GOALS

- Earthwork to meet target elevations and slopes for ESA credit
- Fill placement to simulate cross island transport for CSRM credit
- Possible living shoreline on north side per adaptive management plan

Clam Pond is located on the western portion of Fire Island between Saltaire and Fair Harbor. Clam Pond lies south of the West and East Fire Islands. The Clam Pond area is shallow with an average depth of approximately 1 ft with a maximum of about 5 ft. Historically a sand spit existed at this location. This CPF design seeks to add fill to provide ESA bird habitat (foraging and nesting) as well as provide CSRM benefits by simulating cross island transport.

Foraging habitat is defined as the intertidal area that is intermittently submerged and exposed during tidal induced water surface fluctuations. As a proxy for the local spring tide range, the following discussion applies NOAA's reported Lowest Astronomical Tide (LAT) as the lower bound and Highest Astronomical Tide (HAT) as the upper bound for foraging habitat.

Nesting habitat is located immediately upland of foraging habitat and extends from the HAT elevation to +5 ft-NAVD88 at Clam Pond.

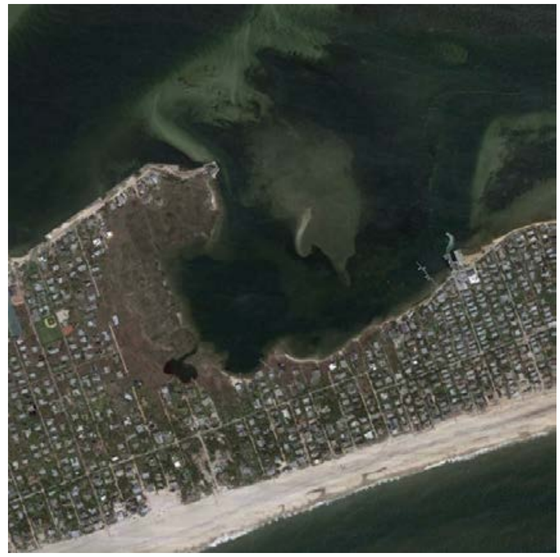
To create early successional habitat that provides nesting and foraging for shorebirds, plans call for fill placement and grading over a project area of approximately 15.3 acres (ac). The project area includes 4.4 ac of proposed newly created nesting habitat and 8.2 ac of proposed foraging habitat. The foraging habitat consists of both newly created and existing habitat between the HAT and LAT elevations. On the north side of the project, fill will slope from the +5 ft-NAVD88 contour to the intersection with existing grade. A living shoreline will be placed on the north side of the project site to help retain fill. On the south side, fill will slope at 3% between +5 ft-NAVD88 and the HAT elevation, then at 1% to the intersection with existing grade.

Sand placement at the CPF sites will be performed in coordination with renourishment cycles of the beachfill features and subject to monitoring to ensure resolution of project objectives. The USACE will not implement vegetation management or manipulation of the sites unless conducted as an incidental action associated with future placement. The USACE recommends the local land management agency consider predator management.

CPF Site 4 Clam Pond

Clam Pond-Reach GSB-2B

40.642437° N / 73.191492° W



CPF PARAMETERS	
Feature	ESA/CSRM
Cut Volume (cy)	0
Fill Volume (cy)	51,312
Net Volume (cy)	51,212
Acreage	12.6
Activity	Regrade
DATA SOURCES	
Topographic	USGS, 2016
Bathymetric	USGS, 2016
Aerial Imagery	Google Earth, 2016
Vegetation	N/A*
REAL ESTATE INFORMATION	
Property Owner	U.S. Fire Island National Village of Saltaire
Municipality	Islip
County	Suffolk
CBRA	NY-59P, Otherwise Protected Area

*up to date vegetation data were not available for the study area

BAYSIDE TIDAL ENVIRONMENT (ft-NAVD88)				
Closest Tidal Benchmark	Sea View Ferry Dock, NY		Highest Astronomical Tide (HAT)	1.08
			Mean Higher High Water (MHHW)	0.60
Coordinates	40.642437° N 73.191492° W		Mean High Water (MHW)	0.44
			Mean Sea Level (MSL)	-0.02
0 ft-NAVD	1.14 ft-NGVD		Mean Tide Level (MTL)	-0.04
Range (MHW-MLW)		0.96	Mean Low Water (MLW)	-0.52
Diurnal Range (MHHW - MLLW)		1.22	Mean Lower Low Water (MLLW)	-0.62
Largest Tidal Range (HAT-LAT)		2.18	Lowest Astronomical Tide (LAT)	-1.10

BAYSIDE WAVE ENVIRONMENT					
Return Period	Fetch (ft)	Wave Height (ft)	Wind Setup (ft)	Wave Setup (ft)	HAT + Setup + Wave Height (ft)
1-year	69,860	4.3	0.14	1.01	6.53
5-year	69,860	5.7	0.24	1.03	8.05
10-year	69,860	6.1	0.28	1.04	8.50

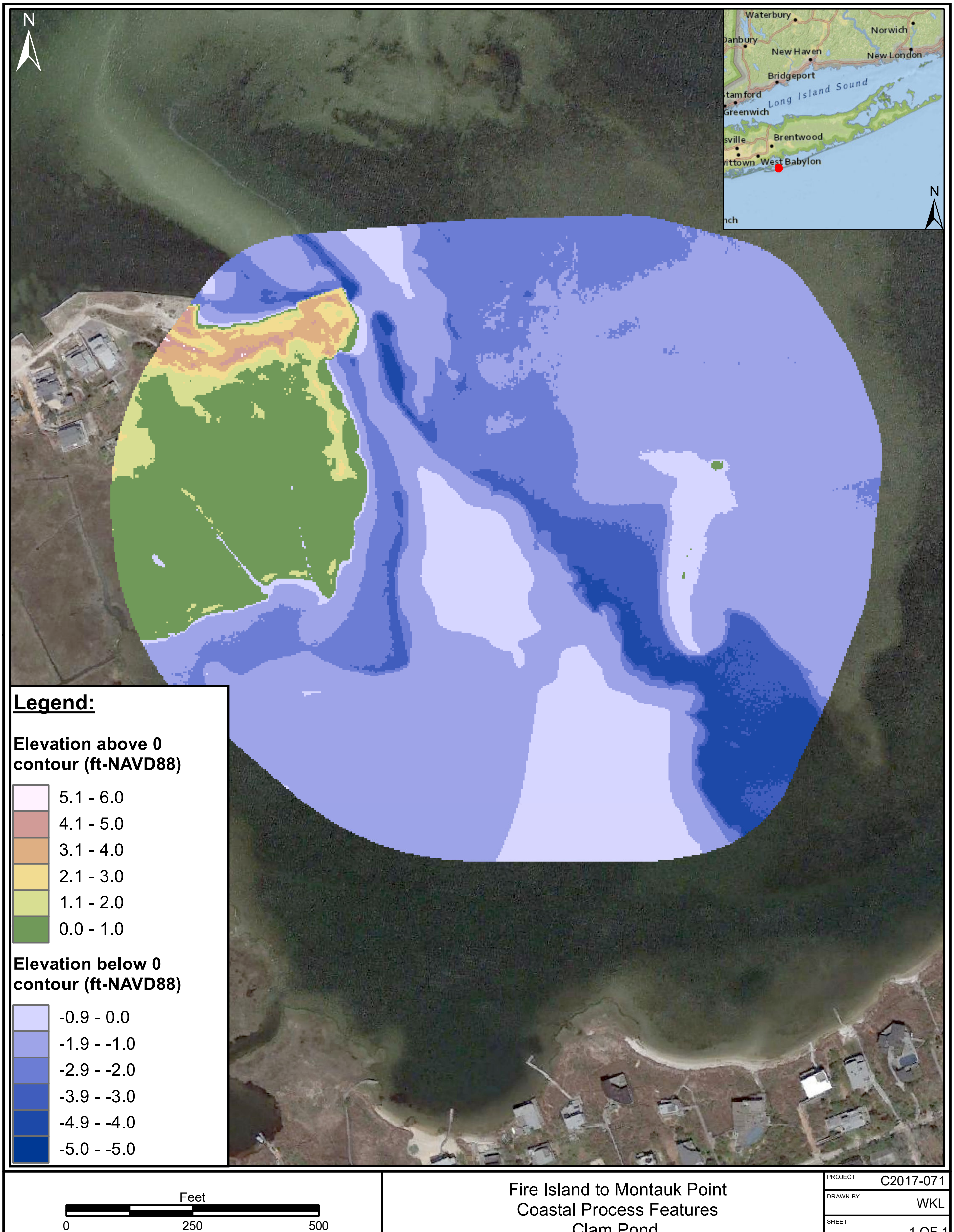
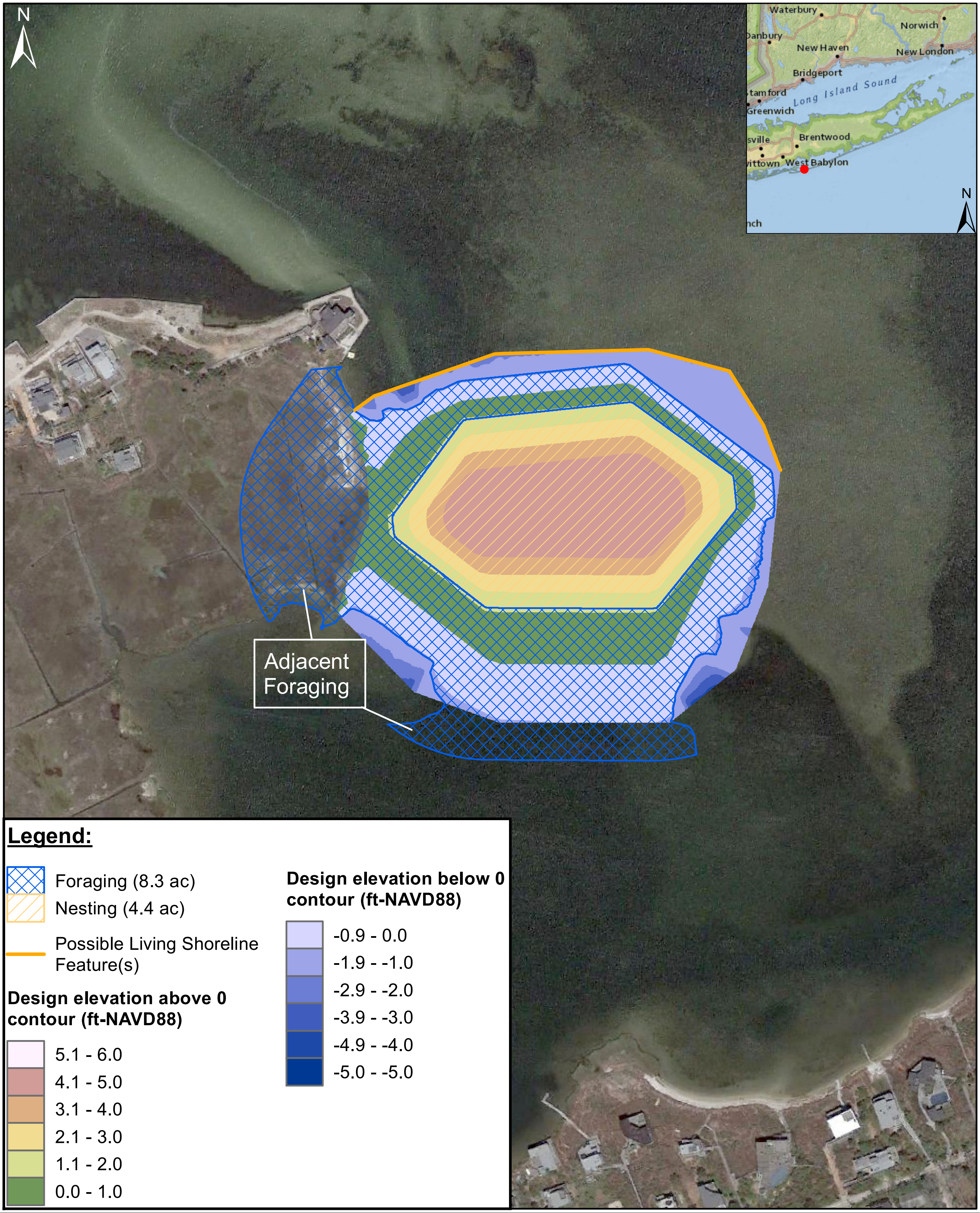


IMAGE SOURCE: Google Earth, 2016

Fire Island to Montauk Point
Coastal Process Features
Clam Pond
Existing Conditions

PROJECT	C2017-071
DRAWN BY	WKL
SHEET	1 OF 1
DATE	DEC 2017



Feet

0 250 500

IMAGE SOURCE: Google Earth, 2016

Fire Island to Montauk Point
Coastal Process Features
Clam Pond
Proposed Elevations

PROJECT	C2017-071
DRAWN BY	WKL
SHEET	1 OF 1
DATE	DEC 2017

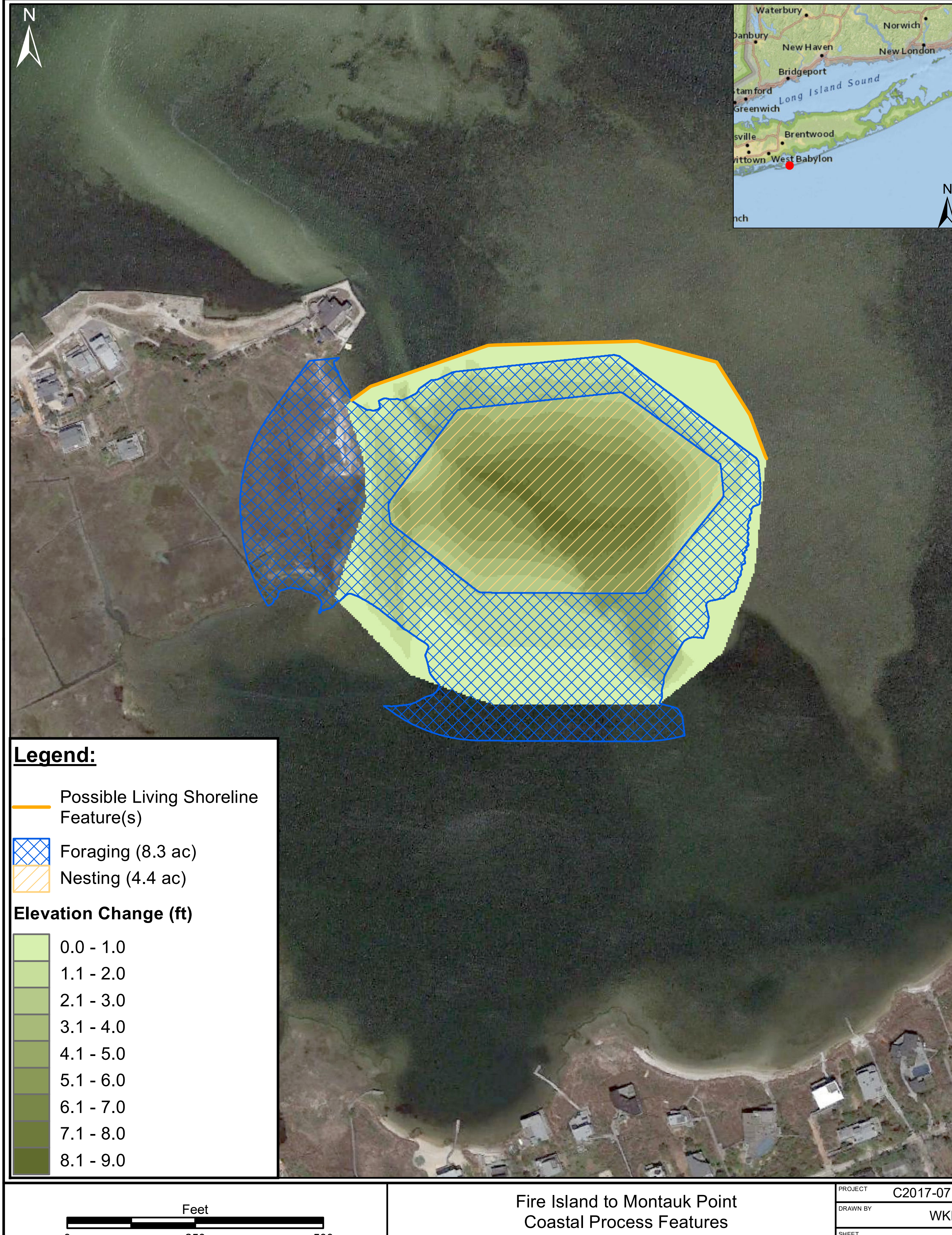
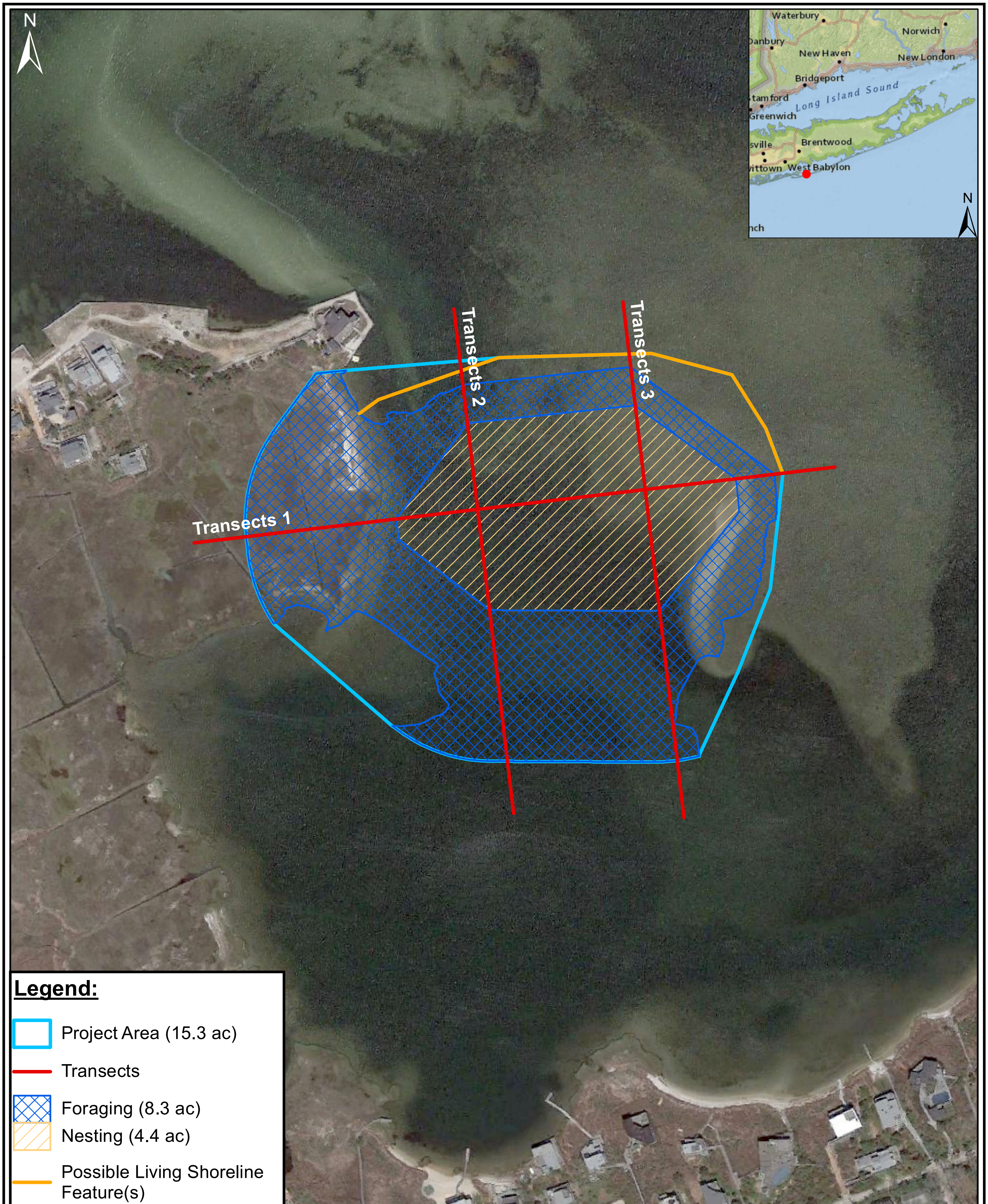


IMAGE SOURCE: Google Earth, 2016

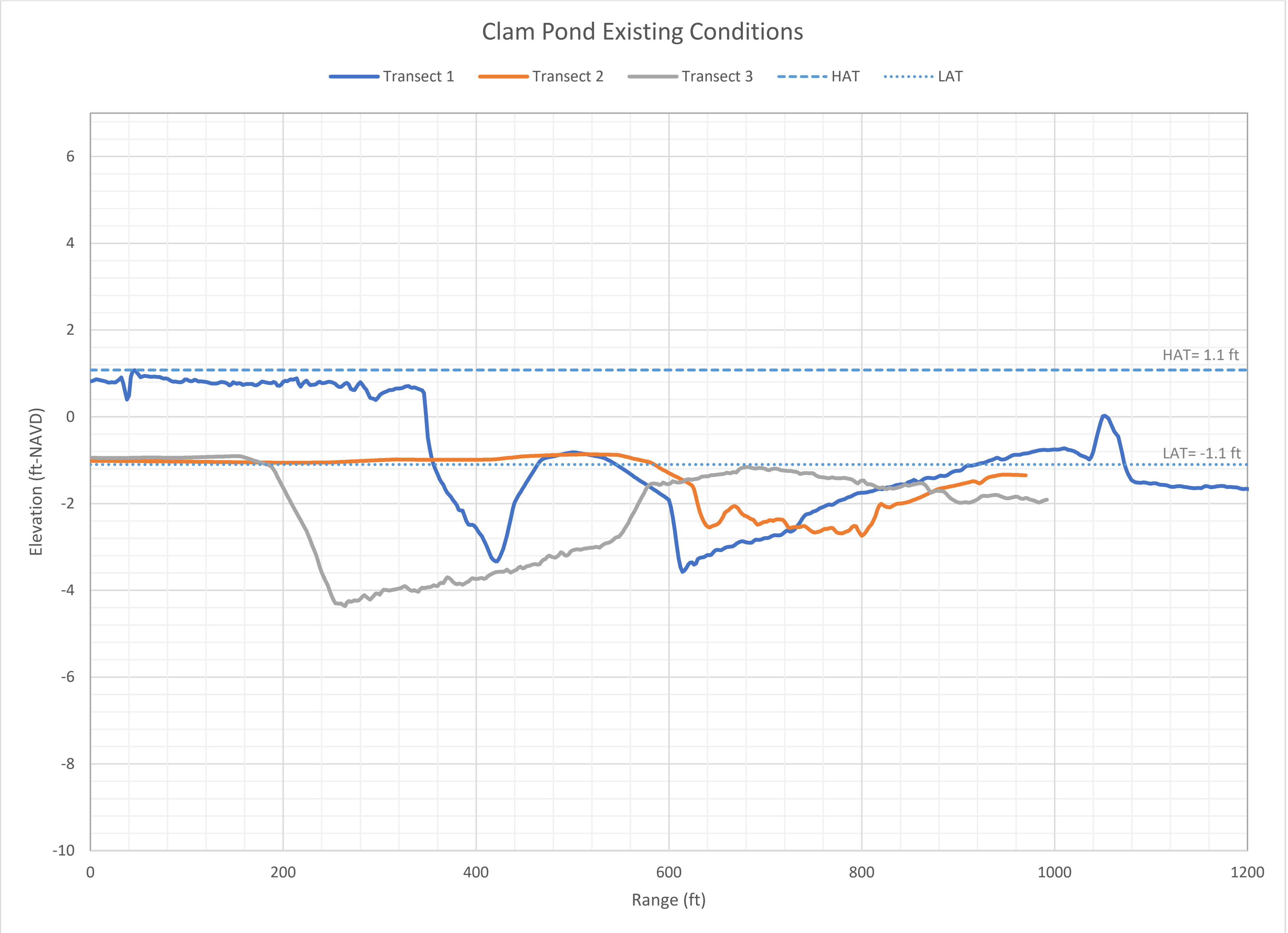
Fire Island to Montauk Point
Coastal Process Features
Clam Pond
Proposed Elevation Changes

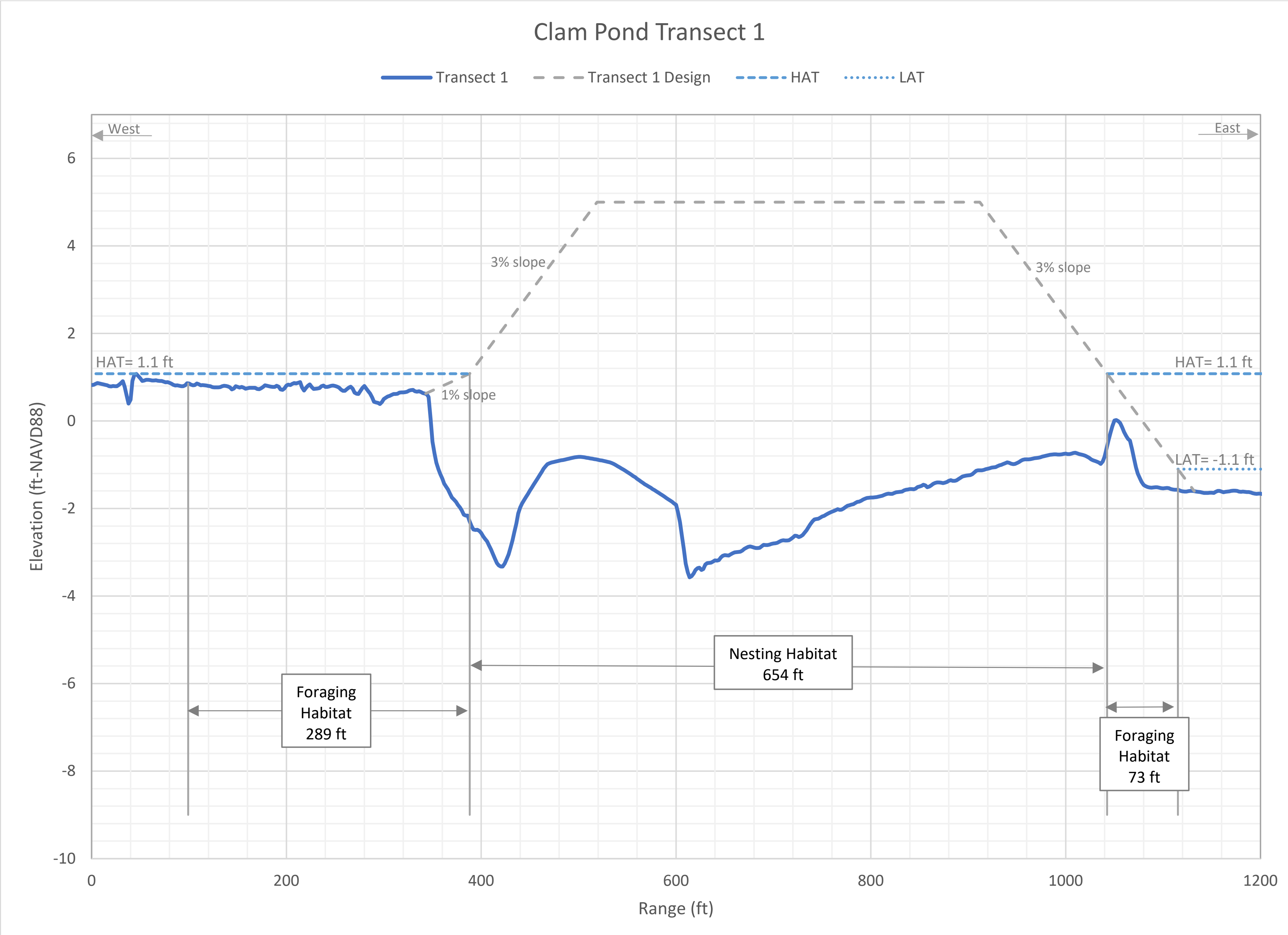
PROJECT	C2017-071
DRAWN BY	WKL
SHEET	1 OF 1
DATE	DEC 2017

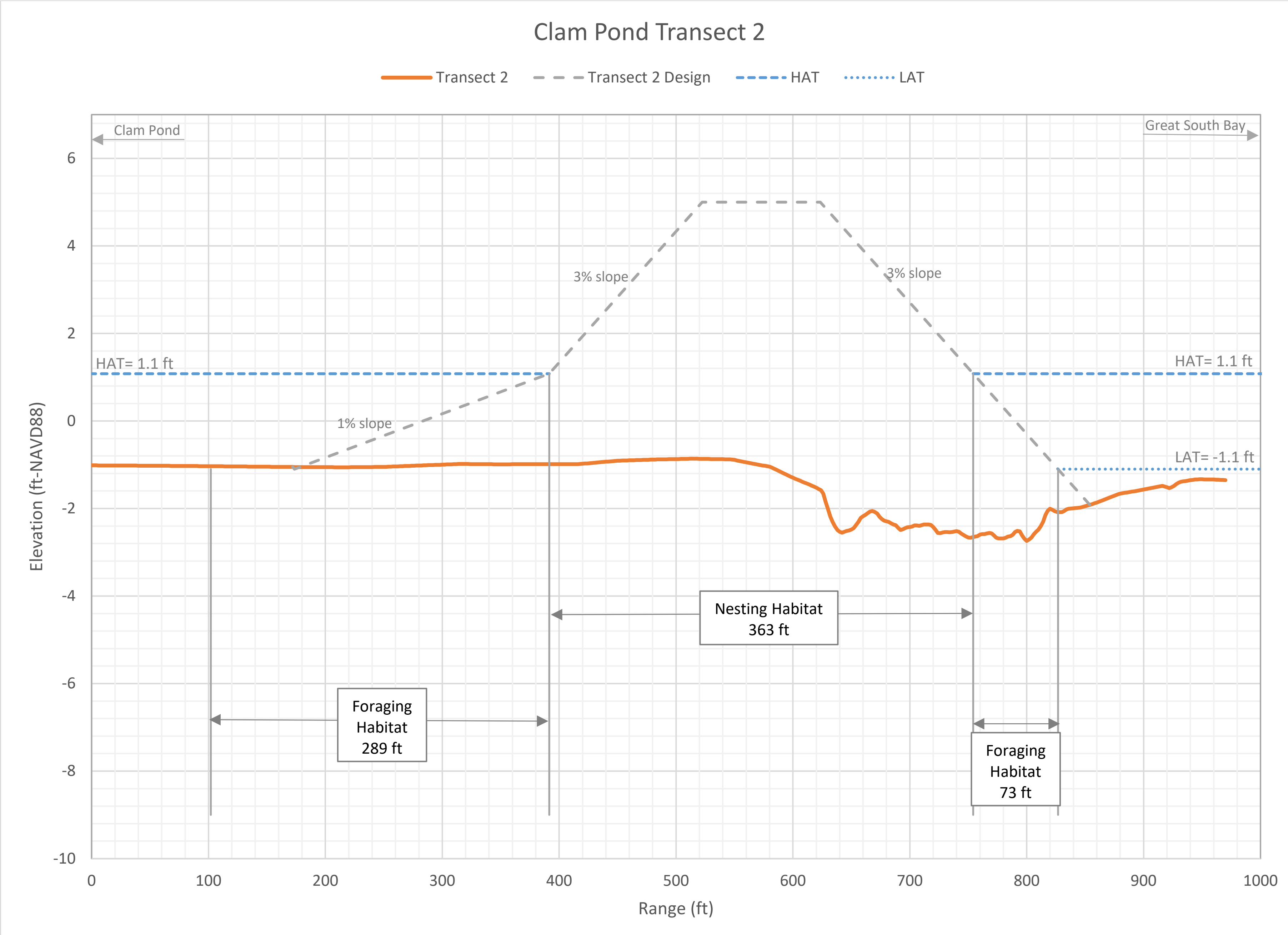


Fire Island to Montauk Point
Coastal Process Features
Clam Pond
Transect Locations

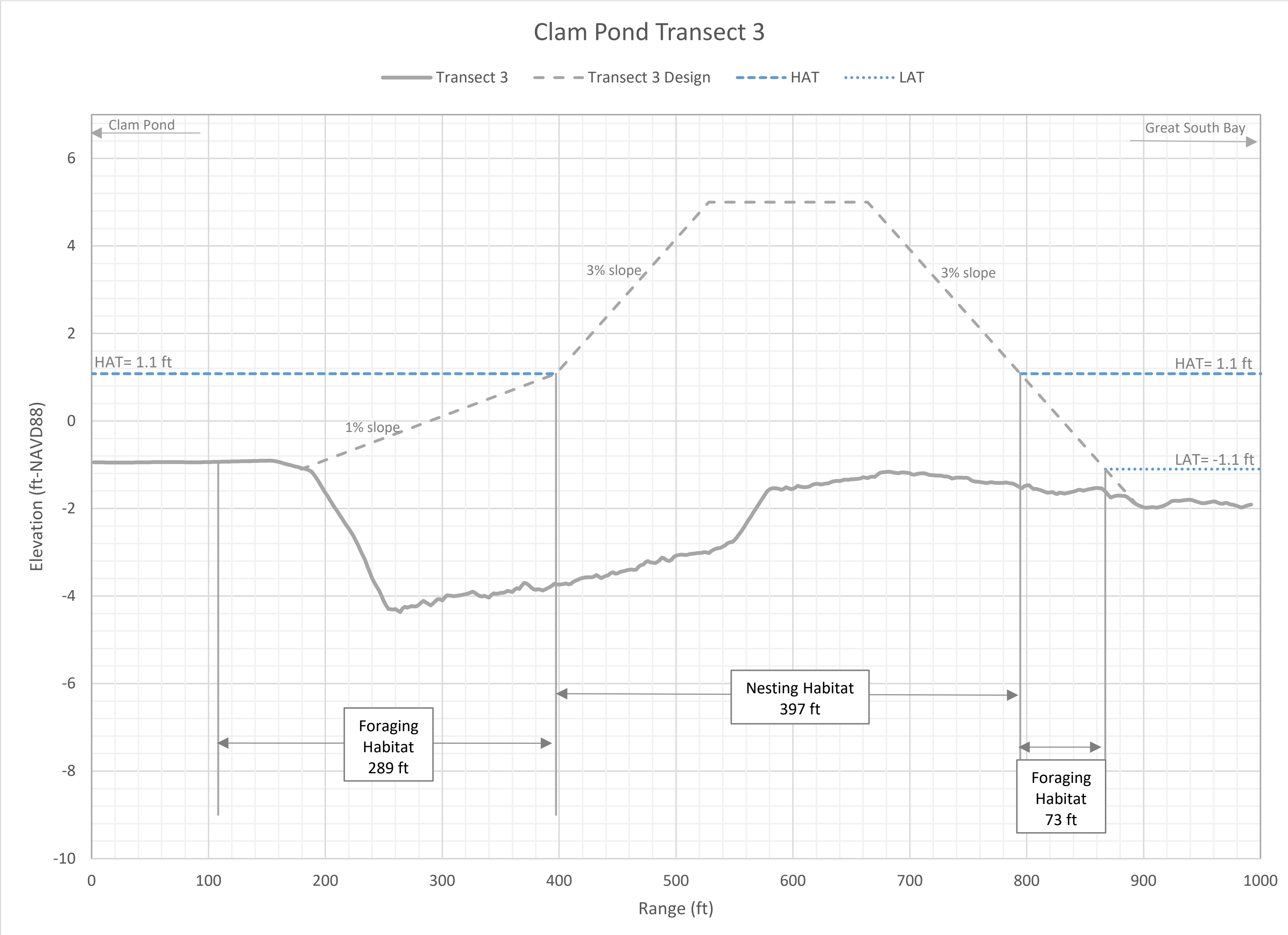
PROJECT	C2017-071
DRAWN BY	WKL
SHEET	1 OF 1
DATE	DEC 2017


Clam Pond Existing Conditions
Transect 1
Transect 2
Transect 3
HAT
LAT
HAT= 1.1 ft
LAT= -1.1 ft
Elevation (ft-NAVD)
Range (ft)
6
4
2
0
-2
-4
-6
-8
-10
0
200
400
600
800
1000
1200


Clam Pond Transect 1
Transect 1
Transect 1 Design
HAT
LAT
West
East
HAT= 1.1 ft
HAT= 1.1 ft
LAT= -1.1 ft
3% slope
3% slope
1% slope
Foraging Habitat 289 ft
Nesting Habitat 654 ft
Foraging Habitat 73 ft
Elevation (ft-NAVD88)
Range (ft)
6
4
2
0
-2
-4
-6
-8
-10
0
200
400
600
800
1000
1200



Clam Pond Transect 2
Transect 2
Transect 2 Design
HAT
LAT
Clam Pond
Great South Bay
HAT= 1.1 ft
HAT= 1.1 ft
LAT= -1.1 ft
1% slope
3% slope
3% slope
Nesting Habitat
363 ft
Foraging
Habitat
289 ft
Foraging
Habitat
73 ft
Elevation (ft-NAVD88)
Range (ft)
6
4
2
0
-2
-4
-6
-8
-10
0
100
200
300
400
500
600
700
800
900
1000


Clam Pond Transect 3
Transect 3
Transect 3 Design
HAT
LAT
Clam Pond
Great South Bay
HAT= 1.1 ft
HAT= 1.1 ft
LAT= -1.1 ft
3% slope
3% slope
1% slope
Nesting Habitat
397 ft
Foraging
Habitat
289 ft
Foraging
Habitat
73 ft
Elevation (ft-NAVD88)
Range (ft)
6
4
2
0
-2
-4
-6
-8
-10
0
100
200
300
400
500
600
700
800
900
1000

CPF Site 5 Atlantique to Corneille	Reach GSB-2B 40.644944° N / 73.167889° W

CPF SITE GOALS

- Earthwork to meet target elevations and slope for ESA credit
- Fill placement to simulate cross island transport for CSRM credit

Atlantique to Corneille is located on the western portion of Fire Island, on the bay just east of Atlantique Park. The average nearshore water depth on the bayside at Atlantique to Corneille is approximately 3 ft. Boat docks exist to the east and west of this CPF, while several small bulkheads lie on either side of the site. The CPF design fill must limit impacts to navigation features. This CPF design seeks to add fill to provide ESA bird habitat (foraging and nesting) as well as provide CSRM benefits by simulating cross island transport.

Foraging habitat is defined as the intertidal area that is intermittently submerged and exposed during tidal induced water surface fluctuations. As a proxy for the local spring tide range, the following discussion applies NOAA's reported Lowest Astronomical Tide (LAT) as the lower bound and Highest Astronomical Tide (HAT) as the upper bound for foraging habitat.

Nesting habitat is located immediately upland of foraging habitat and extends from the HAT elevation to +4 ft-NAVD88 at Atlantique to Corneille as depicted in the Proposed Elevations figure that follows.

To simulate cross island transport and create early successional habitat that provides nesting and foraging for shorebirds, plans call for the placement of fill over 15.8 acres (ac), transitioning from the western bulkhead area to the spit to the east. Within the project area there is a total of 4.2 ac of foraging habitat and 9.9 ac as nesting habitat. The regrading template includes 3% and 1% slopes on the north bank to allow for viable shorebird habitat, and a 4% slope below the LAT to tie into the existing grade. The landward side of the fill profile will tie into existing grade at +4 ft-NAVD88. The cross shore extent of this CPF is limited due to the overall site configuration.

Sand placement at the CPF sites will be performed in coordination with renourishment cycles of the beachfill features and subject to monitoring to ensure resolution of project objectives. The USACE will not implement vegetation management or manipulation of the sites unless conducted as an incidental action associated with future placement. The USACE recommends the local land management agency consider predator management and symbolic fencing to the +10 ft-NAVD88 contour in newly created CPF's.

CPF Site 5 Atlantique to Corneille

Reach GSB-2B

40.644944° N / 73.167889° W

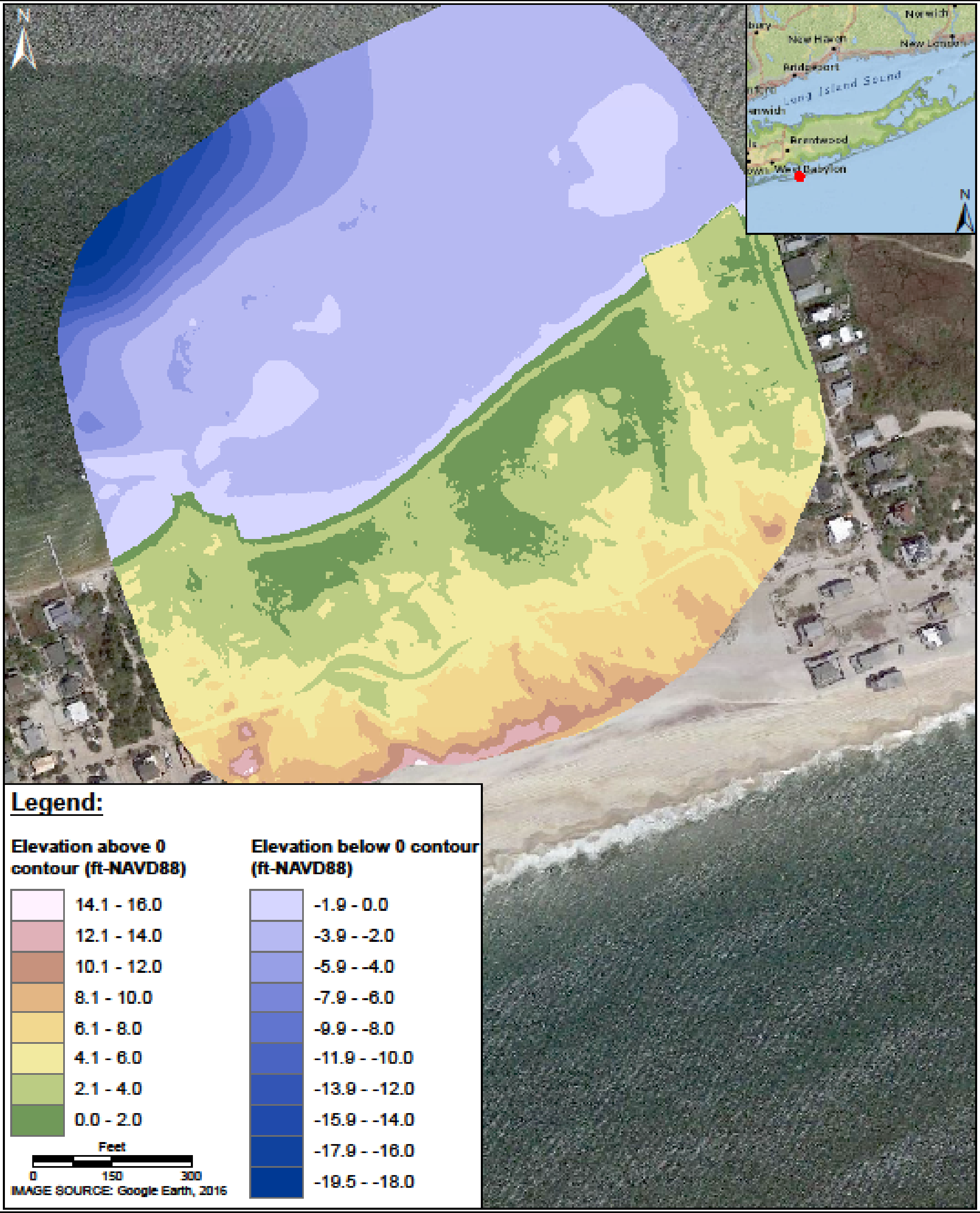
CPF PARAMETERS		
Feature	Habitat	Total
Cut Volume (cy)	0	0
Fill Volume (cy)	62,694	64,640
Net Volume (cy)	62,694	64,640
Acreage	14.1	15.8
Activity	Fill	Fill
DATA SOURCES		
Topographic	USGS, 2016	
Bathymetric	USGS, 2016	
Aerial Imagery	Google Earth, 2016	
Vegetation	N/A*	
REAL ESTATE INFORMATION		
Property Owner	USA Town of Islip	
Municipality	Islip	
County	Suffolk	
CBRA	NY-59P, Otherwise Protected Area	

*up to date vegetation data were not available for the study area

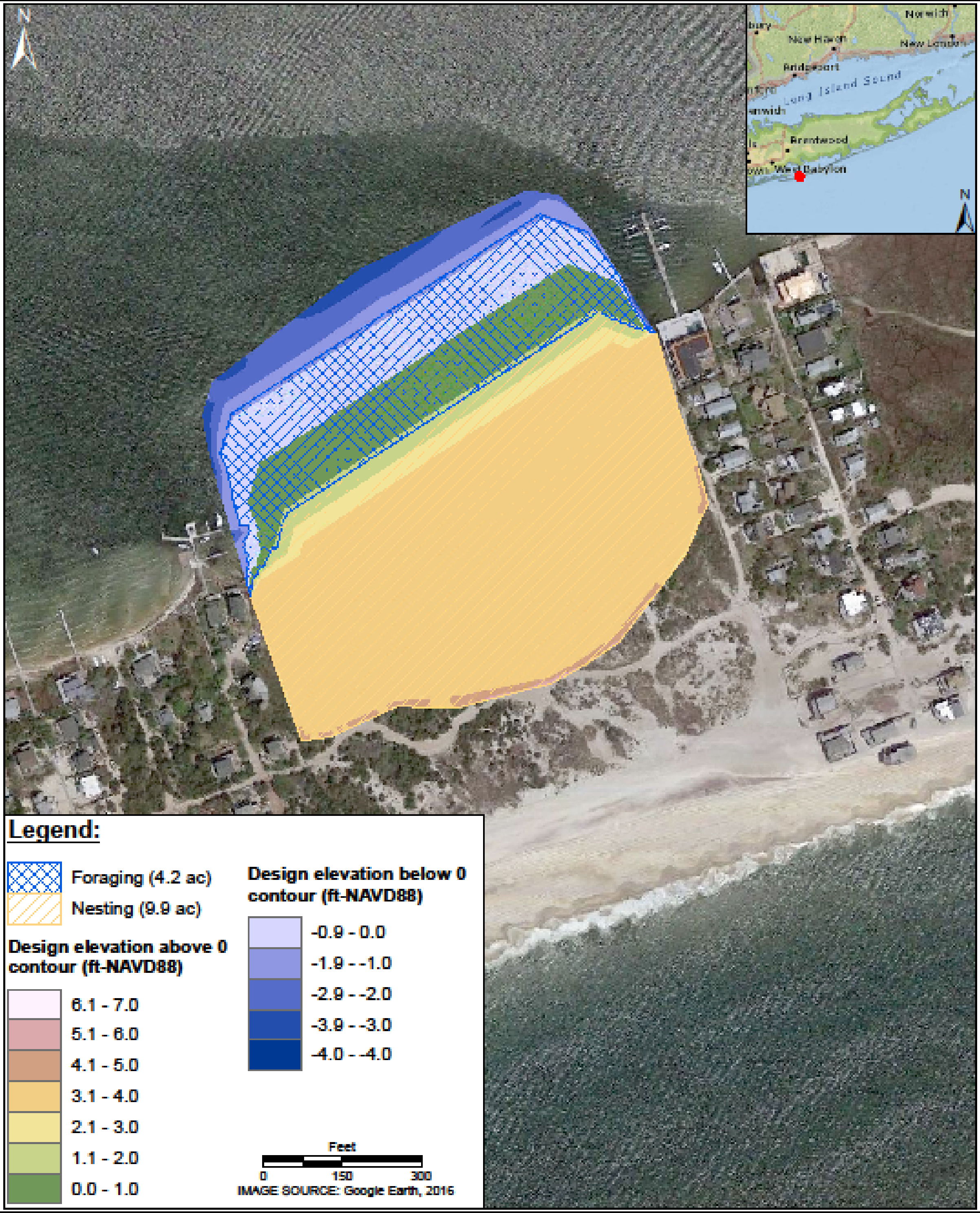
BAYSIDE TIDAL ENVIRONMENT (ft-NAVD88)			
Closest Tidal Benchmark	Seaview Ferry Dock, NY	Highest Astronomical Tide (HAT)	1.09
		Mean Higher High Water (MHHW)	0.62
Coordinates	40.648333° N 73.150000° W	Mean High Water (MHW)	0.45
		Mean Sea Level (MSL)	-0.01
0 ft-NAVD = 1.13 ft-NGVD		Mean Tide Level (MTL)	-0.03
Range (MHW-MLW)	0.97	Mean Low Water (MLW)	-0.52
Diurnal Range (MHHW - MLLW)	1.23	Mean Lower Low Water (MLLW)	-0.61
Largest Tidal Range (HAT-LAT)	2.18	Lowest Astronomical Tide (LAT)	-1.09

BAYSIDE WAVE ENVIRONMENT

Return Period	Fetch (ft)	Wave Height (ft)	Wind Setup (ft)	Wave Setup (ft)	HAT + Setup + Wave Height (ft-NAVD88)
1-year	43,334	3.5	0.56	1.13	6.28
5-year	43,334	4.6	0.95	1.18	7.82
10-year	43,334	5.1	1.16	1.20	8.55

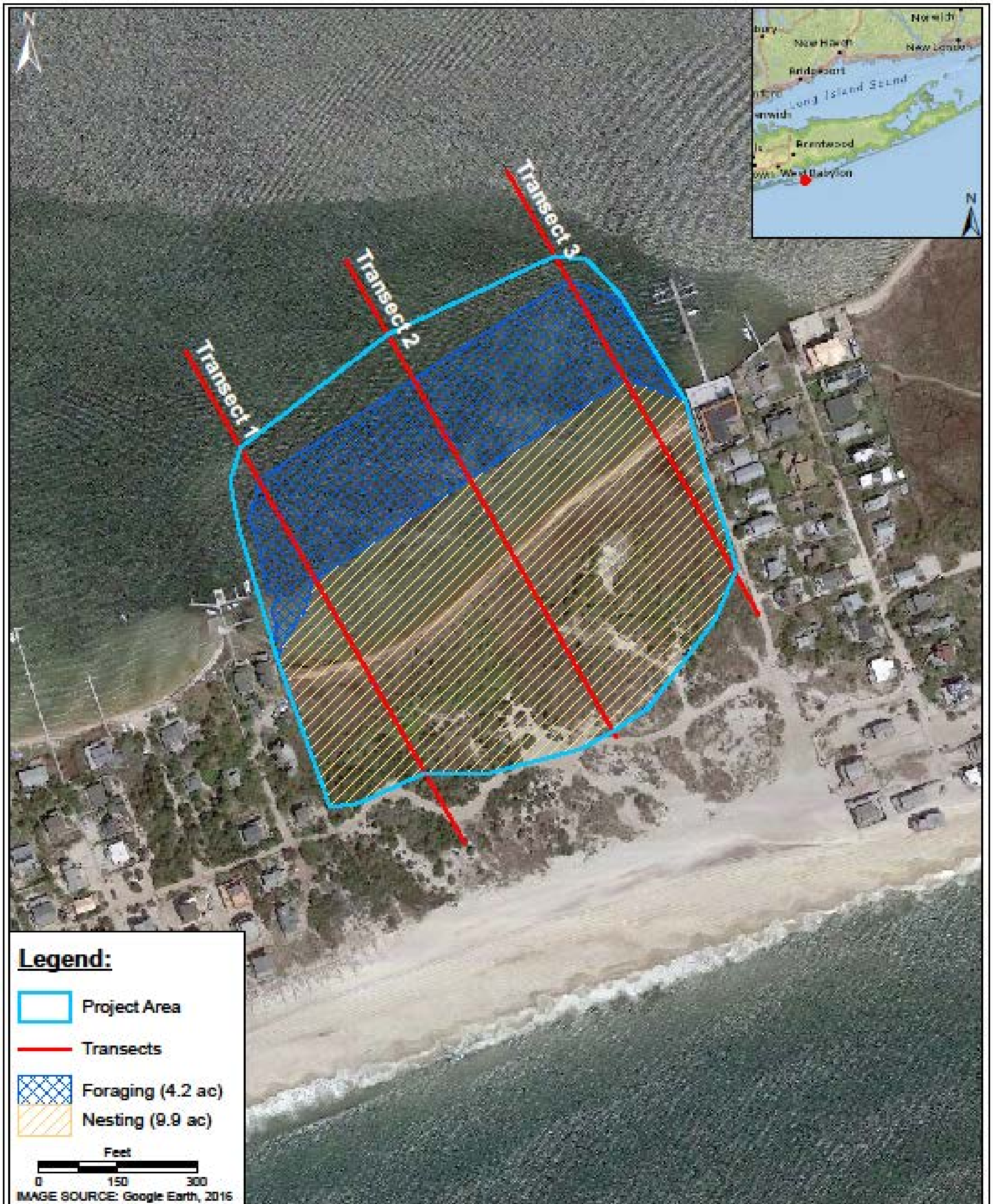


Fire Island to Montauk Point Coastal Process Features Atlantique to Corneille Existing Conditions	PROJECT	C2017-071
	DRAWN BY	WKL
	SHEET	1 OF 1
	DATE	DEC 2017

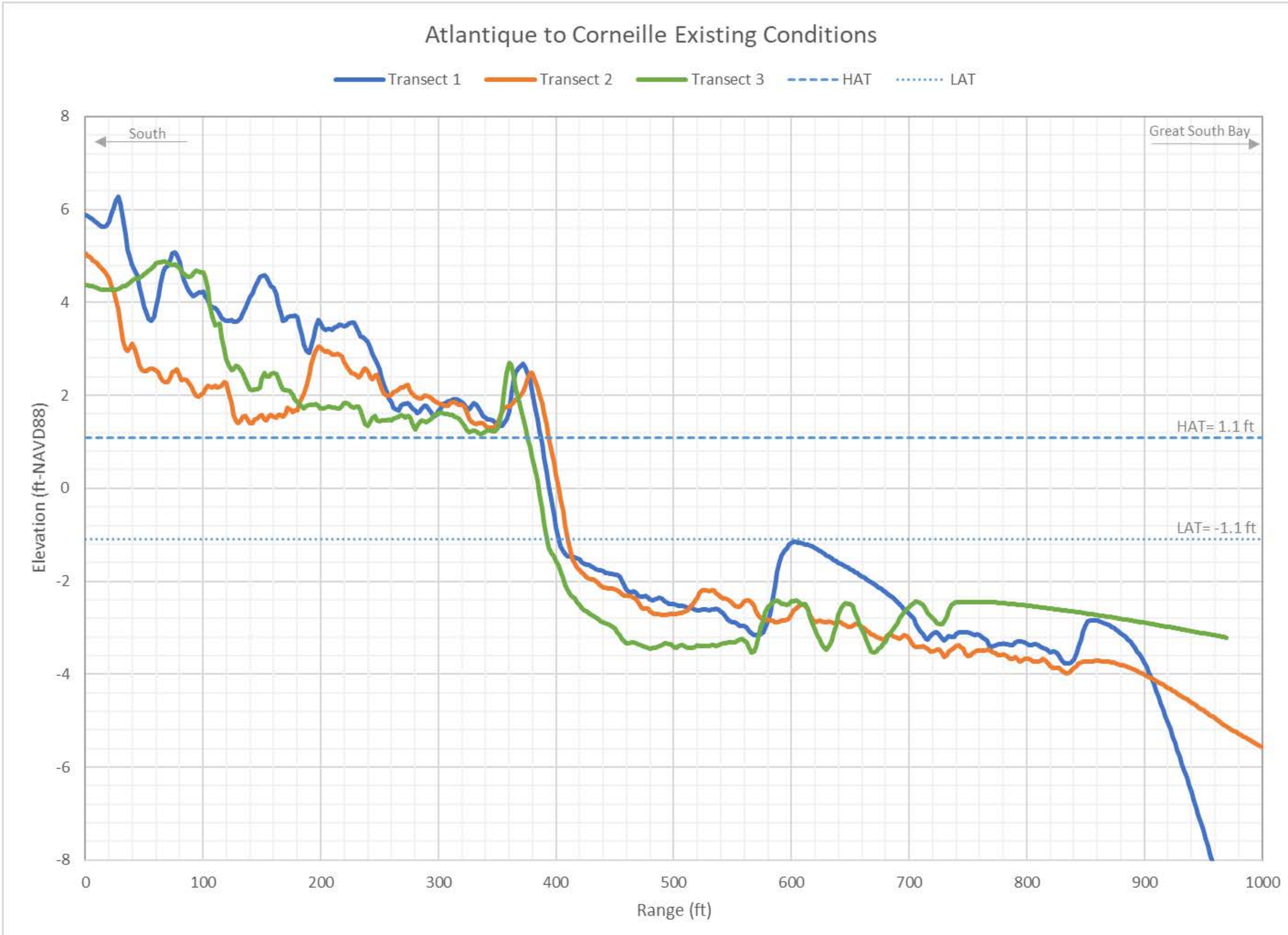


Fire Island to Montauk Point Coastal Process Features Atlantique to Corneille Proposed Elevations	PROJECT	C2017-071
	DRAWN BY	WKL
	SHEET	1 OF 1
	DATE	DEC 2017

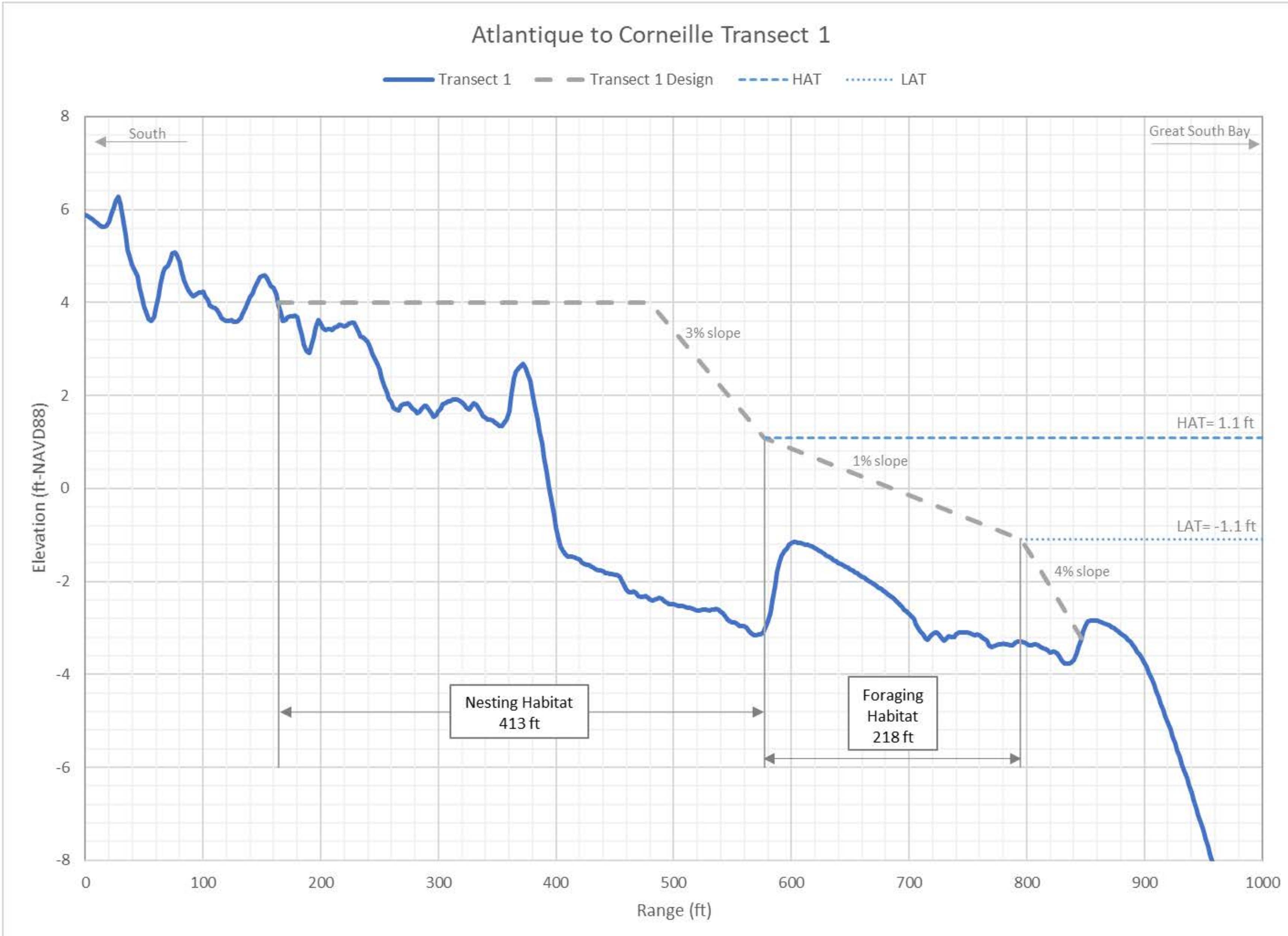
	Fire Island to Montauk Point Coastal Process Features Atlantique to Corneille Proposed Elevation Changes	PROJECT	C2017-071
		DRAWN BY	WKL
		SHEET	1 OF 1
		DATE	DEC 2017



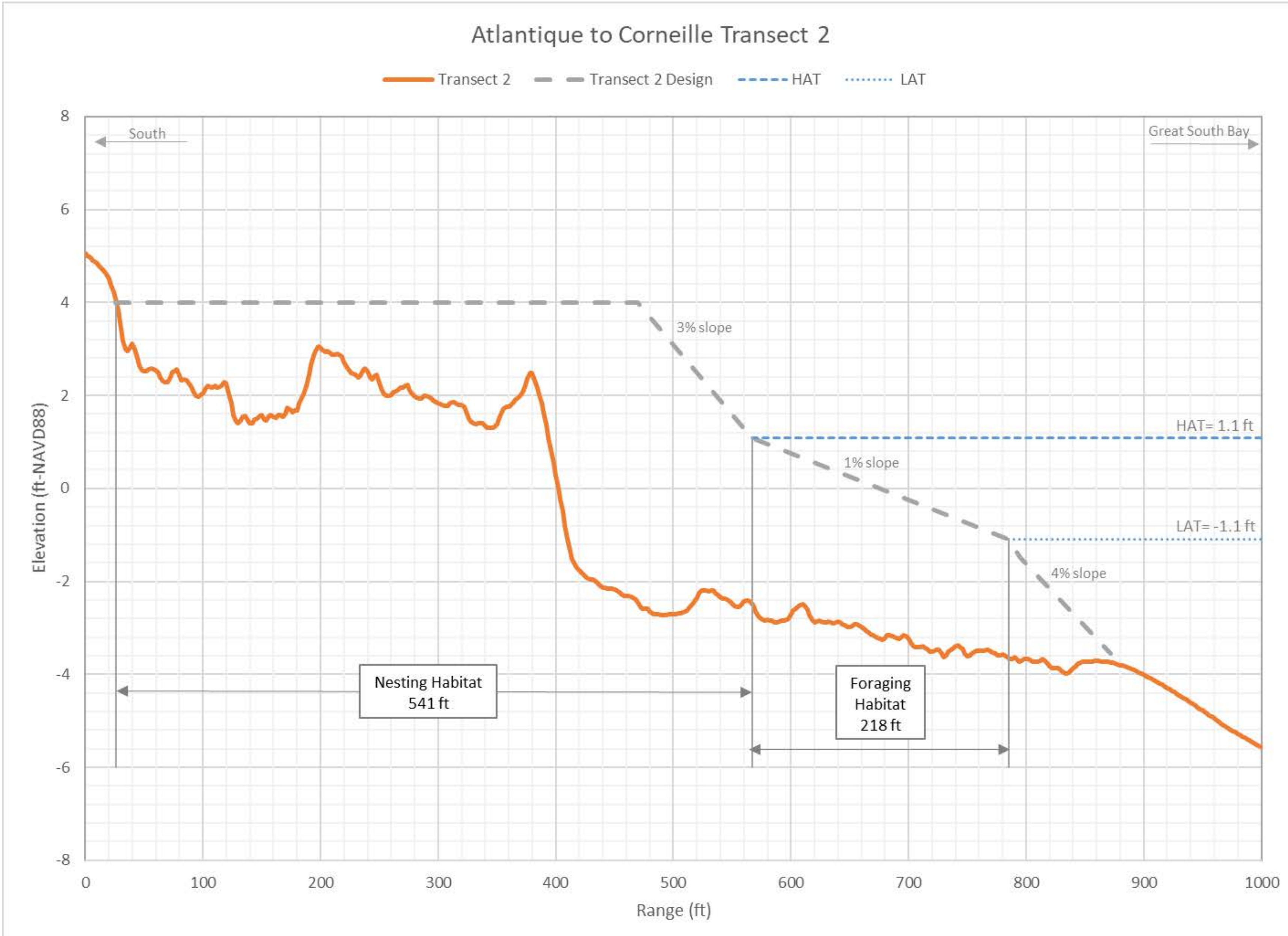
	Fire Island to Montauk Point Coastal Process Features Atlantique to Corneille Transect Locations	PROJECT	C2017-071
		DRAWN BY	WKL
		SHEET	1 OF 1
		DATE	DEC 2017



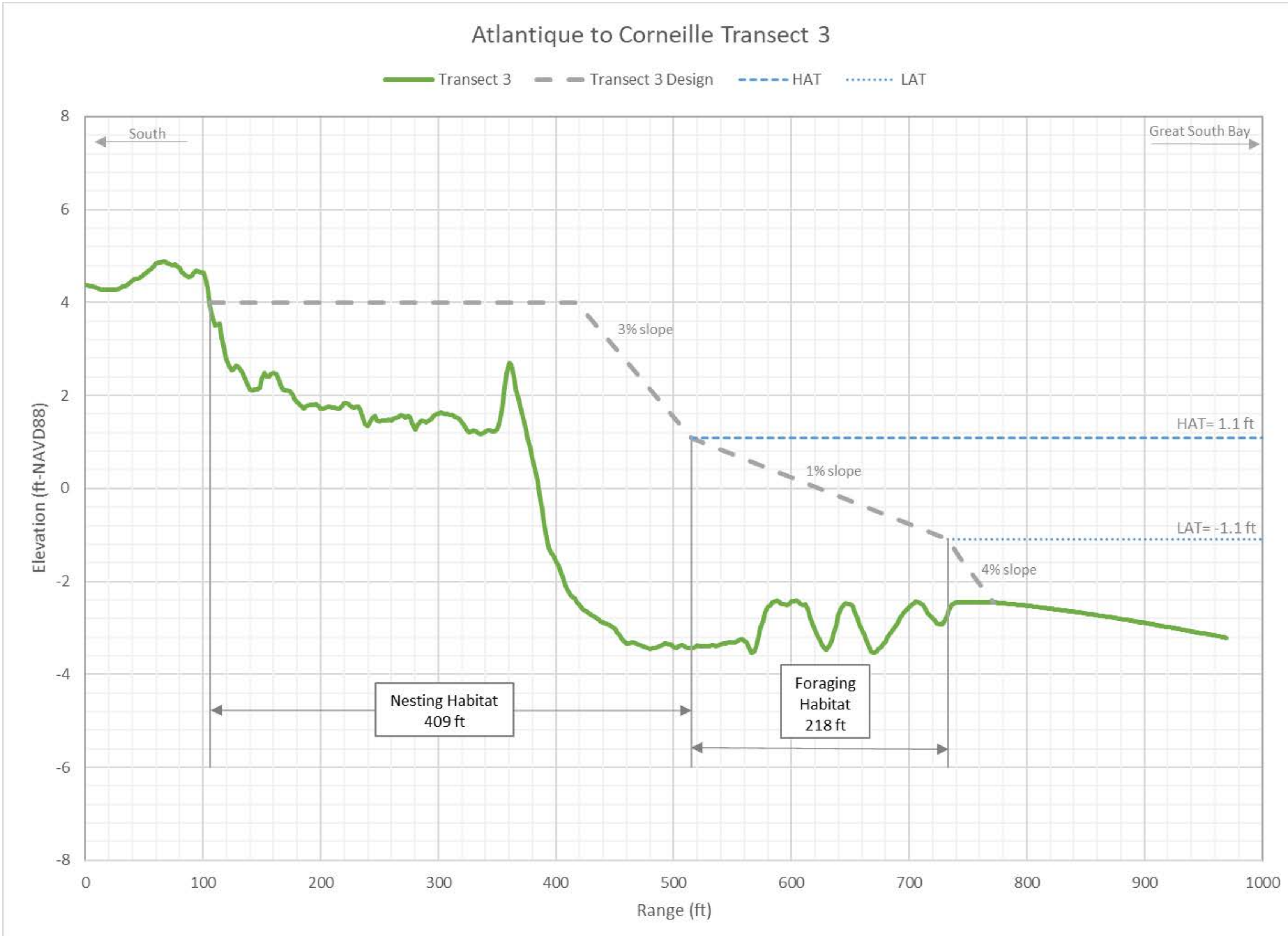
Atlantique to Corneille Existing Conditions
Transect 1
Transect 2
Transect 3
HAT
LAT
South
Great South Bay
HAT= 1.1 ft
LAT= -1.1 ft
Elevation (ft-NAVD88)
Range (ft)
8
6
4
2
0
-2
-4
-6
-8
0
100
200
300
400
500
600
700
800
900
1000



Atlantique to Corneille Transect 1
Transect 1
Transect 1 Design
HAT
LAT
South
Great South Bay
3% slope
1% slope
4% slope
HAT= 1.1 ft
LAT= -1.1 ft
Nesting Habitat
413 ft
Foraging
Habitat
218 ft
Elevation (ft-NAVD88)
Range (ft)
8
6
4
2
0
-2
-4
-6
-8
0
100
200
300
400
500
600
700
800
900
1000



Atlantique to Corneille Transect 2
Transect 2
Transect 2 Design
HAT
LAT
South
Great South Bay
3% slope
1% slope
4% slope
HAT= 1.1 ft
LAT= -1.1 ft
Nesting Habitat
541 ft
Foraging
Habitat
218 ft
Elevation (ft-NAVD88)
Range (ft)
8
6
4
2
0
-2
-4
-6
-8
0
100
200
300
400
500
600
700
800
900
1000



Atlantique to Corneille Transect 3
Transect 3
Transect 3 Design
HAT
LAT
South
Great South Bay
3% slope
1% slope
4% slope
HAT= 1.1 ft
LAT= -1.1 ft
Nesting Habitat
409 ft
Foraging
Habitat
218 ft
Elevation (ft-NAVD88)
Range (ft)
8
6
4
2
0
-2
-4
-6
-8
0
100
200
300
400
500
600
700
800
900
1000

CPF Site 6 Talisman	Reach GSB-3D
	40.674629° N / 73.039332° W

CPF SITE GOALS

- Earthwork to meet target elevations and slopes for ESA credit
- Fill placement to simulate cross island transport for CSRM credit

Talisman is located in the central portion of Fire Island within Barrett Island Park between Fire Island Pines and Water Island. The average nearshore water depth on the bayside at Talisman range from 1 ft to 3 ft. Historically a sand spit existed at this location. The west side of Talisman includes a park dock extending approximately 400 ft into the bay. The proposed fill extends eastward approximately 1,400 ft. A private dock lies to the east of this CPF. Fill placed at this CPF should account for potential impacts to these structures. This CPF design seeks to add fill to provide ESA bird habitat (foraging and nesting) as well as provide CSRM benefits by simulating cross island transport.

Foraging habitat is defined as the intertidal area that is intermittently submerged and exposed during tidal induced water surface fluctuations. As a proxy for the local spring tide range, the following discussion applies NOAA's reported Lowest Astronomical Tide (LAT) as the lower bound and Highest Astronomical Tide (HAT) as the upper bound for foraging habitat.

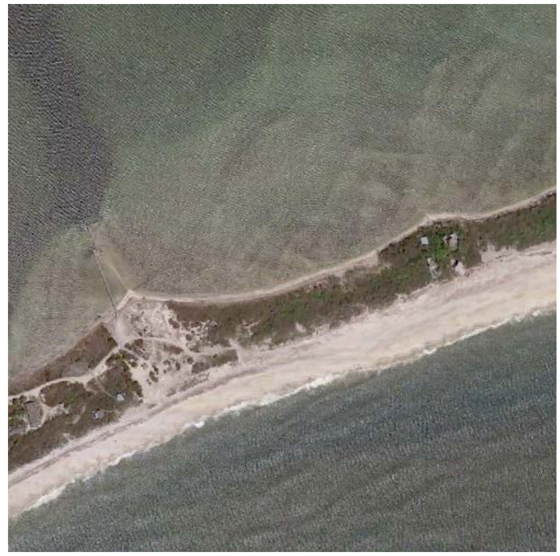
Nesting habitat is located immediately upland of foraging habitat and extends from the HAT elevation up to +4 ft-NAVD88 at Talisman as depicted in the Proposed Elevations figure.

To simulate cross island transport and create early successional habitat that provides nesting and foraging for shorebirds, plans call for the reestablishment of approximately 1,400 ft of the historic shoreline through the placement of fill over 16.1 acres (ac). A living shoreline may be placed on the north side of the project site to help reduce the erosion rate. Within the project area there is a total of 7.0 ac of foraging habitat and 7.1 ac of nesting habitat. The regrading template includes 3% and 1% slopes on the north bank to create viable shorebird habitat, and a 4% slope below the LAT to tie into the existing grade. Some of the upland portions of this CPF lie below the design berm elevation of +4 ft-NAVD88. As such, the landward side of the fill profile will transition to existing grade at a 4% slope, where necessary. Otherwise the berm will tie in to the existing grade at +4 ft-NAVD88. This will preserve the area as nesting habitat. The cross shore extent of this CPF is limited due to the overall site configuration.

Sand placement at the CPF sites will be performed in coordination with renourishment cycles of the beachfill features and subject to monitoring to ensure resolution of project objectives. The USACE will not implement vegetation management or manipulation of the sites unless conducted as an incidental action associated with future placement. The USACE recommends the local land management agency consider predator management and symbolic fencing to the +10 ft-NAVD88 contour in newly created CPF's.

CPF Site 6 Talisman	Reach GSB-3D 40.674629° N / 73.039332° W

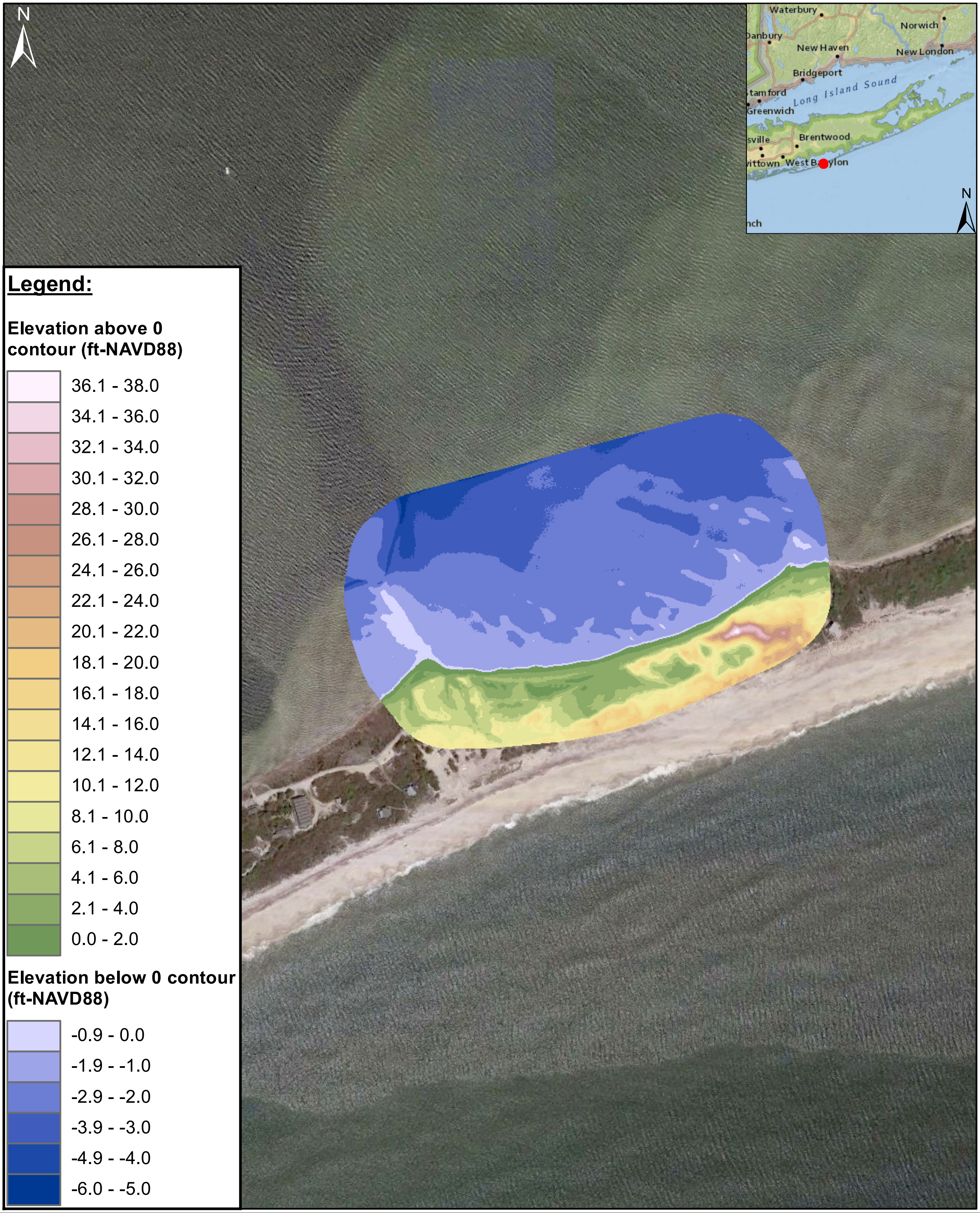
CPF PARAMETERS		
Feature	Habitat	Total
Cut Volume (cy)	0	0
Fill Volume (cy)	83,741	85,880
Net Volume (cy)	83,741	85,880
Acreage	14.0	16.1
Activity	Fill	Fill
DATA SOURCES		
Topographic	USGS, 2016	
Bathymetric	USGS, 2016	
Aerial Imagery	Google Earth, 2016	
Vegetation	N/A*	
REAL ESTATE INFORMATION		
Property Owner	USA Town of Brookhaven	
Municipality	Brookhaven	
County	Suffolk	
CBRA	NY-59P, Otherwise Protected Area	



*up to date vegetation data were not available for the study area

BAYSIDE TIDAL ENVIRONMENT (ft-NAVD88)			
Closest Tidal Benchmark	Seaview Ferry Dock, NY	Highest Astronomical Tide (HAT)	1.18
		Mean Higher High Water (MHHW)	0.70
Coordinates	40.648333° N 73.150000° W	Mean High Water (MHW)	0.54
		Mean Sea Level (MSL)	-0.02
0 ft-NAVD = 1.08 ft-NGVD		Mean Tide Level (MTL)	-0.02
Range (MHW-MLW)	1.11	Mean Low Water (MLW)	-0.57
Diurnal Range (MHHW - MLLW)	1.37	Mean Lower Low Water (MLLW)	-0.67
Largest Tidal Range (HAT-LAT)	2.33	Lowest Astronomical Tide (LAT)	-1.15

BAYSIDE WAVE ENVIRONMENT					
Return Period	Fetch (ft)	Wave Height (ft)	Wind Setup (ft)	Wave Setup (ft)	HAT + Setup + Wave Height (ft-NAVD88)
1-year	66,256	4.2	0.38	0.86	6.62
5-year	66,256	5.4	0.68	0.89	8.15
10-year	66,256	5.5	0.80	0.91	8.39



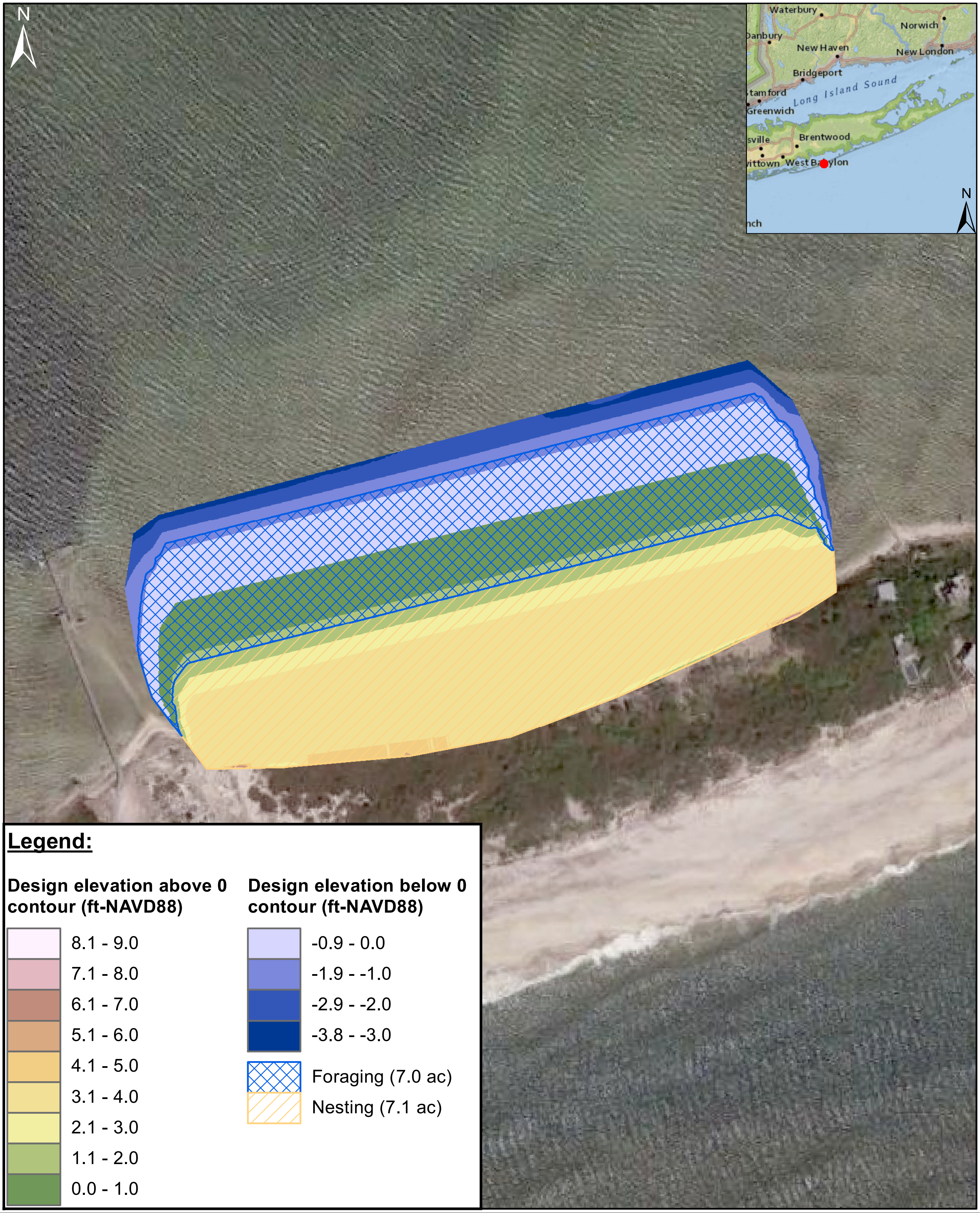
Feet

0 500 1,000

IMAGE SOURCE: Google Earth, 2016

Fire Island to Montauk Point
Coastal Process Features
Talisman
Existing Conditions

PROJECT	C2017-071
DRAWN BY	WKL
SHEET	1 OF 1
DATE	DEC 2017



Legend:

Design elevation above 0 contour (ft-NAVD88)	Design elevation below 0 contour (ft-NAVD88)
8.1 - 9.0	-0.9 - 0.0
7.1 - 8.0	-1.9 - -1.0
6.1 - 7.0	-2.9 - -2.0
5.1 - 6.0	-3.8 - -3.0
4.1 - 5.0	Foraging (7.0 ac)
3.1 - 4.0	Nesting (7.1 ac)
2.1 - 3.0	
1.1 - 2.0	
0.0 - 1.0	

Feet
0 300 600
IMAGE SOURCE: Google Earth, 2016

Fire Island to Montauk Point
Coastal Process Features
Talisman
Proposed Elevations

PROJECT	C2017-071
DRAWN BY	WKL
SHEET	1 OF 1
DATE	DEC 2017

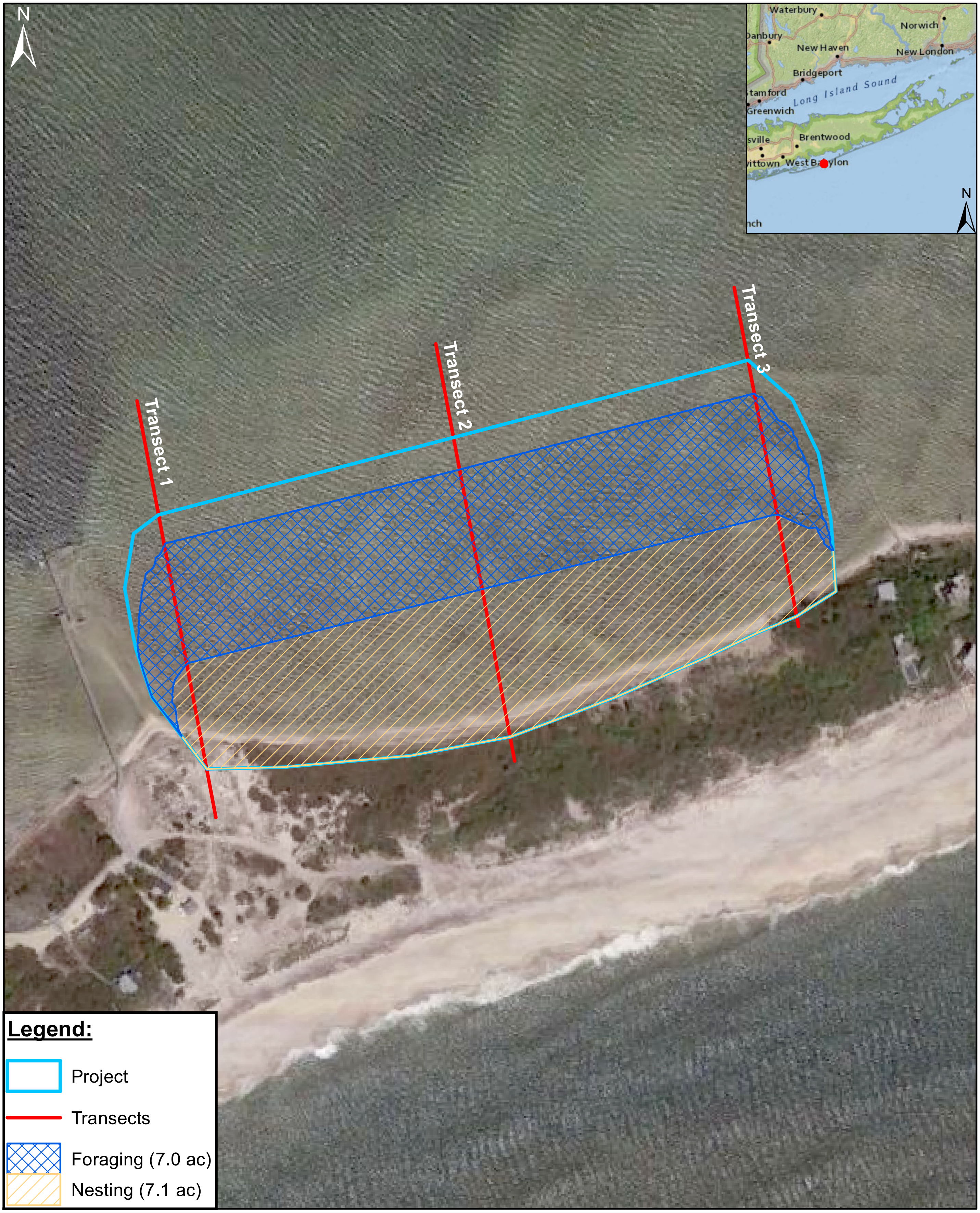
Feet

0 300 600

IMAGE SOURCE: Google Earth, 2016

Fire Island to Montauk Point
Coastal Process Features
Talisman
Proposed Elevation Changes

PROJECT	C2017-071
DRAWN BY	WKL
SHEET	1 OF 1
DATE	DEC 2017



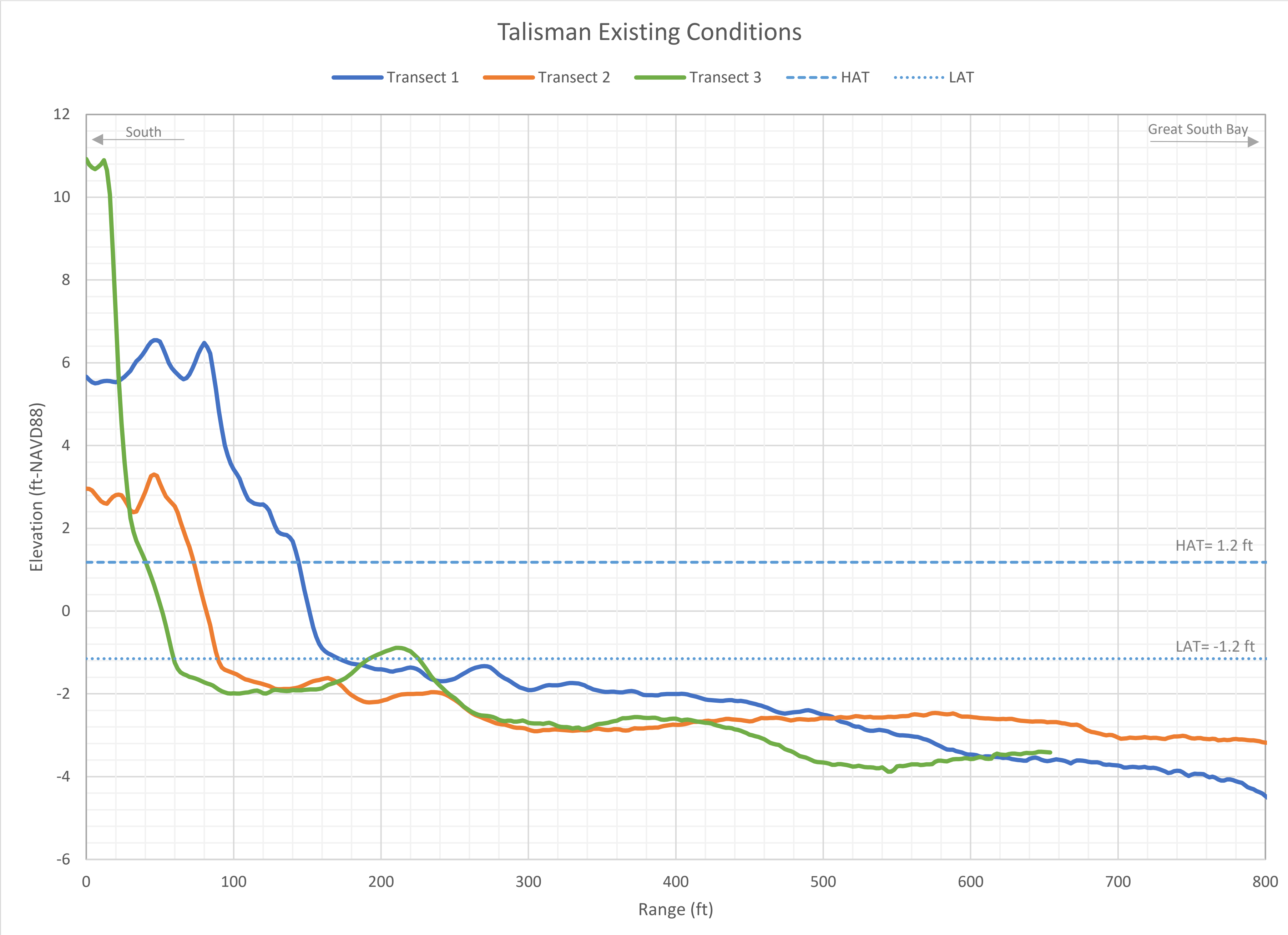
Feet

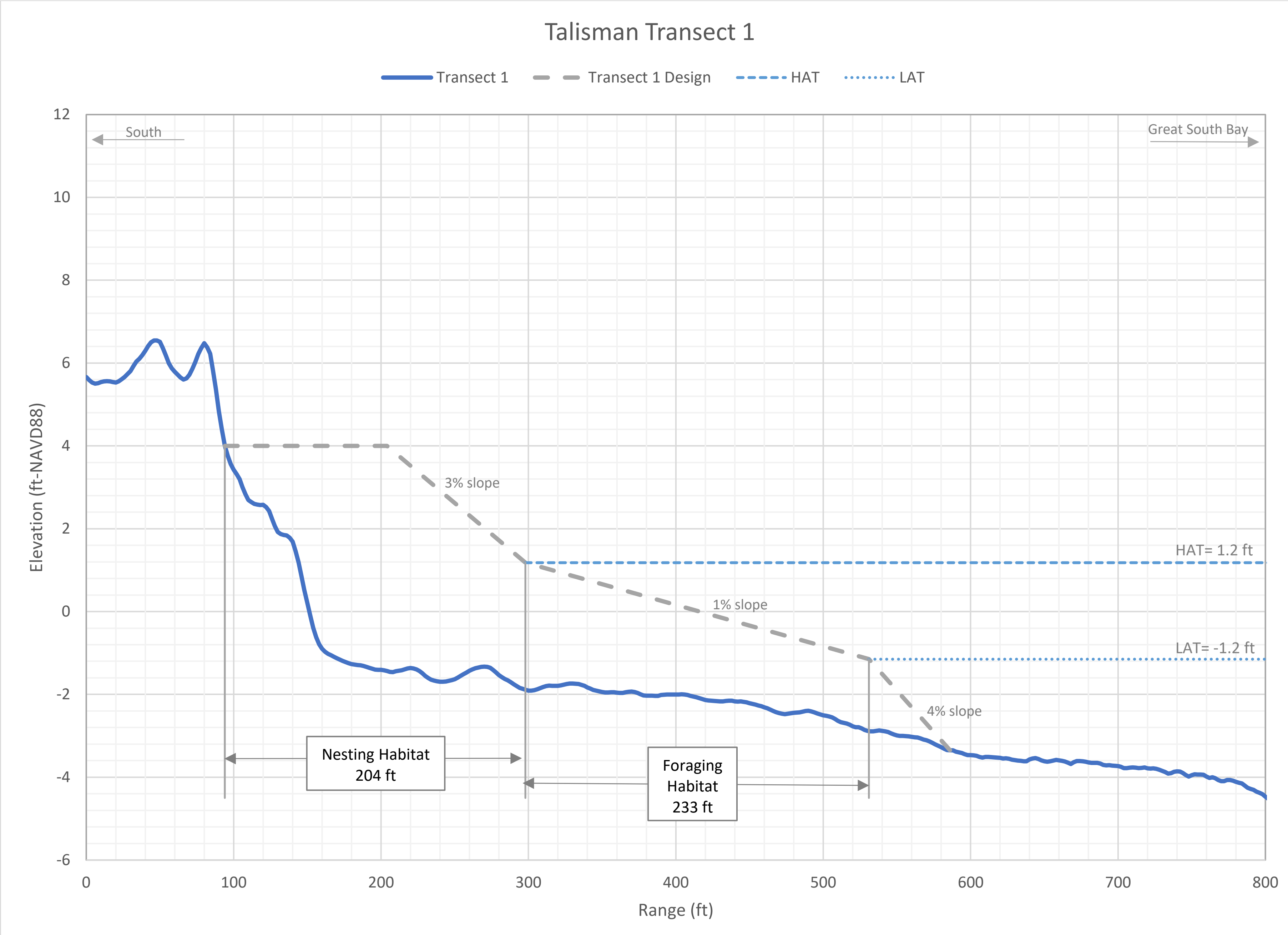
0 300 600

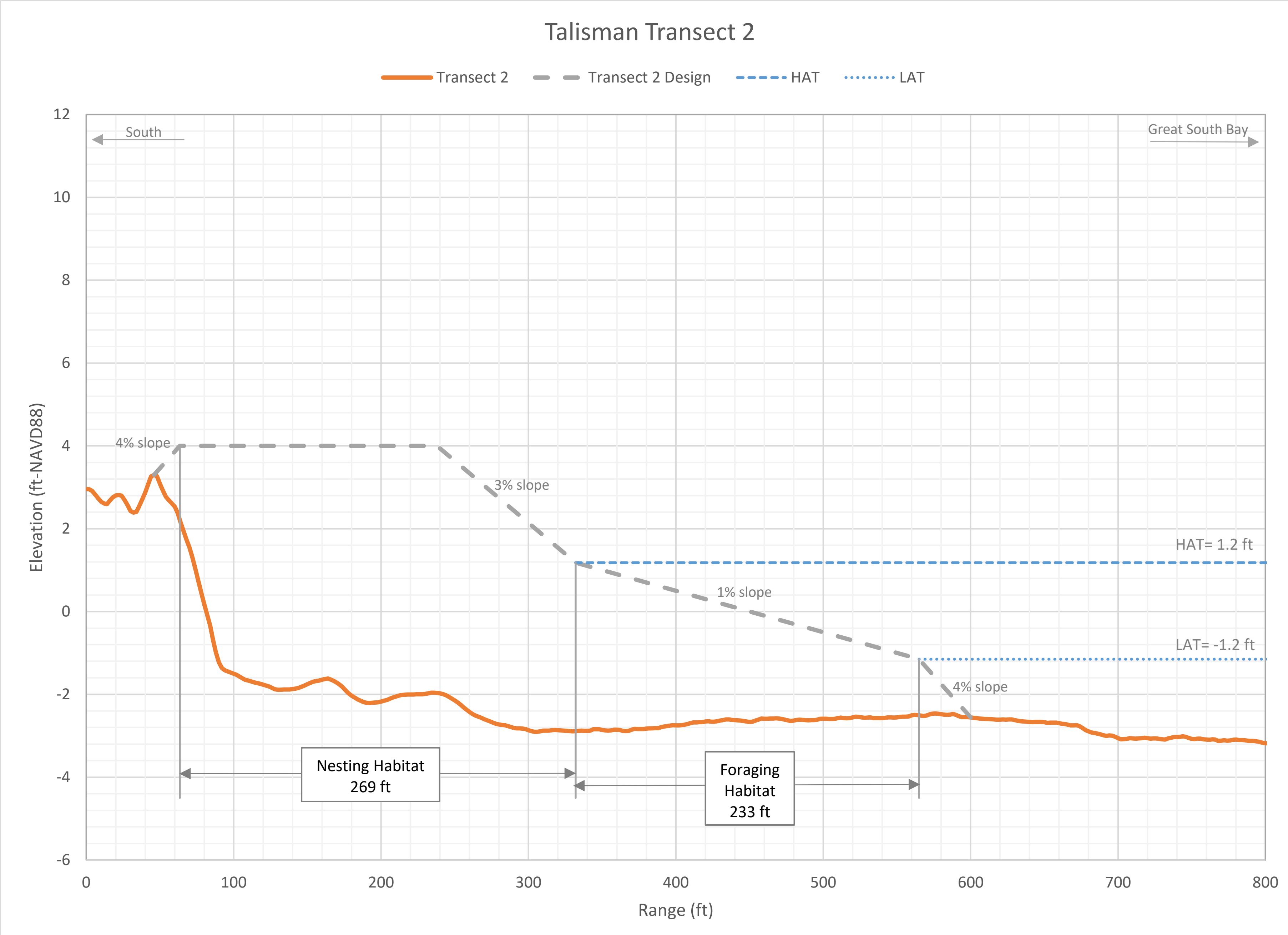
IMAGE SOURCE: Google Earth, 2016

Fire Island to Montauk Point
Coastal Process Features
Talisman
Transect Locations

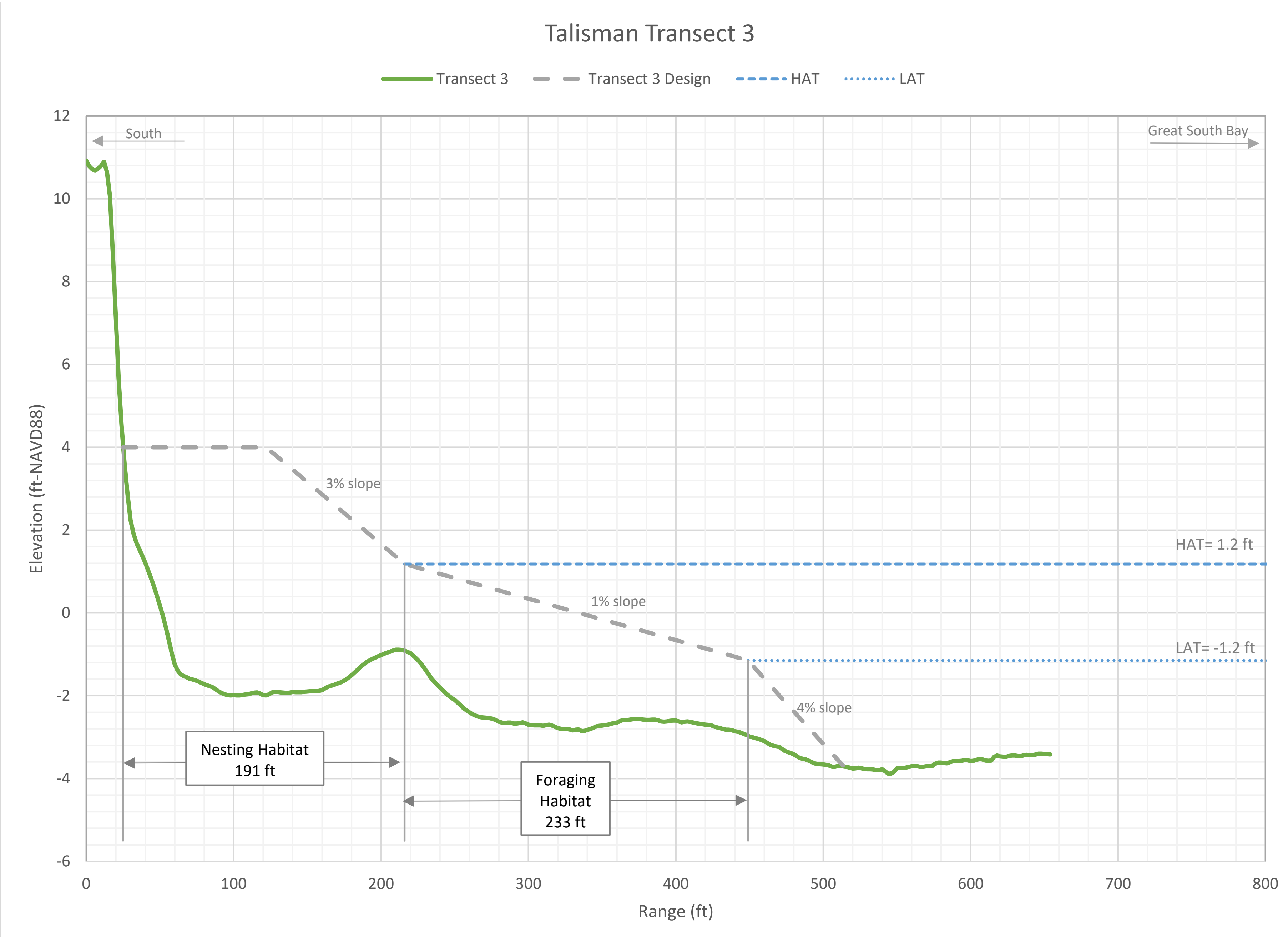
PROJECT	C2017-071
DRAWN BY	WKL
SHEET	1 OF 1
DATE	DEC 2017


Talisman Existing Conditions
Transect 1
Transect 2
Transect 3
HAT
LAT
South
Great South Bay
HAT= 1.2 ft
LAT= -1.2 ft
Elevation (ft-NAVD88)
Range (ft)
12
10
8
6
4
2
0
-2
-4
-6
0
100
200
300
400
500
600
700
800


Talisman Transect 1
Transect 1
Transect 1 Design
HAT
LAT
South
Great South Bay
3% slope
1% slope
4% slope
HAT= 1.2 ft
LAT= -1.2 ft
Nesting Habitat
204 ft
Foraging
Habitat
233 ft
Elevation (ft-NAVD88)
Range (ft)
12
10
8
6
4
2
0
-2
-4
-6
0
100
200
300
400
500
600
700
800



Talisman Transect 2
Transect 2
Transect 2 Design
HAT
LAT
12
10
8
6
4
2
0
-2
-4
-6
Elevation (ft-NAVD88)
South
Great South Bay
4% slope
3% slope
HAT= 1.2 ft
1% slope
LAT= -1.2 ft
4% slope
Nesting Habitat
269 ft
Foraging
Habitat
233 ft
0
100
200
300
400
500
600
700
800
Range (ft)



Talisman Transect 3
Transect 3
Transect 3 Design
HAT
LAT
South
Great South Bay
3% slope
1% slope
4% slope
HAT= 1.2 ft
LAT= -1.2 ft
Nesting Habitat
191 ft
Foraging
Habitat
233 ft
Elevation (ft-NAVD88)
Range (ft)
12
10
8
6
4
2
0
-2
-4
-6
0
100
200
300
400
500
600
700
800

CPF Site 7 Pattersquash Reach	Reach MB-1B 40.746433° N / 72.83247° W

CPF SITE GOALS

- Devegetate area to meet ESA goals
- Shallow water fill to meet CSRM goals
- Southern boundary follows Burma Road alignment and includes physical barrier to limit chick movement into and beyond road

Pattersquash Reach is located on the eastern portion of Fire Island on the bayside within Smith Point County Park. Pattersquash Reach lies between two inlets, Old Inlet to the west and Moriches Inlet to the east. The project area contains coastal dunes with vegetation and an historically ephemeral sand spit. This CPF design seeks to devegetate uplands to provide ESA bird habitat (foraging and nesting) as well as provide CSRM benefits by placing fill to simulate cross island transport.

To create early successional habitat that provides nesting and foraging for shorebirds, plans call for devegetating approximately 49.4 acres (ac), all of which qualify as proposed habitat. All devegetation will occur north of Burma Road. This includes 21.4 ac of foraging habitat and 27.0 ac of nesting habitat. In addition, in-water sediment placement extends from the +1 ft-NAVD88 contour offshore to -1 ft-NAVD88. Fill then follows the -1 ft-NAVD88 contour offshore for approximately 300 ft at which point the fill toes into the existing grade at a 2% slope. No upland regrading is anticipated.

Foraging habitat is defined as the intertidal area that is intermittently submerged and exposed during tide-induced water surface fluctuations. As a proxy for the local spring tide range, the following discussion applies NOAA's reported Lowest Astronomical Tide (LAT) as the lower bound and Highest Astronomical Tide (HAT) as the upper bound for foraging habitat.

Nesting habitat is located immediately upland of foraging habitat and extends from the HAT elevation to the naturally occuring +8 ft-NAVD88 contour at Pattersquash Reach as depicted in the Proposed Elevations figure.

Maintenance activities at the CPF sites will be performed in coordination with renourishment cycles of the beachfill features and are subject to monitoring to ensure resolution of project objectives. CPF maintenance operations may be modified based on the adaptive management plan to meet ESA/CSRM criteria. The USACE will not implement vegetation management or manipulation of the sites unless conducted as an incidental action associated with future placement. The USACE recommends the local land management agency consider predator management in newly created CPFs.

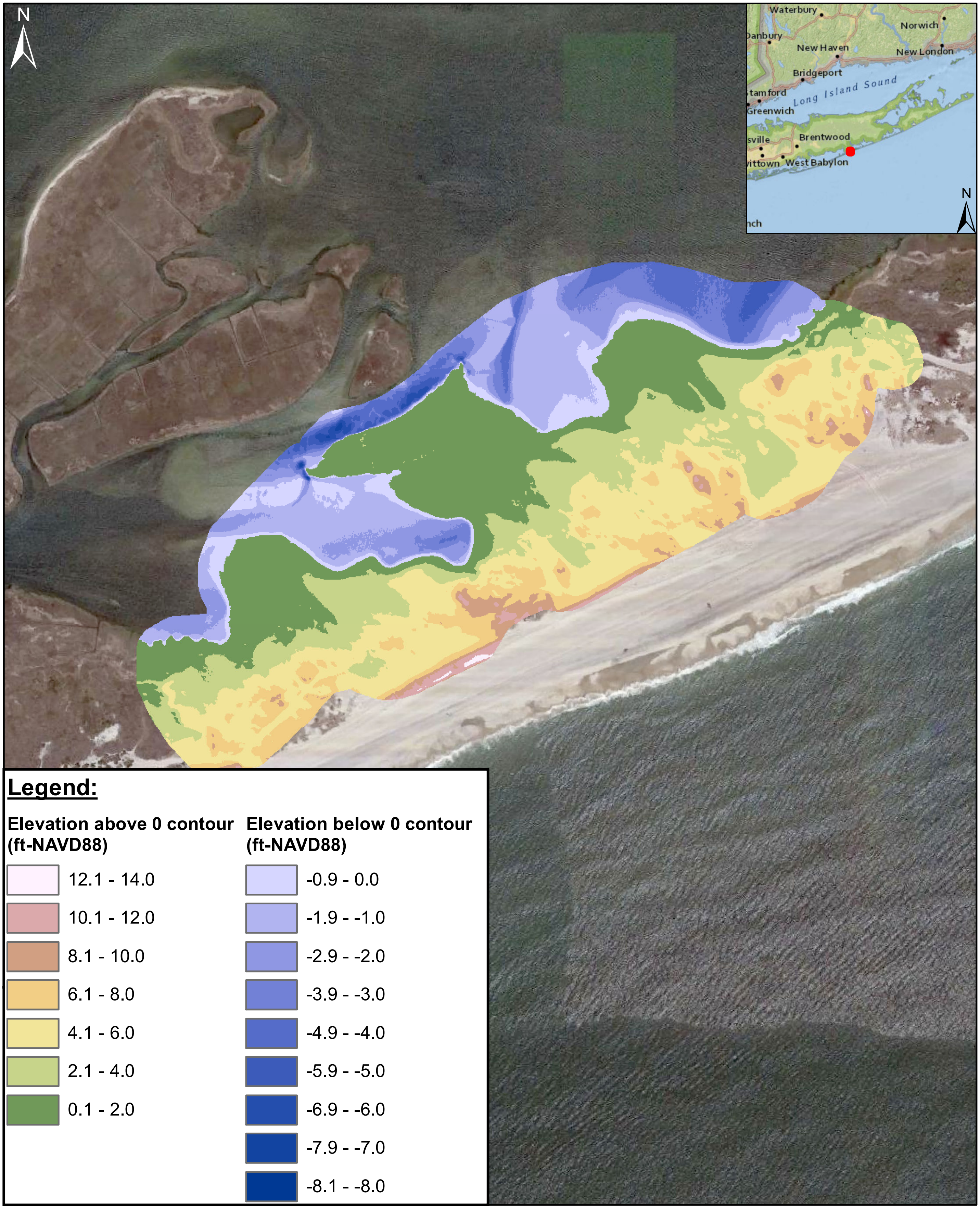
CPF Site 7 Pattersquash Reach	Reach MB-1B 40.746433° N / 72.83247° W

CPF PARAMETERS	
Feature	ESA\CSRM
Cut Volume (cy)	0
Fill Volume (cy)	19,396
Net Volume (cy)	19,396
Acreage (Nesting\Foraging\Devegetation)	49.4 (27.0\21.4\49.4)
Activity	Devegetate and Fill
DATA SOURCES	
Topographic	USGS, 2016
Bathymetric	USGS, 2016
Aerial Imagery	Google Earth, 2016
Vegetation	NPS, 2010
REAL ESTATE INFORMATION	
Property Owner	County of Suffolk Town of Brookhaven
Municipality	Brookhaven
County	Suffolk
CBRA	NY-59P, Otherwise Protected Area

BAYSIDE TIDAL ENVIRONMENT (ft-NAVD88)			
Closest Tidal Benchmark	Smith Point Bridge, NY	Highest Astronomical Tide (HAT)	1.42
		Mean Higher High Water (MHHW)	0.95
Coordinates	40.738333° N 72.868333° W	Mean High Water (MHW)	0.75
		Mean Sea Level (MSL)	-0.09
0 ft-NAVD = 1.04 ft-NGVD		Mean Tide Level (MTL)	-0.10
Range (MHW-MLW)	1.70	Mean Low Water (MLW)	-0.95
Diurnal Range (MHHW - MLLW)	2.01	Mean Lower Low Water (MLLW)	-1.07
Largest Tidal Range (HAT-LAT)	2.97	Lowest Astronomical Tide (LAT)	-1.55

BAYSIDE WAVE ENVIRONMENT

Return Period	Fetch (ft)	Wave Height (ft)	Wind Setup (ft)	Wave Setup (ft)	HAT + Setup + Wave Height (ft-NAVD88)
1-year	19,180	2.5	0.14	0.81	4.87
5-year	19,180	3.3	0.24	0.82	5.78
10-year	19,180	3.7	0.29	0.83	6.24



Feet

0 500 1,000

IMAGE SOURCE: Google Earth, 2016

Fire Island to Montauk Point
Coastal Process Features
Pattersquash
Existing Conditions

PROJECT	C2017-071
DRAWN BY	WKL
SHEET	1 OF 1
DATE	APR 2018

Legend:

Design elevation above 0 contour (ft-NAVD88)

- 0.0 - 1.0

Design elevation below 0 contour (ft-NAVD88)

- -0.9 - 0.0
- -1.9 - -1.0
- -2.9 - -2.0
- -3.9 - -3.0
- -4.9 - -4.0
- -5.3 - -5.0

- Nesting (27.0 ac)
- Foraging (21.4 ac)
- Devegetation (49.4 ac)
- Burma Road Physical Barrier

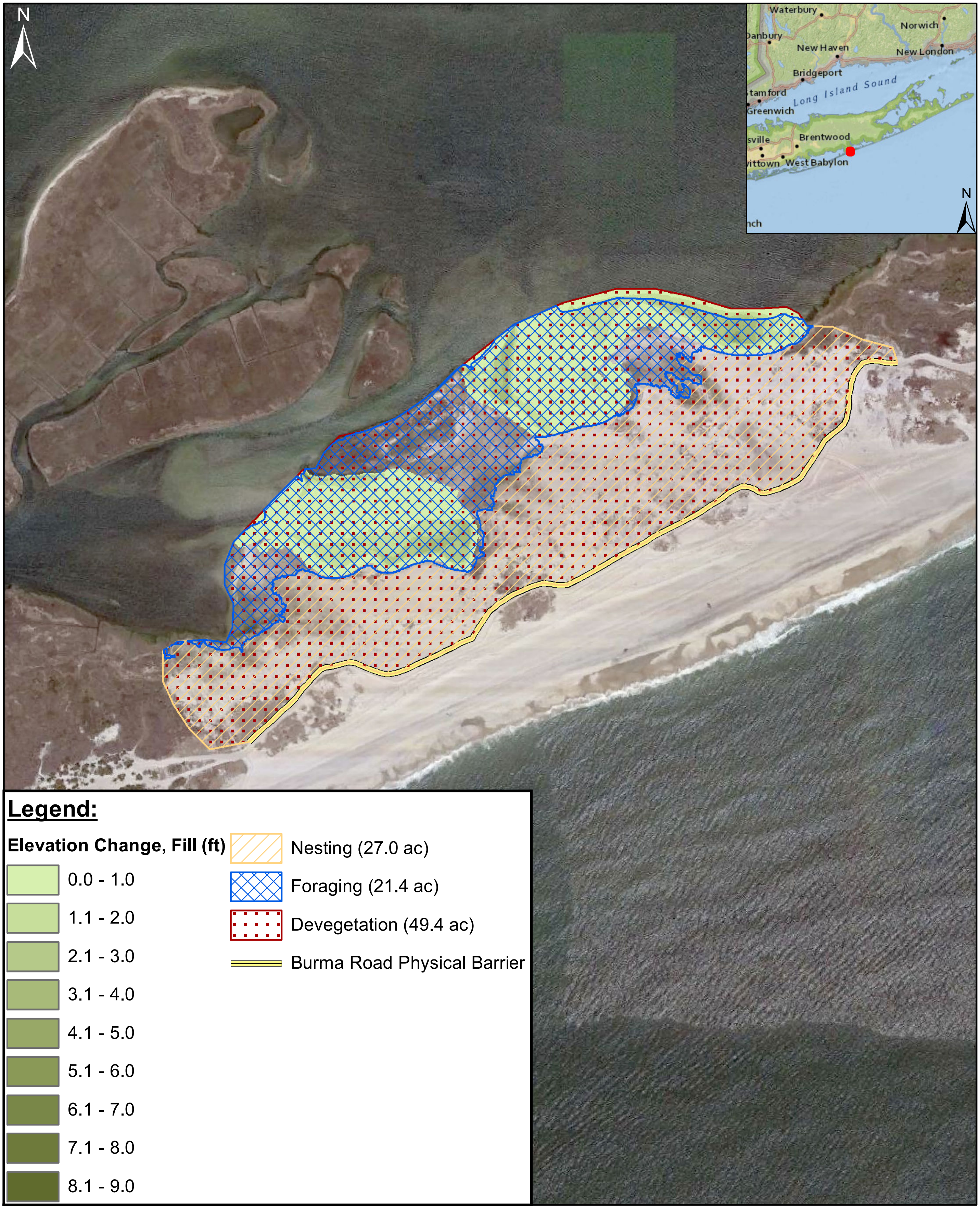
Feet

0 500 1,000

IMAGE SOURCE: Google Earth, 2016

Fire Island to Montauk Point
Coastal Process Features
Pattersquash
Proposed Elevations

PROJECT	C2017-071
DRAWN BY	WKL
SHEET	1 OF 1
DATE	APR 2018



Feet

0 500 1,000

IMAGE SOURCE: Google Earth, 2016

Fire Island to Montauk Point
Coastal Process Features
Pattersquash
Proposed Elevation Changes

PROJECT	C2017-071
DRAWN BY	WKL
SHEET	1 OF 1
DATE	APR 2018

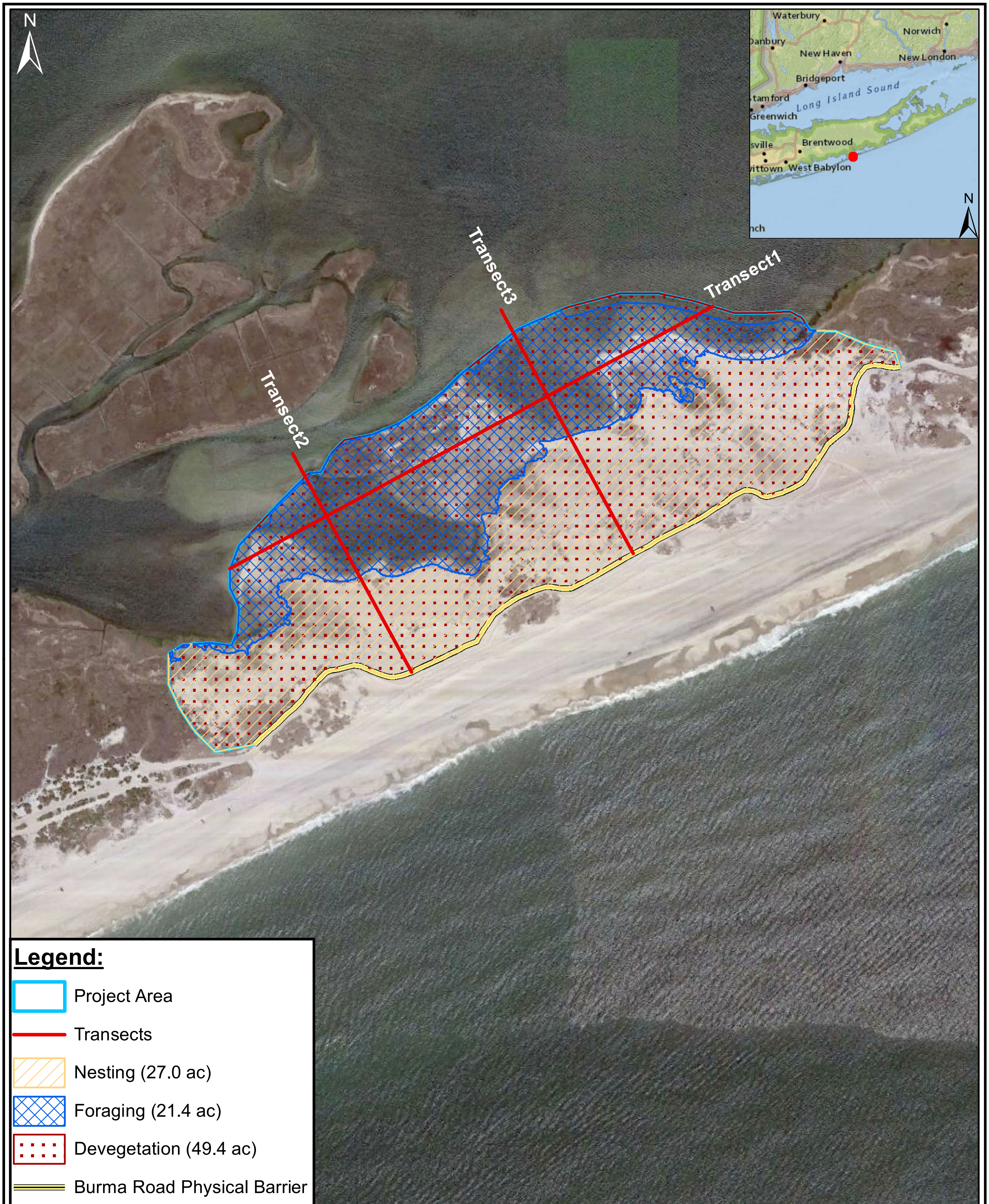
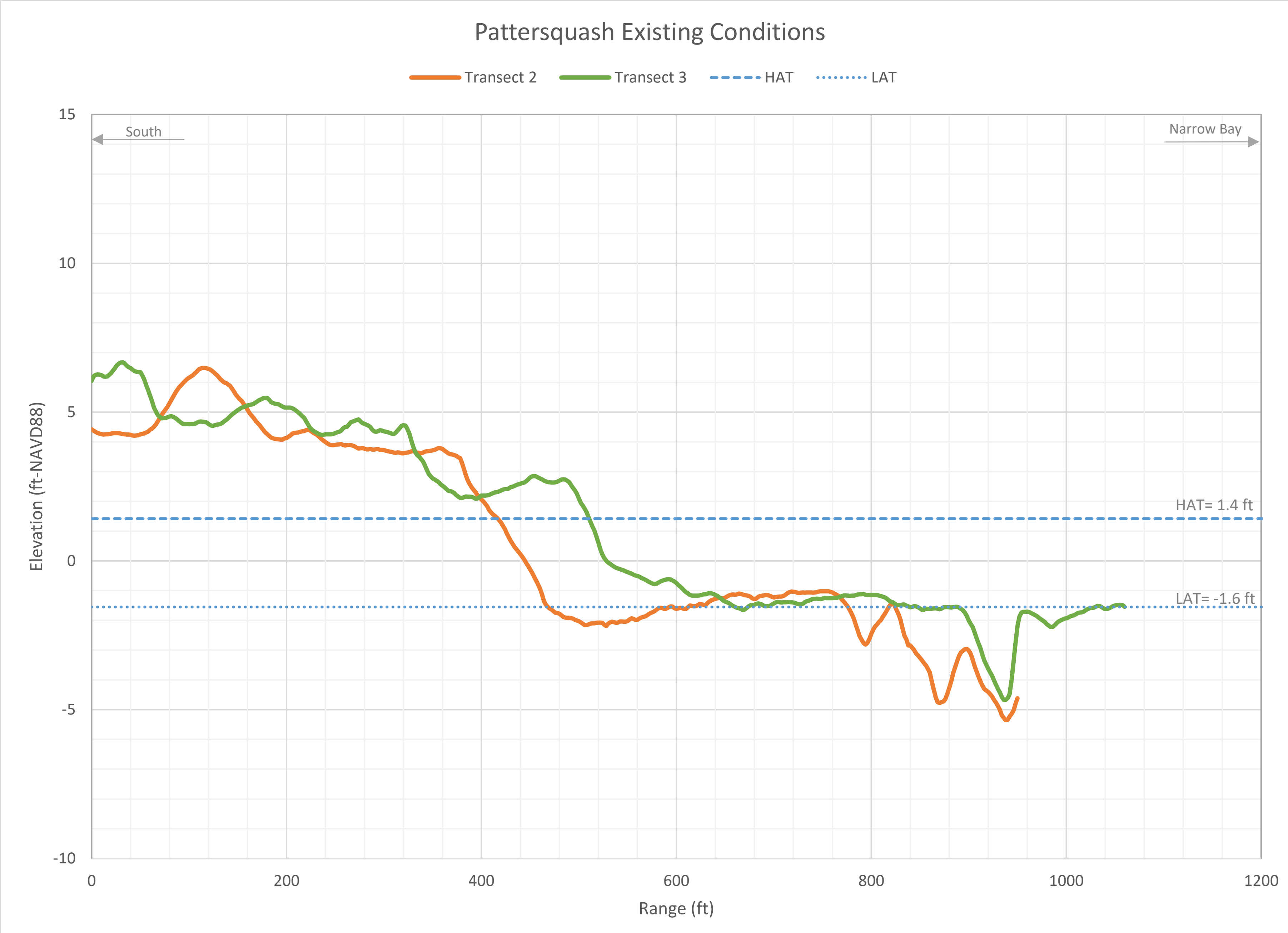


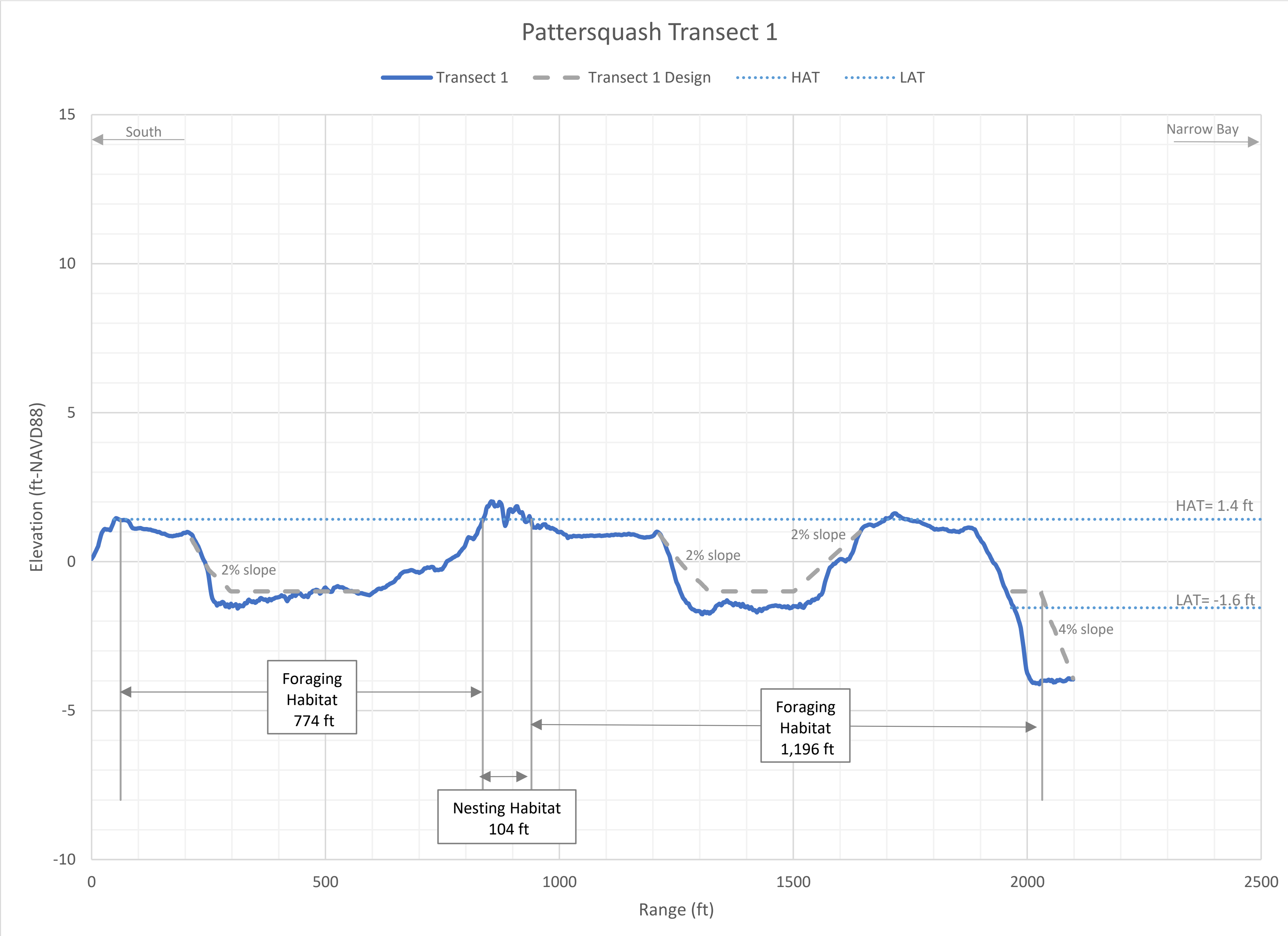
IMAGE SOURCE: Google Earth, 2016

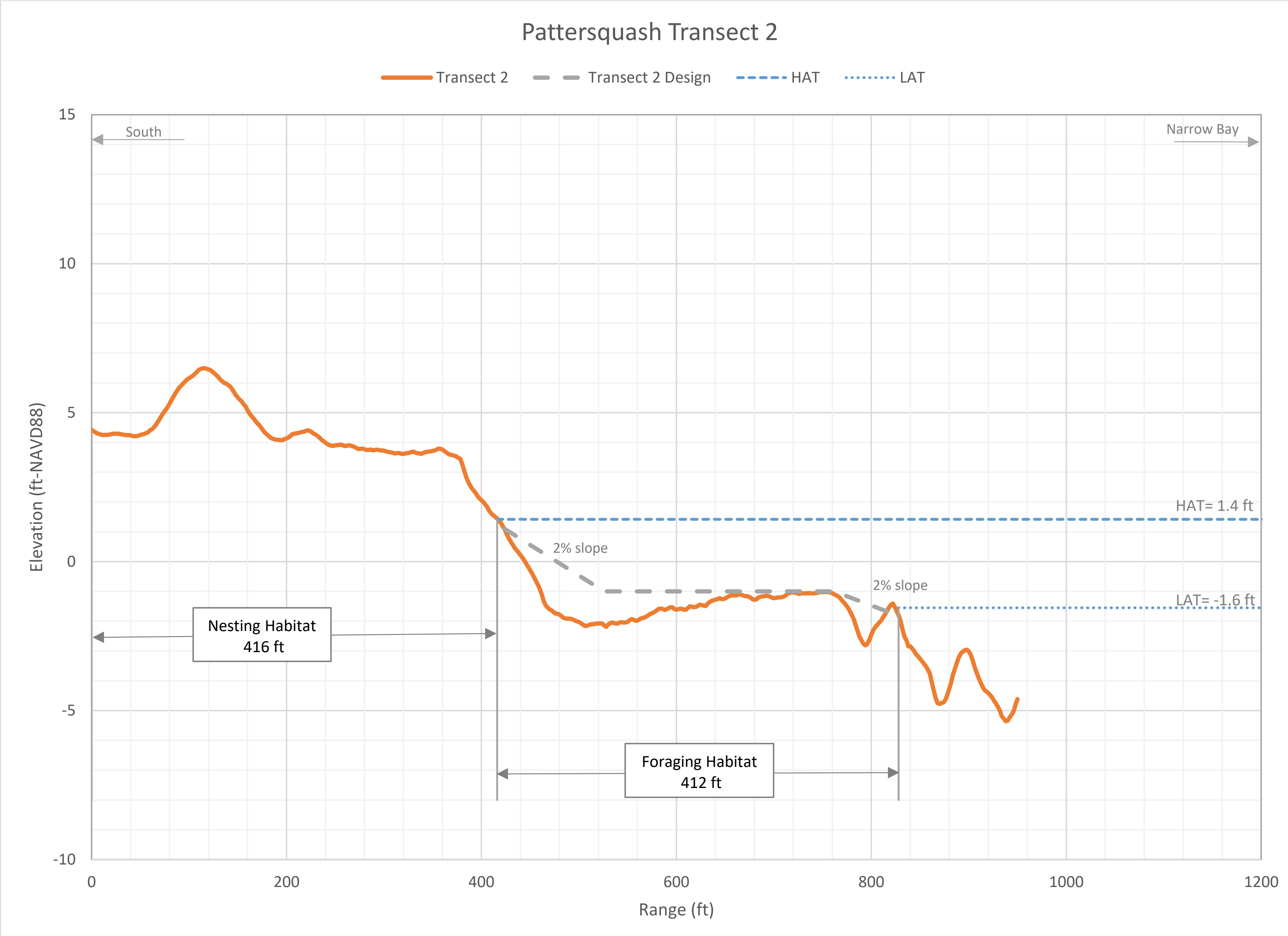
Fire Island to Montauk Point
Coastal Process Features
Pattersquash
Transect Locations

PROJECT	C2017-071
DRAWN BY	WKL
SHEET	1 OF 1
DATE	APR 2018

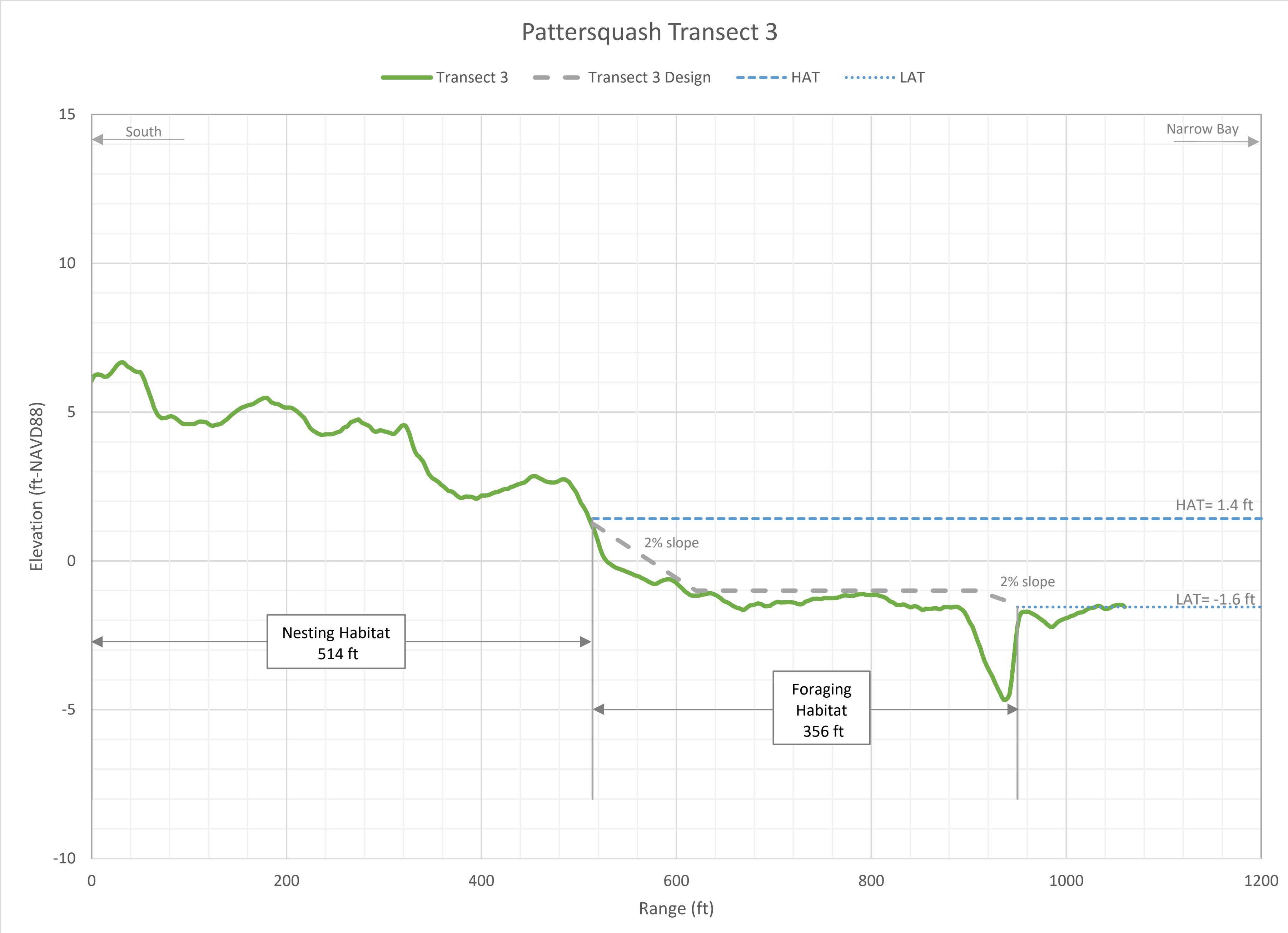


Pattersquash Existing Conditions
Transect 2
Transect 3
HAT
LAT
15
10
5
0
-5
-10
Elevation (ft-NAVD88)
South
Narrow Bay
HAT= 1.4 ft
LAT= -1.6 ft
0
200
400
600
800
1000
1200
Range (ft)


Pattersquash Transect 1
Transect 1
Transect 1 Design
HAT
LAT
South
Narrow Bay
HAT= 1.4 ft
LAT= -1.6 ft
2% slope
2% slope
2% slope
4% slope
Foraging Habitat 774 ft
Nesting Habitat 104 ft
Foraging Habitat 1,196 ft
Elevation (ft-NAVD88)
Range (ft)
15
10
5
0
-5
-10
0
500
1000
1500
2000
2500



Pattersquash Transect 2
Transect 2
Transect 2 Design
HAT
LAT
South
Narrow Bay
HAT= 1.4 ft
LAT= -1.6 ft
2% slope
2% slope
Nesting Habitat
416 ft
Foraging Habitat
412 ft
Elevation (ft-NAVD88)
Range (ft)
15
10
5
0
-5
-10
0
200
400
600
800
1000
1200



Pattersquash Transect 3
Transect 3
Transect 3 Design
HAT
LAT
South
Narrow Bay
HAT= 1.4 ft
LAT= -1.6 ft
2% slope
2% slope
Nesting Habitat
514 ft
Foraging
Habitat
356 ft
Elevation (ft-NAVD88)
Range (ft)
15
10
5
0
-5
-10
0
200
400
600
800
1000
1200

CPF Site 8 New Made Island Reach	Reach MB-2A 40.753186° N / 72.80777° W

CPF SITE GOALS

- Devegetate area to meet ESA goals
- Shallow water fill to meet CSRM goals
- Southern boundary follows Burma Road alignment and includes physical barrier to limit chick movement into and beyond road

New Made Island Reach is located on the eastern portion of Fire Island on the bayside, within Smith Point County Park. New Made Island Reach lies between two inlets, Old Inlet to the west and Moriches Inlet to the east. The project area contains coastal dunes with vegetation and an historically ephemeral sand spit. This CPF design seeks to devegetate uplands to provide ESA bird habitat (foraging and nesting) as well as provide CSRM benefits by placing fill to simulate cross island transport.

To create early successional habitat that provides nesting and foraging for shorebirds, plans call for devegetating approximately 100.1 acres (ac), all of which qualifiy as proposed habitat. All devegetation will occur north of Burma Road. This includes 28.9 ac of foraging habitat and 71.1 ac of nesting habitat. In addition, in-water sediment placement extends at a 1% slope from +1 ft-NAVD88 to the intersection with existing grade in the offshore direction. No upland regrading is anticipated.

Vehicular traffic on Burma Road presents a potential hazard for chicks and older birds. As such, a physical barrier shall be constructed to limit the ability of birds to enter traffic lanes. Past efforts using sand/snow fencing have had limited success primarily due to pedestrian openings in the fencing. Additional types of barriers shall be considered during the PED phase of the project. Possible physical barrier components may include dredge pipe, sand/snow fencing, etc., and elevated pedestrian cross walks to limit the number of openings through the barriers. Future detailed CPF design will be completed in close coordination with FWS, Suffolk County, and NY State Parks.

Foraging habitat is defined as the intertidal area that is intermittently submerged and exposed during tide-induced water surface fluctuations. As a proxy for the local spring tide range, the following discussion applies NOAA’s reported Lowest Astronomical Tide (LAT) as the lower bound and Highest Astronomical Tide (HAT) as the upper bound for foraging habitat.

Nesting habitat is located immediately upland of foraging habitat and extends from the HAT elevation to the naturally occuring +8 ft-NAVD88 contour at Pattersquash Reach as depicted in the Proposed Elevations figure.

Maintenance activities at the CPF sites will be performed in coordination with renourishment cycles of the beachfill features and are subject to monitoring to ensure resolution of project objectives. In addition, future renourishment of the site is subject to the adaptive management plan. The USACE will not implement vegetation management or manipulation of the sites unless conducted as an incidental action associated with future placement. The USACE recommends the local land management agency consider predator management and symbolic fencing to the 10 ft-NAVD88 contour.

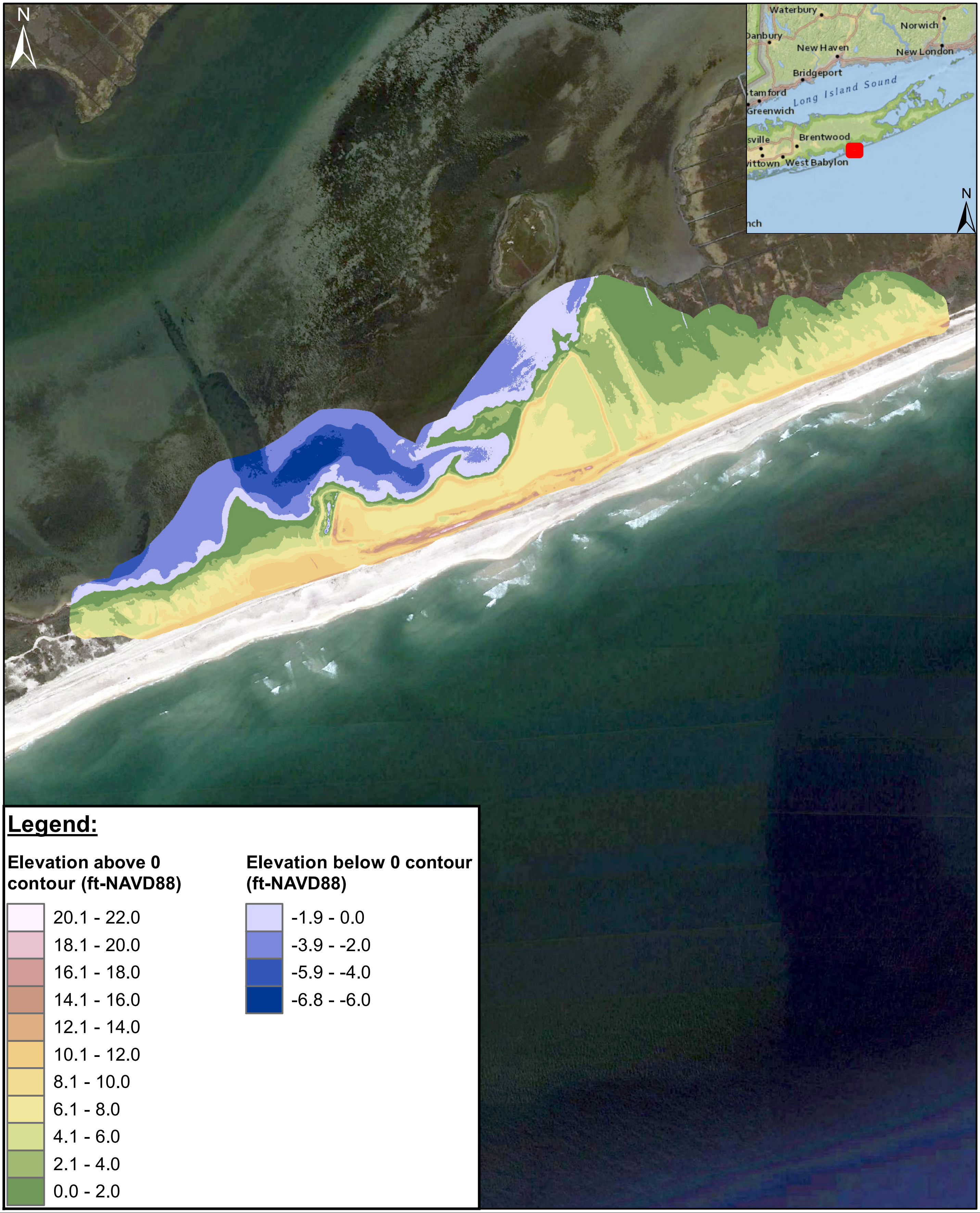
CPF Site 8 New Made Island Reach	Reach MB-2A 40.753186° N / 72.80777° W

CPF PARAMETERS	
Feature	ESA with CSRM Features
Cut Volume (cy)	0
Fill Volume (cy)	100,583
Net Volume (cy)	100,583
Acreage (Nesting\Foraging\Devegetation)	107.9 (71.1\28.9\100.1)
Activity	Habitat Creation / Devegetation
DATA SOURCES	
Topographic	USGS, 2016
Bathymetric	USGS, 2016
Aerial Imagery	Google Earth, 2016
Vegetation	N/A*
REAL ESTATE INFORMATION	
Property Owner	County of Suffolk Town of Brookhaven
Municipality	Brookhaven
County	Suffolk
CBRA	NY-59P, Otherwise Protected Area

*up to date vegetation data were not available for the study area

BAYSIDE TIDAL ENVIRONMENT (ft-NAVD88)				
Closest Tidal Benchmark	Smith Point Bridge, NY		Highest Astronomical Tide (HAT)	1.46
			Mean Higher High Water (MHHW)	0.99
Coordinates	40.738333° N 72.868333° W		Mean High Water (MHW)	0.78
			Mean Sea Level (MSL)	-0.11
0 ft-NAVD = 1.03 ft-NGVD			Mean Tide Level (MTL)	-0.12
Range (MHW-MLW)	1.80		Mean Low Water (MLW)	-1.02
Diurnal Range (MHHW - MLLW)	2.12		Mean Lower Low Water (MLLW)	-1.14
Largest Tidal Range (HAT-LAT)	3.08		Lowest Astronomical Tide (LAT)	-1.62

BAYSIDE WAVE ENVIRONMENT					
Return Period	Fetch (ft)	Wave Height (ft)	Wind Setup (ft)	Wave Setup (ft)	HAT + Setup + Wave Height (ft-NAVD88)
1-year	13,672	2.1	0.13	0.75	4.44
5-year	13,672	2.8	0.21	0.76	5.23
10-year	13,672	3.1	0.26	0.76	5.58



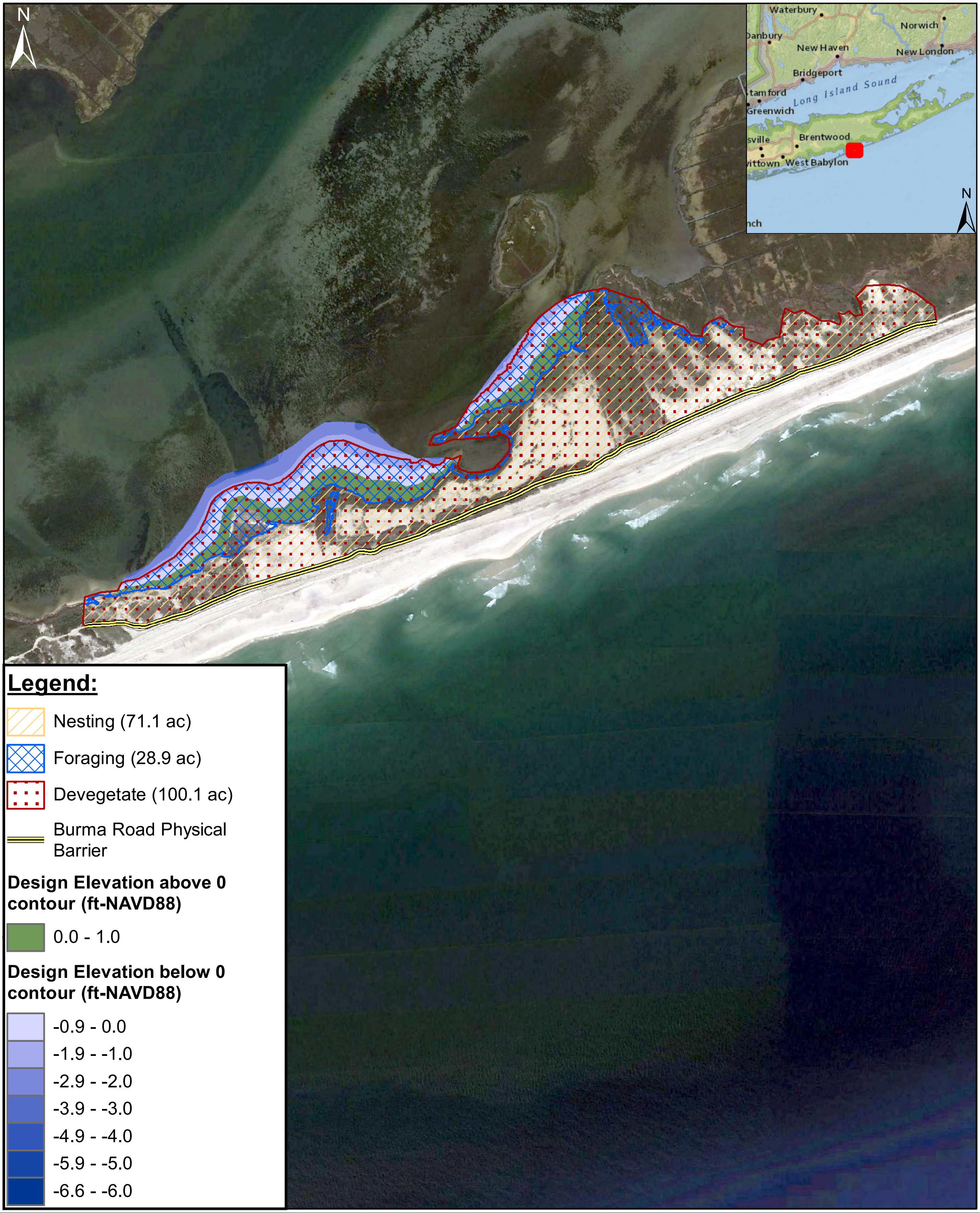
Feet

0 1,000 2,000

IMAGE SOURCE: Google Earth, 2016

Fire Island to Montauk Point
Coastal Process Features
New Made Island
Existing Conditions

PROJECT	C2017-071
DRAWN BY	WKL
SHEET	1 OF 1
DATE	APR 2018



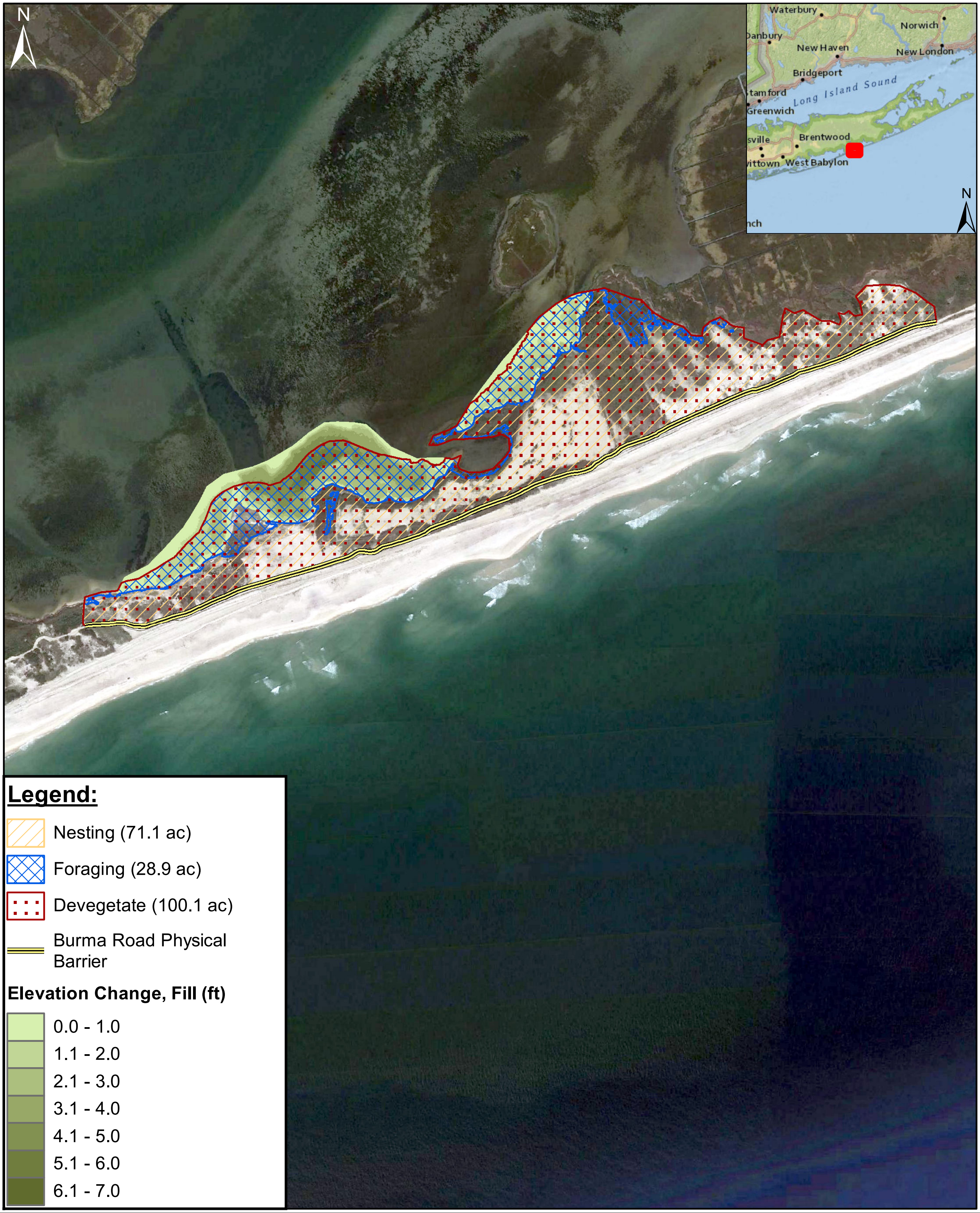
Feet

0 1,000 2,000

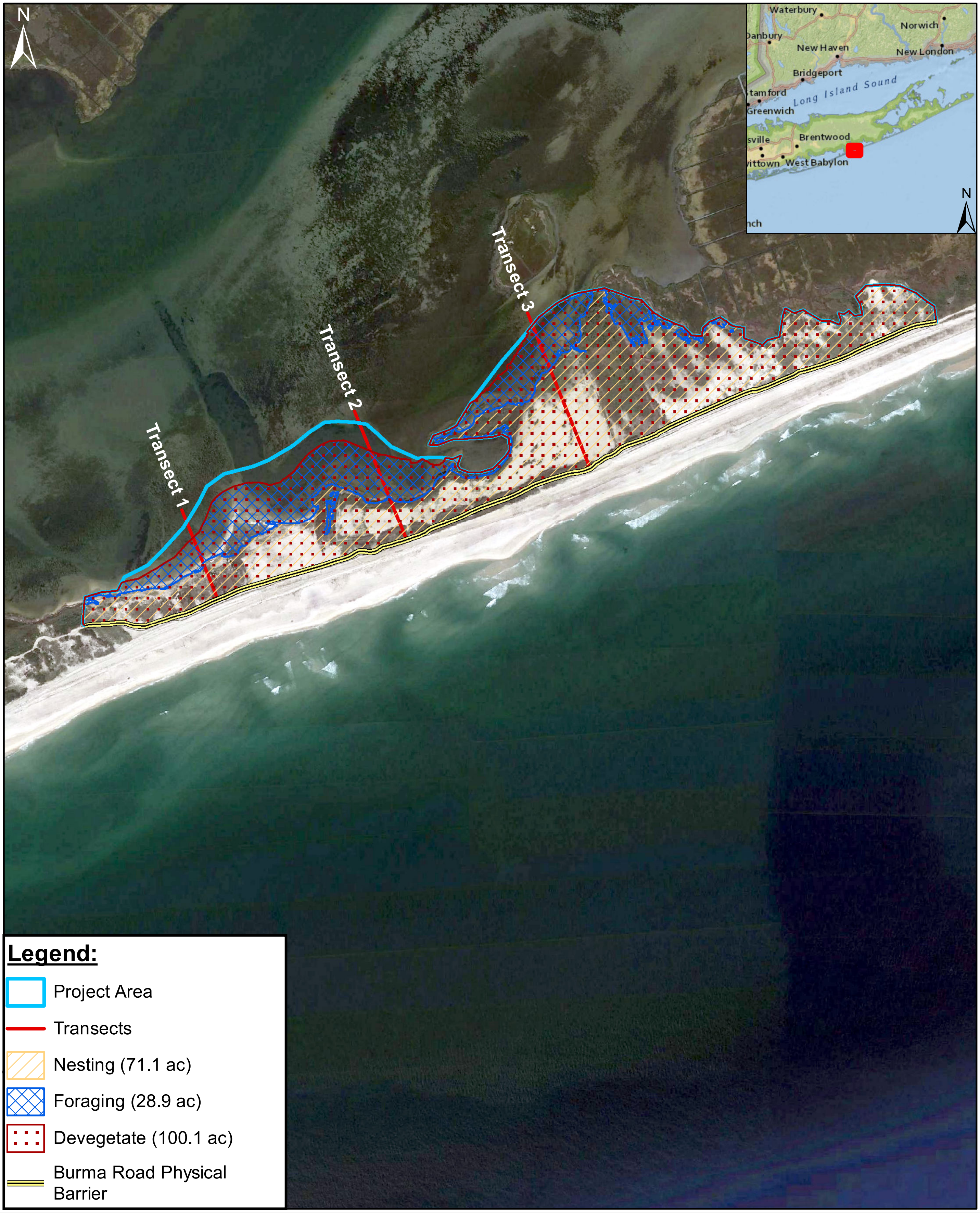
IMAGE SOURCE: Google Earth, 2016

Fire Island to Montauk Point
Coastal Process Features
New Made Island
Proposed Elevations

PROJECT	C2017-071
DRAWN BY	WKL
SHEET	1 OF 1
DATE	APR 2018



Feet 0 1,000 2,000 IMAGE SOURCE: Google Earth, 2016	Fire Island to Montauk Point Coastal Process Features New Made Island Proposed Elevation Changes	PROJECT C2017-071 DRAWN BY WKL SHEET 1 OF 1 DATE APR 2018



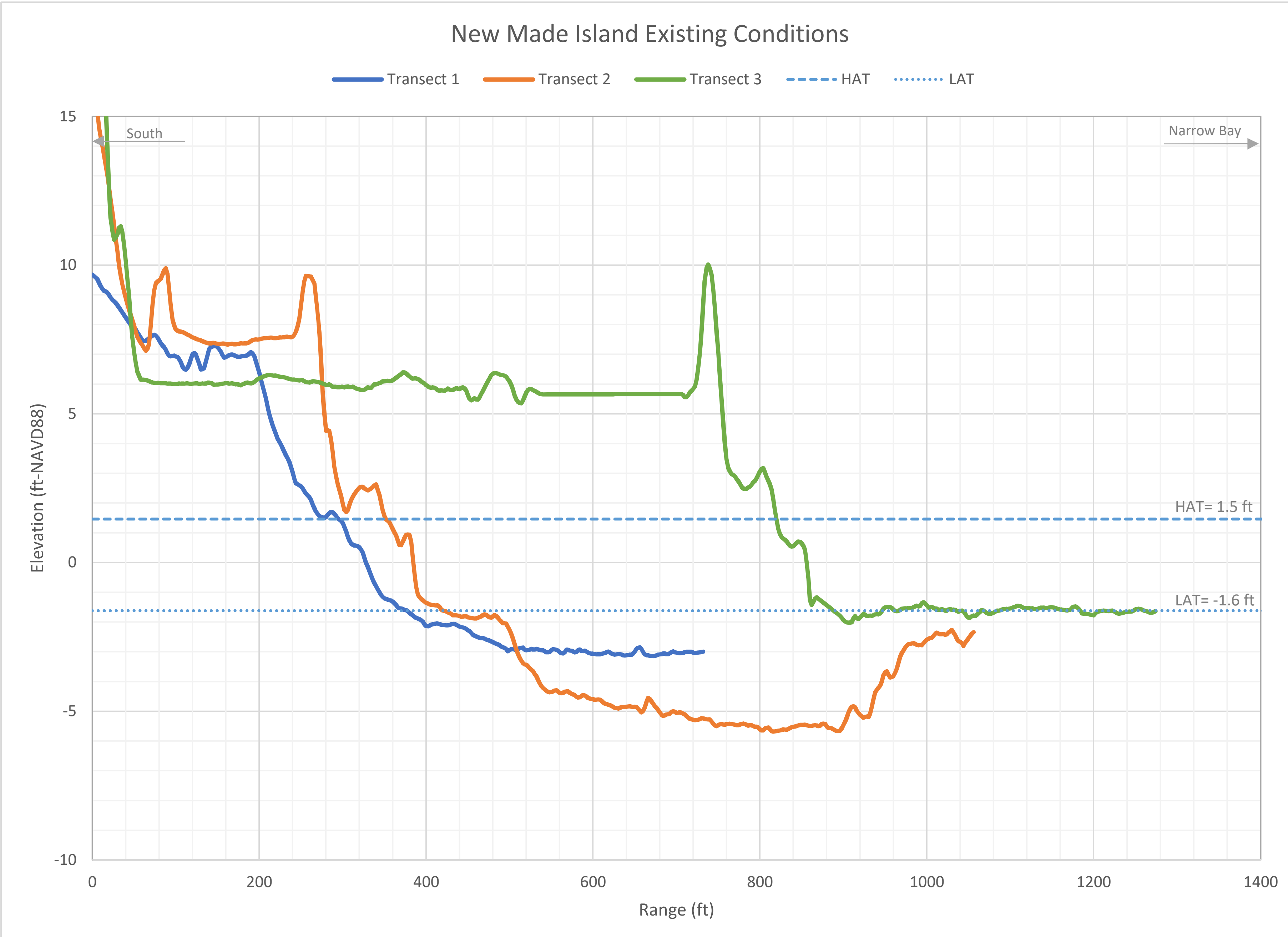
Feet

0 1,000 2,000

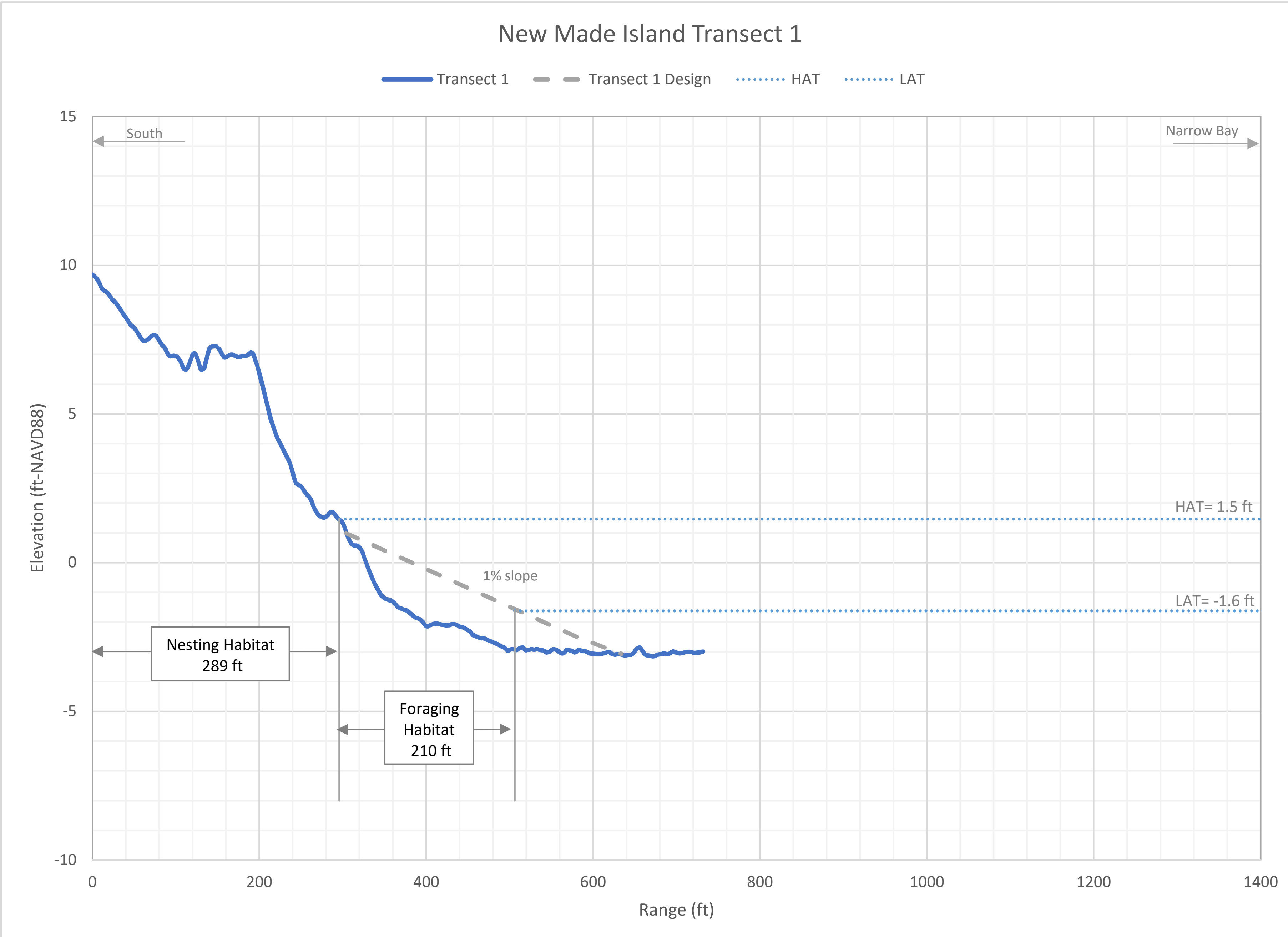
IMAGE SOURCE: Google Earth, 2016

Fire Island to Montauk Point
Coastal Process Features
New Made Island
Transect Locations

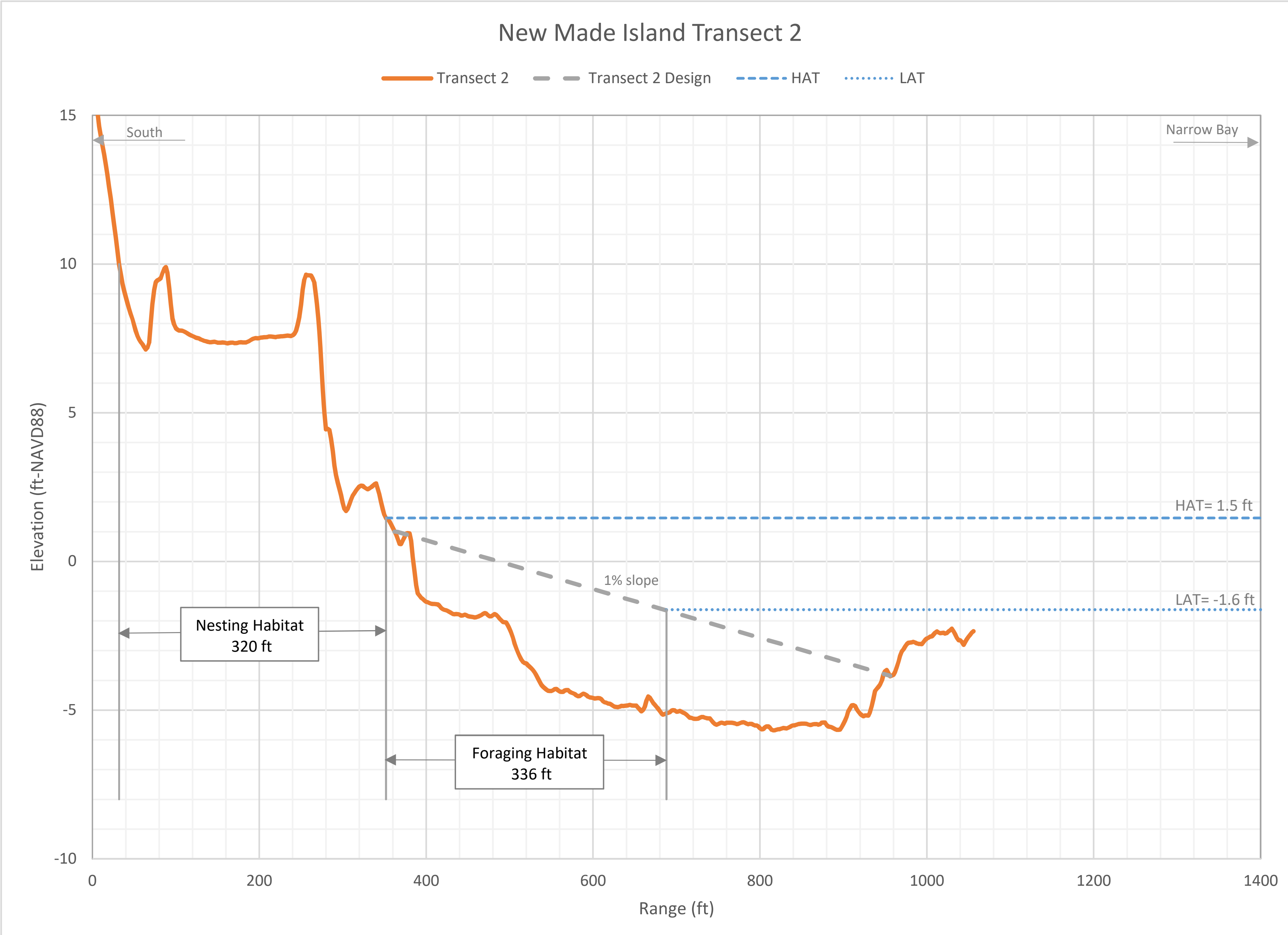
PROJECT	C2017-071
DRAWN BY	WKL
SHEET	1 OF 1
DATE	APR 2018



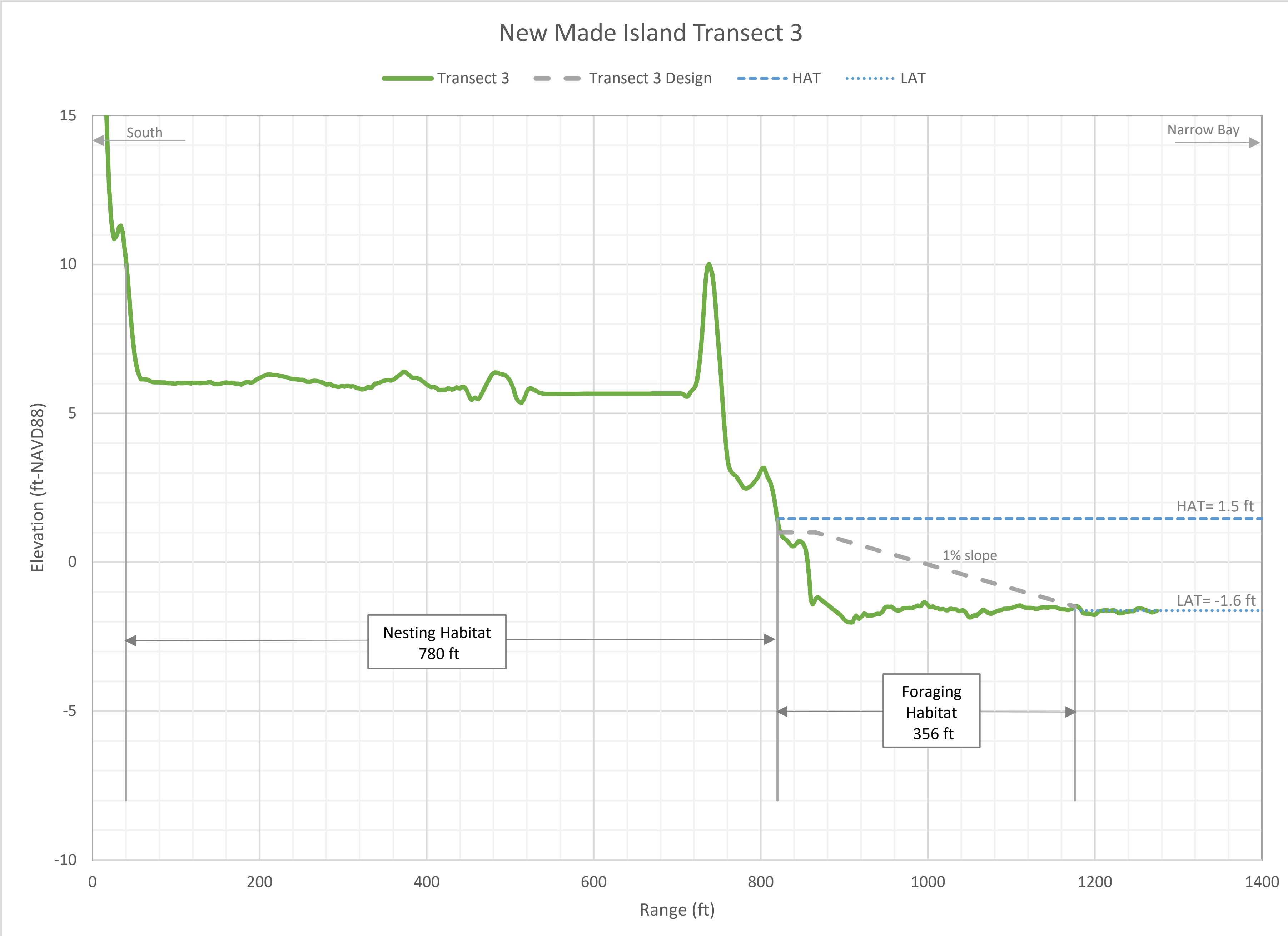
New Made Island Existing Conditions
Transect 1
Transect 2
Transect 3
HAT
LAT
South
Narrow Bay
HAT= 1.5 ft
LAT= -1.6 ft
Elevation (ft-NAVD88)
Range (ft)
15
10
5
0
-5
-10
0
200
400
600
800
1000
1200
1400



New Made Island Transect 1
Transect 1
Transect 1 Design
HAT
LAT
South
Narrow Bay
HAT= 1.5 ft
LAT= -1.6 ft
1% slope
Nesting Habitat
289 ft
Foraging
Habitat
210 ft
Elevation (ft-NAVD88)
Range (ft)
15
10
5
0
-5
-10
0
200
400
600
800
1000
1200
1400



New Made Island Transect 2
Transect 2
Transect 2 Design
HAT
LAT
South
Narrow Bay
HAT= 1.5 ft
LAT= -1.6 ft
1% slope
Nesting Habitat
320 ft
Foraging Habitat
336 ft
15
10
5
0
-5
-10
0
200
400
600
800
1000
1200
1400
Elevation (ft-NAVD88)
Range (ft)


New Made Island Transect 3
Transect 3
Transect 3 Design
HAT
LAT
South
Narrow Bay
HAT= 1.5 ft
1% slope
LAT= -1.6 ft
Nesting Habitat
780 ft
Foraging
Habitat
356 ft
Elevation (ft-NAVD88)
Range (ft)
15
10
5
0
-5
-10
0
200
400
600
800
1000
1200
1400

CPF Site 9 Smith Point County Park Marsh	Reach MB-2A 40.763611° N / 72.79122° W

CPF SITE GOALS

- Fill placement to simulate cross shore transport for CSRM credit
- Create a series of channels to promote tidal exchange within marsh

Smith Point County Park Marsh is located on the eastern portion of Fire Island on the bayside, within Smith Point County Park. Smith Point County Park Marsh lies between two inlets, Old Inlet to the west and Moriches Inlet to the east. The project area contains a large coastal salt marsh with linear man-made ditches cut through the wetland. The north/south running ditches are cut at approximately 1,000 ft intervals while the east/west running ditches are cut at approximately 200 ft intervals. This CPF design seeks to add fill to provide CSRM benefits by simulating cross island transport.

To restore cross island transport, plans call for placement of fill across 284.7 acres (ac) of salt marsh. The site will be regraded to allow for wetland vegetation reestablishment. Higher elevations buffer the project area mimicing its current state. The existing man-made ditches will be filled to reestablish a uniform marsh across the entire project area. A series of tidal channels will be established to promote tidal exchange within the interior of the marsh.

Sand placement at the CPF sites will be performed in coordination with renourishment cycles of the beachfill features and subject to monitoring to ensure resolution of project objectives. The USACE will not implement vegetation management or manipulation of the sites unless conducted as an incidental action associated with future placement. The USACE recommends the local land management agency consider predator management.

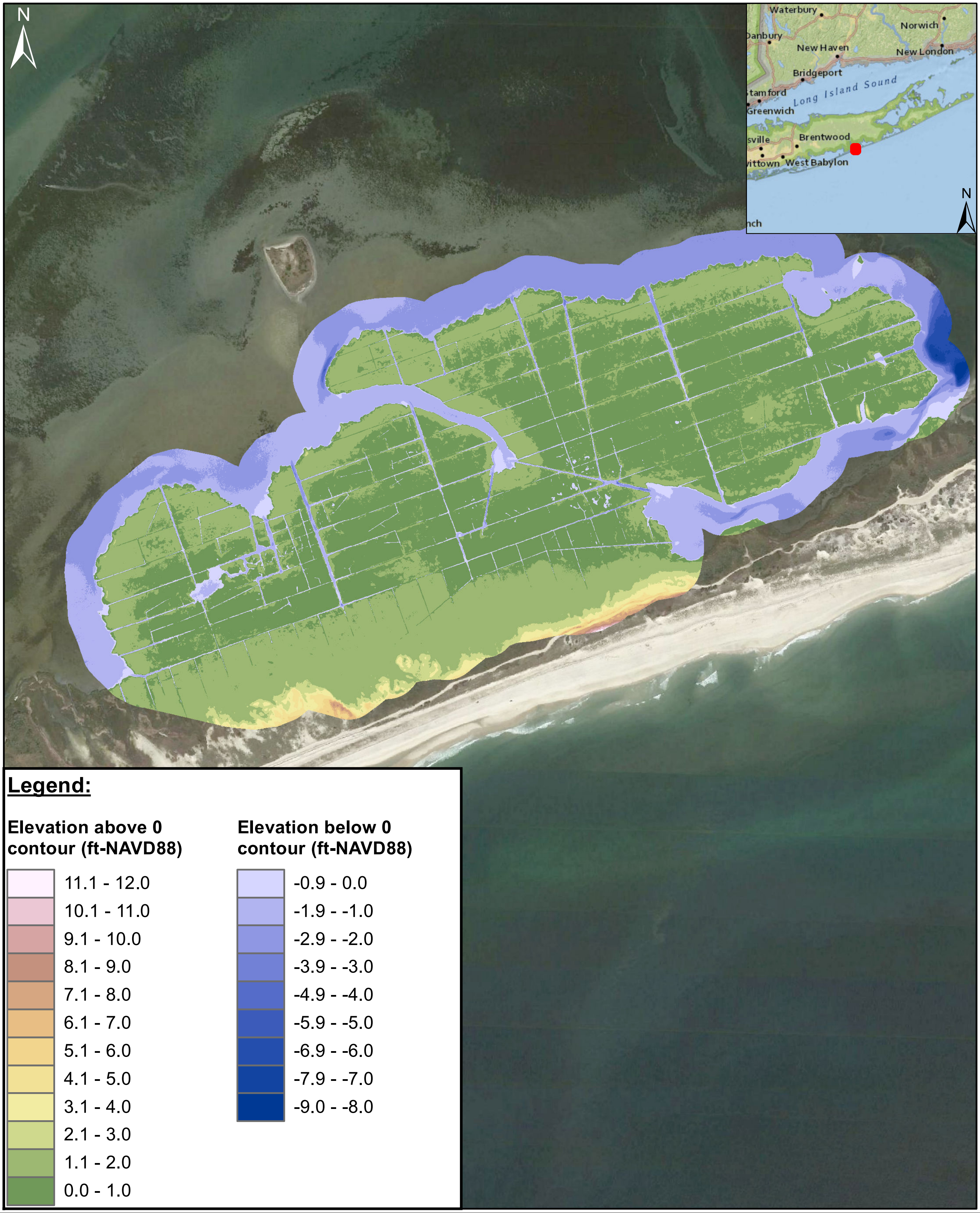
CPF Site 9 Smith Point County Park Marsh	Reach MB-2A 40.763611° N / 72.79122° W

CPF PARAMETERS	
Feature	CSRM
Cut Volume (cy)	-61,523
Fill Volume (cy)	320,953
Net Volume (cy)	259,430
Acreage	284.7
Activity	Fill, cut 4 tidal channels
DATA SOURCES	
Topographic	USGS, 2016
Bathymetric	USGS, 2016
Aerial Imagery	Google Earth, 2016
Vegetation	N/A*
REAL ESTATE INFORMATION	
Property Owner	County of Suffolk Town of Brookhaven
Municipality	Brookhaven
County	Suffolk
CBRA	NY-59P, Otherwise Protected Area

*up to date vegetation data were not available for the study area

BAYSIDE TIDAL ENVIRONMENT (ft-NAVD88)				
Closest Tidal Benchmark	Moriches Inlet, NY		Highest Astronomical Tide (HAT)	1.53
			Mean Higher High Water (MHHW)	1.06
Coordinates	40.763333° N 72.755000° W		Mean High Water (MHW)	0.84
			Mean Sea Level (MSL)	-0.13
0 ft-NAVD = 1.02 ft-NGVD			Mean Tide Level (MTL)	-0.14
Range (MHW-MLW)		1.95	Mean Low Water (MLW)	-1.11
Diurnal Range (MHHW - MLLW)		2.28	Mean Lower Low Water (MLLW)	-1.23
Largest Tidal Range (HAT-LAT)		3.24	Lowest Astronomical Tide (LAT)	-1.71

BAYSIDE WAVE ENVIRONMENT					
Return Period	Fetch (ft)	Wave Height (ft)	Wind Setup (ft)	Wave Setup (ft)	HAT + Setup + Wave Height (ft)
1-year	22,858	2.7	0.22	0.65	5.10
5-year	22,858	3.5	0.37	0.67	6.07
10-year	22,858	4.0	0.45	0.68	6.66



Legend:

Elevation above 0 contour (ft-NAVD88)	Elevation below 0 contour (ft-NAVD88)
11.1 - 12.0	-0.9 - 0.0
10.1 - 11.0	-1.9 - -1.0
9.1 - 10.0	-2.9 - -2.0
8.1 - 9.0	-3.9 - -3.0
7.1 - 8.0	-4.9 - -4.0
6.1 - 7.0	-5.9 - -5.0
5.1 - 6.0	-6.9 - -6.0
4.1 - 5.0	-7.9 - -7.0
3.1 - 4.0	-9.0 - -8.0
2.1 - 3.0	
1.1 - 2.0	
0.0 - 1.0	

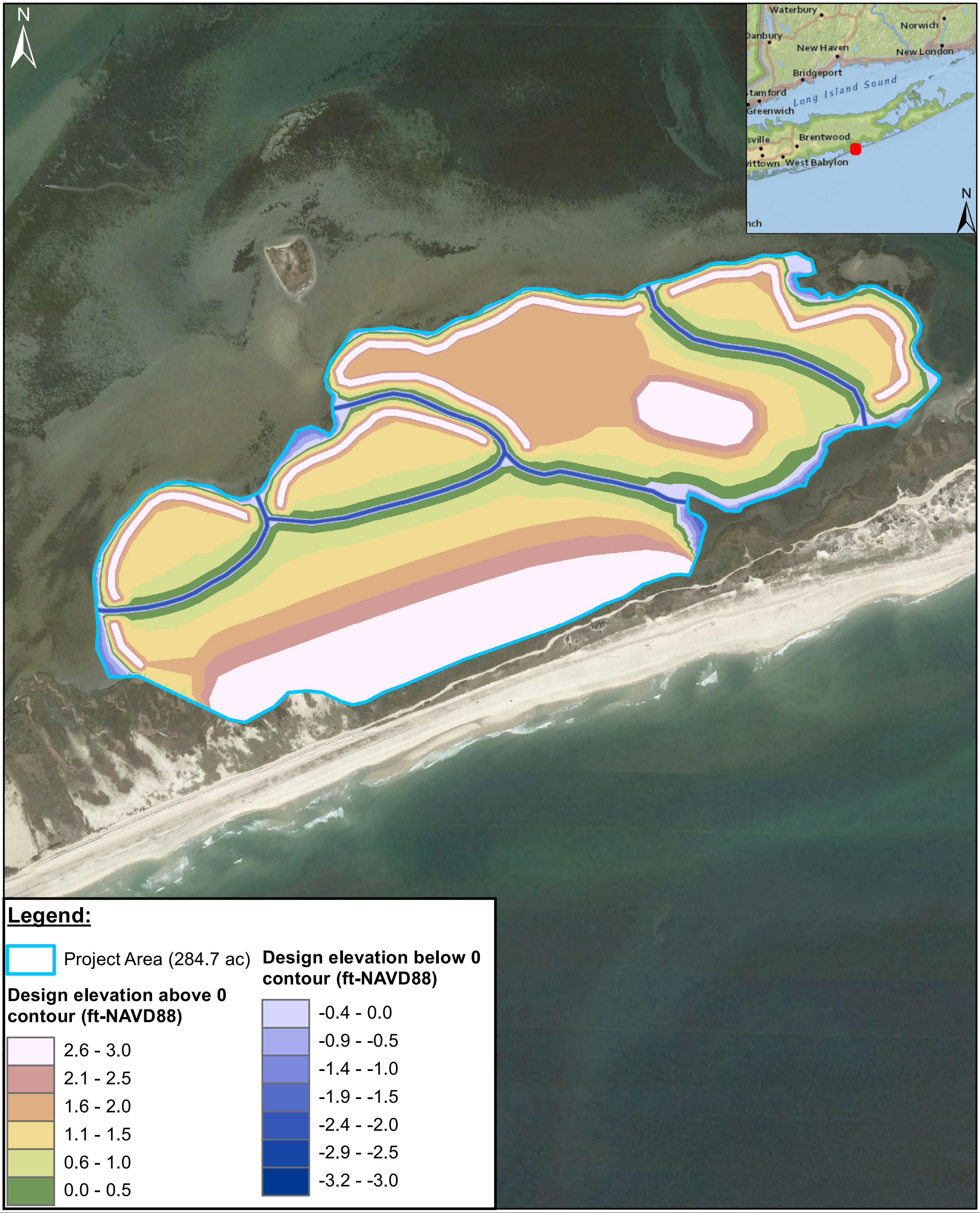
Feet

0 1,000 2,000

IMAGE SOURCE: Google Earth, 2016

Fire Island to Montauk Point
Coastal Process Features
Smith Point County Park Marsh
Existing Conditions

PROJECT	C2017-071
DRAWN BY	WKL
SHEET	1 OF 1
DATE	DEC 2017



Feet 0 1,000 2,000 IMAGE SOURCE: Google Earth, 2016	Fire Island to Montauk Point Coastal Process Features Smith Point County Park Marsh Proposed Elevations	PROJECT C2017-071 DRAWN BY WKL SHEET 1 OF 1 DATE JAN 2018

IMAGE SOURCE: Google Earth, 2016

Fire Island to Montauk Point
Coastal Process Features
Smith Point County Park Marsh
Proposed Elevation Changes

PROJECT	C2017-071
DRAWN BY	WKL
SHEET	1 OF 1
DATE	JAN 2018

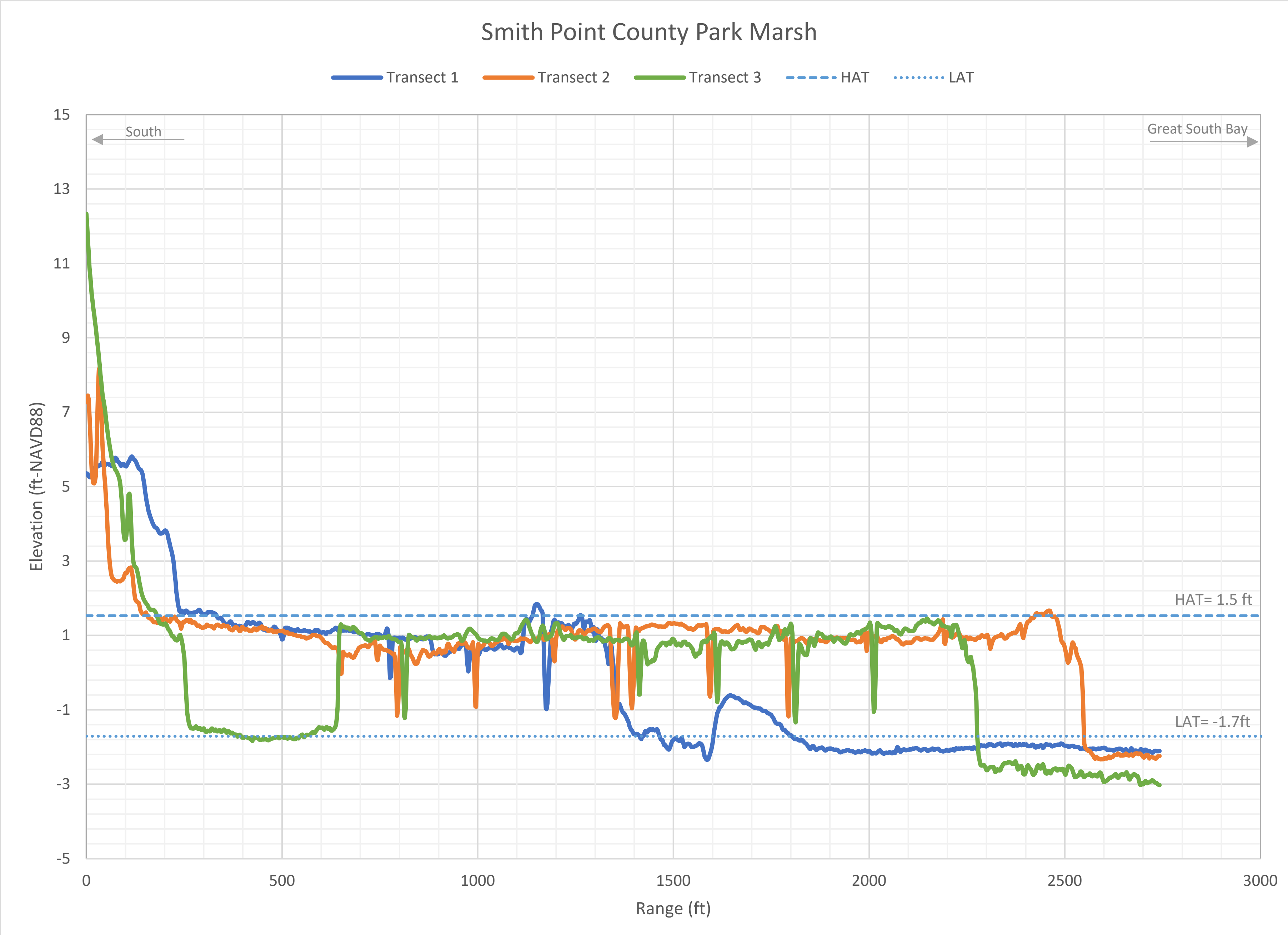
Feet

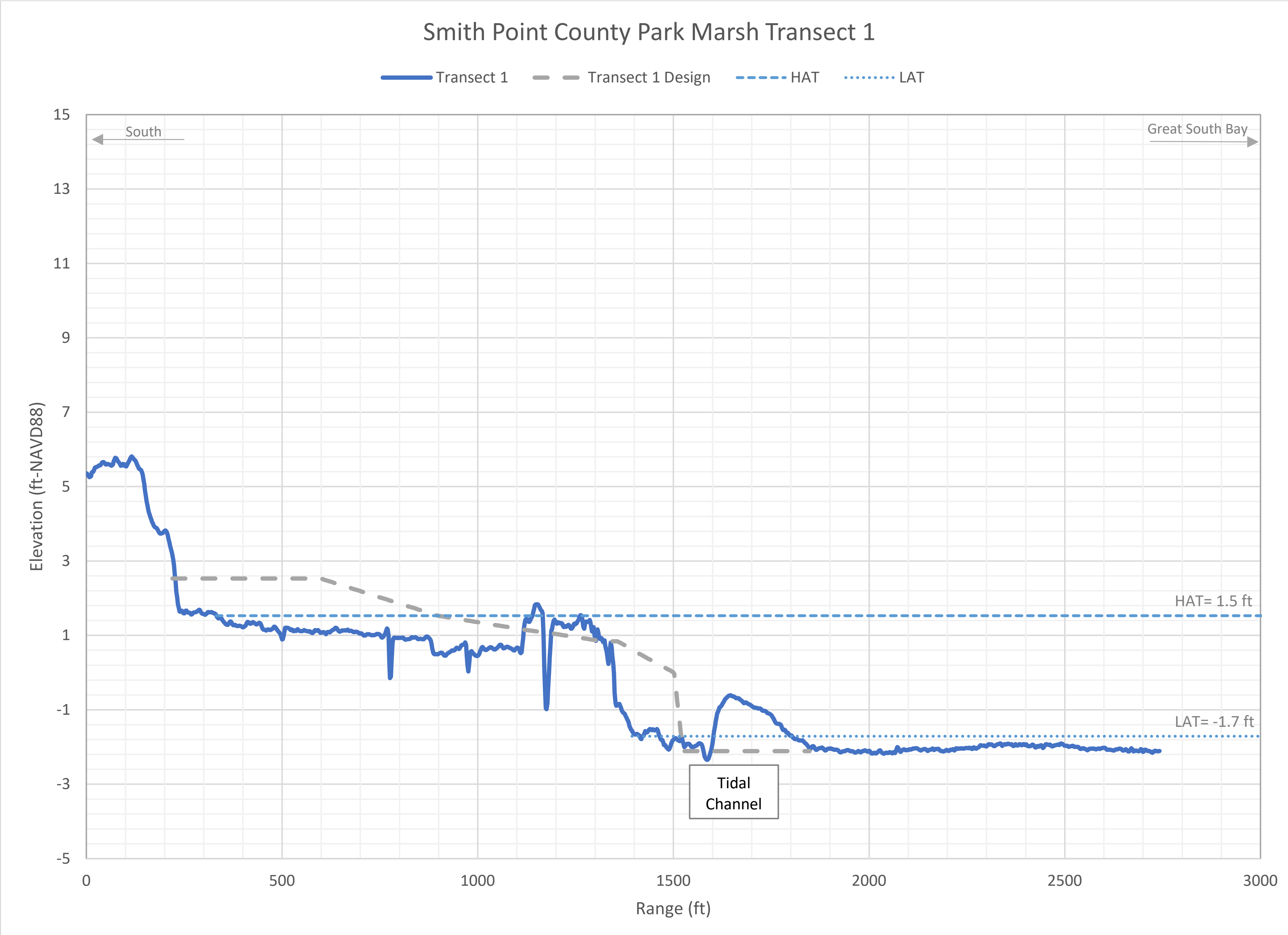
0 1,000 2,000

IMAGE SOURCE: Google Earth, 2016

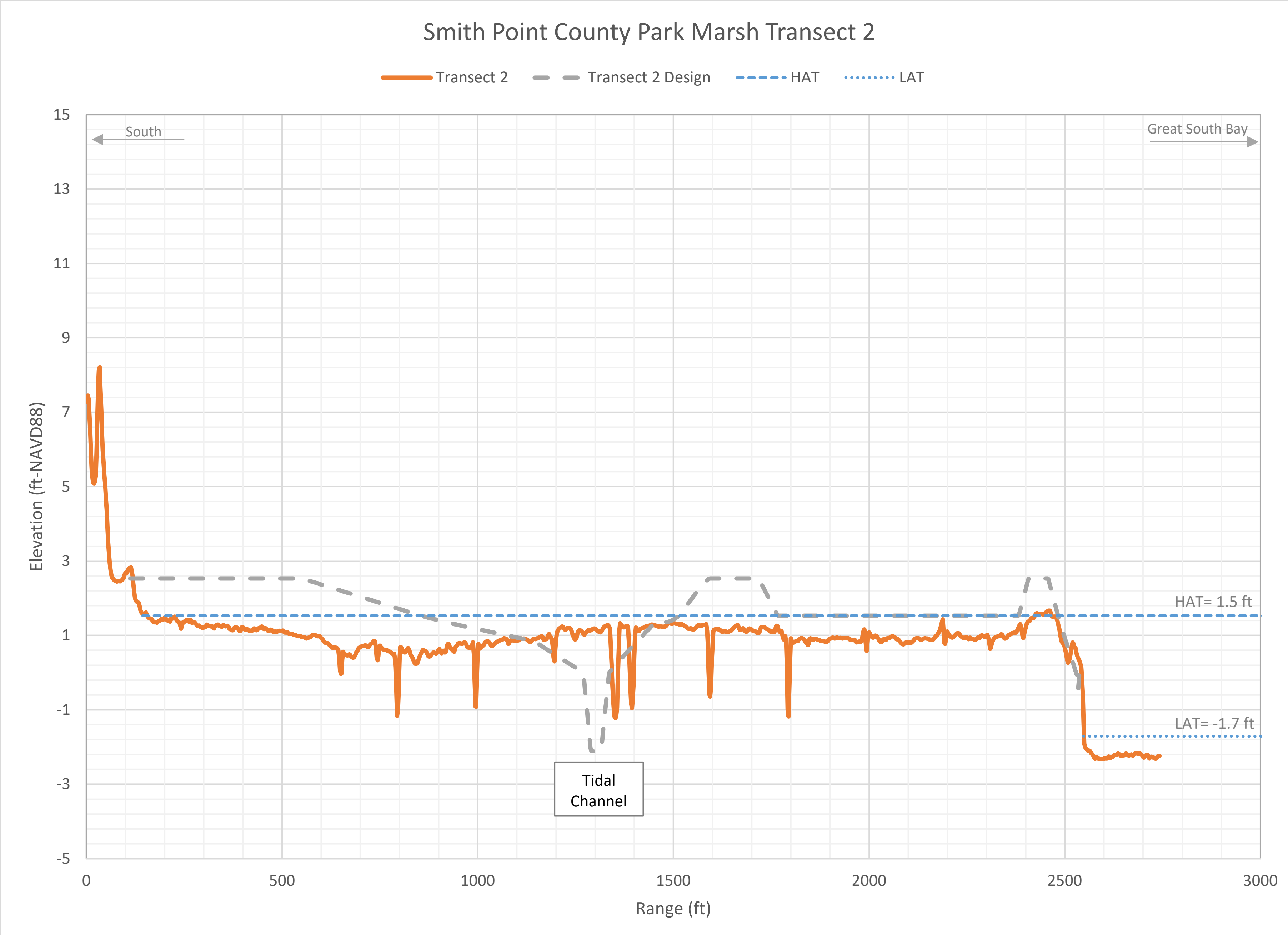
Fire Island to Montauk Point
Coastal Process Features
Smith Point County Park Marsh
Transect Locations

PROJECT	C2017-071
DRAWN BY	WKL
SHEET	1 OF 1
DATE	JAN 2018

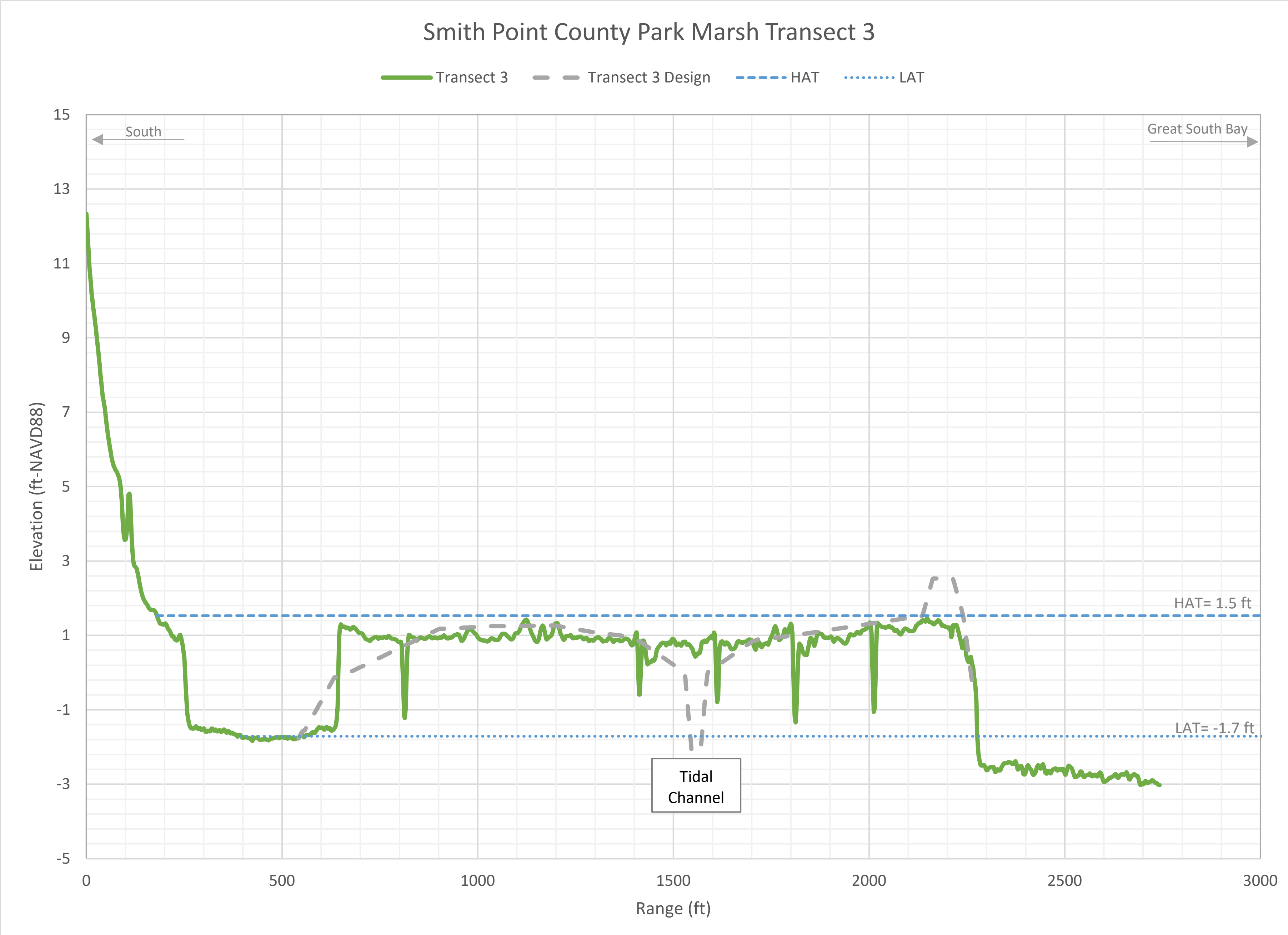

Smith Point County Park Marsh
Transect 1
Transect 2
Transect 3
HAT
LAT
South
Great South Bay
HAT= 1.5 ft
LAT= -1.7ft
Elevation (ft-NAVD88)
Range (ft)
15
13
11
9
7
5
3
1
-1
-3
-5
0
500
1000
1500
2000
2500
3000



Smith Point County Park Marsh Transect 1
Transect 1
Transect 1 Design
HAT
LAT
South
Great South Bay
HAT= 1.5 ft
LAT= -1.7 ft
Tidal Channel
Elevation (ft-NAVD88)
Range (ft)
15
13
11
9
7
5
3
1
-1
-3
-5
0
500
1000
1500
2000
2500
3000



Smith Point County Park Marsh Transect 2
Transect 2
Transect 2 Design
HAT
LAT
15
13
11
9
7
5
3
1
-1
-3
-5
Elevation (ft-NAVD88)
South
Great South Bay
HAT= 1.5 ft
LAT= -1.7 ft
Tidal Channel
0
500
1000
1500
2000
2500
3000
Range (ft)



Smith Point County Park Marsh Transect 3
Transect 3
Transect 3 Design
HAT
LAT
South
Great South Bay
HAT= 1.5 ft
LAT= -1.7 ft
Tidal Channel
Elevation (ft-NAVD88)
Range (ft)
15
13
11
9
7
5
3
1
-1
-3
-5
0
500
1000
1500
2000
2500
3000

CPF Site 10 Great Gun	Reach MB-2B
	40.760937° N / 72.762574° W

CPF SITE GOALS

- Devegetate area to meet ESA goals

Great Gun is located on the eastern portion of Fire Island on the Atlantic Ocean side within Smith Point County Park. Great Gun lies immediately west of Moriches Inlet. The project area contains coastal dunes with vegetation. This CPF design seeks to devegetate uplands to provide ESA bird habitat (foraging and nesting).

To create early successional habitat that provides nesting and foraging for shorebirds, plans call for removing vegetation from approximately 107.7 acres (ac). Beachfront topography will approximate the anticipated FIMP beach fill template between stations 1572+00 and 1623+00. The design template includes a high dune extending above the vertical limit for ESA bird habitat. No regrading of the site beyond the FIMP beach fill plan is anticipated.

Vehicular traffic on Burma Road presents a potential hazard for chicks and older birds. As such, a physical barrier shall be constructed to limit the ability of birds to enter traffic lanes. Past efforts using sand/snow fencing have had limited success primarily due to pedestrian openings in the fencing. Additional types of barriers shall be considered during the PED phase of the project. Possible physical barrier components may include dredge pipe, sand/snow fencing, etc., and elevated pedestrian cross walks to limit the number of openings through the barriers. Future detailed CPF design will be completed in close coordination with FWS, Suffolk County, and NY State Parks.

Foraging habitat is defined as the intertidal area that is intermittently submerged and exposed during tide-induced water surface fluctuations. As a proxy for the local spring tide range, the following discussion applies NOAA's reported Lowest Astronomical Tide (LAT) as the lower bound and Highest Astronomical Tide (HAT) as the upper bound for foraging habitat.

Nesting habitat is located immediately upland of foraging habitat and extends from the HAT elevation to +10 ft-NAVD88 at Great Gun as depicted in the Proposed Devegetation figure.

To create early successional habitat that provides nesting and foraging for shorebirds, plans call for devegetating approximately 107.7 acres (ac), all of which qualify as proposed habitat. This includes 82.7 ac of nesting habitat and 6.3 ac of foraging habitat. Foraging habitat encompasses the area between the LAT and the HAT, while nesting habitat extends from the HAT to the naturally occuring +10 ft-NAVD88 elevation contour or 640 ft from the HAT.

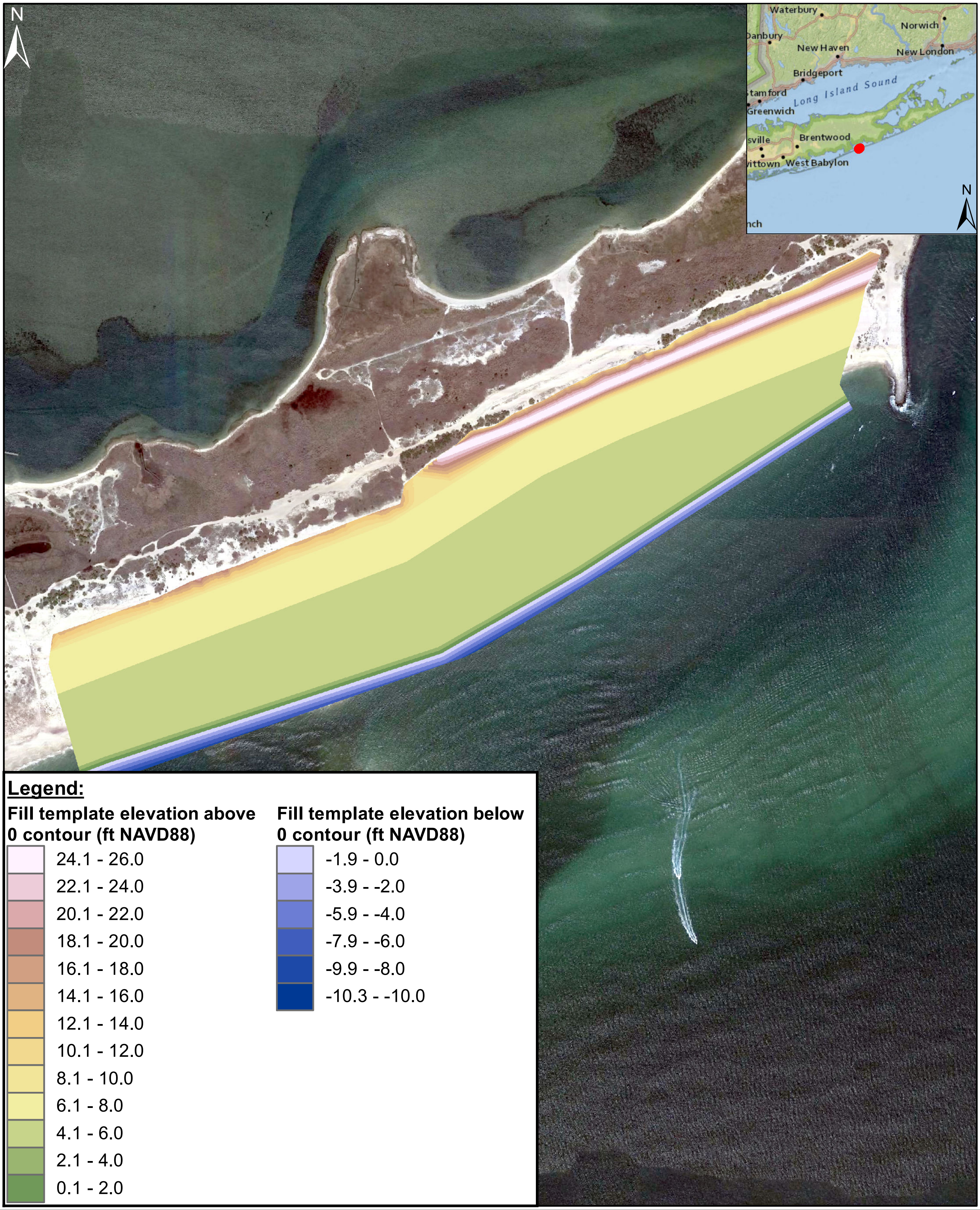
Maintenance activities at the CPF sites will be performed in coordination with renourishment cycles of the beachfill features and are subject to monitoring to ensure resolution of project objectives. CPF maintenance operations may be modified based on the adaptive management plan to meet ESA/CSRM criteria. The USACE will not implement vegetation management or manipulation of the sites unless conducted as an incidental action associated with future placement. The USACE recommends the local land management agency consider predator management in newly established CPF's.

CPF Site 10 Great Gun		Reach MB-2B 40.760937° N / 72.762574° W
CPF PARAMETERS		
Feature	ESA	
Cut Volume (cy)	n/a	
Fill Volume (cy)	n/a	
Net Volume (cy)	n/a	
Acreage (Nesting\Foraging\Devegetation)	107.7 (82.7\6.3\107.7)	
Activity	Devegetate	
DATA SOURCES		
Topographic	USGS, 2016	
Bathymetric	USGS, 2016	
Aerial Imagery	Google Earth, 2016	
Vegetation	N/A*	
REAL ESTATE INFORMATION		
Property Owner	State of New York County of Suffolk	
Municipality	Southampton	
County	Suffolk	
CBRA	NY-59P, Otherwise Protected Area	

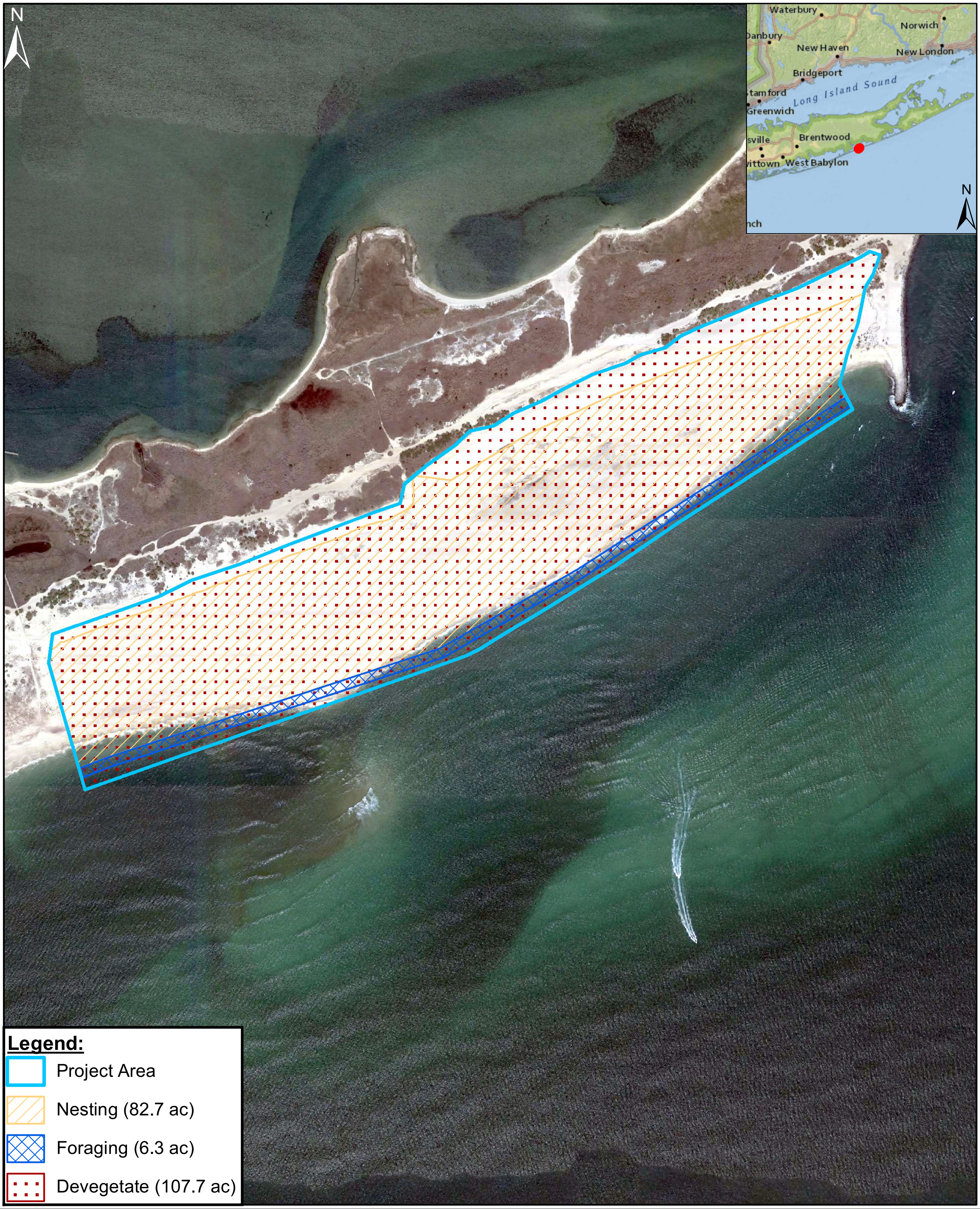
*up to date vegetation data were not available for the study area

OCEANSIDE TIDAL ENVIRONMENT (ft-NAVD88)				
Closest Tidal Benchmark	Moriches Inlet, NY		Highest Astronomical Tide (HAT)	2.67
			Mean Higher High Water (MHHW)	1.73
Coordinates	40.763333° N 72.755000° W		Mean High Water (MHW)	1.45
			Mean Sea Level (MSL)	-0.23
0 ft-NAVD = 1.01 ft-NGVD			Mean Tide Level (MTL)	-0.25
Range (MHW-MLW)		3.38	Mean Low Water (MLW)	-1.94
Diurnal Range (MHHW - MLLW)		3.80	Mean Lower Low Water (MLLW)	-2.08
Largest Tidal Range (HAT-LAT)		5.63	Lowest Astronomical Tide (LAT)	-2.96

OCEANSIDE WAVE ENVIRONMENT					
Return Period	Deep Water Wave Height (ft)	Surf Zone Wave Height (ft)	Wind Setup (ft)	Wave Setup (ft)	HAT + Setup + Surf Zone Wave Height (ft-NAVD88)
1-year	15.0	6.8	0.80	1.09	11.36
5-year	21.9	7.2	1.50	2.53	13.90
10-year	24.9	7.4	1.90	3.16	15.13



Feet 0 1,000 2,000 IMAGE SOURCE: Google Earth, 2016	Fire Island to Montauk Point Coastal Process Features Great Gun Shorefront Existing Conditions	PROJECT	C2017-071
		DRAWN BY	WKL
		SHEET	1 OF 1
		DATE	MAR 2018



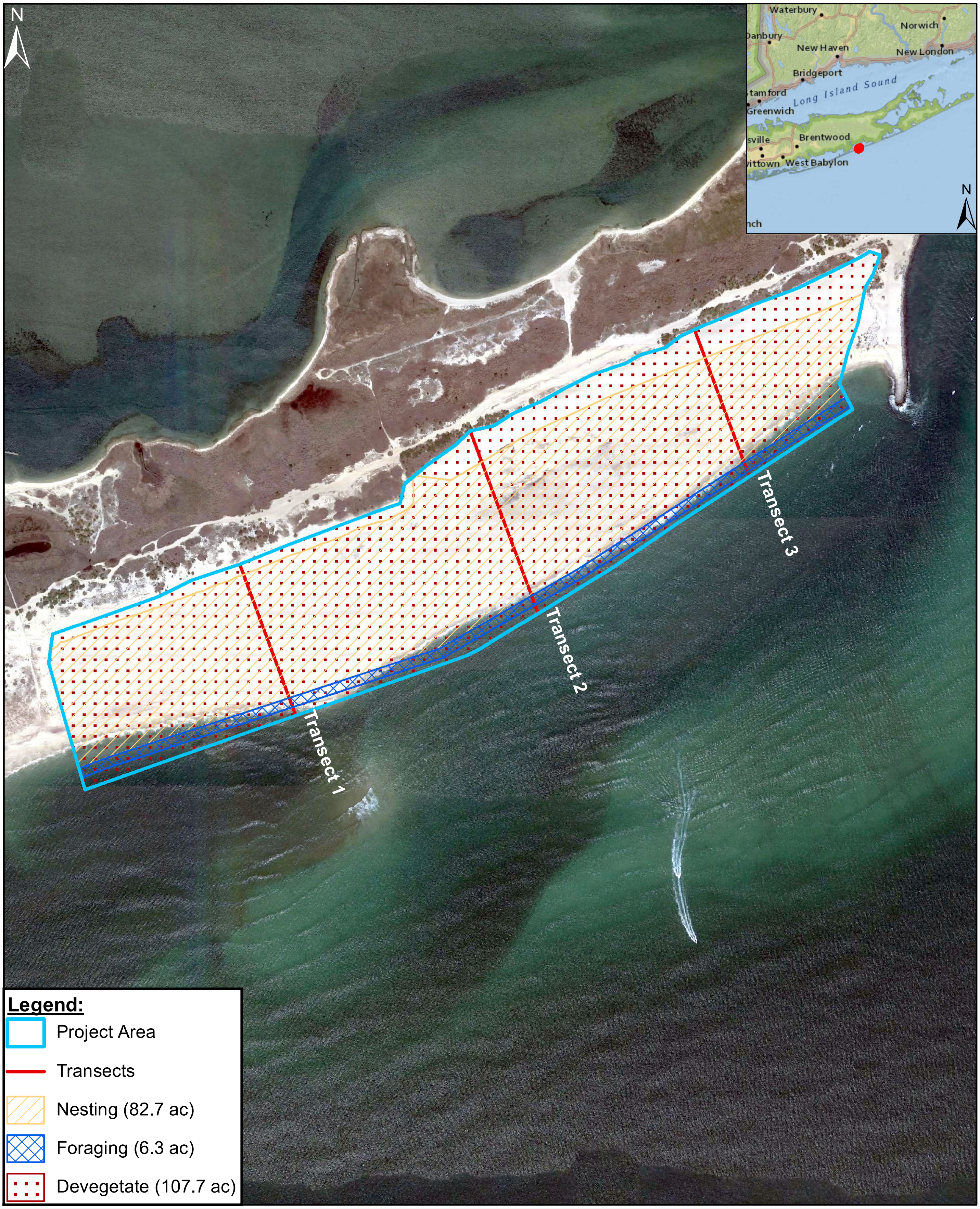
Feet

0 1,000 2,000

IMAGE SOURCE: Google Earth, 2016

Fire Island to Montauk Point
Coastal Process Features
Great Gun Shorefront
Proposed Devegetation

PROJECT	C2017-071
DRAWN BY	WKL
SHEET	1 OF 1
DATE	MAR 2018



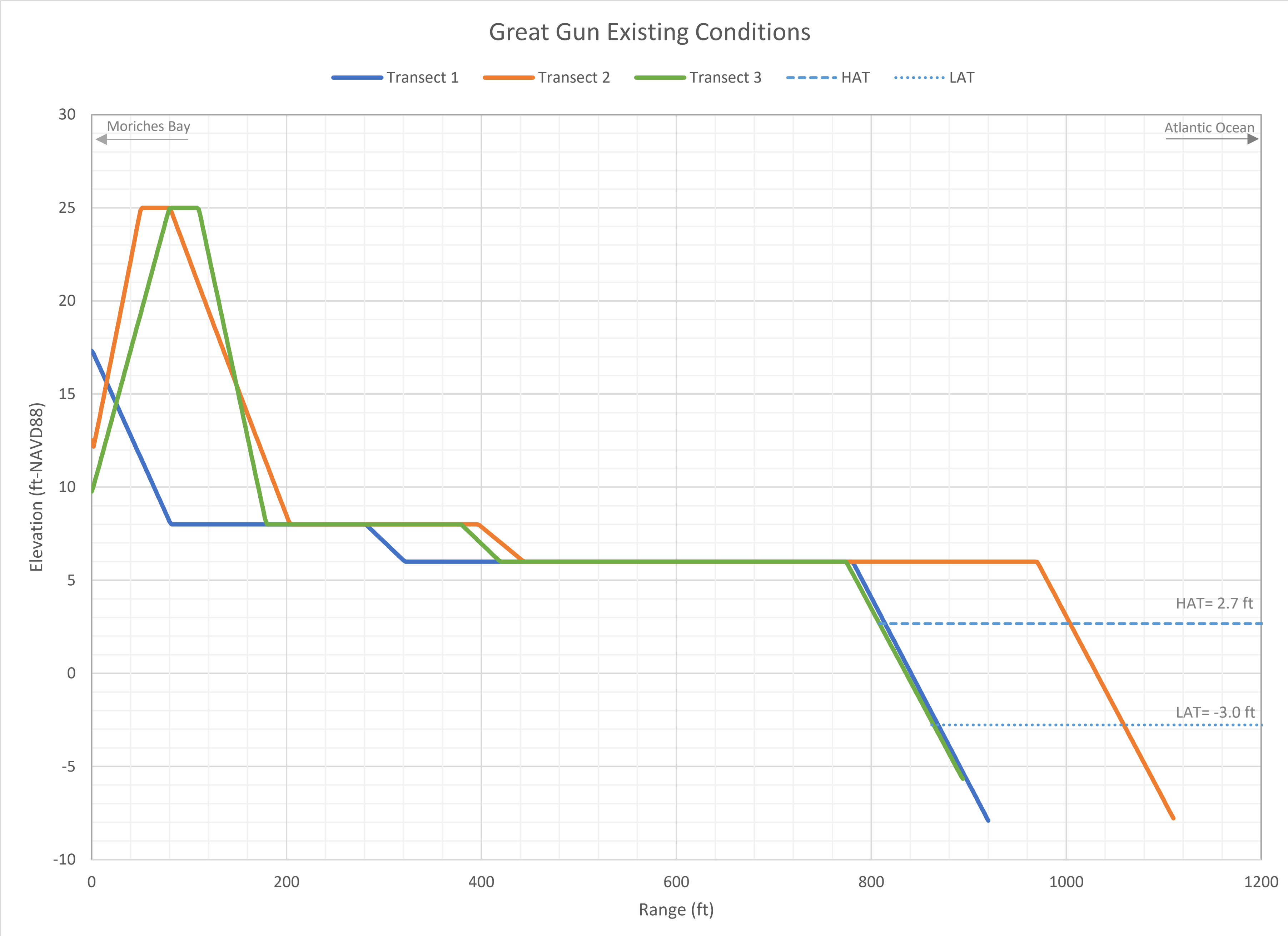
Feet

0 1,000 2,000

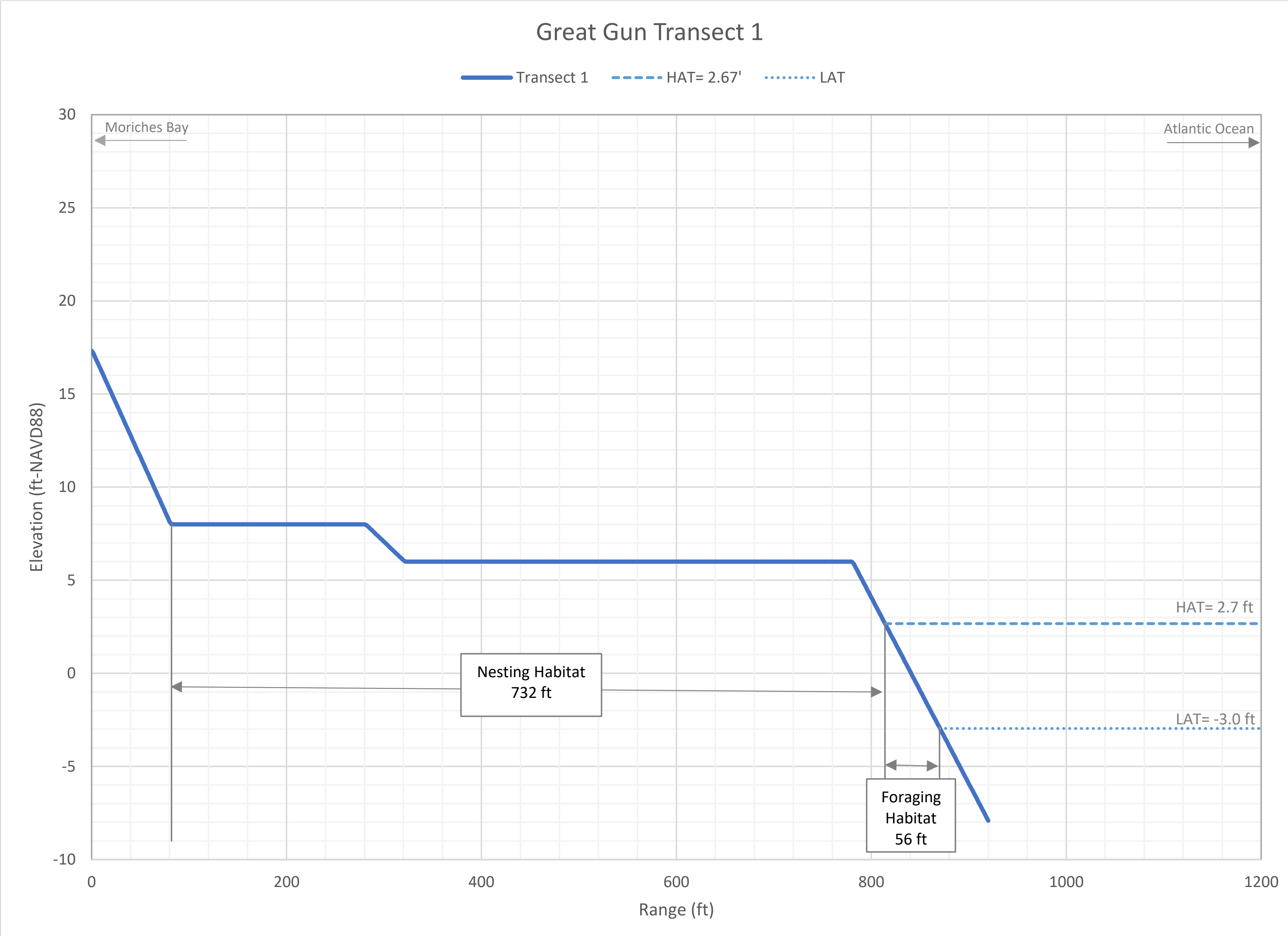
IMAGE SOURCE: Google Earth, 2016

Fire Island to Montauk Point
Coastal Process Features
Great Gun Shorefront
Transect Locations

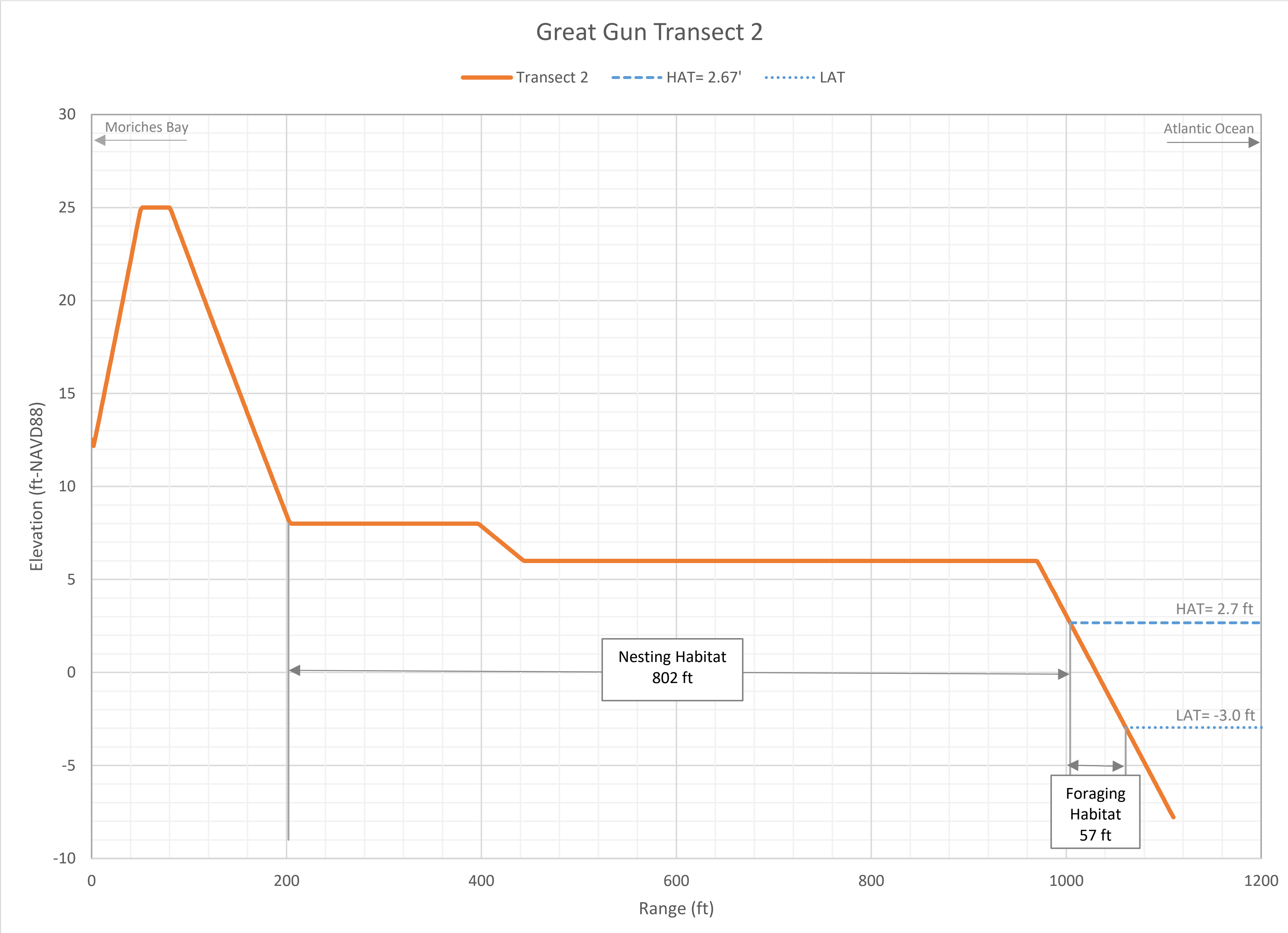
PROJECT	C2017-071
DRAWN BY	WKL
SHEET	1 OF 1
DATE	MAR 2018



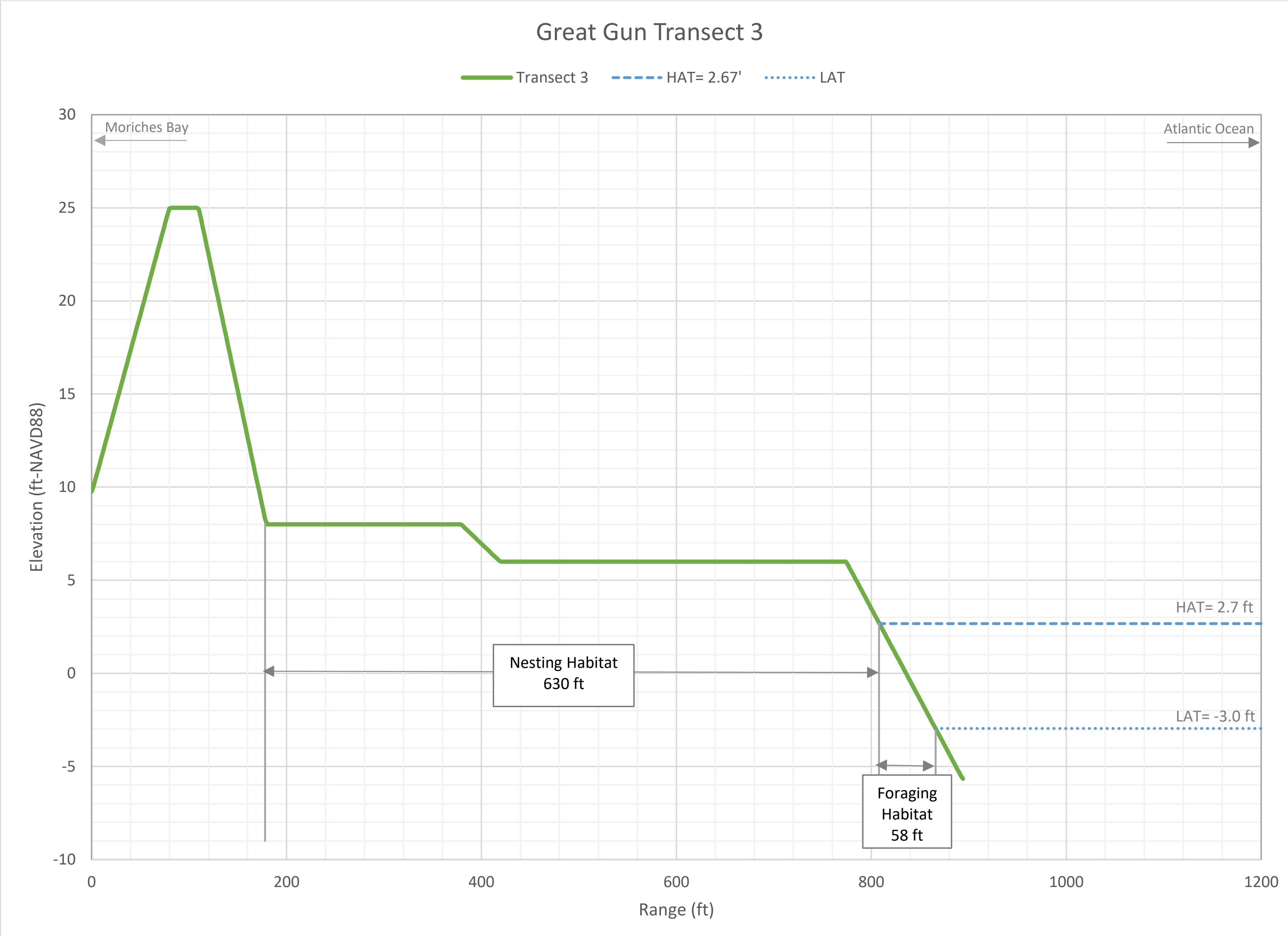
Great Gun Existing Conditions
Transect 1
Transect 2
Transect 3
HAT
LAT
Moriches Bay
Atlantic Ocean
HAT= 2.7 ft
LAT= -3.0 ft
Elevation (ft-NAVD88)
Range (ft)
30
25
20
15
10
5
0
-5
-10
0
200
400
600
800
1000
1200



Great Gun Transect 1
Transect 1
HAT= 2.67'
LAT
Moriches Bay
Atlantic Ocean
HAT= 2.7 ft
LAT= -3.0 ft
Nesting Habitat
732 ft
Foraging
Habitat
56 ft
Elevation (ft-NAVD88)
Range (ft)
30
25
20
15
10
5
0
-5
-10
0
200
400
600
800
1000
1200



Great Gun Transect 2
Transect 2
HAT= 2.67'
LAT
Moriches Bay
Atlantic Ocean
30
25
20
15
10
5
0
-5
-10
Elevation (ft-NAVD88)
0
200
400
600
800
1000
1200
Range (ft)
HAT= 2.7 ft
LAT= -3.0 ft
Nesting Habitat
802 ft
Foraging
Habitat
57 ft



Great Gun Transect 3
Transect 3
HAT= 2.67'
LAT
Moriches Bay
Atlantic Ocean
HAT= 2.7 ft
LAT= -3.0 ft
Nesting Habitat
630 ft
Foraging
Habitat
58 ft
Elevation (ft-NAVD88)
Range (ft)
30
25
20
15
10
5
0
-5
-10
0
200
400
600
800
1000
1200

CPF Site 11 – 45, 47, and 51 Dune Road, East Quogue	Reach GSB-2D
	40.826855° N / 72.534709° W

CPF SITE GOALS

- Fill placement to simulate cross island transport for CSRM credit

45, 47, and 51 Dune Road, East Quogue is located on the eastern portion of Westhampton Island, on the bayside just west of Shinnecock Inlet and Shinnecock County Park West. The average nearshore water depth on the bayside at 45, 47, and 51 Dune Road, East Quogue is approximately 3 ft with a maximum of about 6 ft. A couple bulkheads and groins lie in the center of the project site while multiple pile supported and floating docks associated with Tiana Bayside Park lie just to the east. The CPF design fill must limit impacts to adjacent navigation features. This CPF design seeks to add fill to provide CSRM benefits by simulating cross island transport.

As a proxy for the local spring tide range, the following discussion applies NOAA's reported Lowest Astronomical Tide (LAT) as the lower bound and the Highest Astronomical Tide (HAT) as the upper bound for the tide range.

To restore cross island transport, plans call for removal of the bulkheads and groins and placement of fill over 10.2 acres (ac) extending across the embayment centered on the currently bulkheaded properties. The fill template includes a 75 ft berm extending bayward from the existing HAT contour with a landward extension to the intersection with native ground. The template includes an assumed 5% slope from the bayside edge of berm to the intersection with the bay bottom. The cross shore extent of this CPF is limited due to the overall site configuration. This is considered the base project for CPF 11.

The design may add CSRM benefits by considering additional fill within the existing offshore channel. Two options are presented in the following tables and figures. Additional Fill 1 involves placing 7,021 cy of fill within a 350 ft x 600 ft area immediately north of the base project. Additional Fill 2 extends this area an additional 500 ft to the north and adds 8,581 cy. Combined Additional Fill 1 and 2 provide capacity for an additional 15,602 cy.

Sand placement at the CPF sites will be performed in coordination with renourishment cycles of the beachfill features and subject to monitoring to ensure resolution of project objectives. The USACE will not implement vegetation management or manipulation of the sites unless conducted as an incidental action associated with future placement.

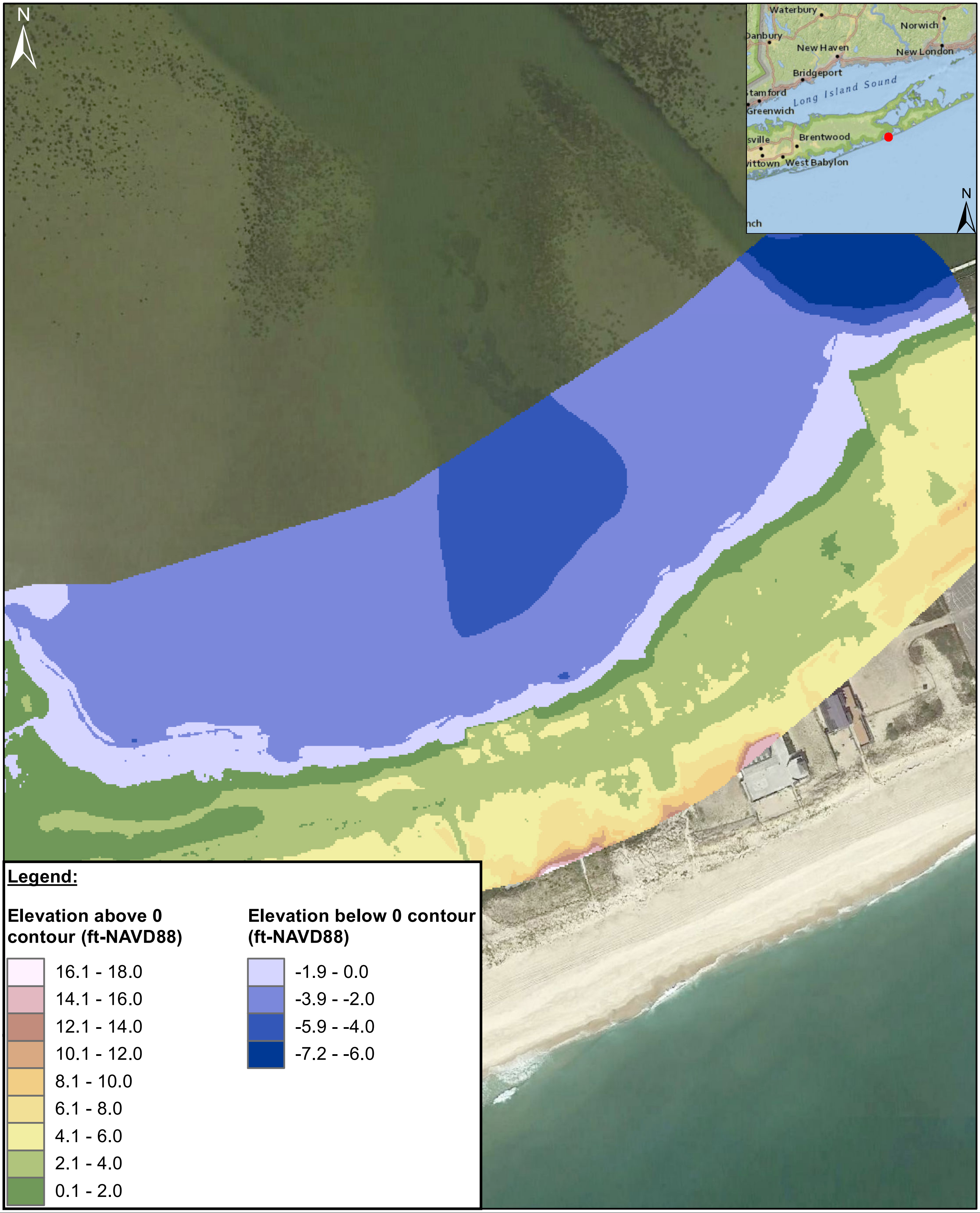
CPF Site 11 – 45, 47, and 51 Dune Road, East Quogue	Reach GSB-2D 40.826855° N / 72.534709° W

CPF PARAMETERS			
Feature	Fill	Additional Fill 1	Additional Fill 2
Cut Volume (cy)	0	0	0
Fill Volume (cy)	49,890	7,021	8,581
Net Volume (cy)	49,890	7,021	8,581
Acreage	10.2	4.6	6.7
Activity	Fill	Fill	Fill
DATA SOURCES			
Topographic	USGS, 2016		
Bathymetric	USGS, 2016		
Aerial Imagery	Google Earth, 2016		
Vegetation	N/A*		
REAL ESTATE INFORMATION			
Property Owner	Town of Southhampton Bruce Ratner Private Rd Freedom Beach, LLC 42 Dune Rd, LLC Rebman Family Trust Jonathan Chilvers Mary F Phillips 53 Dune Rd, LLC		
Municipality	Southampton		
County	Suffolk		
CBRA	F13, System Unit		

*up to date vegetation data were not available for the study area

BAYSIDE TIDAL ENVIRONMENT (ft-NAVD88)				
Closest Tidal Benchmark	Shinnecock Bay Entrance, NY		Highest Astronomical Tide (HAT)	1.79
			Mean Higher High Water (MHHW)	1.31
Coordinates	40.820000° N 72.561667° W		Mean High Water (MHW)	1.05
			Mean Sea Level (MSL)	-0.30
0 ft-NAVD = 0.93 ft-NGVD			Mean Tide Level (MTL)	-0.28
Range (MHW-MLW)		2.66	Mean Low Water (MLW)	-1.60
Diurnal Range (MHHW - MLLW)		3.02	Mean Lower Low Water (MLLW)	-1.71
Largest Tidal Range (HAT-LAT)		3.98	Lowest Astronomical Tide (LAT)	-2.19

BAYSIDE WAVE ENVIRONMENT					
Return Period	Fetch (ft)	Wave Height (ft)	Wind Setup (ft)	Wave Setup (ft)	HAT + Setup + Wave Height (ft-NAVD88)
1-year	14,440	2.2	0.26	0.81	5.05
5-year	14,440	2.9	0.46	0.83	5.97
10-year	14,440	3.3	0.56	0.85	6.49



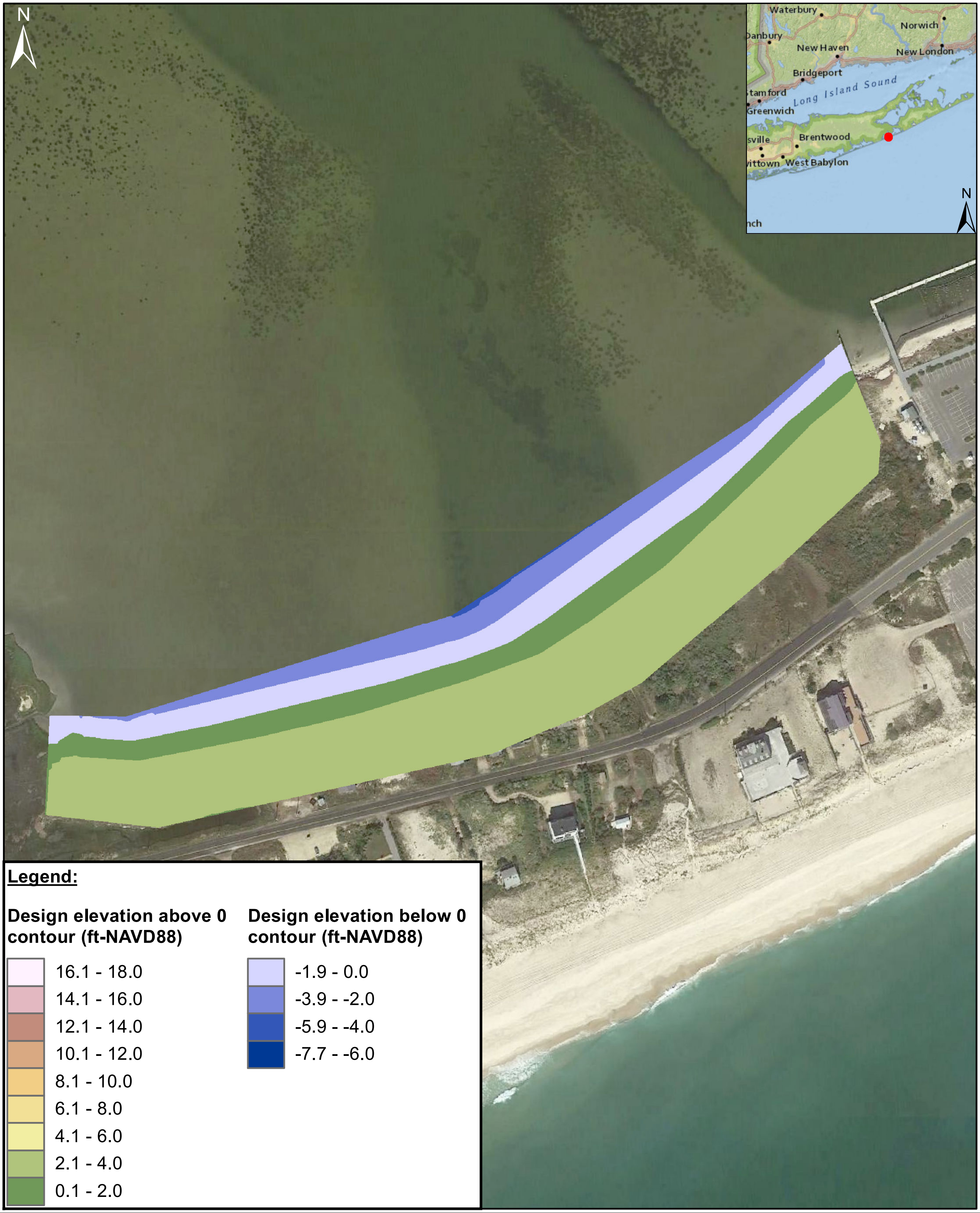
Feet

0 250 500

IMAGE SOURCE: Google Earth, 2016

Fire Island to Montauk Point
Coastal Process Features
45,47, and 51 Dune Road, East Quogue
Existing Conditions

PROJECT	C2017-071
DRAWN BY	WKL
SHEET	1 OF 1
DATE	DEC 2017



Feet

0 250 500

IMAGE SOURCE: Google Earth, 2016

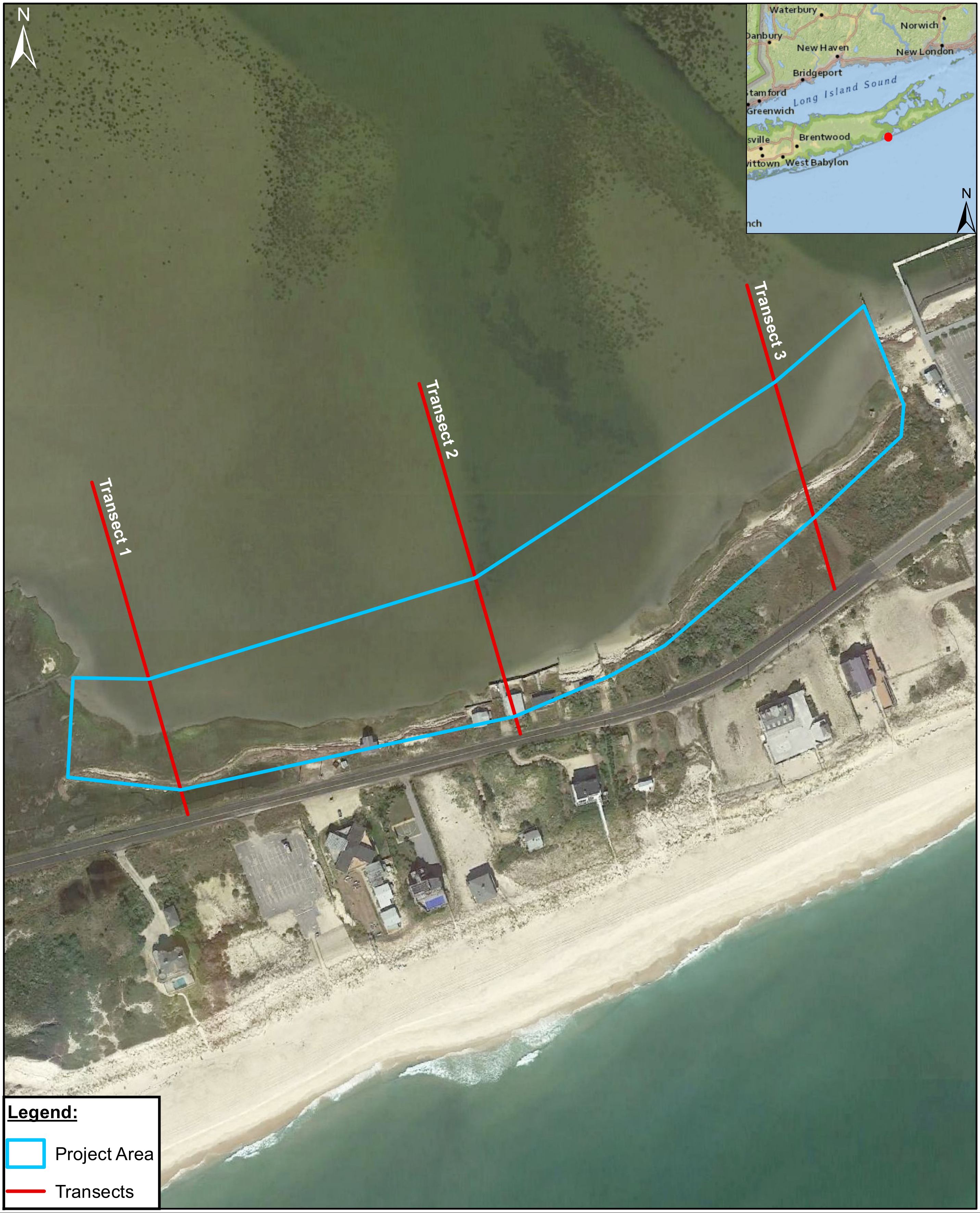
Fire Island to Montauk Point
Coastal Process Features
45,47, and 51 Dune Road, East Quogue
Proposed Elevations

PROJECT	C2017-071
DRAWN BY	WKL
SHEET	1 OF 1
DATE	DEC 2017

IMAGE SOURCE: Google Earth, 2016

Fire Island to Montauk Point
Coastal Process Features
45,47, and 51 Dune Road, East Quogue
Proposed Elevation Changes

PROJECT	C2017-071
DRAWN BY	WKL
SHEET	1 OF 1
DATE	DEC 2017

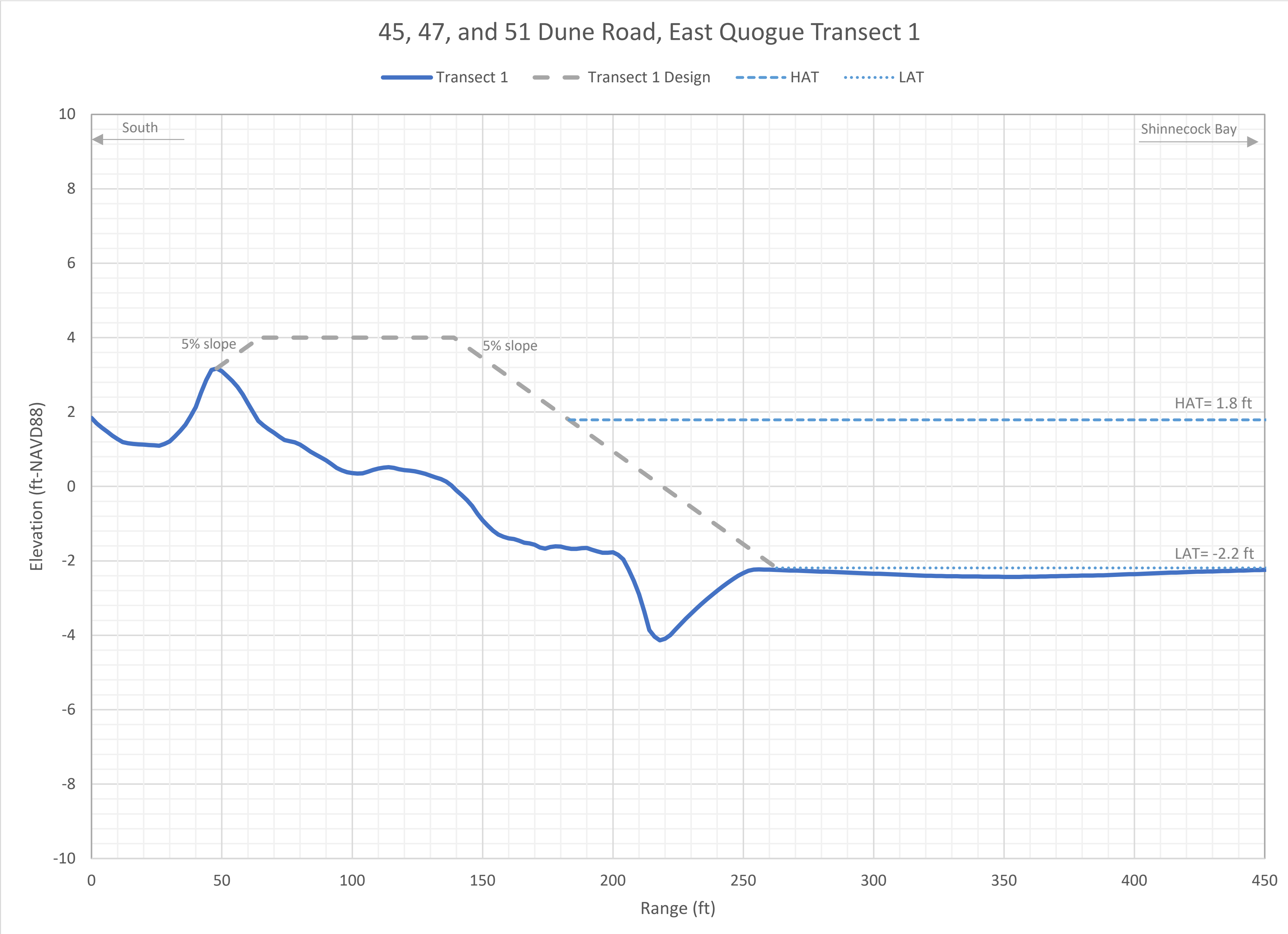


Feet
0 250 500
IMAGE SOURCE: Google Earth, 2016

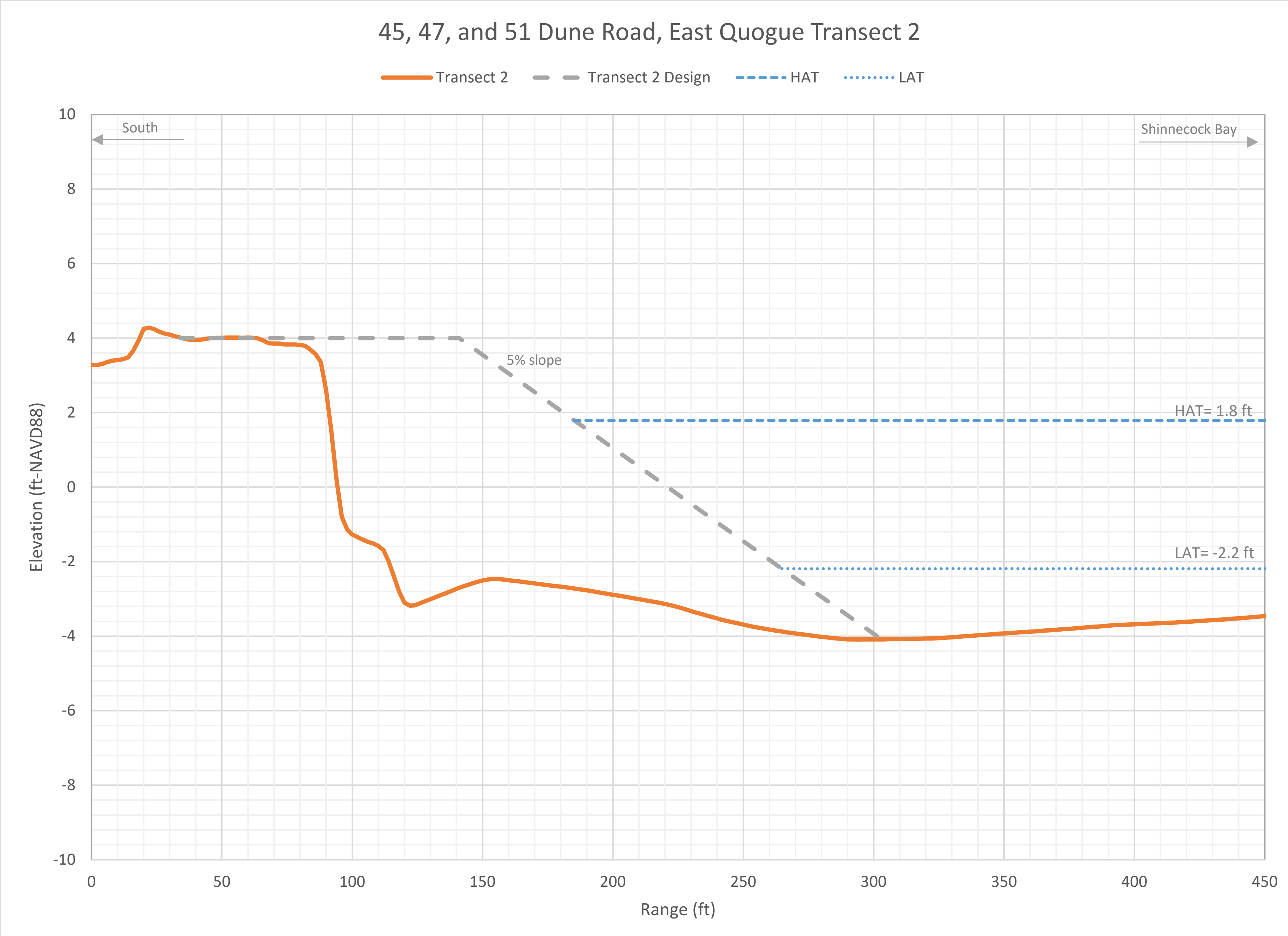
Fire Island to Montauk Point
Coastal Process Features
45,47, and 51 Dune Road, East Quogue
Transect Locations

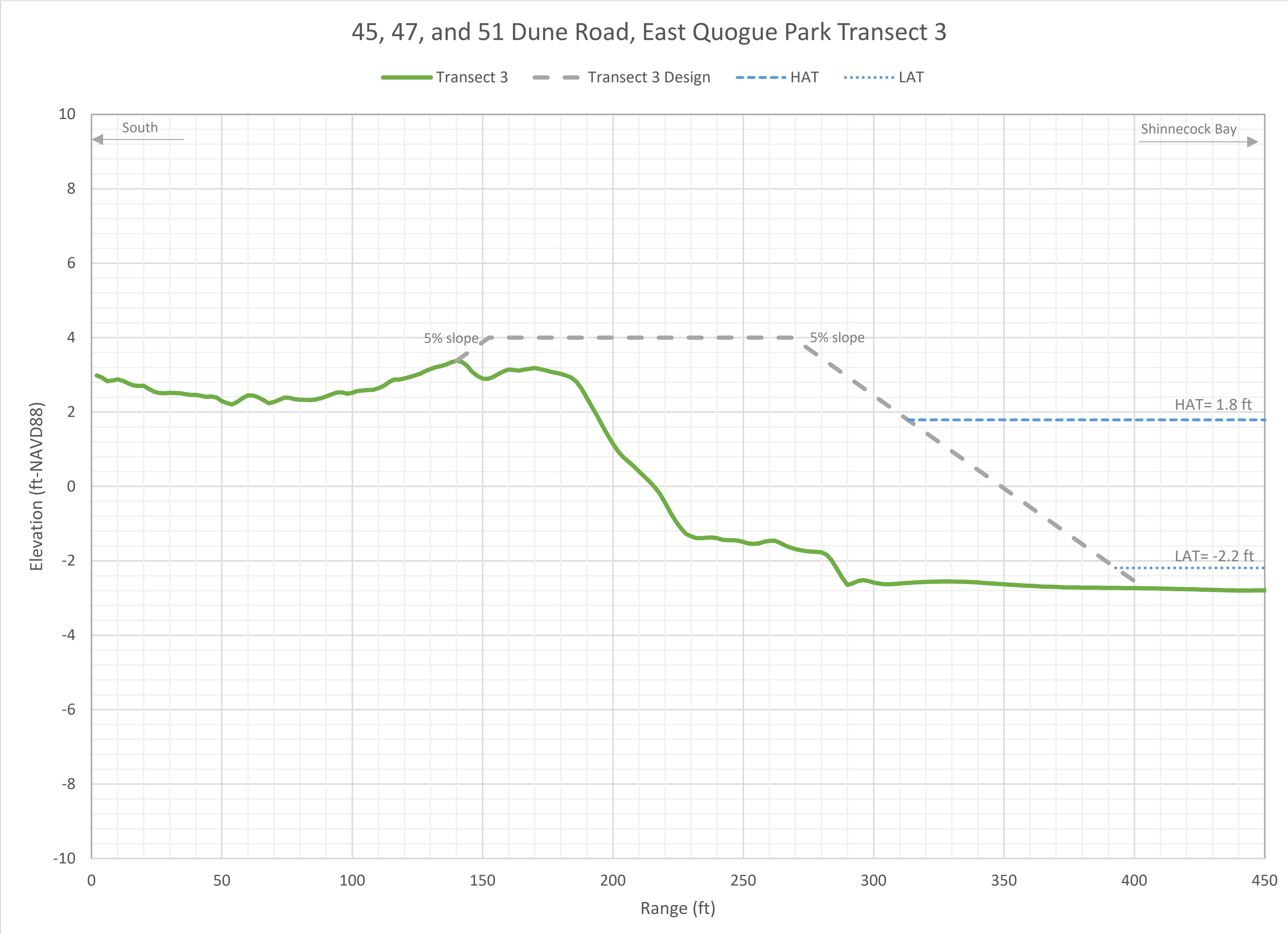
PROJECT	C2017-071
DRAWN BY	WKL
SHEET	1 OF 1
DATE	DEC 2017


45, 47, and 51 Dune Road, East Quogue Existing Conditions
Transect 1
Transect 2
Transect 3
HAT
LAT
South
Shinnecock Bay
HAT= 1.8 ft
LAT= -2.2 ft
Elevation (ft-NAVD88)
Range (ft)
10
8
6
4
2
0
-2
-4
-6
-8
-10
0
50
100
150
200
250
300
350
400
450

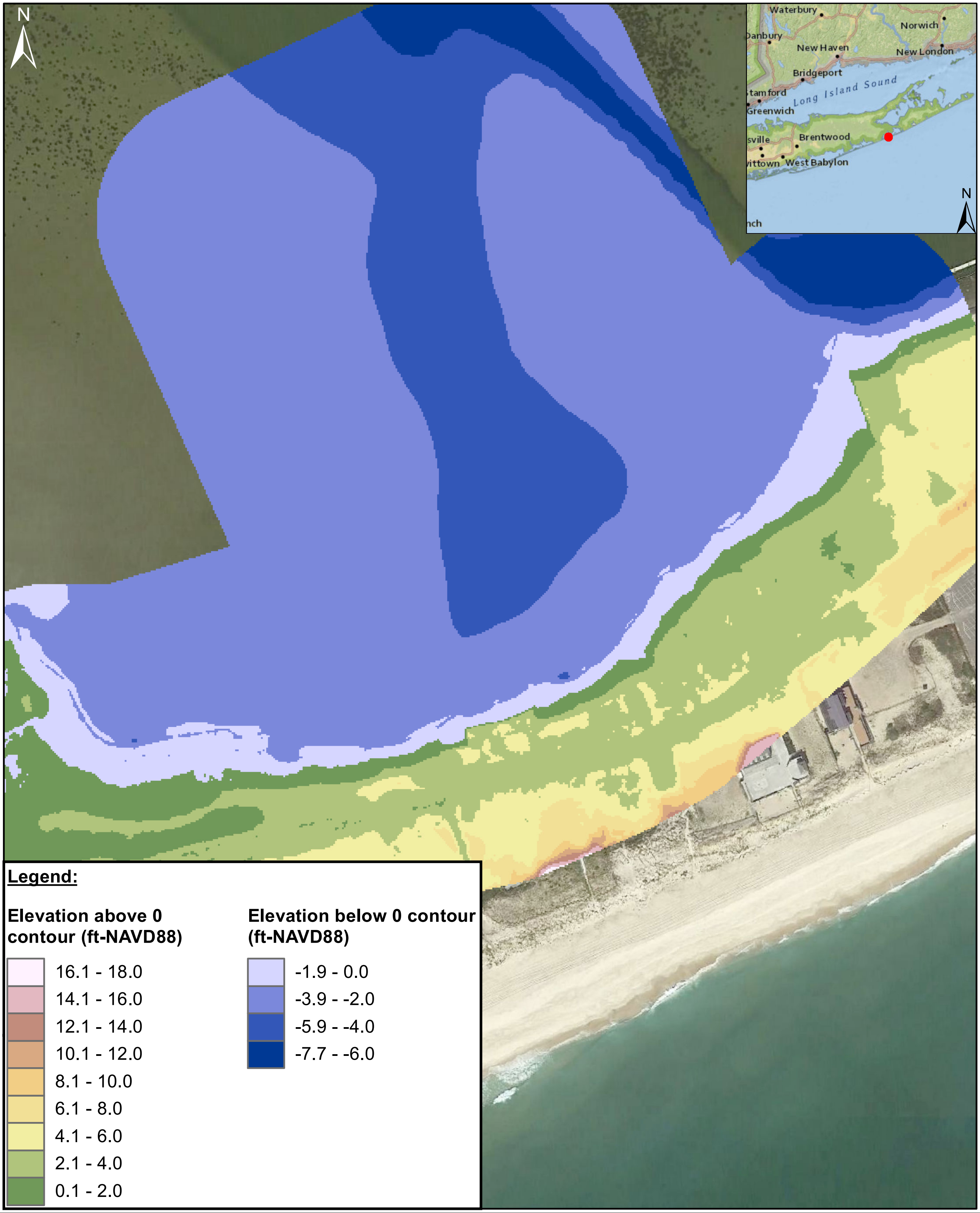


45, 47, and 51 Dune Road, East Quogue Transect 1
Transect 1
Transect 1 Design
HAT
LAT
South
Shinnecock Bay
5% slope
5% slope
HAT= 1.8 ft
LAT= -2.2 ft
Elevation (ft-NAVD88)
Range (ft)
10
8
6
4
2
0
-2
-4
-6
-8
-10
0
50
100
150
200
250
300
350
400
450


45, 47, and 51 Dune Road, East Quogue Transect 2
Transect 2
Transect 2 Design
HAT
LAT
South
Shinnecock Bay
5% slope
HAT= 1.8 ft
LAT= -2.2 ft
Elevation (ft-NAVD88)
Range (ft)
10
8
6
4
2
0
-2
-4
-6
-8
-10
0
50
100
150
200
250
300
350
400
450



45, 47, and 51 Dune Road, East Quogue Park Transect 3
Transect 3
Transect 3 Design
HAT
LAT
South
Shinnecock Bay
5% slope
5% slope
HAT= 1.8 ft
LAT= -2.2 ft
Elevation (ft-NAVD88)
Range (ft)
10
8
6
4
2
0
-2
-4
-6
-8
-10
0
50
100
150
200
250
300
350
400
450



Legend:

Elevation above 0 contour (ft-NAVD88)	Elevation below 0 contour (ft-NAVD88)
16.1 - 18.0	-1.9 - 0.0
14.1 - 16.0	-3.9 - -2.0
12.1 - 14.0	-5.9 - -4.0
10.1 - 12.0	-7.7 - -6.0
8.1 - 10.0	
6.1 - 8.0	
4.1 - 6.0	
2.1 - 4.0	
0.1 - 2.0	

Feet
0 250 500

IMAGE SOURCE: Google Earth, 2016

Fire Island to Montauk Point
Coastal Process Features
45,47, and 51 Dune Road, East Quogue
Existing Conditions

PROJECT	C2017-071
DRAWN BY	WKL
SHEET	1 OF 1
DATE	DEC 2017

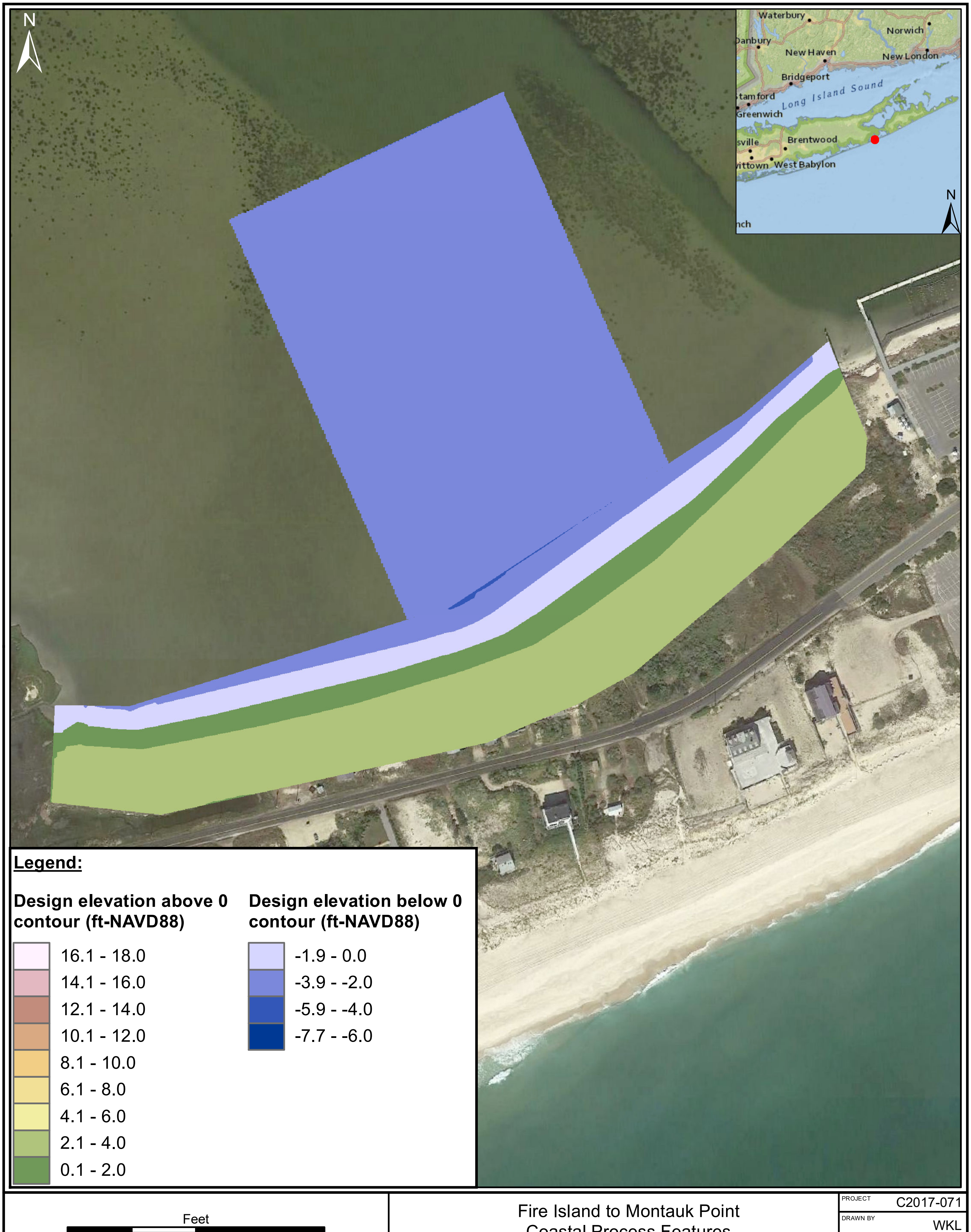
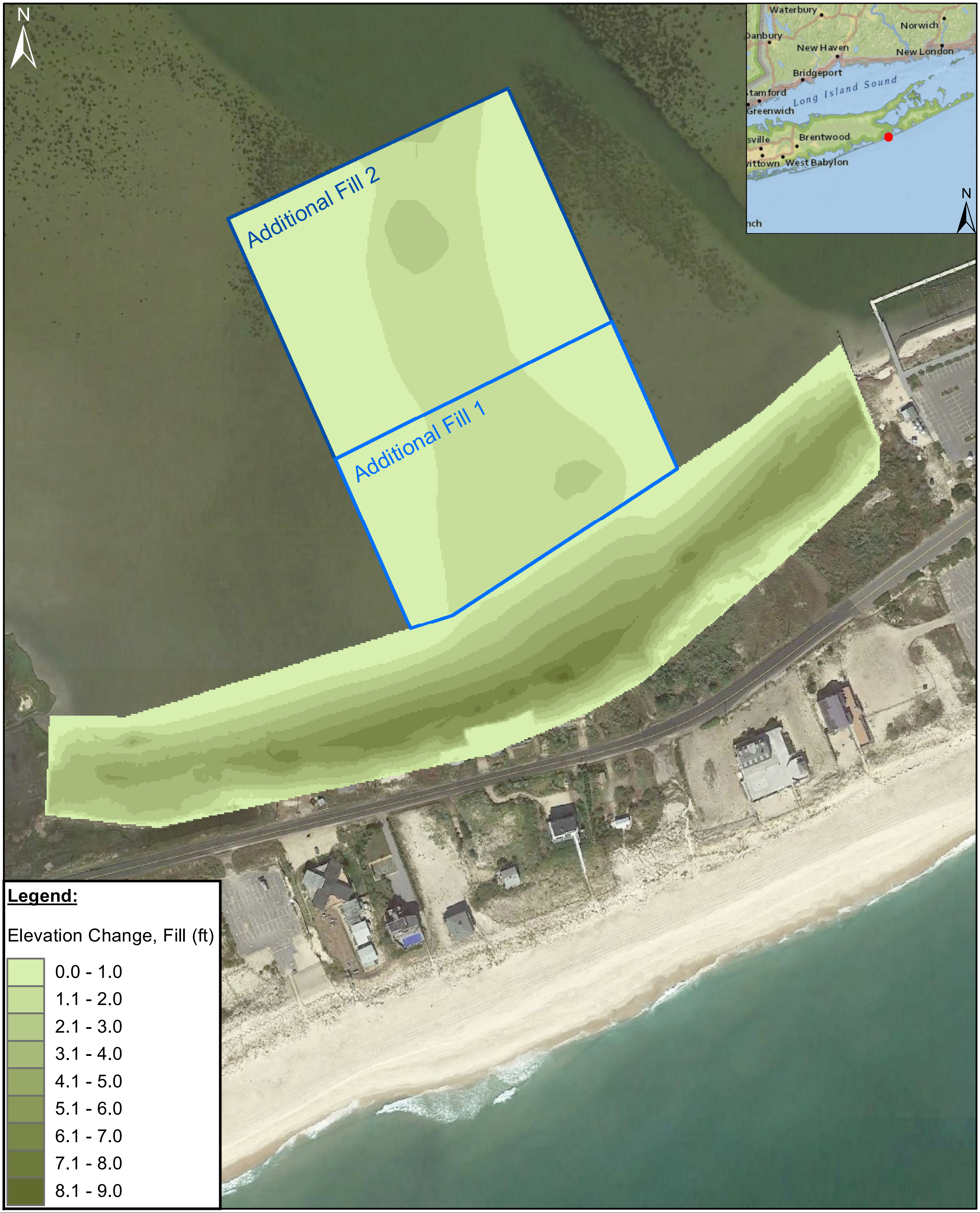


IMAGE SOURCE: Google Earth, 2016

Fire Island to Montauk Point
Coastal Process Features
45,47, and 51 Dune Road, East Quogue
Proposed Elevations

PROJECT	C2017-071
DRAWN BY	WKL
SHEET	1 OF 1
DATE	DEC 2017



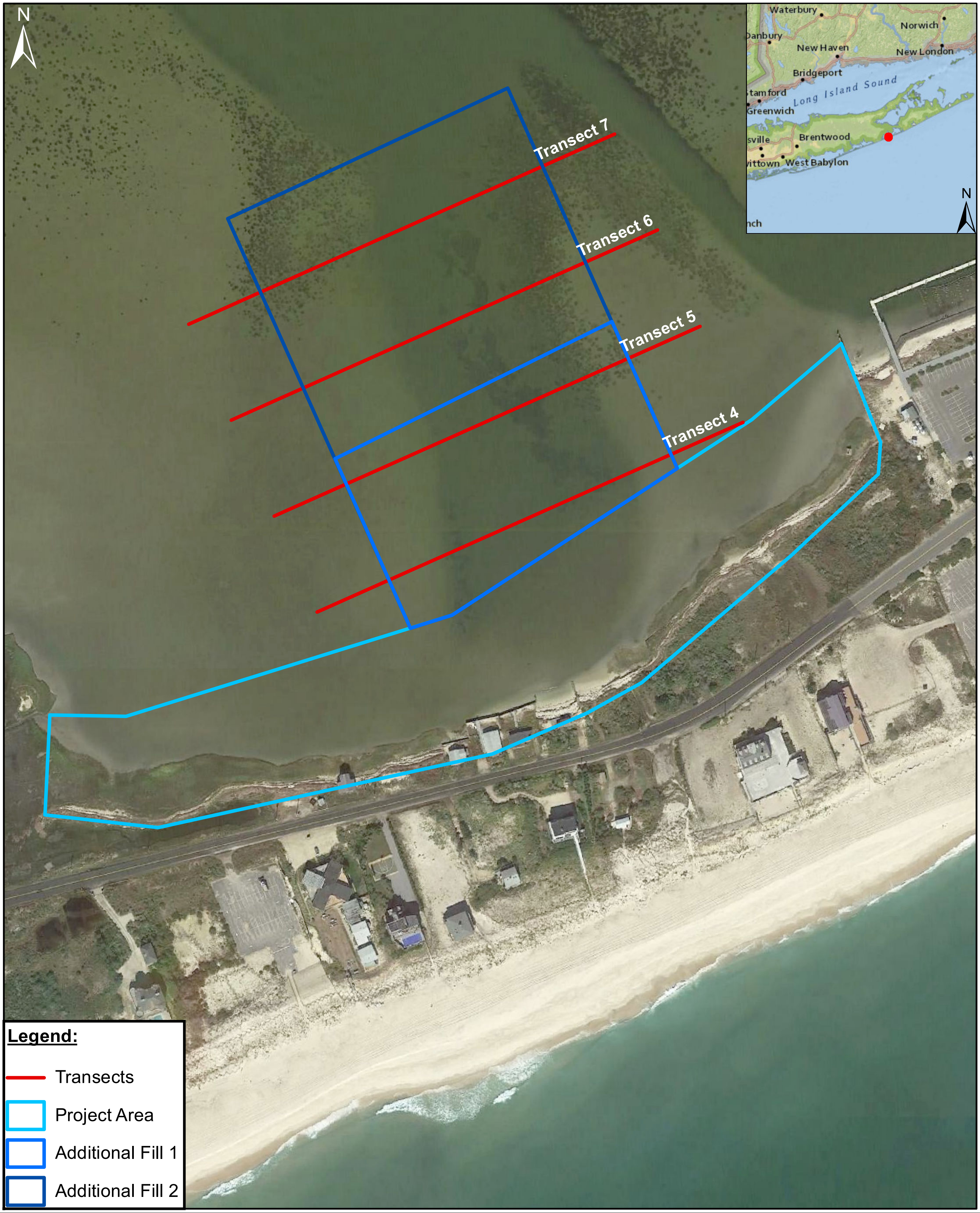
Feet

0 250 500

IMAGE SOURCE: Google Earth, 2016

Fire Island to Montauk Point
Coastal Process Features
45,47, and 51 Dune Road, East Quogue
Proposed Elevation Changes

PROJECT	C2017-071
DRAWN BY	WKL
SHEET	1 OF 1
DATE	DEC 2017



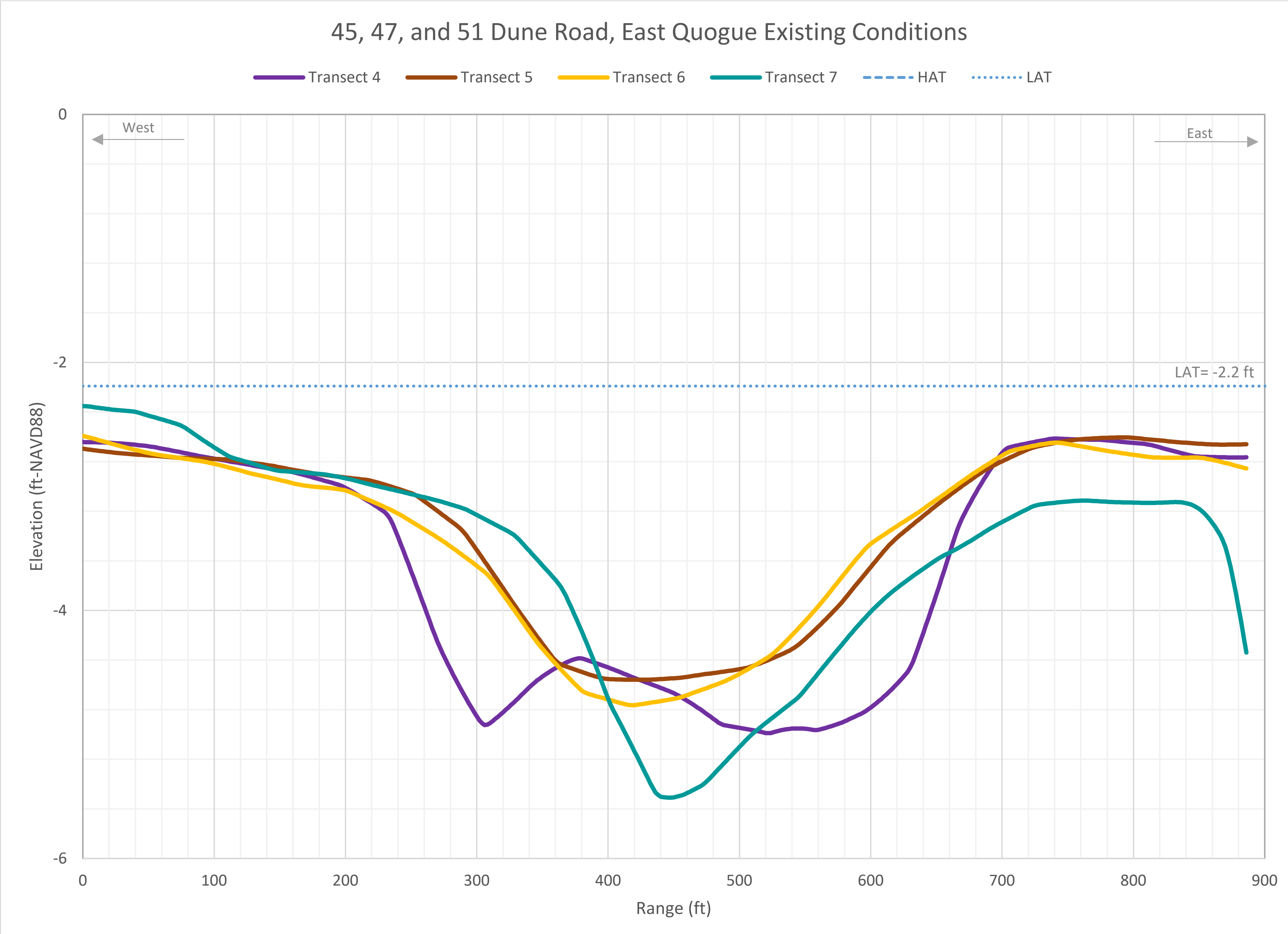
Feet

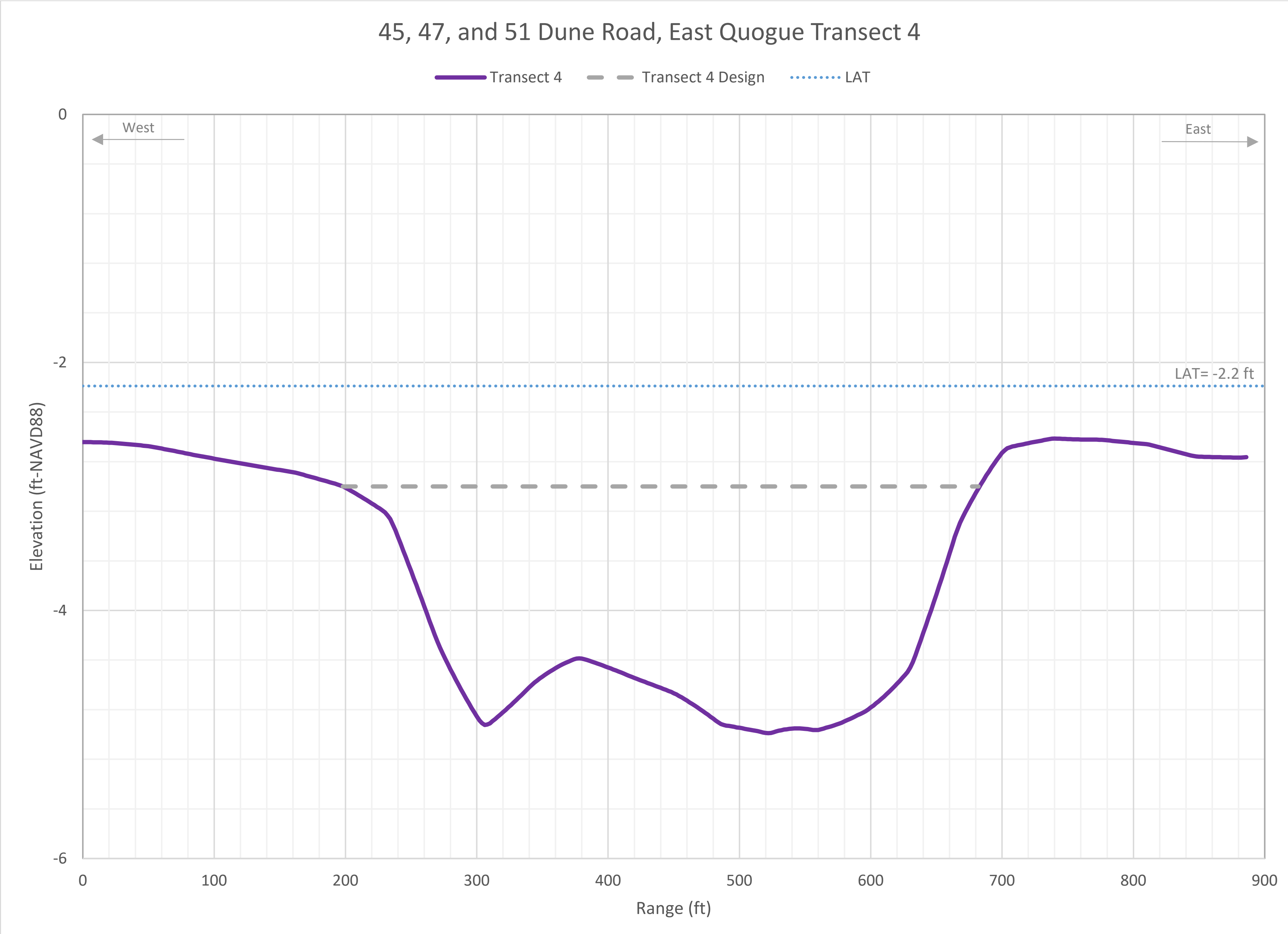
0 250 500

IMAGE SOURCE: Google Earth, 2016

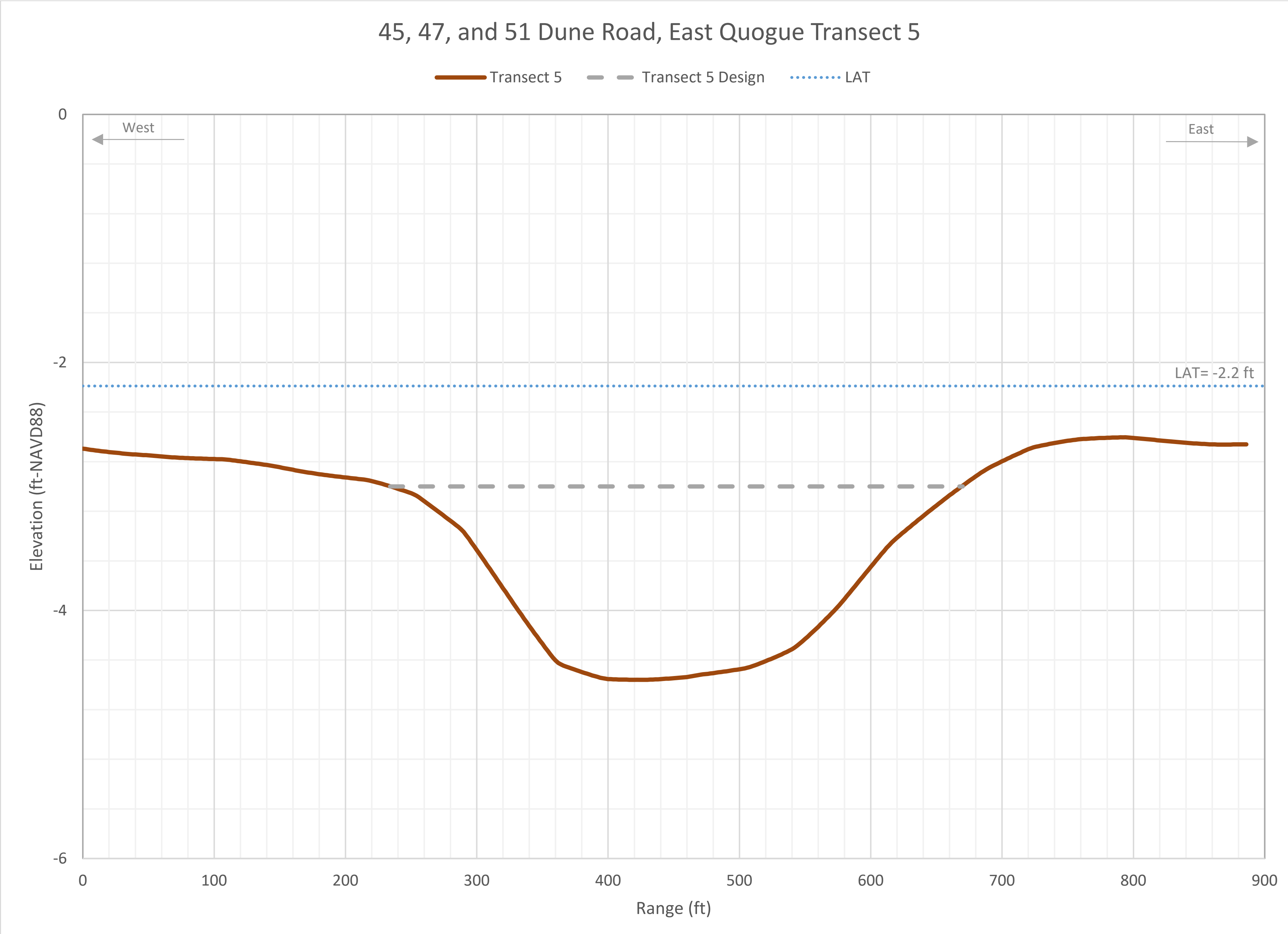
Fire Island to Montauk Point
Coastal Process Features
45,47, and 51 Dune Road, East Quogue
Transect Locations

PROJECT	C2017-071
DRAWN BY	WKL
SHEET	1 OF 1
DATE	DEC 2017

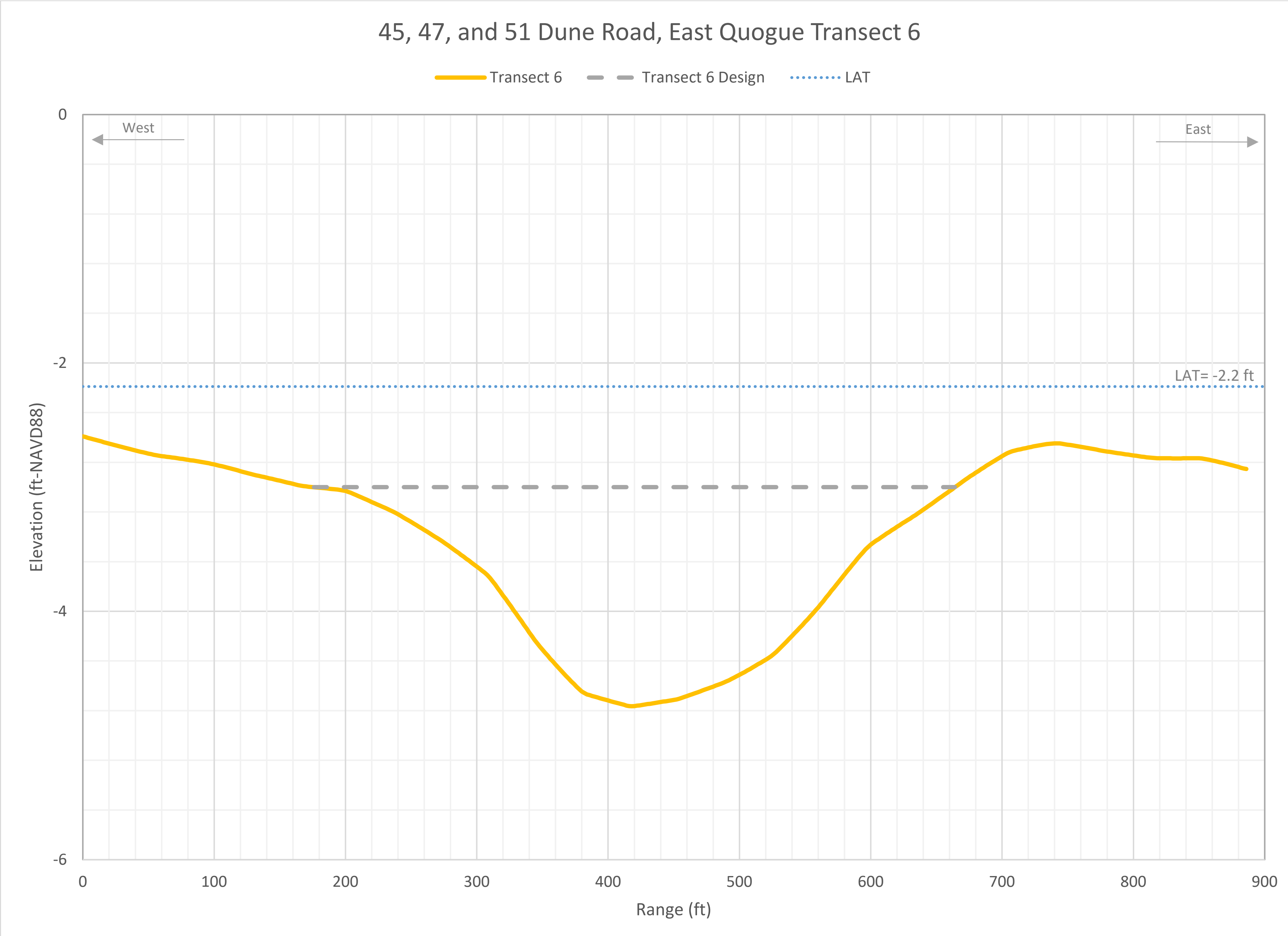

45, 47, and 51 Dune Road, East Quogue Existing Conditions
Transect 4
Transect 5
Transect 6
Transect 7
HAT
LAT
West
East
LAT= -2.2 ft
Elevation (ft-NAVD88)
Range (ft)
0
-2
-4
-6
0
100
200
300
400
500
600
700
800
900

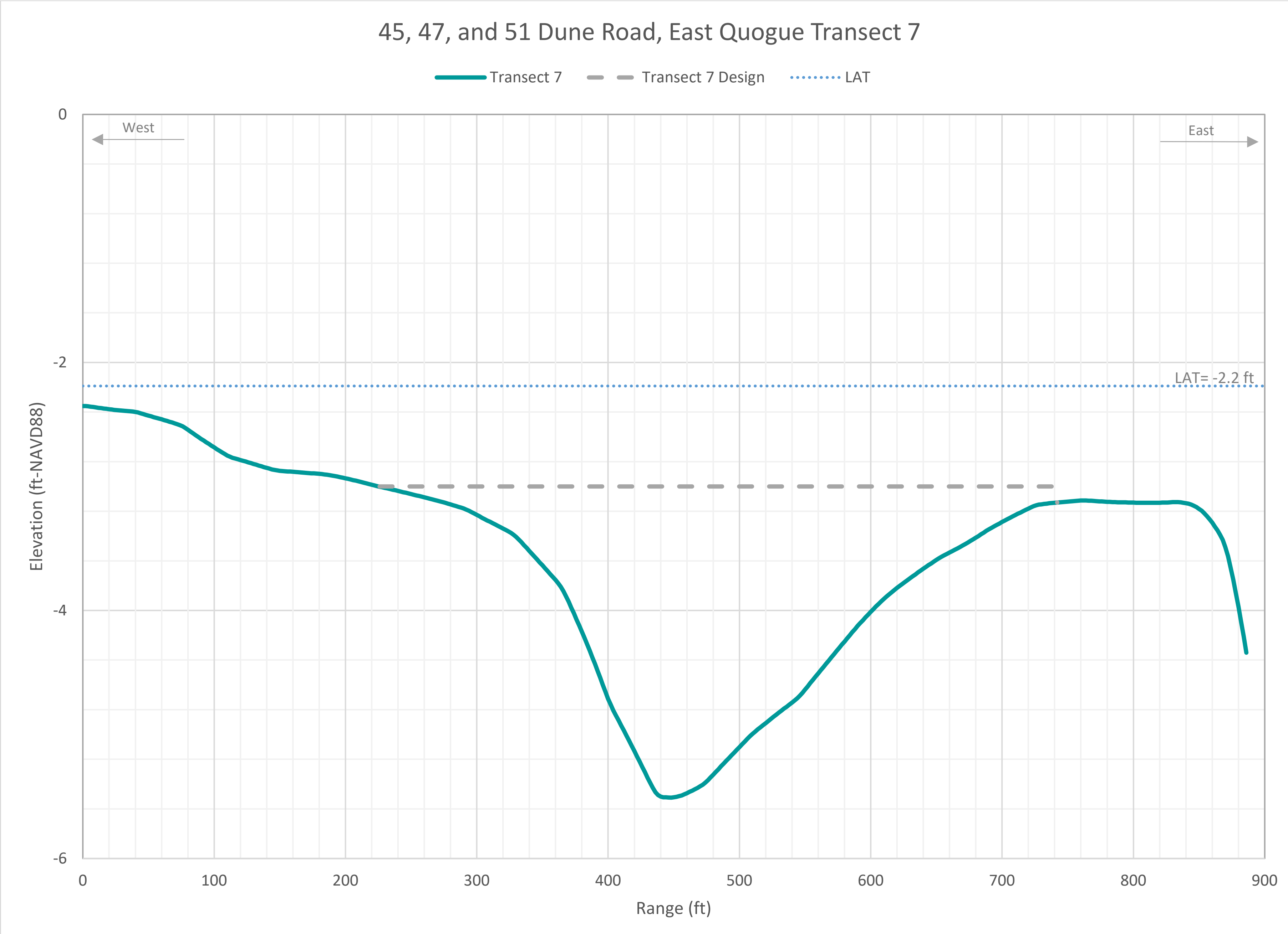


45, 47, and 51 Dune Road, East Quogue Transect 4
Transect 4
Transect 4 Design
LAT
West
East
LAT= -2.2 ft
Elevation (ft-NAVD88)
0
-2
-4
-6
0
100
200
300
400
500
600
700
800
900
Range (ft)



45, 47, and 51 Dune Road, East Quogue Transect 5
Transect 5
Transect 5 Design
LAT
West
East
LAT= -2.2 ft
Elevation (ft-NAVD88)
Range (ft)
0
-2
-4
-6
0
100
200
300
400
500
600
700
800
900


45, 47, and 51 Dune Road, East Quogue Transect 6
Transect 6
Transect 6 Design
LAT
West
East
LAT= -2.2 ft
Elevation (ft-NAVD88)
Range (ft)
0
-2
-4
-6
0
100
200
300
400
500
600
700
800
900



45, 47, and 51 Dune Road, East Quogue Transect 7
Transect 7
Transect 7 Design
LAT
West
East
LAT= -2.2 ft
Elevation (ft-NAVD88)
Range (ft)
0
-2
-4
-6
0
100
200
300
400
500
600
700
800
900

CPF Site 12 Tiana Bayside Park	Reach GSB-2D 40.828985° N / 72.530510° W

CPF SITE GOALS

- Fill placement to simulate cross shore transport for CSRM credit

Tiana Bayside Park is located on the eastern portion of Westhampton Island, on the bayside just west of Shinnecock Inlet and Shinnecock County Park West. The average nearshore water depth on the bayside at Tiana Bayside Park is approximately 3 ft with a maximum of 6 to 7 ft in an offshore channel. Several pile supported and floating docks lie along the western half of the project site. A 750 ft long line of rock-filled gabions fronts the shoreline within the dock structures. The CPF design fill must limit impacts to navigation features. This CPF design seeks to add fill to provide CSRM benefits by simulating cross island transport.

As a proxy for the local spring tide range, the following discussion applies NOAA's reported Lowest Astronomical Tide (LAT) as the lower bound and Highest Astronomical Tide (HAT) as the upper bound for the tide range.

To restore cross island transport, plans call for the placement of fill over 12.2 acres (ac) extending from the eastern bulkhead area across the adjacent bayside shoreline to the east. The landward side of the fill profile will tie into the closer of the existing grade at +4 ft-NAVD88 or the adjacent roadway right-of-way. The fill template includes a berm extending bayward. The template includes an assumed 5% slope from the bayside edge of berm to the intersection with the bay bottom. The cross shore extent of this CPF is limited due to the overall site configuration.

The base design includes fill placed to -3 ft-NAVD88 within the eastern half of the navigation channel immediately offshore of the project area. The total fill currently envisioned in the project area is 36,647 cy.

The eastern 350 ft of gabions may be treated in one of three possible ways. First, they may be left as-is in place. Second they may be removed and replaced with a small amount of fill to soften the shoreline. Finally, they may be left in place and buried beneath a small amount of fill to soften the shoreline while retaining the shoreline protection should erosion re-expose the gabions.

Sand placement at the CPF sites will be performed in coordination with renourishment cycles of the beachfill features and subject to monitoring to ensure resolution of project objectives. The USACE will not implement vegetation management or manipulation of the sites unless conducted as an incidental action associated with future placement.

CPF Site 12 Tiana Bayside Park	Reach GSB-2D 40.828985° N / 72.530510° W

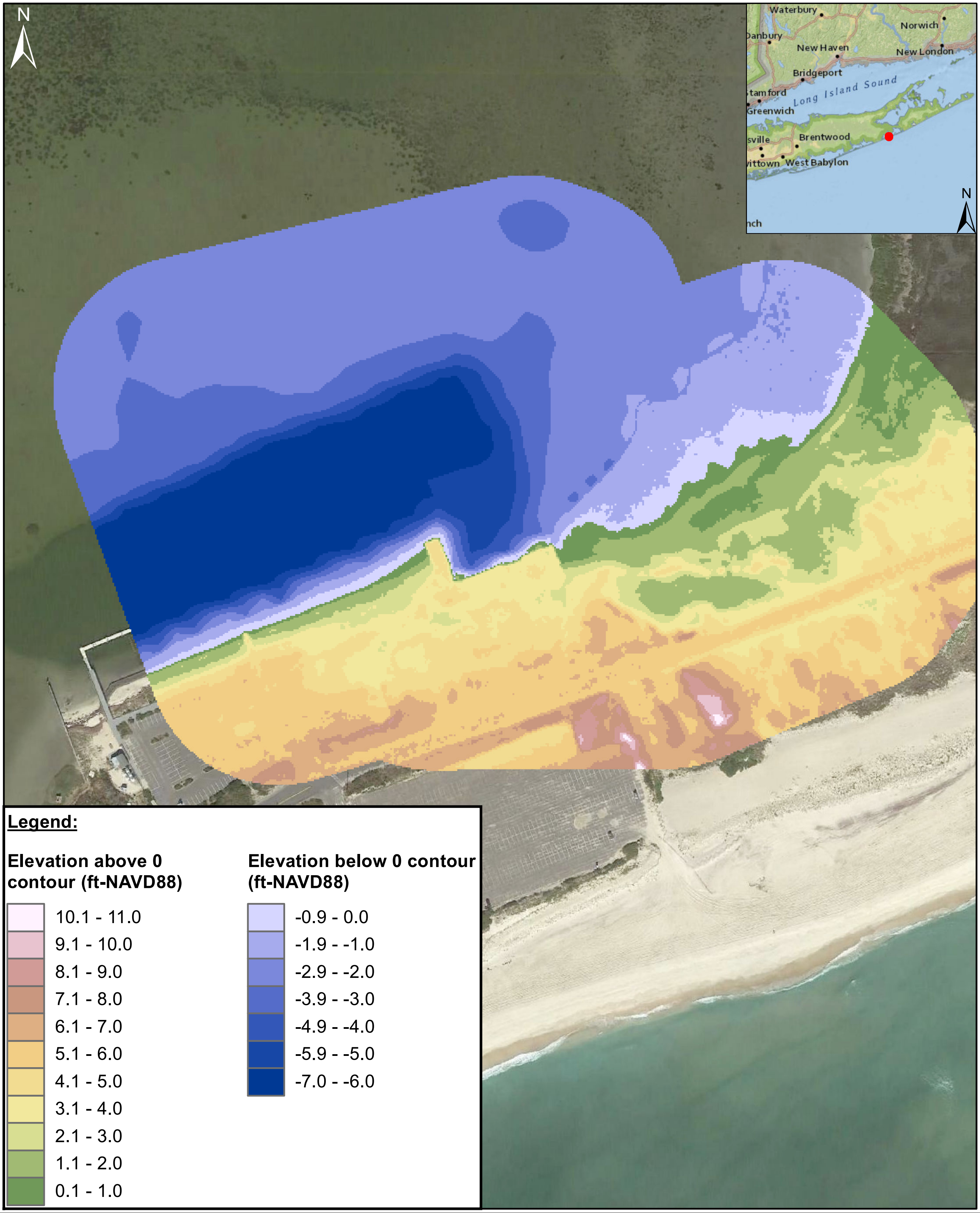
CPF PARAMETERS	
Feature	Fill
Cut Volume (cy)	0
Fill Volume (cy)	36,647
Net Volume (cy)	36,647
Acreage	12.2
Activity	Fill
DATA SOURCES	
Topographic	USGS, 2016
Bathymetric	USGS, 2016
Aerial Imagery	Google Earth, 2016
Vegetation	N/A*
REAL ESTATE INFORMATION	
Property Owner	County of Suffolk Town of Southampton
Municipality	Southampton
County	Suffolk
CBRA	F13, System Unit

*up to date vegetation data were not available for the study area

BAYSIDE TIDAL ENVIRONMENT (ft-NAVD88)				
Closest Tidal Benchmark	Shinnecock Bay Entrance, NY		Highest Astronomical Tide (HAT)	1.79
			Mean Higher High Water (MHHW)	1.31
Coordinates	40.820000° N 72.561667° W		Mean High Water (MHW)	1.05
			Mean Sea Level (MSL)	-0.30
0 ft-NAVD = 0.92 ft-NGVD			Mean Tide Level (MTL)	-0.28
Range (MHW-MLW)		2.66	Mean Low Water (MLW)	-1.60
Diurnal Range (MHHW - MLLW)		3.02	Mean Lower Low Water (MLLW)	-1.71
Largest Tidal Range (HAT-LAT)		3.98	Lowest Astronomical Tide (LAT)	-2.19

BAYSIDE WAVE ENVIRONMENT

Return Period	Fetch (ft)	Wave Height (ft)	Wind Setup (ft)	Wave Setup (ft)	HAT + Setup + Wave Height (ft-NAVD88)
1-year	13,192	2.1	0.28	0.82	4.99
5-year	13,192	2.8	0.49	0.85	5.93
10-year	13,192	3.1	0.59	0.87	6.35



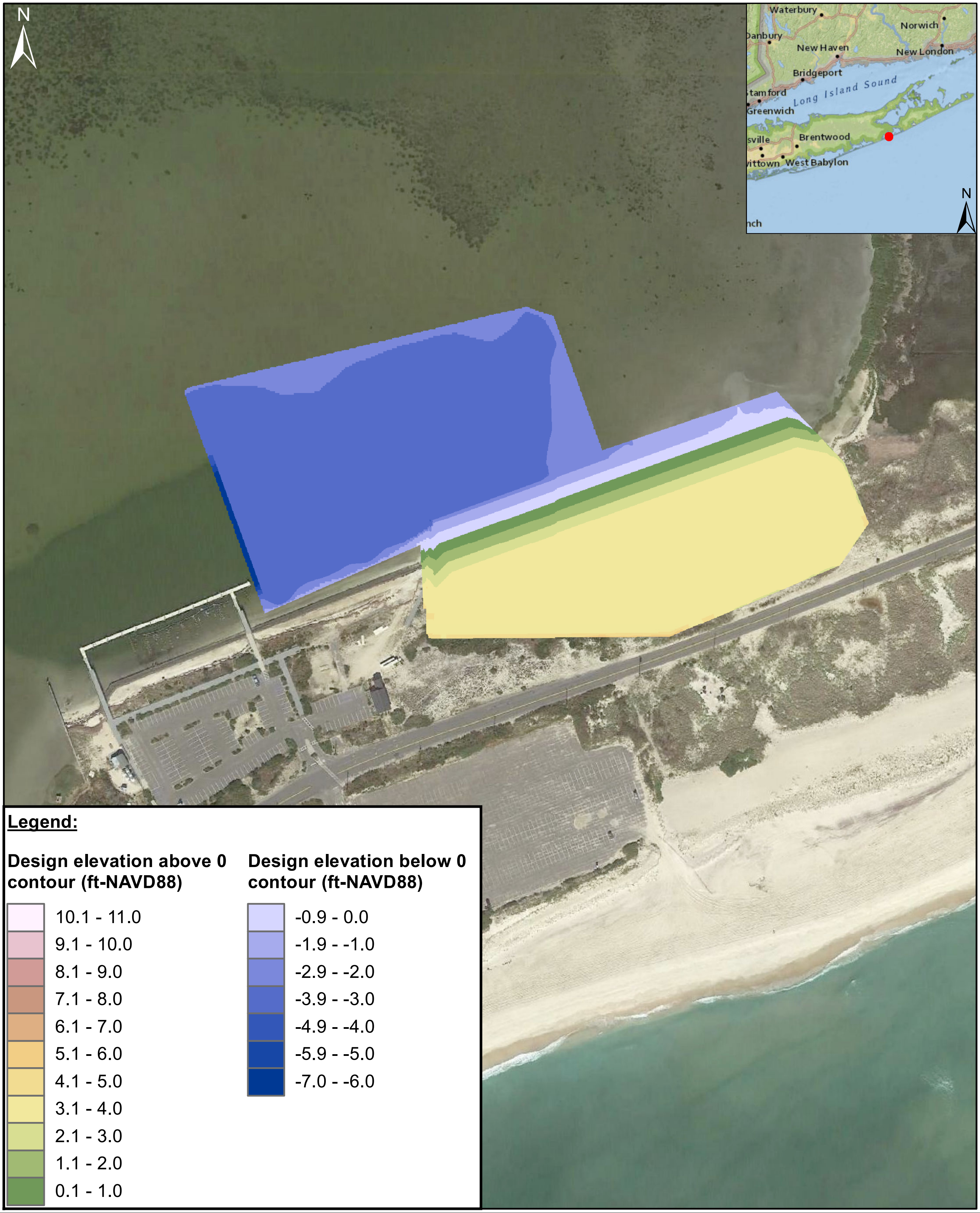
Feet

0 250 500

IMAGE SOURCE: Google Earth, 2016

Fire Island to Montauk Point
Coastal Process Features
Tiana Bayside Park
Existing Conditions

PROJECT	C2017-071
DRAWN BY	WKL
SHEET	1 OF 1
DATE	DEC 2017



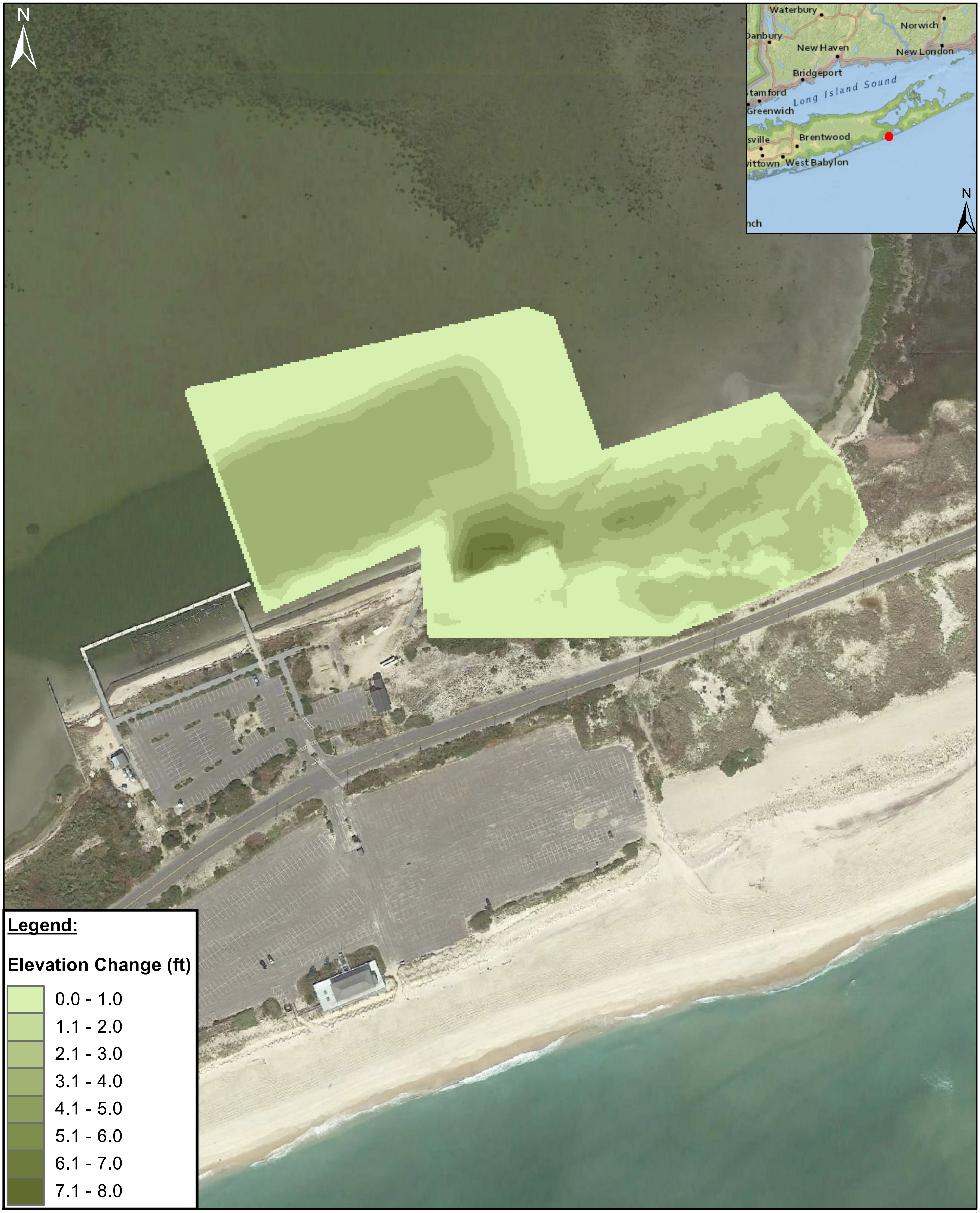
Feet

0 250 500

IMAGE SOURCE: Google Earth, 2016

Fire Island to Montauk Point
Coastal Process Features
Tiana Bayside Park
Proposed Elevations

PROJECT	C2017-071
DRAWN BY	WKL
SHEET	1 OF 1
DATE	DEC 2017



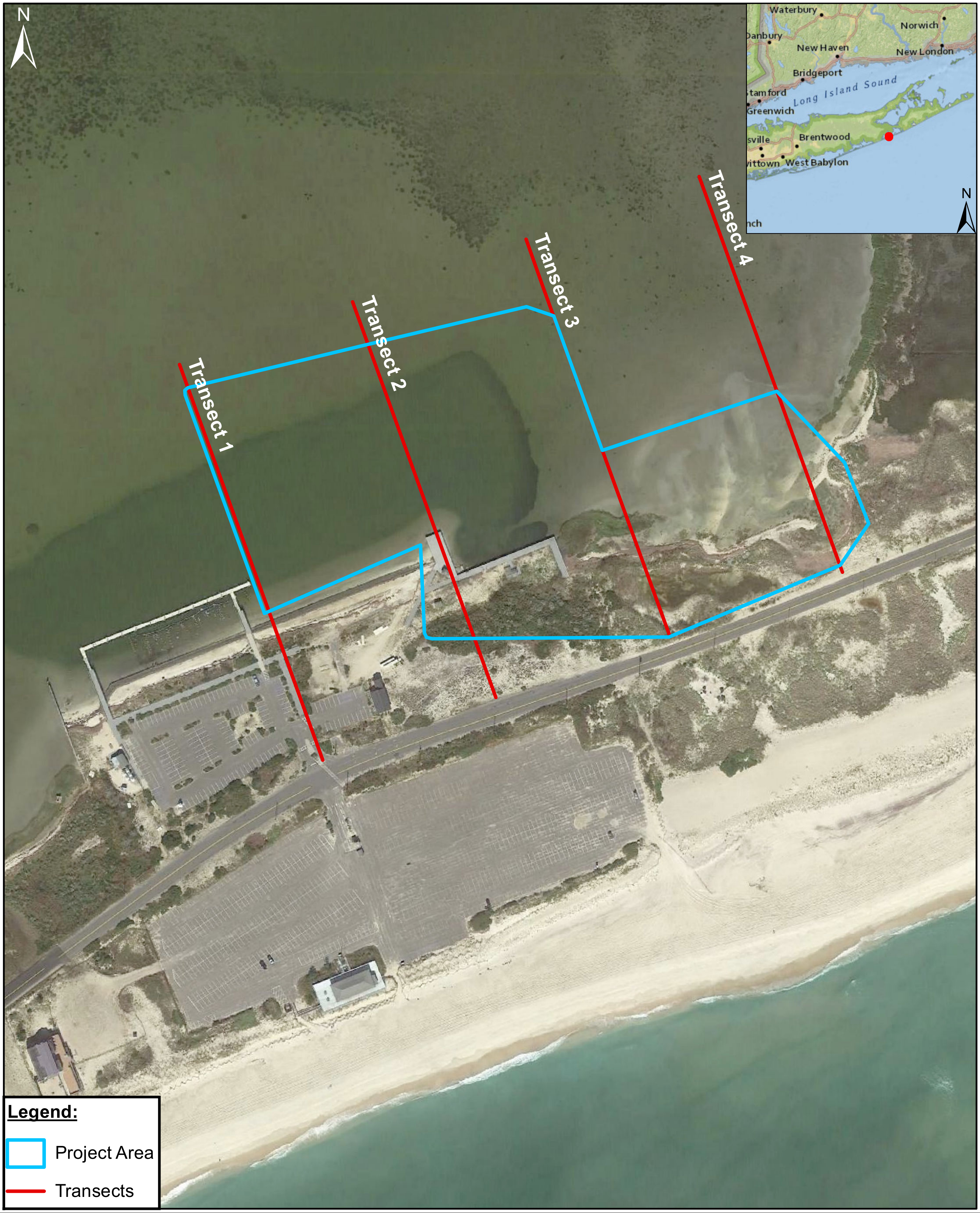
Feet

0 250 500

IMAGE SOURCE: Google Earth, 2016

Fire Island to Montauk Point
Coastal Process Features
Tiana Bayside Park
Proposed Elevation Changes

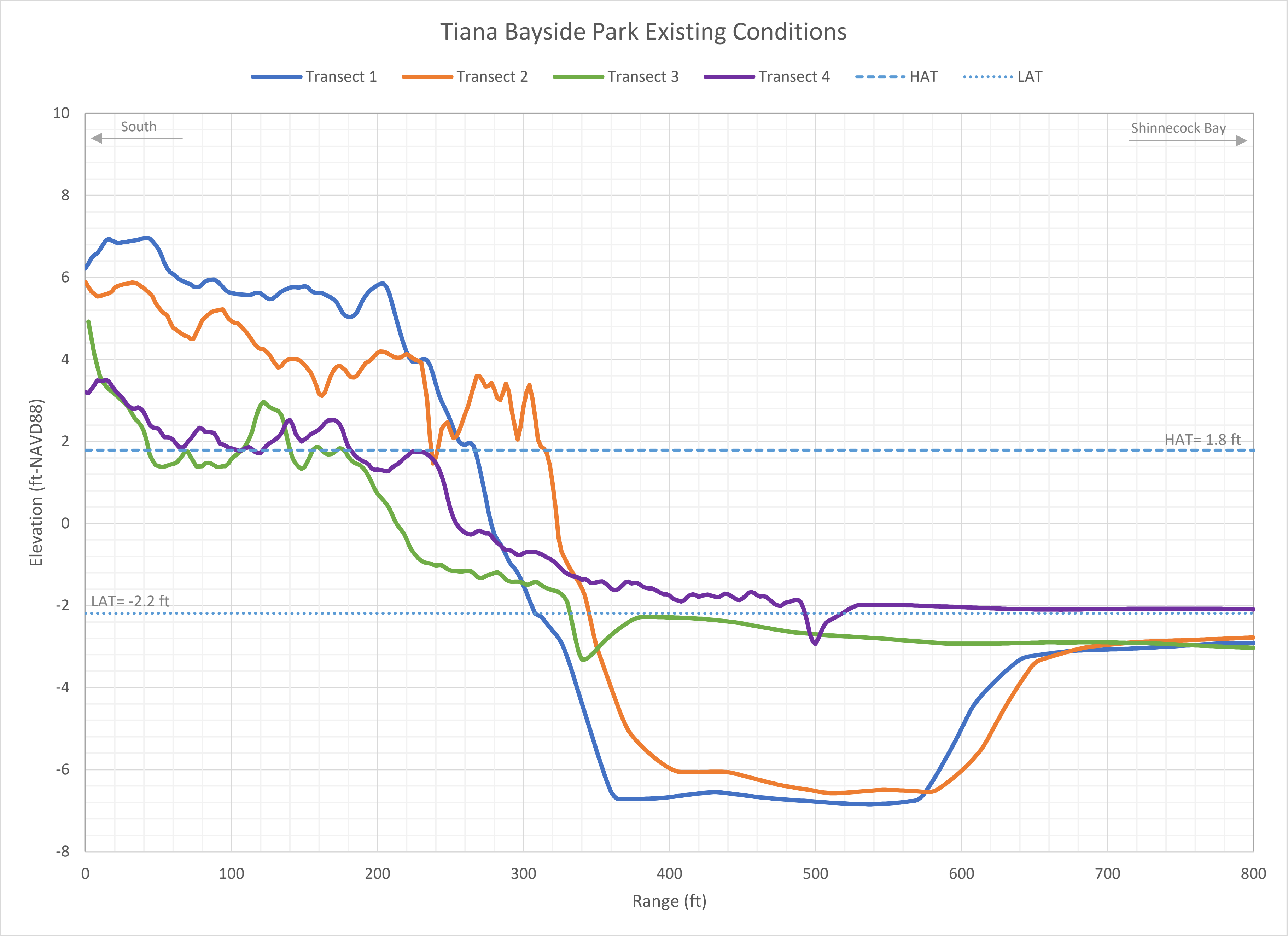
PROJECT	C2017-071
DRAWN BY	WKL
SHEET	1 OF 1
DATE	DEC 2017



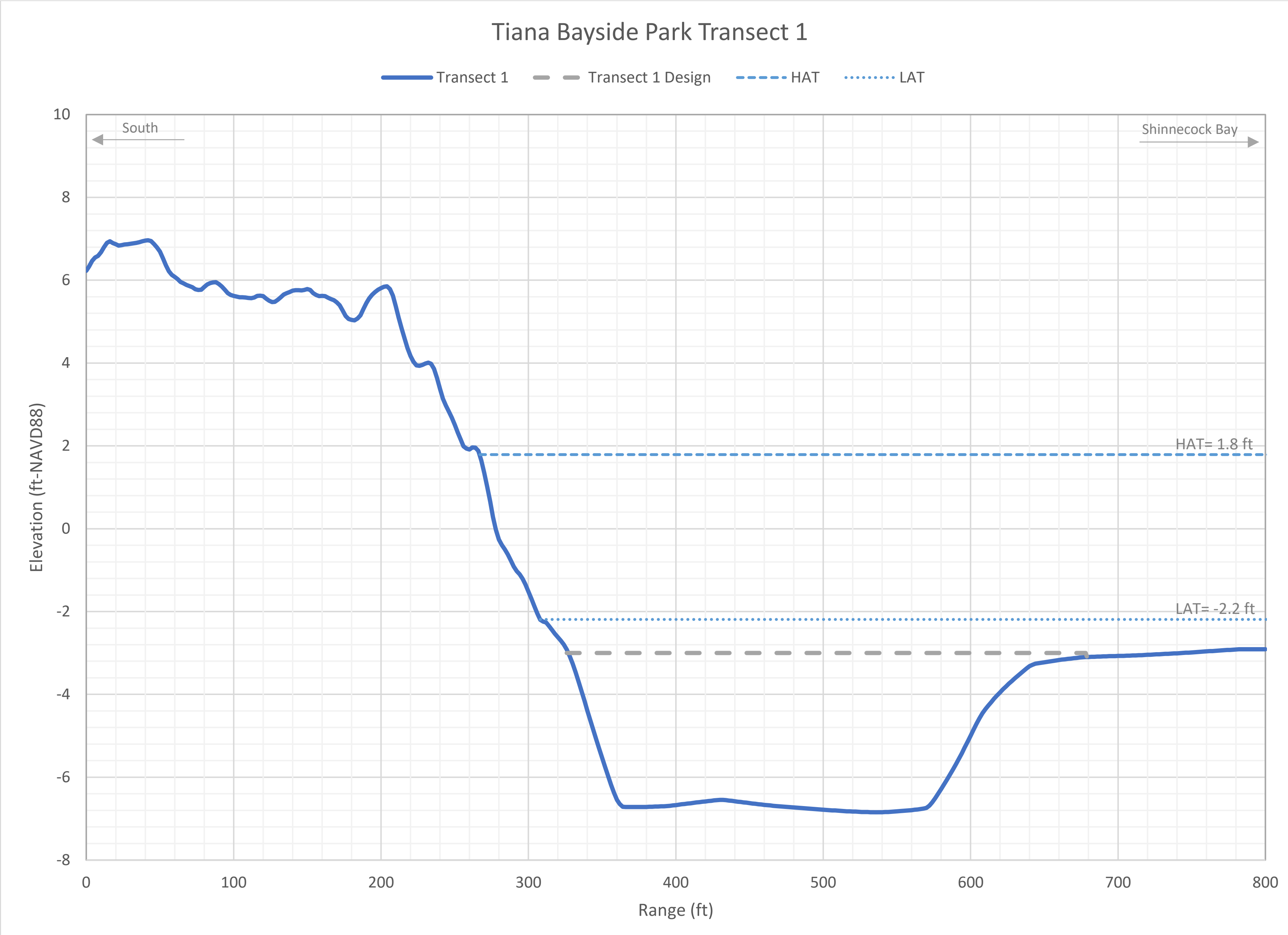
Feet
0 250 500
IMAGE SOURCE: Google Earth, 2016

Fire Island to Montauk Point
Coastal Process Features
Tiana Bayside Park
Transect Locations

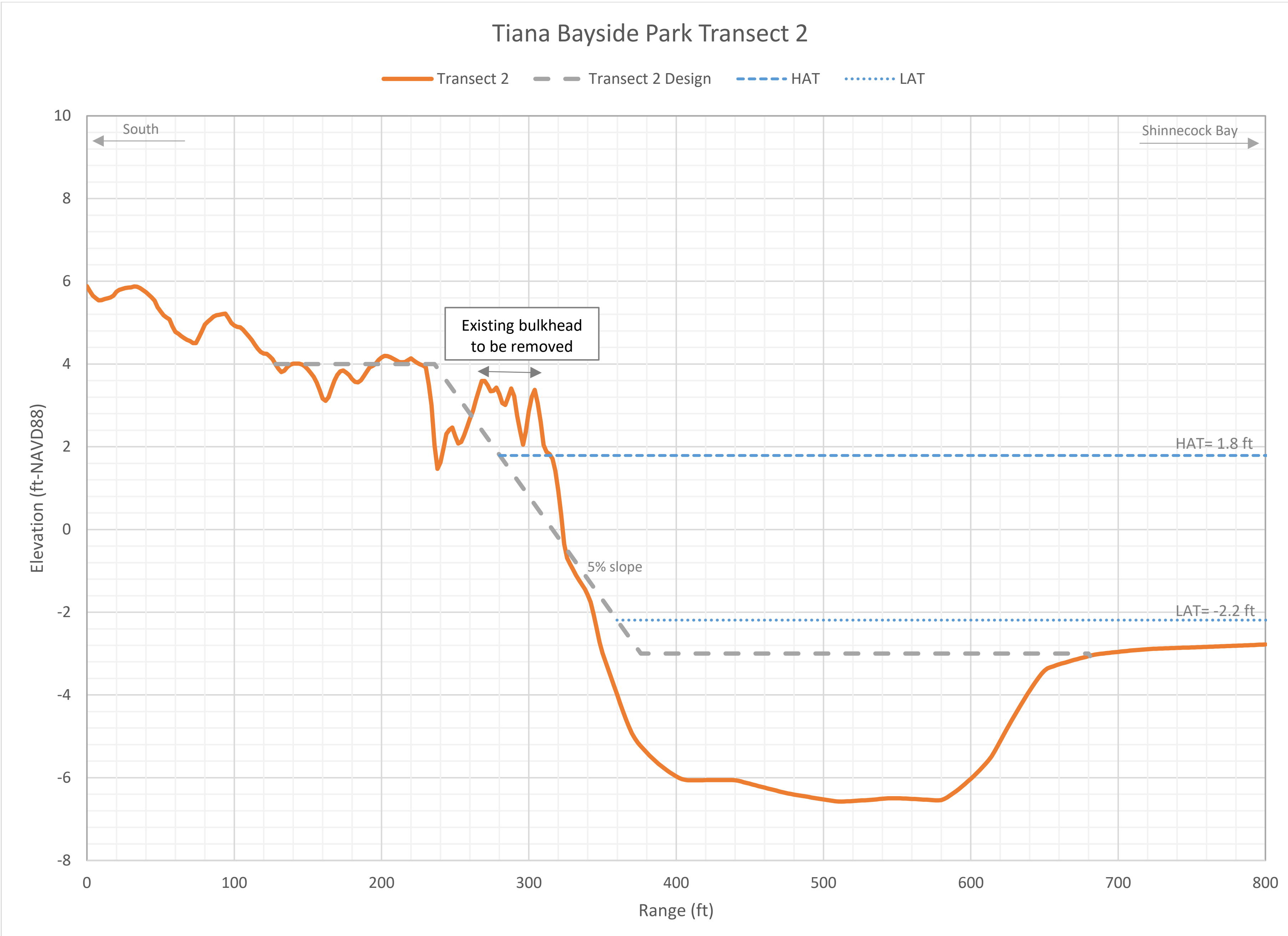
PROJECT	C2017-071
DRAWN BY	WKL
SHEET	1 OF 1
DATE	DEC 2017

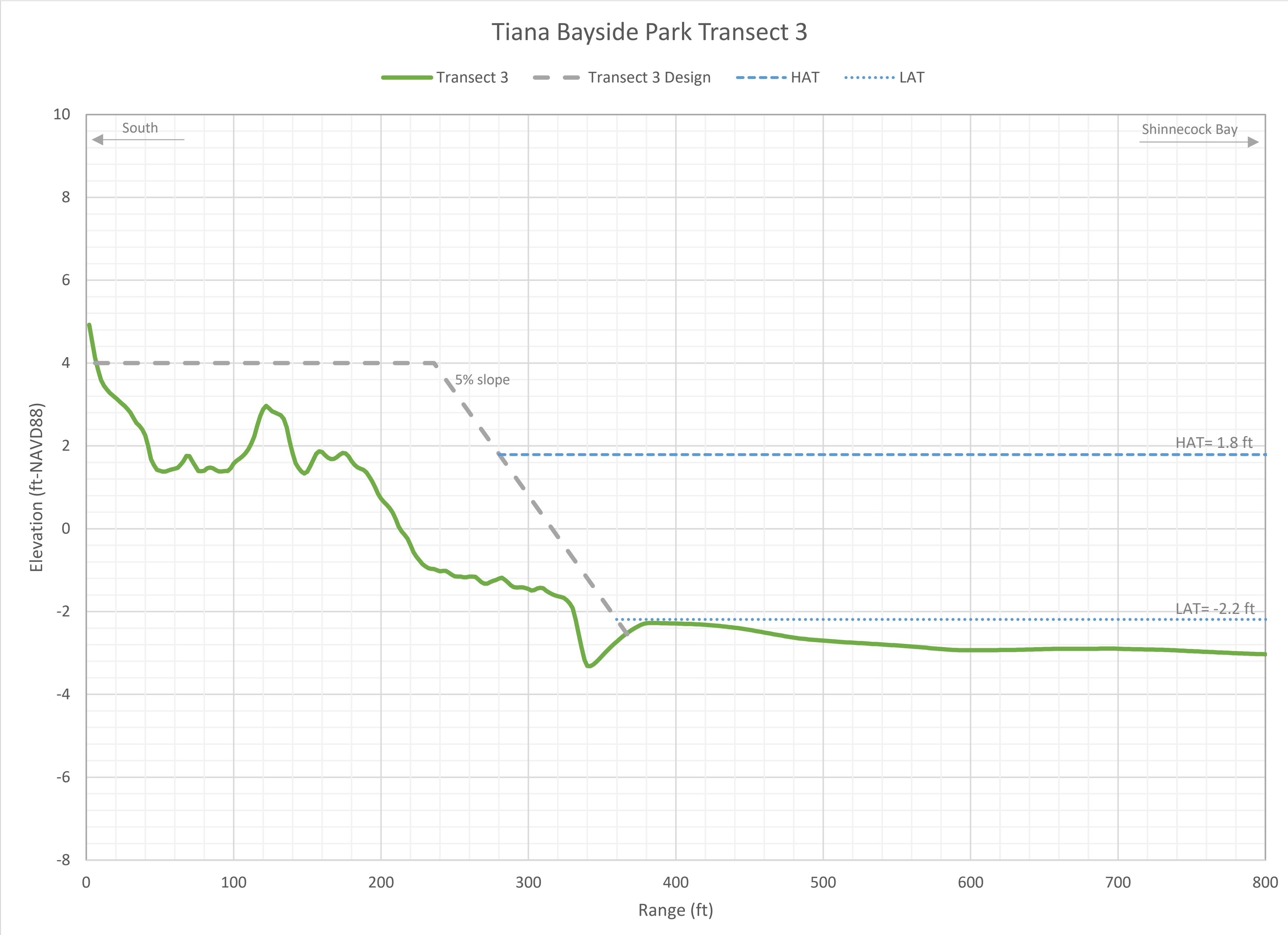


Tiana Bayside Park Existing Conditions
Transect 1
Transect 2
Transect 3
Transect 4
HAT
LAT
South
Shinnecock Bay
HAT= 1.8 ft
LAT= -2.2 ft
10
8
6
4
2
0
-2
-4
-6
-8
0
100
200
300
400
500
600
700
800
Elevation (ft-NAVD88)
Range (ft)

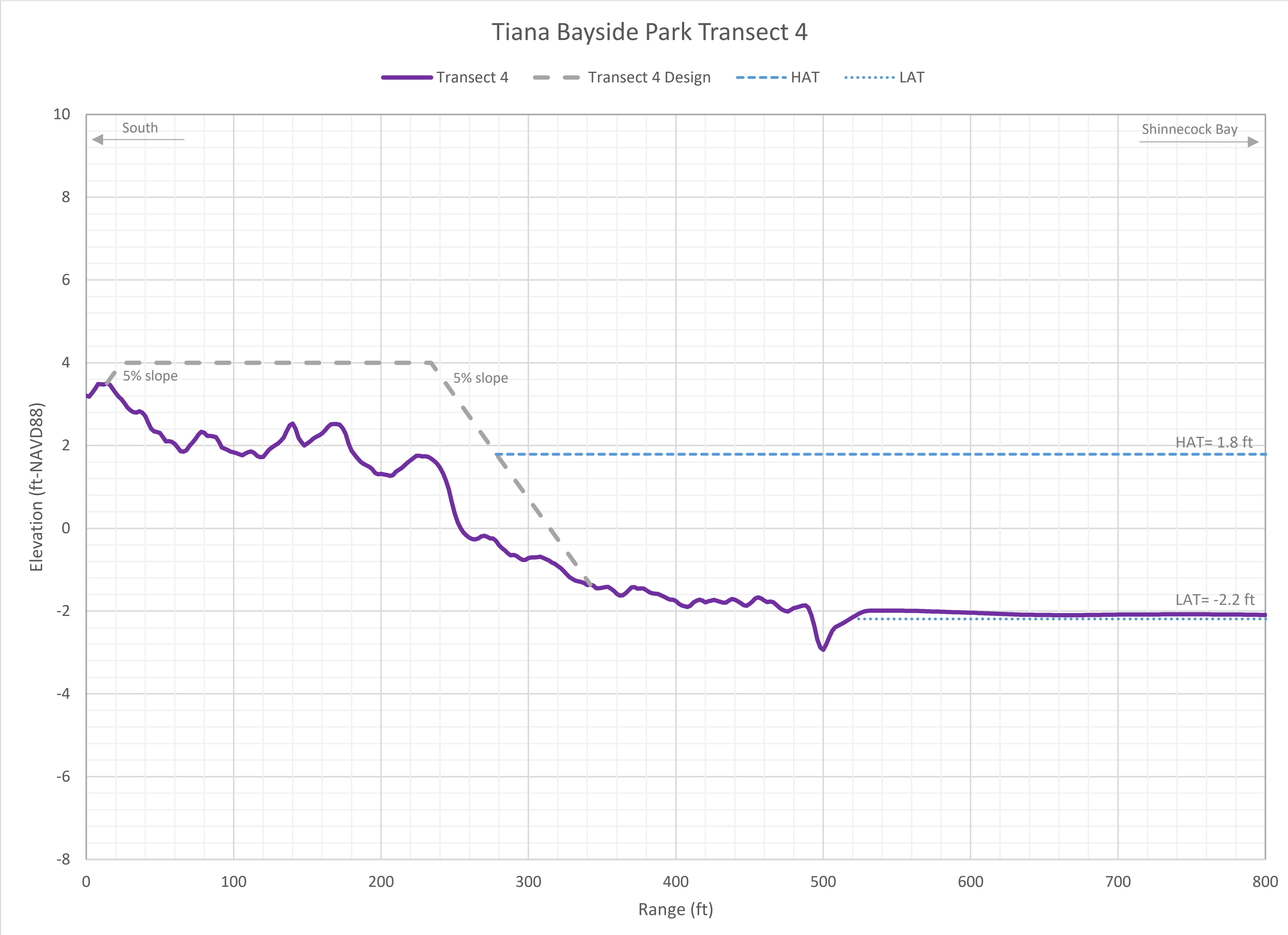


Tiana Bayside Park Transect 1
Transect 1
Transect 1 Design
HAT
LAT
South
Shinnecock Bay
HAT= 1.8 ft
LAT= -2.2 ft
Elevation (ft-NAVD88)
Range (ft)
10
8
6
4
2
0
-2
-4
-6
-8
0
100
200
300
400
500
600
700
800


Tiana Bayside Park Transect 2
Transect 2
Transect 2 Design
HAT
LAT
South
Shinnecock Bay
Existing bulkhead to be removed
HAT= 1.8 ft
LAT= -2.2 ft
5% slope
Elevation (ft-NAVD88)
Range (ft)
10
8
6
4
2
0
-2
-4
-6
-8
0
100
200
300
400
500
600
700
800



Tiana Bayside Park Transect 3
Transect 3
Transect 3 Design
HAT
LAT
South
Shinnecock Bay
5% slope
HAT= 1.8 ft
LAT= -2.2 ft
Elevation (ft-NAVD88)
Range (ft)
10
8
6
4
2
0
-2
-4
-6
-8
0
100
200
300
400
500
600
700
800


Tiana Bayside Park Transect 4
Transect 4
Transect 4 Design
HAT
LAT
South
Shinnecock Bay
5% slope
5% slope
HAT= 1.8 ft
LAT= -2.2 ft
Elevation (ft-NAVD88)
Range (ft)
10
8
6
4
2
0
-2
-4
-6
-8
0
100
200
300
400
500
600
700
800

CPF Site MB1: Mastic Beach 1	Town of Brookhaven, NY/ east of William Floyd Parkway & West of Pattersquash Creek
	40.746981° N / -72.846617° W

CPF SITE GOALS

- Combine non-structural acquisition with restoration of natural floodplain function
- Create natural buffer to attenuate waves and reduce flooding impacts to developed areas

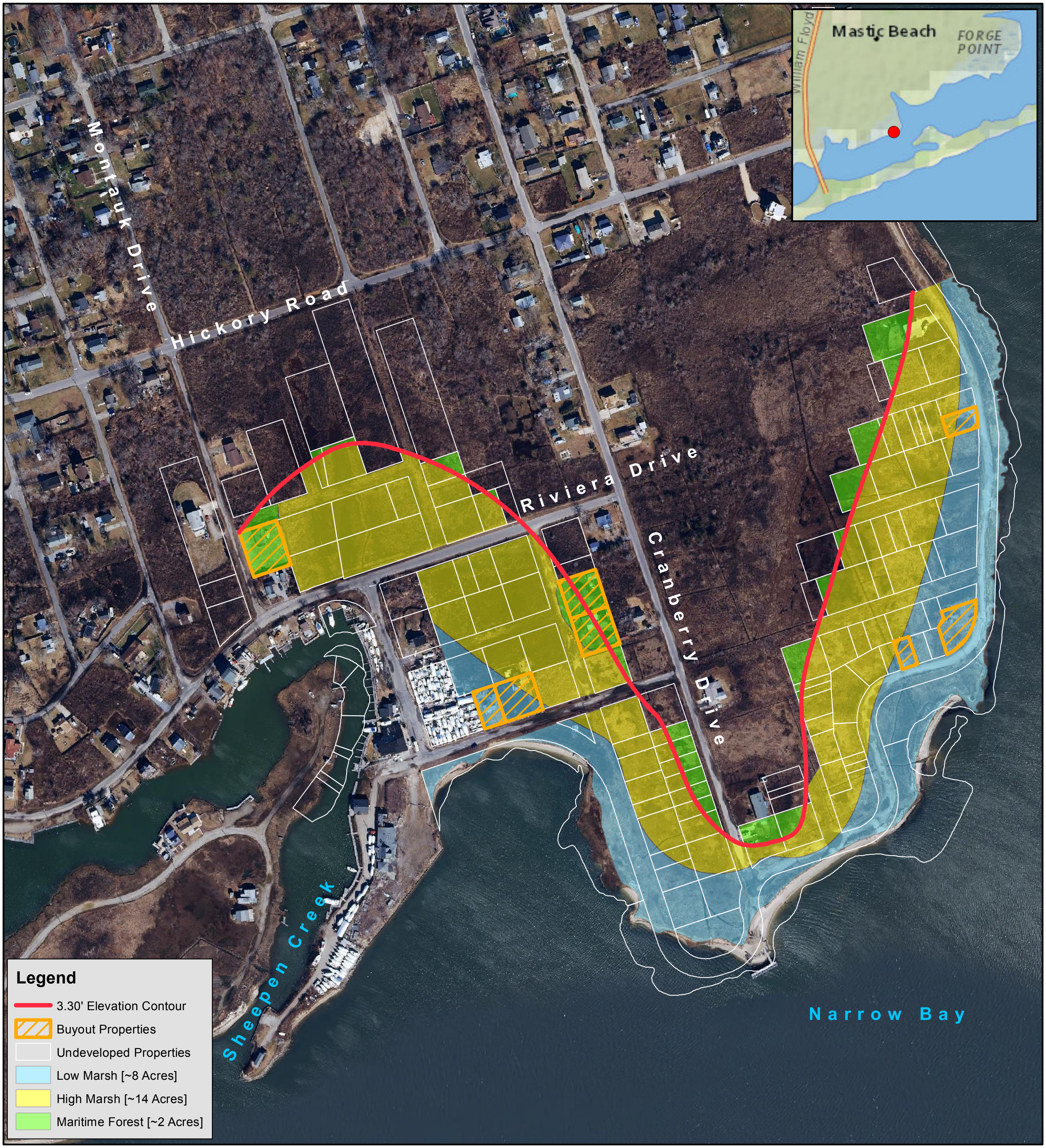
Coordination among agencies has identified the potential to combine the non-structural plans with restoration of natural systems to create a more effective CSRM plan.

Mastic Beach 1 includes undeveloped lands and eight properties targeted for buyouts as part of the non-structural plan. The undeveloped land consists primarily of common reed dominated wetlands, some existing uplands and high marsh shrub areas.

The conceptual CPF plan for Mastic Beach 1 consists of reestablishment of a natural vegetation community transition, beginning with forested uplands adjacent to the remaining residential areas, followed by high marsh shrub, high marsh grasses and low march near the shoreline at appropriate elevations. Following selective acquisition, former private parcels would be restored with native vegetation suited for the site conditions, thereby enhancing the CPF function of this vegetation type by increasing the width of vegetated area. Where higher elevations exist along the shoreline, these areas would be expanded if possible to create and enhance a high marsh shrub vegetation community. Although not depicted on the concept plan, existing linear channels, if and where present, would be altered to create more sinuous natural configurations to enhance the hydrologic function of the wetland and facilitate restoration of native vegetation. Details on existing channel configuration and reconfiguration, if needed, would be developed during the PED phase.

CPF Site MB1: Mastic Beach 1		Town of Brookhaven, NY/ east of William Floyd Parkway & West of Pattersquash Creek 40.746981° N / -72.846617° W
CPF PARAMETERS		
Feature	CSRM	
Cut Volume (cy)	0	
Fill Volume (cy)	0	
Net Volume (cy)	0	
Acreage	~25	
Activity	Buyouts – 8 residences Habitat Restoration	
DATA SOURCES		
Topographic	LiDAR DEM, North Atlantic Coast Comprehensive Study, 2010	
Aerial Imagery	NY State High Resolution Orthoimagery (2016)	
REAL ESTATE INFORMATION		
Property Owners	See Real Estate Report	
Municipality Location	Town of Brookhaven Mastic Beach	
County	Suffolk	
CBRA	None	

BAYSIDE TIDAL ENVIRONMENT			**Elevation (ft NAVD88)**
		Highest Astronomical Tide (HAT) – (2018)	1.5
Flood Frequency Node (see Engineering Appendix)	10	HAT – Project Year 2048 Sea Level Rise (SLR)	1.9
		HAT – 2048 Intermediate SLR	2.1
Datum Conversion			
0 ft-NAVD88	= - 1.17 ft-NGVD29	**Flood Frequency Data**	
		2-year	3.1
Target Habitat Type	**Acres**	10-year	4.5
Low Marsh	9	25-year	5.3
High Marsh	14	100-year	6.1
Maritime Forest	2		



0 500 1,000
Feet

Notes:
1. Lot lines for publically owned parcels not shown
2. All elevations in NAVD88 Feet

Map Source:
NY State High Resolution 2016 Orthoimagery

N
W E
S

Fire Island to Montauk Point
Coastal Process Features
Mastic Beach 1
Target Habitats Concept Plan

CPF Site MB2: Mastic Beach 2 – Area 1	Town of Brookhaven, NY East of Pattersquash Creek
	40.7535° N / -72.840596° W

CPF SITE GOALS

- Combine non-structural acquisition with restoration of natural floodplain function
- Create natural buffer to attenuate waves and reduce flooding impacts to developed areas

Coordination among agencies has identified the potential to combine the non-structural plans with restoration of natural systems to create a more effective CSRM plan.

Mastic Beach 2 – Area 1 includes undeveloped lands and one property targeted for buyout as part of the non-structural plan. The undeveloped land consists primarily of common reed dominated wetlands, some existing uplands and high marsh shrub areas. The common reed dominated wetlands appear to have been hydrologically altered as a result of linear channel construction and in some locations are low lying and may have restrictions to normal semi-diurnal tidal flow. Low marsh vegetation is present in lower lying areas and adjacent to channels. Uplands are present throughout and adjacent to the site.

The conceptual CPF plan for Mastic Beach 2 - Area 1 consists of reestablishment of a natural vegetation community transition, beginning with forested uplands adjacent to the remaining residential areas, followed by high marsh shrub, high marsh grasses and low march near the shoreline at appropriate elevations. Following acquisition, former private parcel would be restored with native vegetation suited for the site conditions, thereby enhancing the CPF function of this vegetation type by increasing the width of vegetated area. Where higher elevations exist along the shoreline, these areas would be expanded if possible to create and enhance a high marsh shrub vegetation community. Although not depicted on the concept plan, existing linear channels, if and where present, would be altered to create more sinuous natural configurations to enhance the hydrologic function of the wetland and facilitate restoration of native vegetation. Details on existing channel configuration and reconfiguration, if needed, would be developed during the PED phase.

CPF Site MB2: Mastic Beach 2 – Area 1		Town of Brookhaven, NY East of Pattersquash Creek 40.7535° N / -72.840596° W
CPF PARAMETERS		
Feature	CSRM	
Cut Volume (cy)	0	
Fill Volume (cy)	0	
Net Volume (cy)	0	
Acreage	~24	
Activity	Buyouts – 1 residence Habitat Restoration	
DATA SOURCES		
Topographic	LiDAR DEM, North Atlantic Coast Comprehensive Study, 2010	
Aerial Imagery	NY State High Resolution Orthoimagery (2016)	
REAL ESTATE INFORMATION		
Property Owners	See Real Estate Report	
Municipality Location	Town of Brookhaven Mastic Beach	
County	Suffolk	
CBRA	None	

BAYSIDE TIDAL ENVIRONMENT			**Elevation (ft-NAVD88)**
		Highest Astronomical Tide (HAT) – (2018)	1.5
Flood Frequency Node (see Engineering Appendix)	10	HAT – Project Year 2048 Sea Level Rise (SLR)	1.9
		HAT – 2048 Intermediate SLR	2.1
Datum Conversion			
0 ft-NAVD88	= - 1.17 ft-NGVD29	**Flood Frequency Data**	
		2-year	3.1
Target Habitat Type	**Acres**	10-year	4.5
Low Marsh	13	25-year	5.3
High Marsh	9	100-year	6.1
Maritime Forest	2		

0 550 1,100 Feet

N W E S

Fire Island to Montauk Point Coastal Process Features Mastic Beach 2 Area 1 Target Habitats Concept Plan

Notes:
1. Lot lines for publically owned parcels not shown
2. All elevations in NAVD88 Feet

Map Source:
NY State High Resolution 2016 Orthoimagery

CPF Site MB2: Mastic Beach 2 – Area 2	Town of Brookhaven, NY West of Lawrence Creek
	40.758649° N / -72.828377° W

CPF SITE GOALS

- Combine non-structural acquisition with restoration of natural floodplain function
- Create natural buffer to attenuate waves and reduce flooding impacts to developed areas

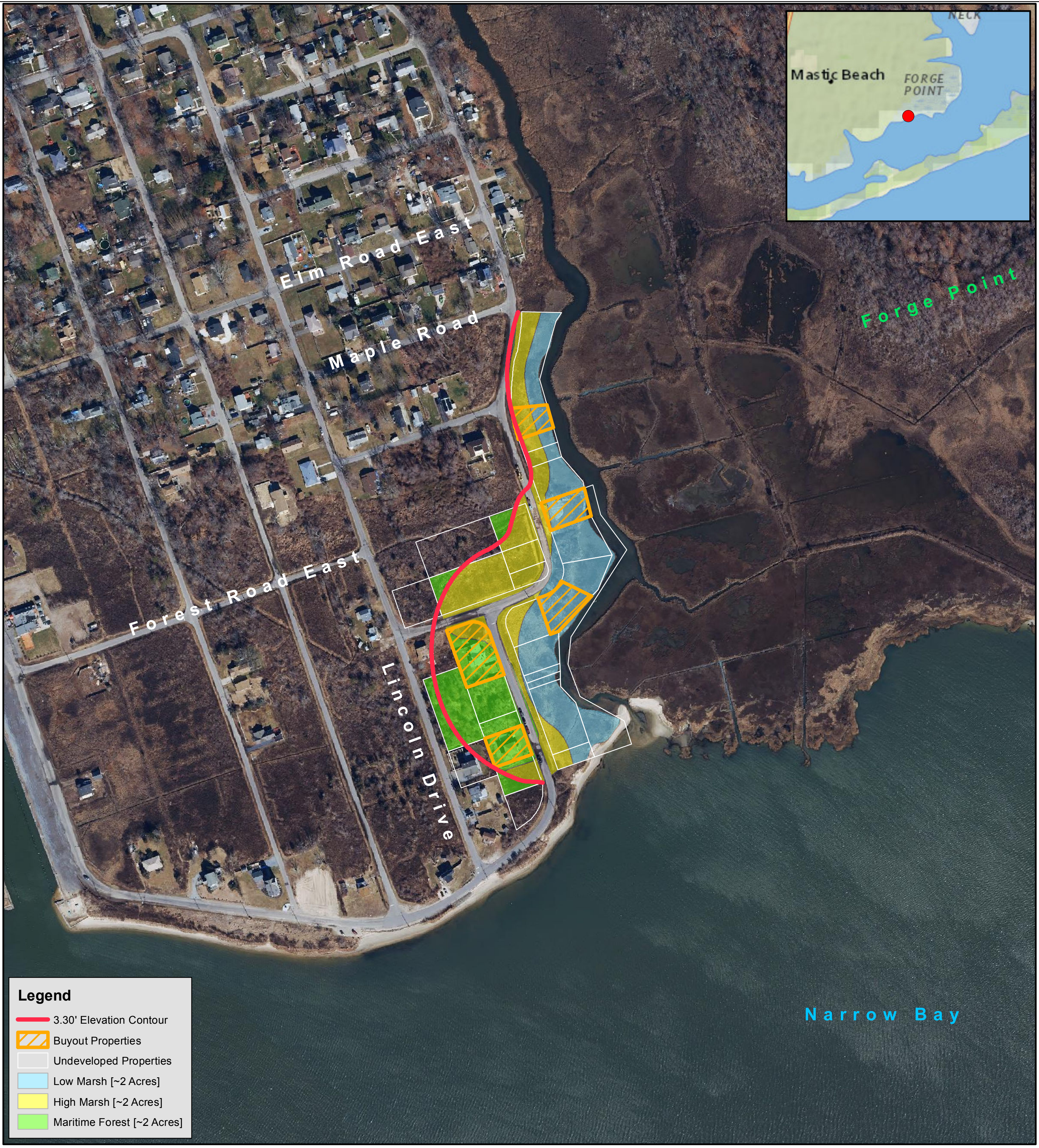
Coordination among agencies has identified the potential to combine the non-structural plans with restoration of natural systems to create a more effective CSRM plan.

Mastic Beach 2 – Area 2 includes undeveloped lands and five properties targeted for buyout as part of the non-structural plan. The undeveloped land consists primarily of common reed dominated wetlands and high marsh shrub areas, with some adjoining uplands.

The conceptual CPF plan for Mastic Beach 2 - Area 2 consists of reestablishment of a natural vegetation community transition, beginning with forested uplands adjacent to the remaining residential areas, followed by high marsh shrub, high marsh grasses and low march near the shoreline at appropriate elevations. Following acquisition, former private parcels would be restored with native vegetation suited for the site conditions, thereby enhancing the CPF function of this vegetation type by increasing the width of vegetated area. Although not depicted on the concept plan, existing linear channels, if and where present, would be altered to create more sinuous natural configurations to enhance the hydrologic function of the wetland and facilitate restoration of native vegetation. Details on existing channel configuration and reconfiguration, if needed, would be developed during the PED phase.

CPF Site MB2: Mastic Beach 2 – Area 2		Town of Brookhaven, NY West of Lawrence Creek 40.758649° N / -72.828377° W
CPF PARAMETERS		
Feature	CSRM	
Cut Volume (cy)	0	
Fill Volume (cy)	0	
Net Volume (cy)	0	
Acreage	~7	
Activity	Buyouts – 5 residences Habitat Restoration	
DATA SOURCES		
Topographic	LiDAR DEM, North Atlantic Coast Comprehensive Study, 2010	
Aerial Imagery	NY State High Resolution Orthoimagery (2016)	
REAL ESTATE INFORMATION		
Property Owners	See Real Estate Report	
Municipality Location	Town of Brookhaven Mastic Beach	
County	Suffolk	
CBRA	None	

BAYSIDE TIDAL ENVIRONMENT			**Elevation (ft-NAVD88)**
		Highest Astronomical Tide (HAT) – (2018)	1.5
Flood Frequency Node (see Engineering Appendix)	10	HAT – Project Year 2048 Sea Level Rise (SLR)	1.9
		HAT – 2048 Intermediate SLR	2.1
Datum Conversion			
0 ft. NAVD88	= - 1.17 ft. NGVD29	**Flood Frequency Data**	
		2-year	3.1
Target Habitat Type	**Acres**	10-year	4.5
Low Marsh	3	25-year	5.3
High Marsh	2	100-year	6.1
Maritime Forest	2		



0 500 1,000 Feet

N W E S

Notes:
1. Lot lines for publically owned parcels not shown
2. All elevations in NAVD88 Feet

Map Source:
NY State High Resolution 2016 Orthoimagery

Fire Island to Montauk Point
Coastal Process Features
Mastic Beach 2 Area 2
Target Habitats Concept Plan

INITIAL CONSTRUCTION (Year 0)
GRR - TSP
FIRE ISLAND TO MONTAUK POINT

Reach Name	Subreach	Plan	Sediment Source	Max Fill Length (ft)	Berm Length (ft)	Dune Length (ft)	Design Fill Volume (cy)	Est. Erosion Rate (ft/yr)	Renourishment Length (ft)	Renourishment Interval (yr)	Advance Fill Volume (cy)	15% Overfill (cy)	Subtotal Volume (cy)	15% Contigency/ Tolerance (cy)	UPDATED Total Initial Fill (cy)
Gilgo Beach		Bypassing	FII	12,700	12,700					2	0				701,048
RMSP	GSB-1A	Beachfill / Bypassing	FII	16,562	16,562		405,540	5	12,000	4	0	60,831	466,371	69,956	536,327
Democrat Point West	GSB-1A	CPF	N/A				0				0	0	0	0	deferred to yr4
Democrat Point East	GSB-1A	CPF	N/A				0				0	0	0	0	deferred to yr4
Dunefield West of Field 4	GSB-1A	CPF	N/A				0				0	0	0	0	deferred to yr4
FILT	GSB-1B	Proactive BCP	N/A	5,461				5			0	0	0	0	0
Kismet to Lonelyville	GSB-2A	Beachfill	N/A	8,918	8,918	8,918	346,591	5	8,918	4	0	51,989	398,580	59,787	deferred to yr4
Clam Pond	GSB-2A	CPF	N/A				51,212			4	0	7,682	58,894	8,834	deferred to yr4
Town Beach to Corneille Estates	GSB-2B	Beachfill	N/A	4,529	4,529	4,529	145,405	5	4,529	4	0	21,811	167,215	25,082	deferred to yr4
Atlantique to Corneille	GSB-2B	CPF	N/A				64,640			4	0	9,696	74,336	11,150	deferred to yr4
Ocean Beach to Seaview	GSB-2C	Beachfill	N/A	3,752	3,752	3,752	120,459	5	3,752	4	0	18,069	138,528	20,779	deferred to yr4
OBP to POW	GSB-2D	Beachfill	N/A	7,228	7,228	7,228	123,622	5	7,316	4	0	18,543	142,165	21,325	deferred to yr4
Cherry Grove	GSB-3A	Beachfill	N/A	2,950	2,950		22,906	2	3,389	4	0	3,436	26,342	3,951	deferred to yr4
Fire Island Pines	GSB-3C	Beachfill	N/A	6,457	6,457	6,457	237,714	10	7,034	4	0	35,657	273,371	41,006	deferred to yr4
Talisman	GSB-3D	CPF	N/A				85,880			4	0	12,882	98,762	14,814	deferred to yr4
Water Island	GSB-3E	Beachfill	N/A	2,875	2,875	2,575	17,489	2	2,875	4	0	2,623	20,112	3,017	deferred to yr4
Davis Park	GSB-3G	Beachfill	N/A	4,167	4,167	4,167	182,092	12	4,989	4	0	27,314	209,405	31,411	deferred to yr4
SPCP-West - Ebb Shoal	MB-1A	Beachfill / Bypassing	MI Ebb Shoal	6,290	6,290		97,782	2	6,290	1	0	14,667	112,450	16,867	73,000
SPCP-West - Inlet	MB-1A	Beachfill / Bypassing	MI	6,290	6,290		97,782	2	6,290	1	0	14,667	112,450	16,867	56,317
SPCP-East	MB-1B	Proactive BCP / Bypassing	MI	13,095			88,509	2	13,095	1	0	13,276	101,785	15,268	30,011
Pattersquash	MB-1B	CPF	MI				19,396				0	2,909	22,305	3,346	25,651
New Made Island	MB-1B	CPF	MI				100,583				0	15,087	115,670	17,351	133,021
Great Gun	MB-2A	Proactive BCP / Bypassing	N/A	7,600			66,914	2	4,500	1	0	10,037	76,951	11,543	0
SPCP Marsh	MB-2A	CPF	4C?				259,430				0	38,915	298,345	44,752	343,096
Moriches Inlet -West	MB-2B	Proactive BCP	N/A	6,200			0	-			0	0	0	0	0
"Great Gun" CPF	MB-2B	CPF	N/A				0	-			0	0	0	0	0
Cupsogue	MB-2C	Beachfill	4C	4,300	4,300	4,300	118,283	5	2,000	4	0	17,742	136,025	20,404	156,429
Pikes	MB-2D	Beachfill	4C	9,630	9,630		175,741	9	9,630	4	0	26,361	202,102	30,315	232,417
Westhampton	MB-2E	Beachfill	4C	10,908	10,908		132,709	6	10,908	4	0	19,906	152,615	22,892	175,508
Hampton Beach	SB-1A	Proactive BCP	N/A	16,800				-			0	0	0	0	0
Sedge Island	SB-1B	Proactive BCP	5Bexp	10,200	10,200	8,263	784,142	5		2	0	117,621	901,763	135,264	1,037,027
Dune Rd, East Quogue	SB-1B	CPF	5BExp				49,890				0	7,484	57,374	8,606	65,980
Tiana Beach	SB-1C	Proactive BCP	5Bexp	3,400	3,400	3,400	156,673	5		2	0	23,501	180,173	27,026	207,199
Tiana Bayside Park	SB-1C	CPF	5BExp				36,647				0	5,497	42,144	6,322	48,466
SIPW -Offshore	SB-1D	Proactive BCP	5Bexp	6,300	3,400	3,200	315,331	5		2	0	47,300	362,630	54,395	417,025
SIPW - Inlet	SB-1D	Proactive BCP / Bypassing	SI	5,300	3,400	3,200	7,758	5		2	0	1,164	8,921	1,338	10,259
Ponquogue	SB-2A	Proactive BCP	N/A	5,300			0	-			0	0	0	0	0
WOSI - Inlet	SB-2B	Proactive BCP / Bypassing	SI	2,700	2,700	1,000	616,250	25		2	0	92,438	708,688	106,303	814,991
WOSI - Offshore	SB-2B	Proactive BCP	N/A	2,700	2,700	1,000	0	25			0	0	0	0	0
Shinnecock Inlet - East	SB-2C	Reactive BCP	N/A	9,800			0	-			0	0	0	0	0
Southampton Beach	SB-3A	Reactive BCP	N/A	9,200			0	-			0	0	0	0	0
Montauk Beach	M-1F	Sediment Management	8D	6,000	6,000		409,000	-	6,000	4	0				450,000
															5,513,771
															616213.585

Inlet Management	Channel / Dep.	Ebb Shoal	Total
Fire Island Inlet	858,375	379,000	1,237,375
Moriches Inlet	245,000	73,000	318,000
Shinnecock Inlet	616,250	209,000	825,250
			2,380,625

Contracts	Plan	Volume (cy)	
1 - Fire Island Inlet	Inlet Management	1,237,375	
2 - Moriches and Shinnecock Inlets	Inlet Management	1,143,250	
3a - Shinnecock Area	Proactive BCP & CPFs	1,776,000	2,226,000

Notes:
Intrasite Mobilizations will need to be included for each CPF.
Beachfill quantities based on expected losses since last date of construction.
Fire Island Communities Beachfill Initial Construction occurred under FIMI, so renourishment deferred until Year 4. Design volumes rem
Inlet dredging quantities based on the 2007 Inlet Modifications Report (AP + Ebb Shoal) and date of last dredging.
RMSP projected to use FII as borrow source, in conjunction with Inlet dredging
At Fire Island Inlet, 701048 cy bypassed to Gilgo Beach
At Moriches Inlet, 73000 of Ebb Shoal material assumed to be placed at SPCP West

3b - Montauk	Sediment Management	450,000		At Moriches Inlet, remaining 56317cy of SPCP-West beachfill assumed to use Moriches Inlet as the Borrow Source
4a - SPCP Marsh CPF	CPF	343,096	907,096	At Moriches Inlet, Pattersquash and New Made Island CPFs assumed to use Moriches Inlet as the Borrow Source
4b - Westhampton	Beachfill	564,000		At Moriches Inlet, the remaining 30011cy of dredged material assumed to be placed at SPCP-East
5 - Fire Island	Beachfill	-		SPCP Marsh CPF assumed to use an offshore borrow source due to quantity required, and included in the Westhampton Beachfill contra
				Proactive BCP trigger has been reached in Sedge Island, Tiana Beach, and SIPW based on 2012 LIDAR survey.
		5,513,721		Proactive BCP quantities are estimated based on 2012 LIDAR and Proactive BCP Template (13' Dune and 90' Berm) Plus estimated additi
				Proactive BCP quantities at Sedge Island were reduced by 150,000cy due to project overlap with Village of Quogue beachfill project
				Dune Rd and Tiana Bayside Park CPFs assumed to be included in the Shinnecock Area Proactive BCP Contract

Figure B-1: Active Borrow Sites for Coney Island, Rockaway, and Long Beach

Figure B-2: Active Borrow Sites for Jones Beach

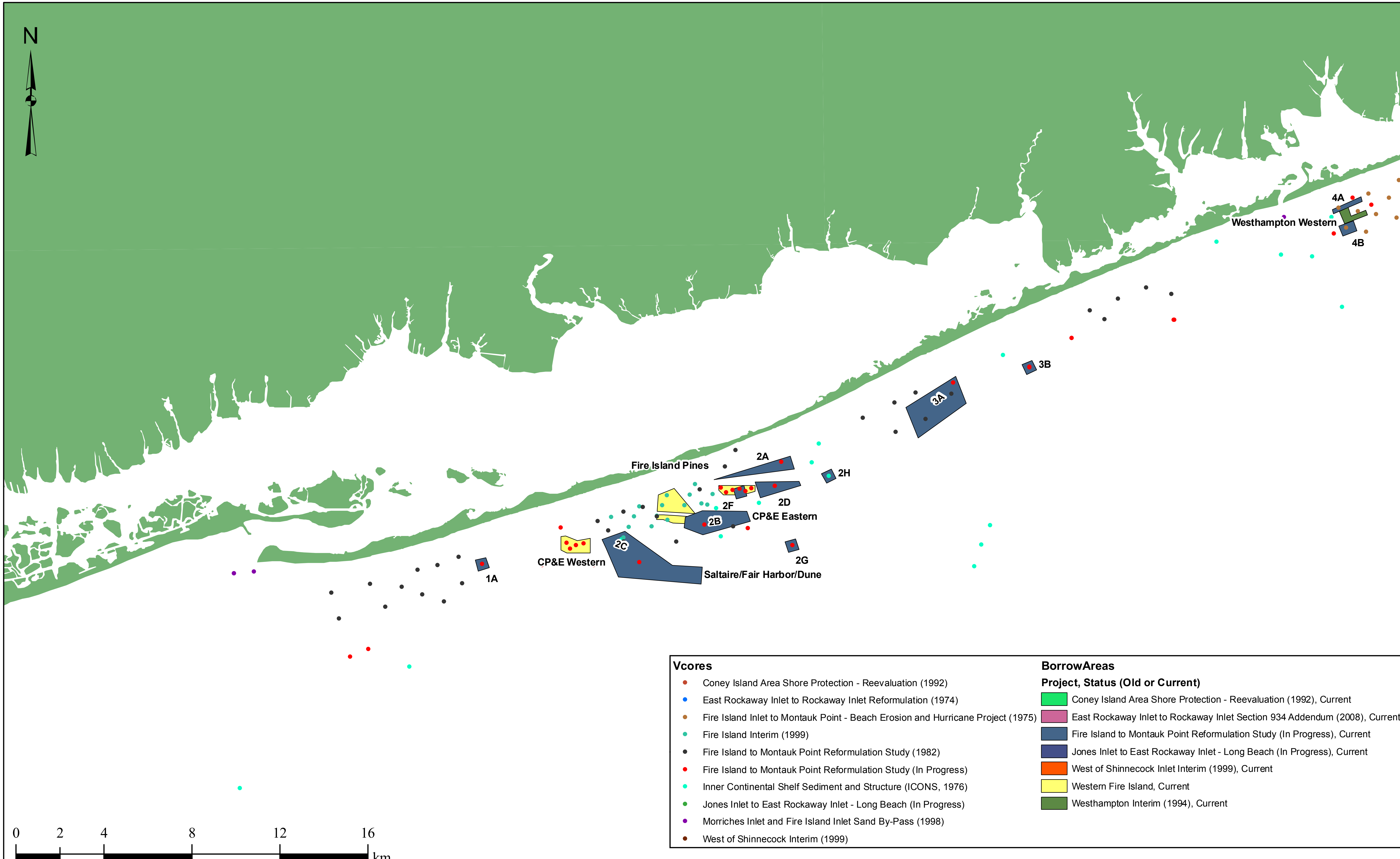


Figure B-3: Active Borrow Sites for Fire Island

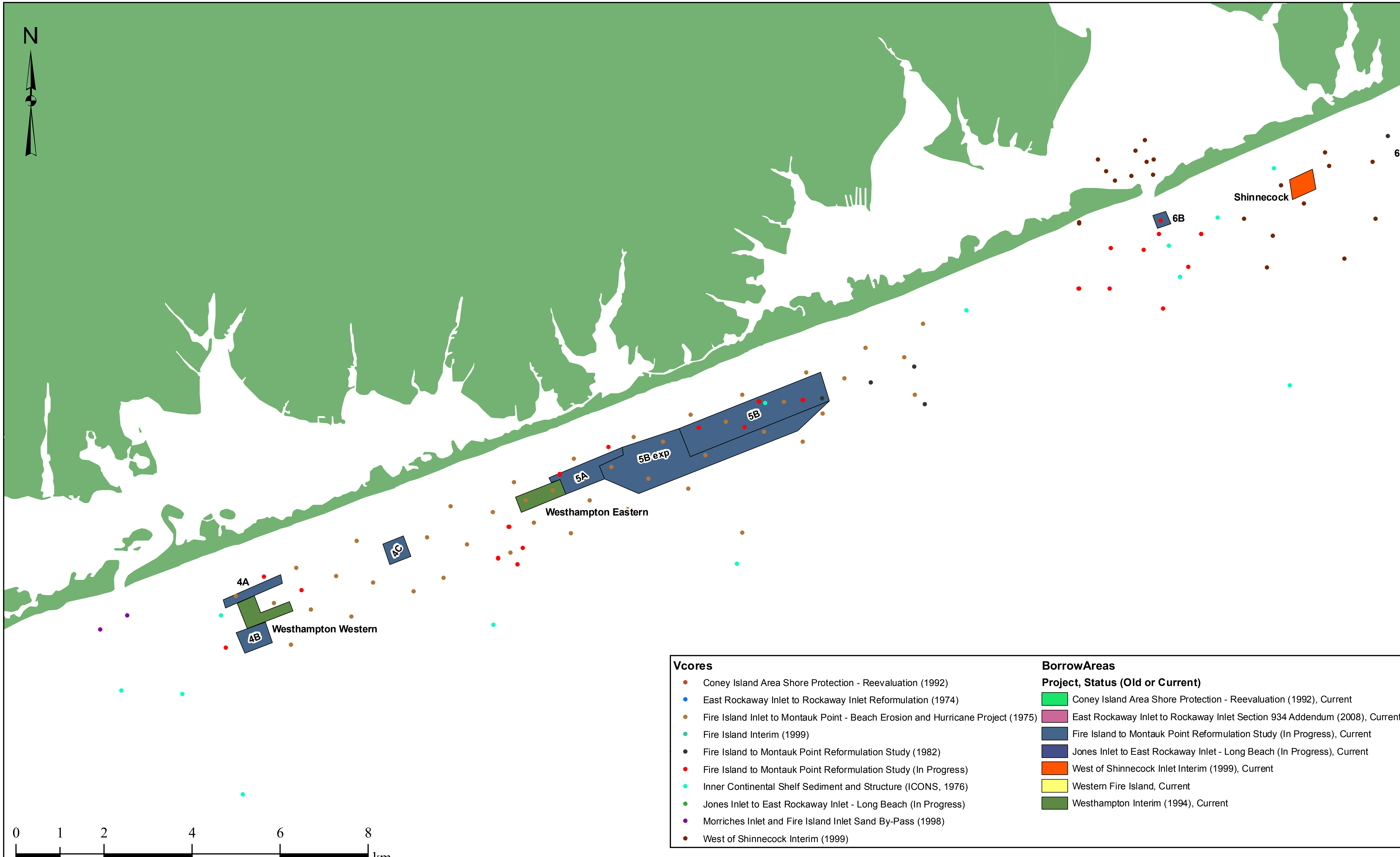


Figure B-4: Active Borrow Sites for Westhampton

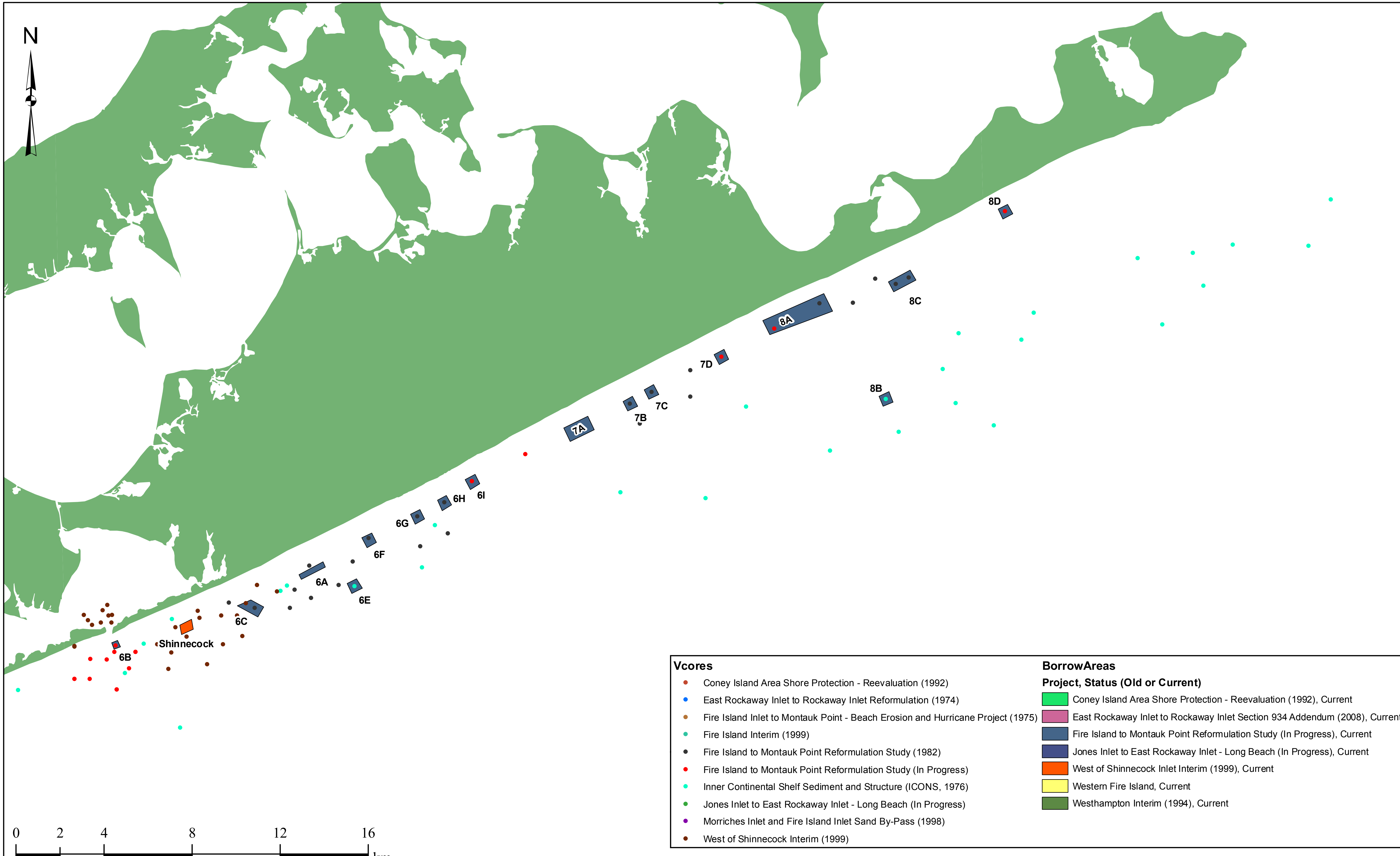


Figure B-5: Active Borrow Sites for Montauk

Biological and Environmental Services Related to Marine and Navigable Waterways Civil Works Activities in the New York District

Contract: W912BU-12-D-0021, Task Order 0059

Fire Island to Moriches Inlet (FIMI), Borrow Area Study for the Atlantic Coast Long Island, New York, Storm Damage Reduction Projects

Contract: W912BU-13-D-0010, Task Order CE08

Flood Control Coastal Emergency Borrow Area Study for the Atlantic Coast Long Island, New York, Storm Damage Reduction Projects

Final Report
April 2018

FOREWORD

This report entitled "Fire Island to Moriches Inlet (FIMI) Borrow Area Study for the Atlantic Coast Long Island, New York, Storm Damage Reduction Projects- Flood Control Coastal Emergency Borrow Area Study for the Atlantic Coast Long Island, New York, Storm Damage Reduction Projects" was prepared by Tetra Tech, Inc., for Mr. Robert Smith, Environmental Branch, U.S. Army Corps of Engineers, New York District, under Contract No. W912BU-12-D-0021; Task Order: 0059; and Contract No. W912BU-13-D-0010; Task Order: CE08.

Sources for Cover Photos (in order from left to right):
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Images: James D'Ambrosio
http://www.nan.usace.army.mil/Media/News-Stories/Story-Article-View/Article/570983/westhampton-beach-interim-project-complete-caps-two-years-work-restoring-the-ne/

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LIST OF FIGURES

RECOMMENDED CITATION:

U.S. Army Corps of Engineers. 2018. FIMI Borrow Area Study for the Atlantic Coast Long Island, New York, Storm Damage Reduction Projects Final Report. Task Order 0059. Flood Control Coastal Emergency Borrow Area Study for the Atlantic Coast Long Island, New York, Storm Damage Reduction Projects. Task Order CE08. Final Report. Prepared for U.S. Army Corps of Engineers – New York District by Tetra Tech, Inc., April 2018.

LIST OF ABBREVIATIONS

°C	degrees Celsius
cm	centimeter
CPUE	catch per unit effort
DO	dissolved oxygen
ECO	Ecological Consulting Organization
EFH	Essential Fish Habitat
ft.	feet
GPS	global positioning system
HDPE	high-density polyethylene
in	inch
m^2	square meter
mg/L	milligrams per liter
NAVD	North American Vertical Datum
NJDEP	New Jersey Department of Environmental Protection
NOAA	National Oceanic and Atmospheric Administration
NTU	nephelometric turbidity units
oz	ounce
ppt	parts per thousand
QC	quality control
sp.	species
USACE	United States Army Corps of Engineers
QC	quality control

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1.0 INTRODUCTION

The U.S. Army Corps of Engineers (USACE), New York District is conducting a comprehensive feasibility-level reformulation of shore protection and storm damage reduction for the Atlantic Coast of Long Island, New York, FIMI Storm Damage Reduction Project (the Project). The habitats within the borrow area of the project must be assessed to monitor conditions before and after dredge activities. Field work conducted between May and September 2017 included the collection of water quality data, benthic grab sampling, sediment characterization, and fish trawling at the FIMI Borrow Areas 2C and 5B, East Rockaway, and WOSI.

There are potential impacts to fish from the dredging of sand for beach nourishment along the New York coast. Dredge activities affect the top portion of the seabed, creating a shallow depression in the borrow area. Impacts are generally localized and restricted to the dredge project footprint and the immediately surrounding area. Larger and more mobile organisms, such as crustaceans, finfish, and marine mammals, are not similarly confined to one area and will largely be able to avoid most of the dredging activity, though this is not universal, especially for bottom-dwelling animals and early life history stages. Additionally, many fisheries resources depend on benthos as a prey resource. Since benthic invertebrates are expected to experience 100% mortality if residing within dredged material removed from the borrow area, finfish abundance within the borrow area following dredging may be influenced by recovery of benthic resources within the borrow area.

Of interest to this fish study are commercially important species, as New York waters support a diversity of valuable fisheries. For the purposes of this report the commercially important species in New York waters are the 12 species that generated over $1 million of revenue individually in 2016 (Table 1; NOAA 2017a). Of these, six were finfish, four were bivalves, one was a cephalopod and one was a crustacean. Northern quahogs (*Mercenaria mercenaria*) were the most valuable fishery, worth over $11.9 million. The most abundant species landed by weight was longfin squid (*Doryteuthis pealeii*), which brought in over $7.7 million. In total, 121 different species were landed in New York State, grossing $47.8 million.

Table 1. Commercial Fisheries Landings from 2016 in New York that Generated Over $1 Million in Revenue

Commercial Fisheries Landings from 2016 in New York that Generated Over $1 Million in Revenue		
Species	**Pounds**	**Value**
Northern quahog clam	2,165,545	$ 11,913,969
Longfin squid	6,274,957	$ 7,794,865
Sea scallop	397,652	$ 3,782,858
Golden tilefish	741,314	$ 2,972,145
Scup	3,505,830	$ 2,905,285
Summer flounder	602,535	$ 2,523,692
Striped bass	539,670	$ 2,261,201
Goosefish	1,581,142	$ 1,963,318
Silver hake	1,719,344	$ 1,520,403
Clams or bivalves*	1,840,896	$ 1,265,056
Atlantic surf clam	1,835,643	$ 1,241,763
American lobster	218,354	$ 1,034,999

Source: NOAA 2017a; * species not specified

1.1 Project Description and Location

The USACE identified the East Rockaway Borrow Area; FIMI Borrow Areas, 2C and 5B; and West of Shinnecock Inlet (WOSI) Borrow Area for this benthic and finfish survey (Figure 1). The borrow areas surveyed for this study are located on the Atlantic shore of Long Island, NY. East Rockaway is 2 miles south of Long Island, NY and about 6 miles east of Rockaway Inlet (Figure 2). It is about 2.86 square miles (approximately 2.6 miles long and 1.1 miles wide). Its depth ranges from 36 to 58 feet. Borrow Area 2C is located about 2 miles off Cherry Grove, Fire Island, NY; it is approximately 2.0 square miles (2.4 miles long on its longest side, and 1.1 miles wide at its widest), with depths of 51 to 78 feet (Figure 3). Borrow Area 5B is approximately 2 miles off the coast from Quogue, NY. It is approximately 2 square miles (3 miles long and 0.7 miles wide), with depths of 24 to 64 feet (Figure 4Figure 4). WOSI is located approximately 1.5 miles east of Shinnecock Inlet (

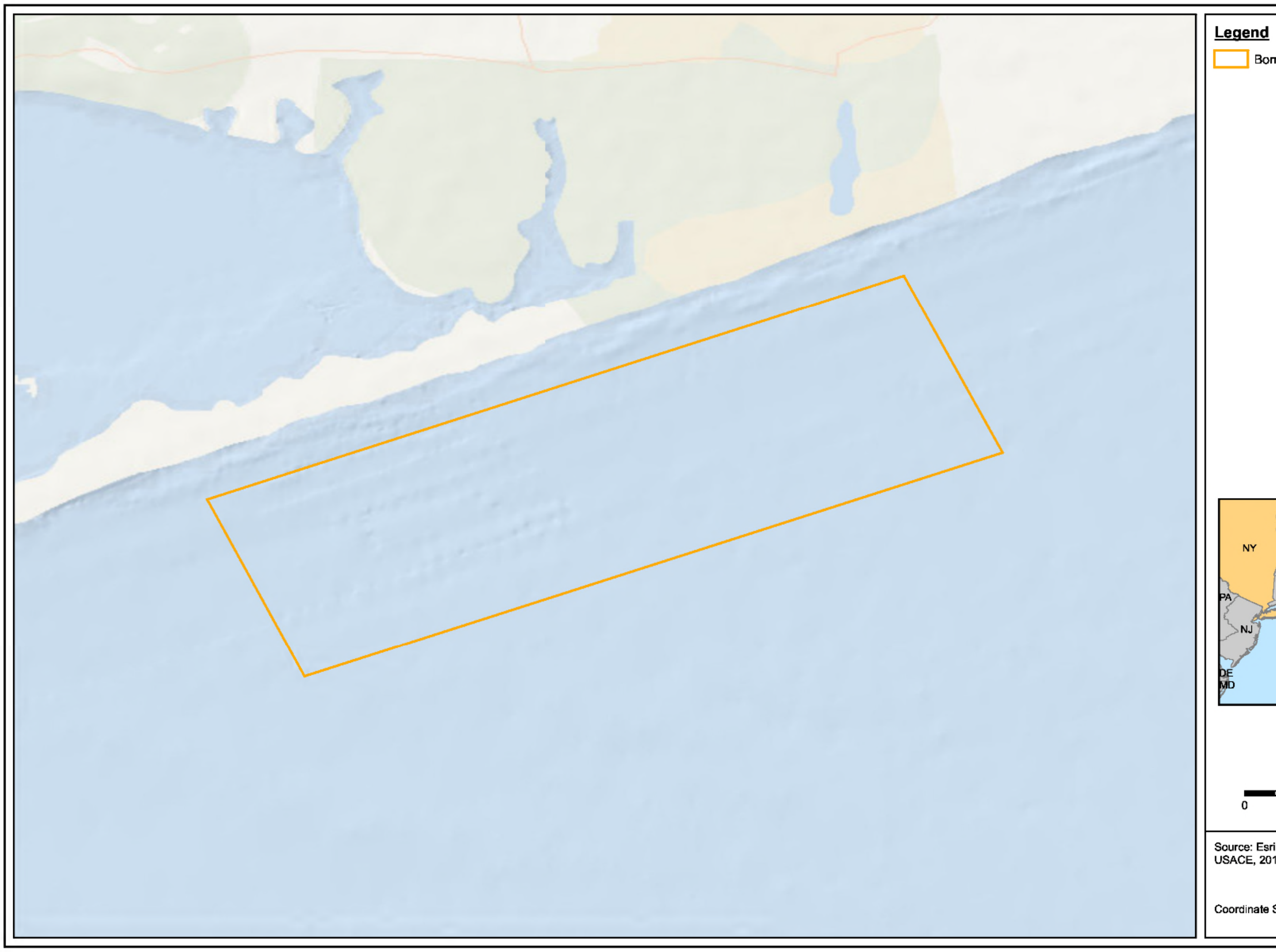

Figure 5). It is about 5.2 square miles (approximately 3.9 miles long and 1.3 miles wide), with depths of 23 to 74 feet.

Borrow Areas have designated utilized areas that were dredged before the commencement of this study that are depicted in the figures. The coordinates of the borrow areas are defined according to the New York State Plane Coordinate System, Long Island Zone, NAD 83 coordinate system in Table 2.

Table 2: Coordinates of the Borrow Areas

Coordinates of the Borrow Areas in North American Datum 83		
Borrow Area	**Latitude**	**Longitude**
East Rockaway	229200.9741	1365190.327
	230031.974	1367020.327
	230596.9739	1366900.327
	231980.9734	1371140.326
2C	168702.785	1228875.547
	168704.5219	1228879.606
	169996.9898	1228250.352
	171296.9898	1231600.351
	170418.2891	1232884.41
	166210.7887	1238735.183
	165921.8614	1243159.378
5B	163393.75	1243032.972
	164477.2265	1230663.283
	168702.785	1228875.547
	234054.2212	1382348.301
	234053.9726	1382350.324
	231846.973	1380000.324
	227146.9742	1368150.326
	228234.9747	1365580.327
WOSI	231980.8839	1371143.856
	236208.5841	1381679.706
	234054.2212	1382348.301
	139297.189	1030850.466

The benthic and finfish survey of this site was completed as described in the following sections. Sampling sites were targeted and identified using the vessel's onboard global positioning system (GPS) navigation system. Positioning data were recorded manually or electronically with the ESRI Collector application in an Apple iPad along with a mapping grade Bluetooth GPS receiver, at each of the sites identified for sampling. GPS points followed the WGS 84 coordinate system. Sampling locations were mapped using ESRI ArcGIS® Release 10.

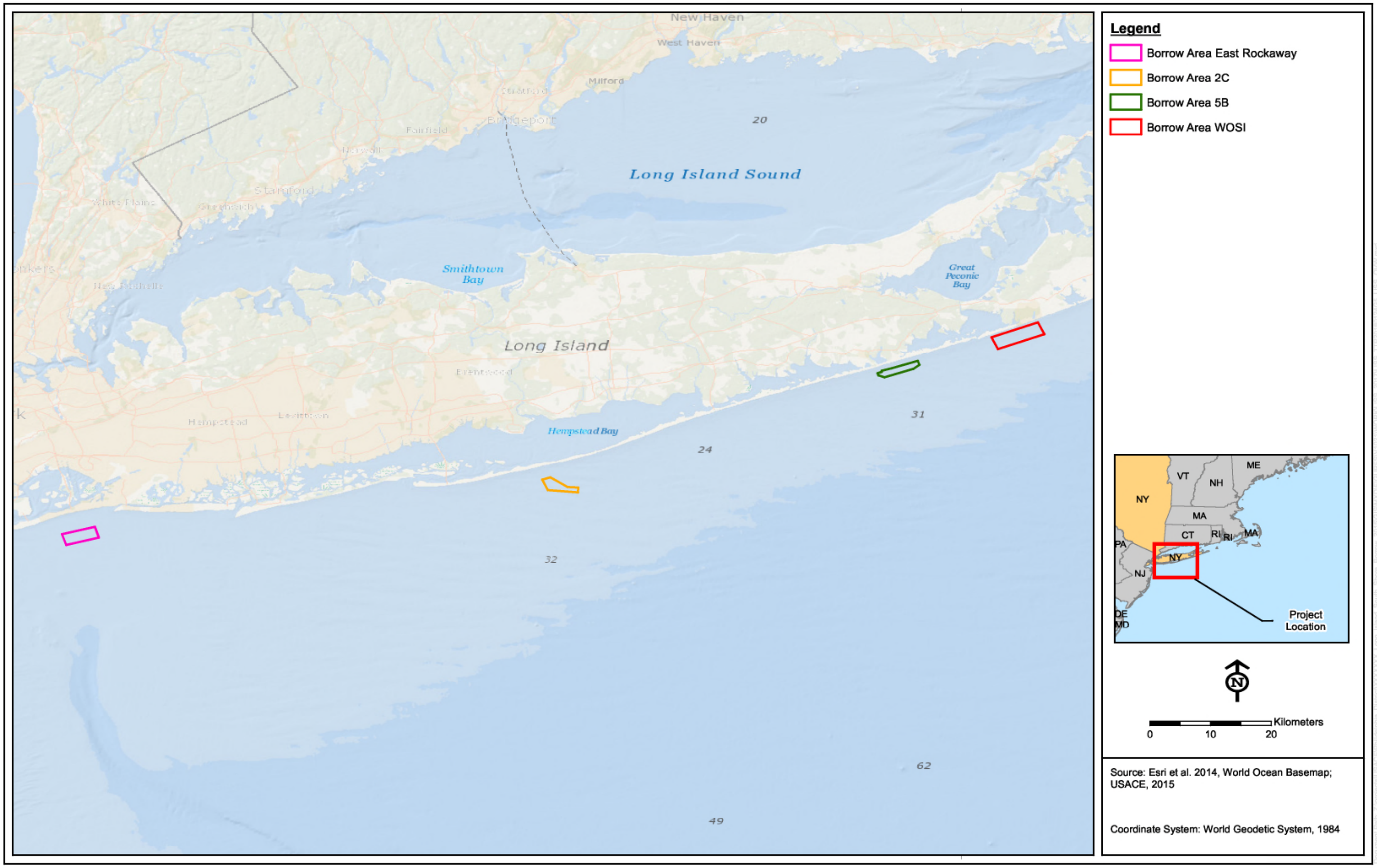

Figure 1: Study Borrow Areas for Long Island, New York Storm Damage Reduction Projects

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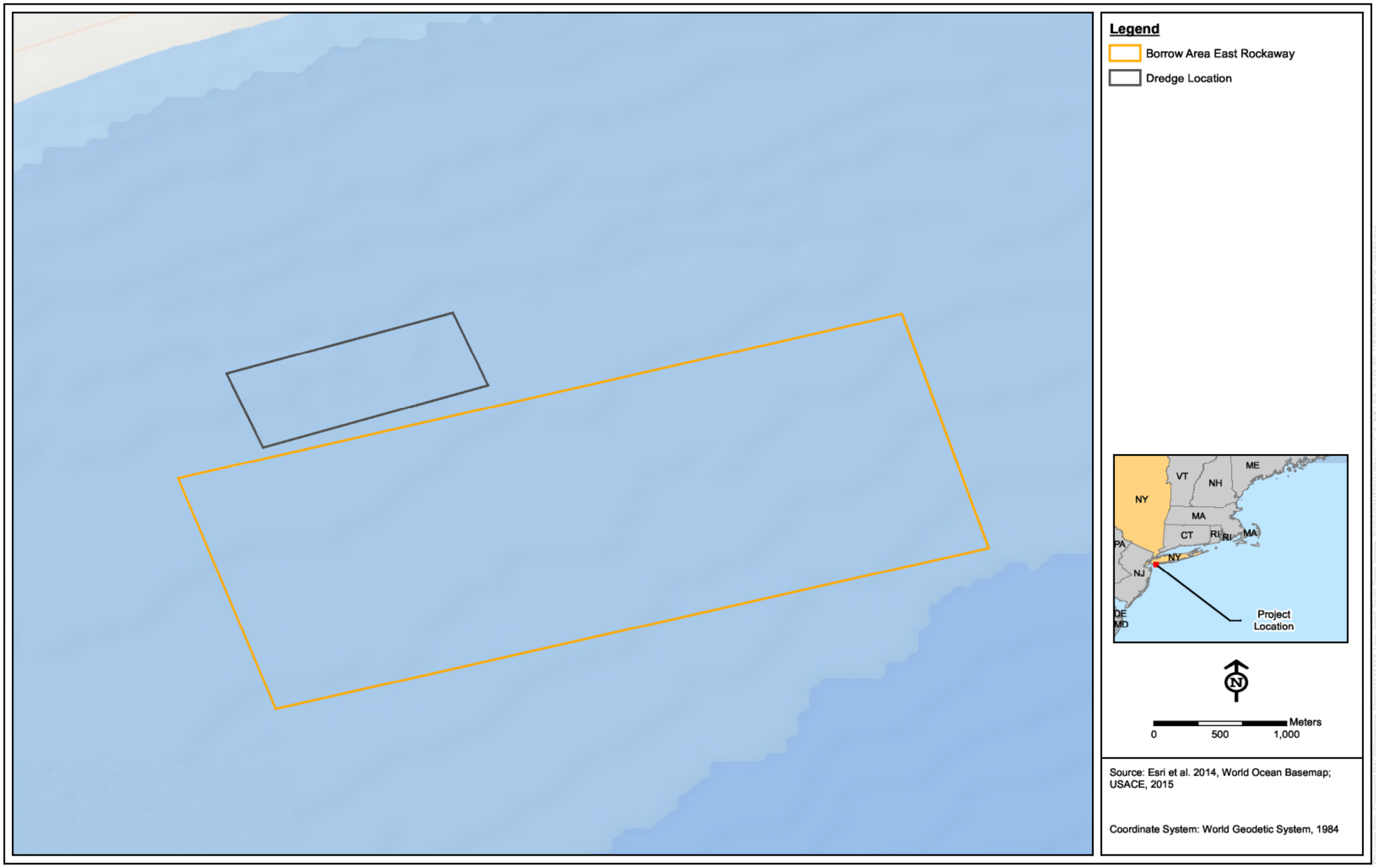

Figure 2: Borrow Area East Rockaway

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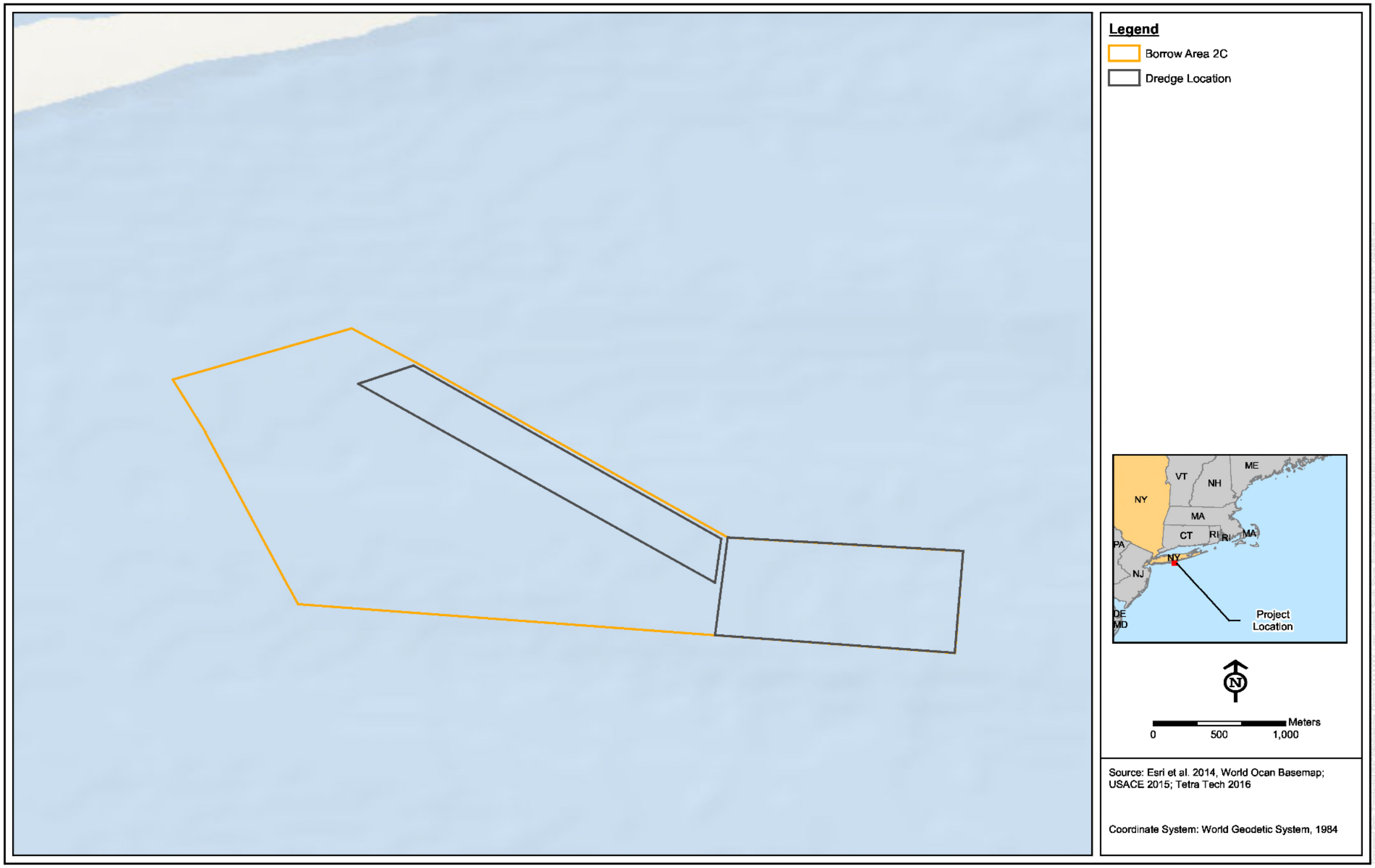

Figure 3: Borrow Area 2C

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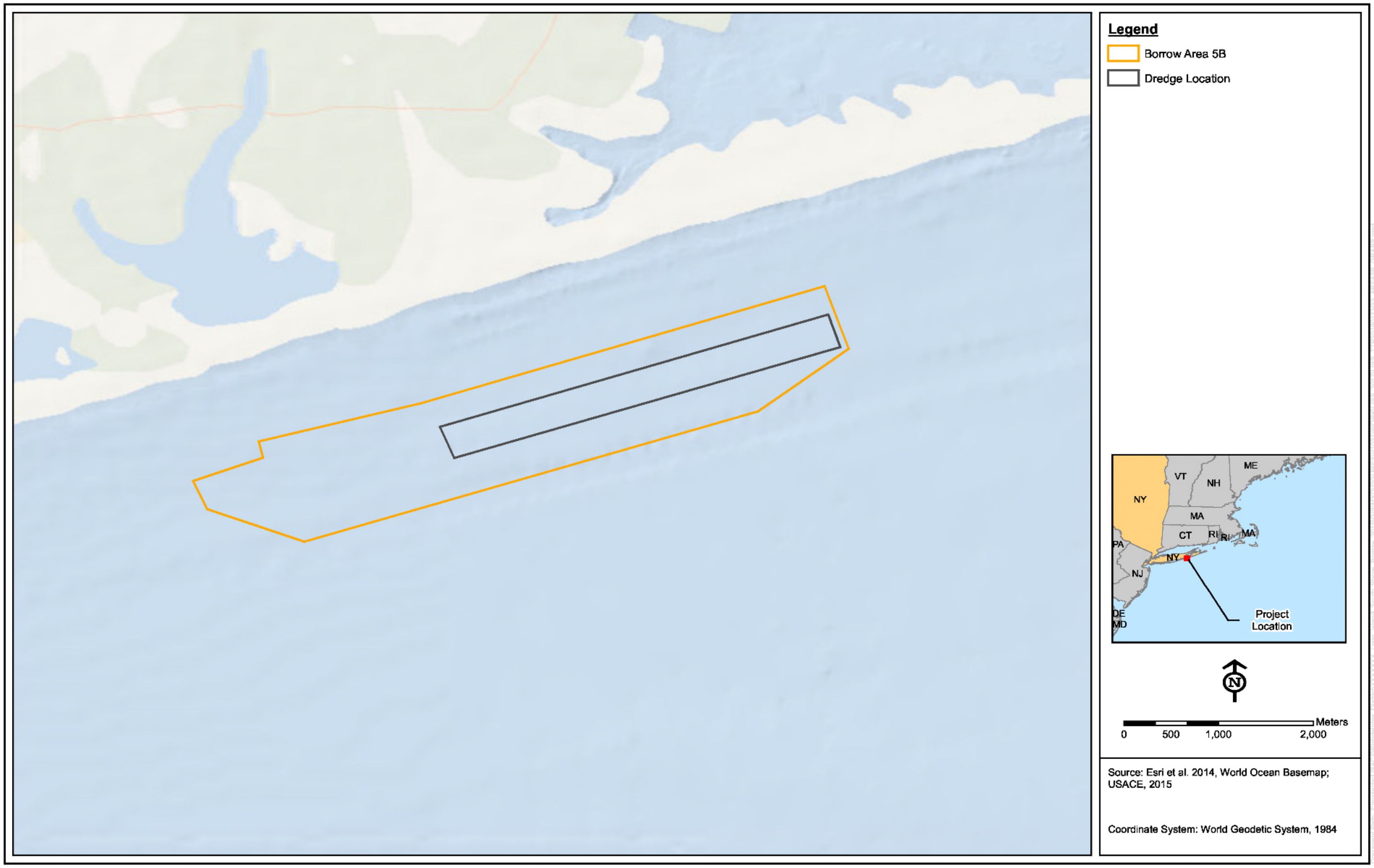

Figure 4: Borrow Area 5B

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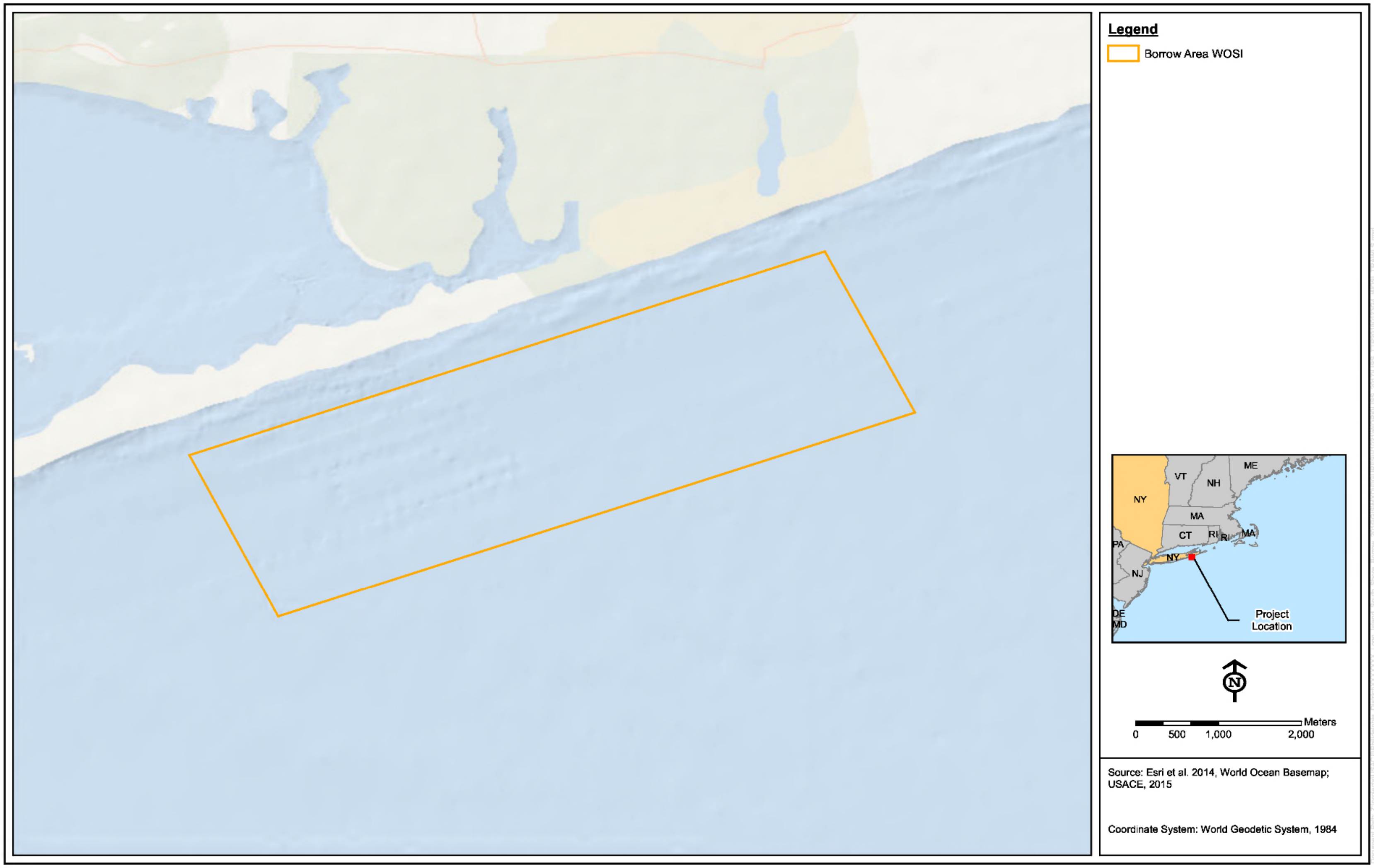

Figure 5: Borrow Area WOSI

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1.2 Objectives

The objectives of this study were to characterize and compare seasonal demersal fishes and benthic community structures, and to assess Project impacts on these communities and their related marine habitats, based on the Project Scope of Work. This report describes field and laboratory methods that were used for the collection of benthic grab samples and offshore fishing trawls. Results are presented in graphs and tables, and are discussed in the context of other relevant studies. The benthic sample collection and bottom trawl methods are described in Section 2.0. Benthic grabs were collected in the spring and fall of 2017. Infauna identification, biomass, and sediment size were conducted on the benthic grab samples. Monthly trawl data was analyzed for species composition, abundance, and size data to characterize the finfish community of the borrow areas.

1.3 Summary of Findings

1.3.1 Borrow Area East Rockaway

Based on the benthic grabs collected in Borrow Area East Rockaway in the spring and fall, the average dominant sediment type was fine-size sand for whole samples in the spring, and whole and top samples in the fall. The most abundant benthic infauna phylum in Borrow Area 2C for both spring and fall was Molluska for On-site spring and fall samples, and fall reference samples. Arthropoda was the most abundant phyla for spring reference samples. At the species level, *Nucula proxima* was the most abundant in both seasons of On-site samples and fall reference samples. *Pseudunciola obliquua* was the most abundant species in spring reference samples. None of the benthic population parameters were significantly different between seasons for any sample type. During monthly fish sampling, both within the borrow area (On-site) and at reference sites, 45 distinct species were captured. Of these, 32 supported the commercial fishing industry in 2016 (NOAA 2017a) and 13 have Essential Fish Habitat (EFH) in the study area (NOAA 2017b). Overall, the most abundant species was spotted hake; clearnose skate had the greatest biomass. Based on catch per unit effort (CPUE), which is a standardized unit of abundance, there was greater variation month-to-month than between On-site and reference trawls within a given month.

1.3.2 Borrow Area 2C

Based on the benthic grabs collected in Borrow Area 2C in the spring and fall, the average dominant sediment type was coarse sand for whole and top samples in both seasons. The most abundant benthic infauna phylum in Borrow Area 2C for both spring and fall On-site, and fall reference samples was Nematoda. Annelida (Polychaeta) was the most highly represented phyla in spring reference samples. The most abundant taxa for all sample types for both seasons was Nematoda but individuals were not identified at the species level. Species richness was significantly greater in the spring for On-site outside and On-site inside dredged box samples. The number of individuals per grab was significantly greater in the spring for On-site outside dredged box samples. None of the reference samples were significantly different. During monthly fish sampling, both within the borrow area (On-site) and at reference sites, 37 distinct species were captured. Of these, 26 supported a commercial industry in 2016 (NOAA 2017a) and 13 have Essential Fish Habitat (EFH) in the study area (NOAA 2017b). Overall, the most abundant species was scup, with scup young-of-the-year accounting for the majority of the abundance. Winter skate had the greatest biomass. Based on CPUE, there was greater variation month-to-month than between On-site and reference trawls within a given month.

1.3.3 Borrow Area 5B

Based on the benthic grabs collected in Borrow Areas 5B, the dominant sediment type for On-site whole and top samples was coarse sand in the spring, and medium sand for spring whole and top reference samples. In the fall, coarse sand was dominant for all whole and top sample types. The most abundant infauna phylum in Borrow Area 5B in spring and fall was Nematoda; the individuals were not identified at the species level. During monthly fish sampling, both within the borrow area (On-site) and at reference sites, 49 distinct species were captured. Of these, 33 supported a commercial industry in 2016 (NOAA 2017a) and 12 have Essential Fish Habitat (EFH) in the study area (NOAA 2017b). Overall, the most abundant species was bay anchovy; winter skate had the greatest biomass. Based on CPUE, there was greater variation month-to-month than between On-site and reference trawls within a given month.

1.3.4 Borrow Area WOSI

Based on the benthic grabs collected in Borrow Areas 5B, the dominant sediment type was coarse-size sand in the spring for whole On-site samples; and medium-size sand in the spring for whole reference samples. Coarse-size sand was dominant in all fall whole and top samples. The most abundant benthic infauna phylum in Borrow Area WOSI in spring and fall was Nematoda. Nematoda were not identified at the species level. None of the benthic population parameters were significantly different between seasons for any sample type. During monthly fish sampling, both within the borrow area (On-site) and at reference sites, 41 distinct species were captured. Of these, 30 supported the commercial fishing industry in 2016 (NOAA 2017a) and 12 have Essential Fish Habitat (EFH) in the study area (NOAA 2017b). Overall, the most abundant species was bay anchovy; winter skate had the greatest biomass. Based on CPUE, there was greater variation month-to-month than between On-site and reference trawls within a given month.

2.0 METHODS

Sample collection in the field is summarized in Table 3. Sampling details are provided in each subsection below. Blank data sheets used in the field are provided in Appendix A.

Table 3: Summary of Sample Collection Methods in the FIMI Borrow Areas

Summary of Sample Collection Methods in the FIMI Borrow Areas				
Type of sampling	**Gear**	**Number of sites**	**Frequency of sampling**	**Samples collected**
***In situ* water quality**	YSI 6920 sonde	Surface, middle, and bottom readings at each site	Every site	Readings of pH, water temperature, turbidity, dissolved oxygen, and salinity
	Onset HOBO Water Quality Data Loggers	Surface, middle, and bottom readings at each site	Estimated center of each borrow area	Readings of pH, water temperature, dissolved oxygen, and salinity
Benthic grab	0.1 m^2 Smith-McIntyre grab	150 sites (45 sites within 5B and 2C; 30 sites within WOSI and East Rockaway)	Seasonally, spring and fall	Assessment of subsamples: macroinvertebrates, and sediment size. Two samples from each grab: a) from top 1 in. of sample, 2) vertical sample of the whole grab*
Finfish trawl	30-ft. headrope bottom otter trawl with 1-in. mesh and ¼-in. codend liner	Average of 13 trawl transects per month	Monthly, May through September	Species identification, length, and weight; all animals released

Notes: m^2 = square meters; ft. = foot; in. = inch; *In the spring, only vertical samples were procured for East Rockaway and WOSI.

2.1 PHYSICAL DATA AND WATER QUALITY

Physical data and water parameters were taken at all sampling sites. In the field, date and time of collection, and latitude/longitude coordinates (by dual-range global positioning system) for all samples were recorded. Weather was also recorded for each sampling day.

In May, water quality data were collected at each of the benthic and finfish sample sites, at the end of each grab or tow. The following parameters were measured at the surface, middle, and bottom: pH, water temperature (degrees Celsius [°C]), turbidity (nephelometric turbidity units [NTU]), dissolved oxygen (DO) (milligrams per liter [mg/L] and percent [%]), and salinity (parts per thousand [ppt]), using a YSI 6920.

Starting in June, Onset HOBO Water Quality data loggers replaced the YSI 6920 unit. The following parameters were measured at the surface, middle, and bottom: pH, water temperature (degrees Celsius [°C]), dissolved oxygen (DO) (milligrams per liter [mg/L]) and conductivity (µS/cm). The data loggers were affixed to an anchoring system, placing the data loggers at the bottom, middle, and surface locations based on depth at the deployment location. The anchorage system was deployed roughly in the center of the borrow area at the beginning of each survey event. Data loggers collected data at 5-minute intervals. The anchorage system was retrieved at the end of the survey day and data was offloaded from the data loggers. Depth was also reported relative to tide state at the end of each grab and tow. The time of the latest high and low tide at the nearest tide station is included in Appendix B.

2.2 Benthic Grabs

To characterize the benthic environment, a total of 300 benthic grabs were completed. Benthic grabs were collected from pre-selected sites in Borrow Area East Rockaway, FIMI Borrow Areas 2C and 5B, and Borrow Area WOSI in the spring and fall of 2017, which are summarized in Table 4. Spring and fall benthic grabs for the Borrow Area East Rockaway, Borrow Area 2C, Borrow Area 5B, and Borrow Area WOSI are depicted in Figure 6. Coordinates of each grab location are provided in Appendix C. Sites within the borrow areas were labeled as “ER”,“2C”, “5B”, and “WOSI” with the site number following each borrow area name, while reference sites were labeled “R” at the end the site name. At each site, the 0.1 m^2 stainless steel Smith-McIntyre grab sampler was thoroughly rinsed with ambient sea water prior to each grab. Each grab was at least 50% full and showed no evidence of surface washout. A 2-liter subsample of each grab was collected and sieved through a clean 0.5-millimeter sieve bucket. The filtered samples were placed in a sediment bag and preserved in 10% buffered formalin with rose bengal stain. Every sample was analyzed in a laboratory for macroinvertebrate composition and grain size.

Table 4: Benthic Sampling Effort within the Borrow Areas

Benthic Sampling Effort within the Borrow Areas							
Borrow area	**Collection date (2017)**	**Weather conditions**	**Number of samples in borrow area**	**Number of reference samples**	**Benthic infauna samples**	**Grain size: top samples**	**Grain size: whole samples**
Spring 2017							
5B	09-May	Partly cloudy, 49-52° F, SE 5-10 kt winds	35	3	38	38	38
5B	10-May	Cloudy, 43-59° F, SE 9-15 kt winds	5	2	7	7	7
WOSI	10-May	Cloudy, 43-59° F, SE 9-15 kt winds	25	5	30	--	30
2C	11-May	Partly cloudy, 52° F, N 5-10 kt winds	40	5	45	45	45
ER	15-May	Clear, 52-68° F, NW 18 kt winds	13	2	15	--	15

Benthic Sampling Effort within the Borrow Areas							
Borrow area	**Collection date (2017)**	**Weather conditions**	**Number of samples in borrow area**	**Number of reference samples**	**Benthic infauna samples**	**Grain size: top samples**	**Grain size: whole samples**
Spring 2017							
ER	16-May	Clear, 53-75° F, WSW 10 kt winds	13	2	15	--	15
Fall 2017							
5B	11-Sep	Sunny, 60-70°F, NW 5-10 kts winds	40	5	45	45	45
WOSI	11-Sep	Sunny, 60-70°F, NW 5-10 kts winds	13	2	15	15	15
WOSI	12-Sep	Sunny, 60-75°F, W NW 5-10 kt winds	12	3	15	15	15
2C	15-Sep	Sunny, 70°F, S 5 kt winds	40	5	45	45	45
ER	26-Sep	Partly cloudy, 67-78, E 6 kt winds	26	4	30	30	30

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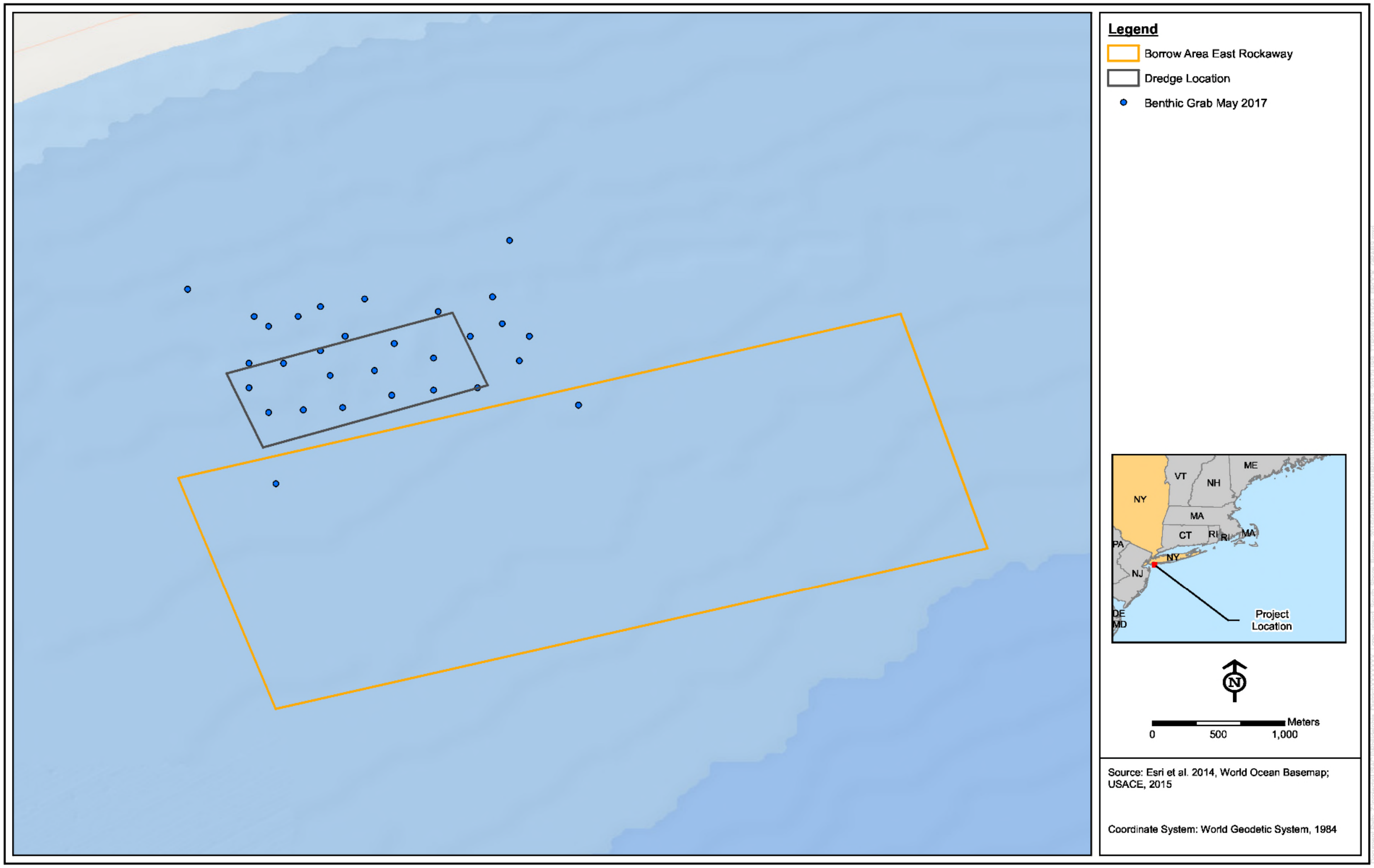

Figure 6: Benthic Grab Sampling Sites in East Rockaway Borrow Area Collected in the Spring

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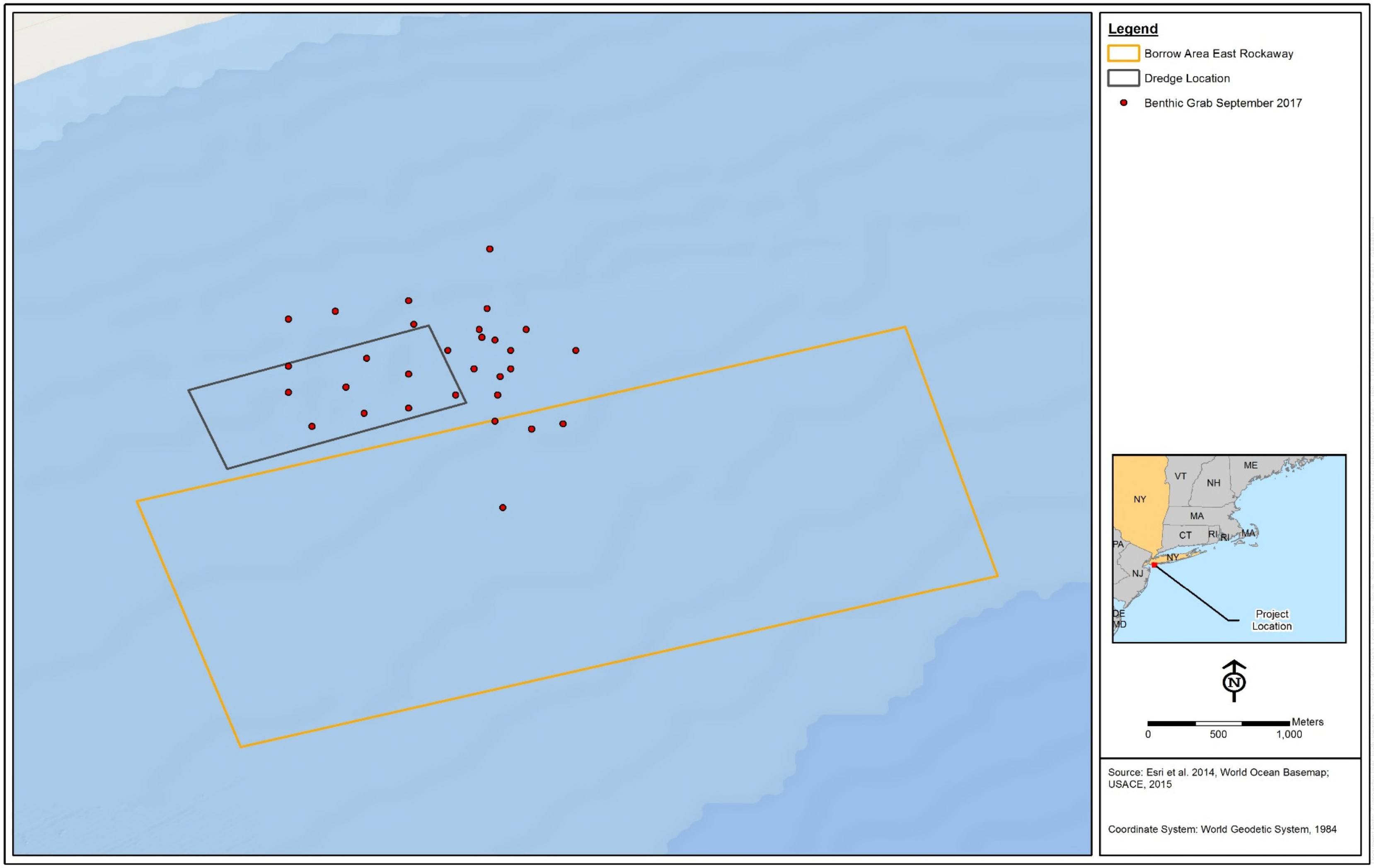

Figure 7: Benthic Grab Sampling Sites in East Rockaway Borrow Area Collected in Fall

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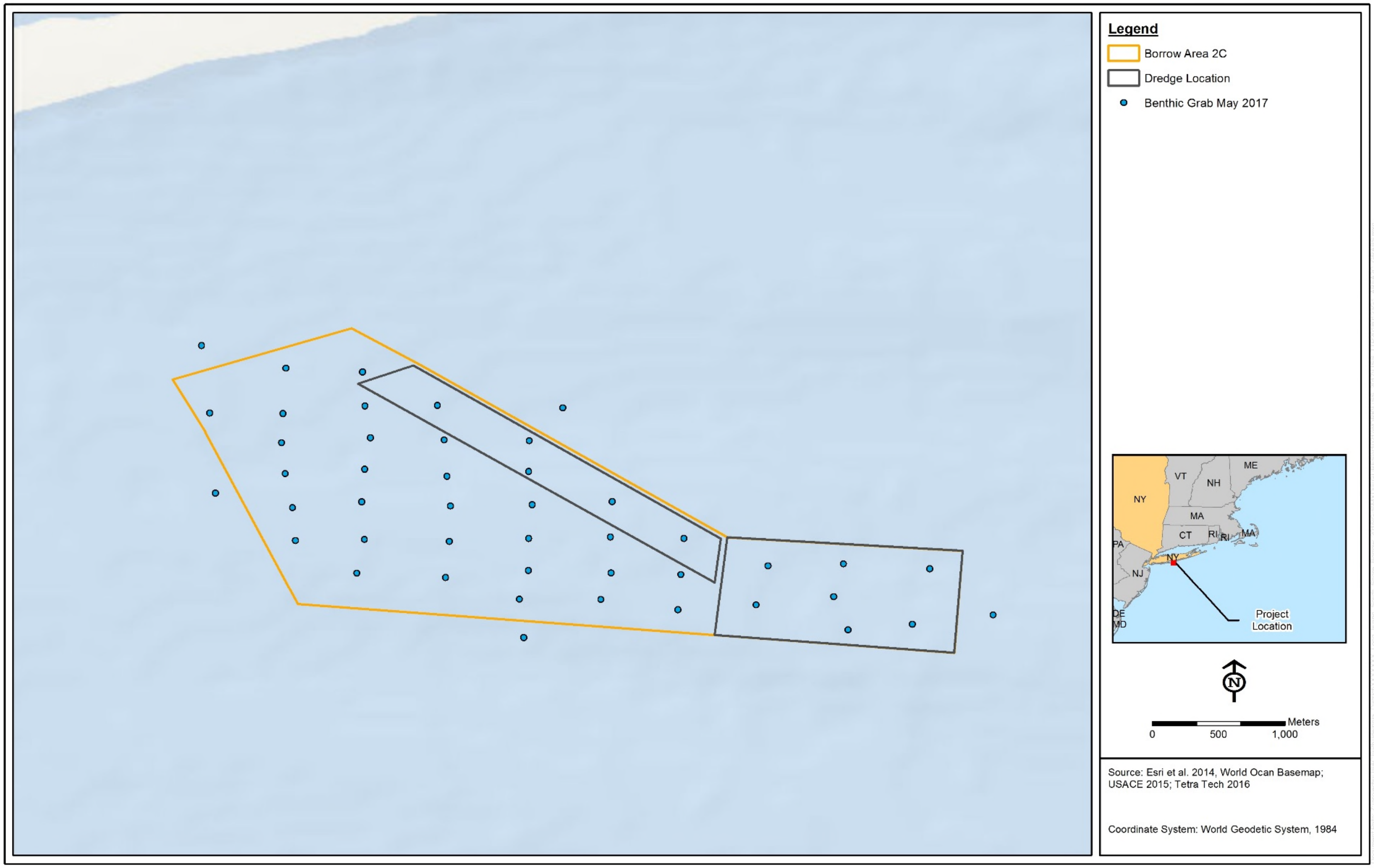

Figure 8: Benthic Grab Sampling Sites in FIMI Borrow Area 2C Collected in the Spring

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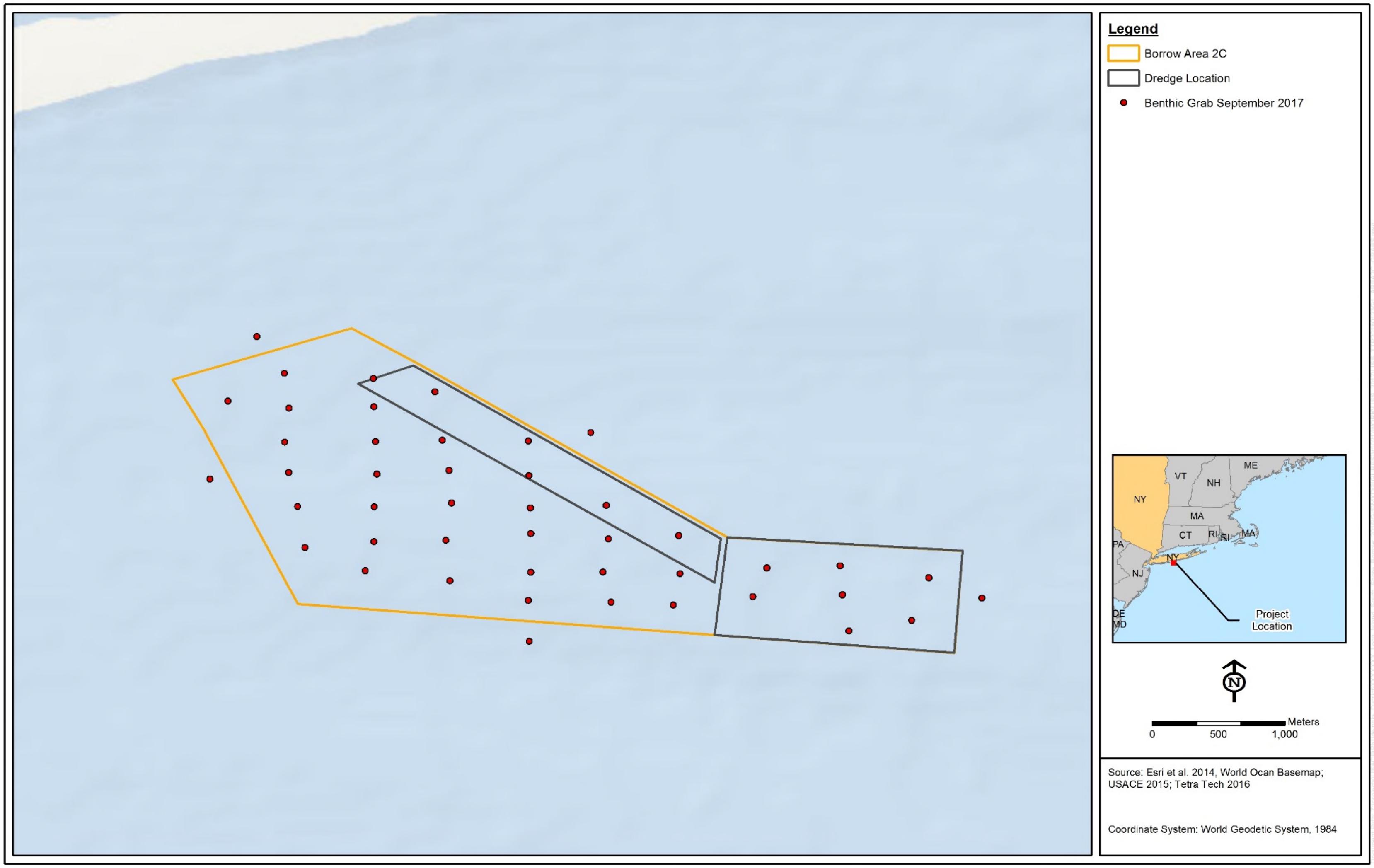

Figure 9: Benthic Grab Sampling Sites in FIMI Borrow Area 2C Collected in the Fall

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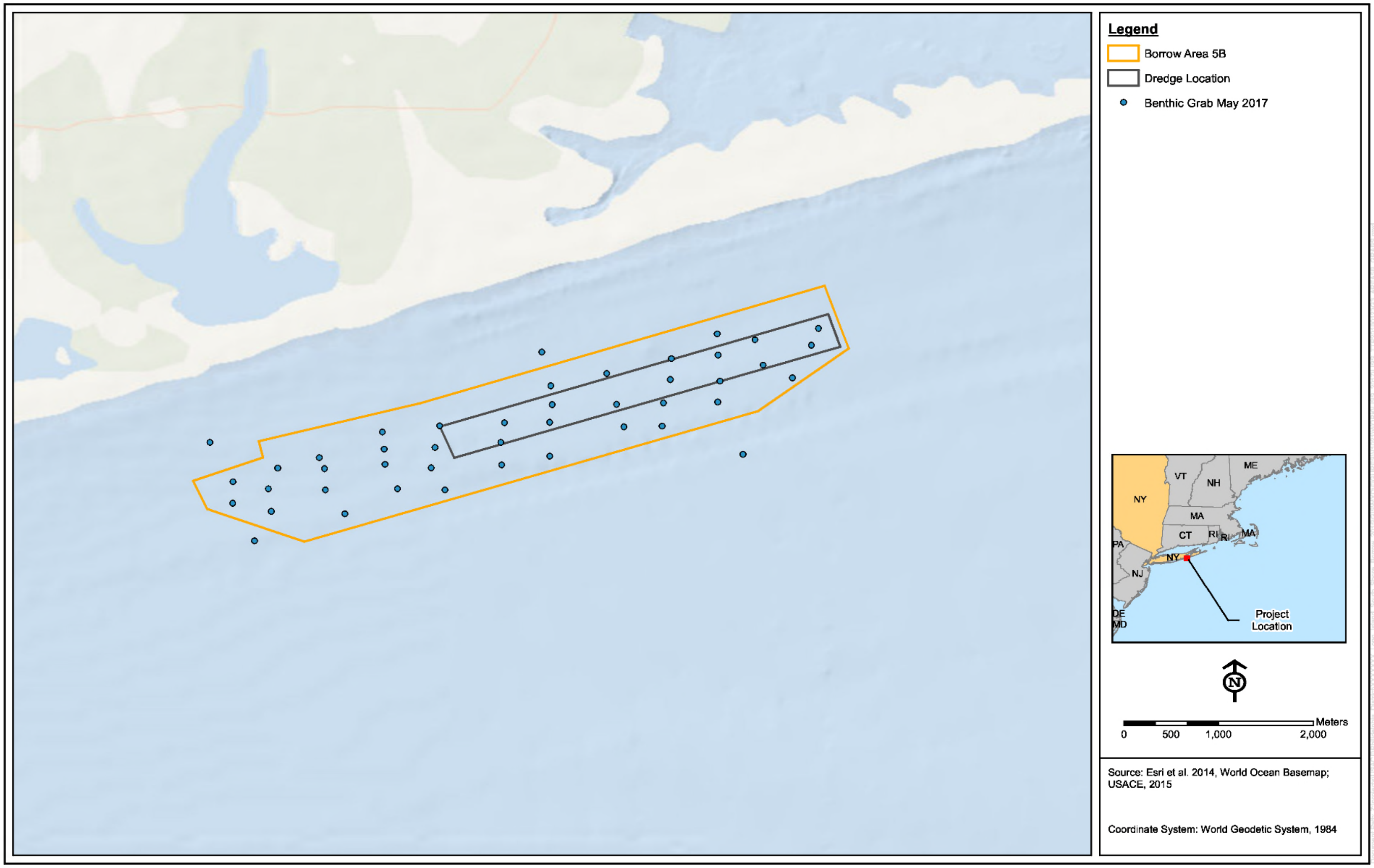

Figure 10: Benthic Grab Sampling Sites in FIMI Borrow Area 5B Collected in the Spring

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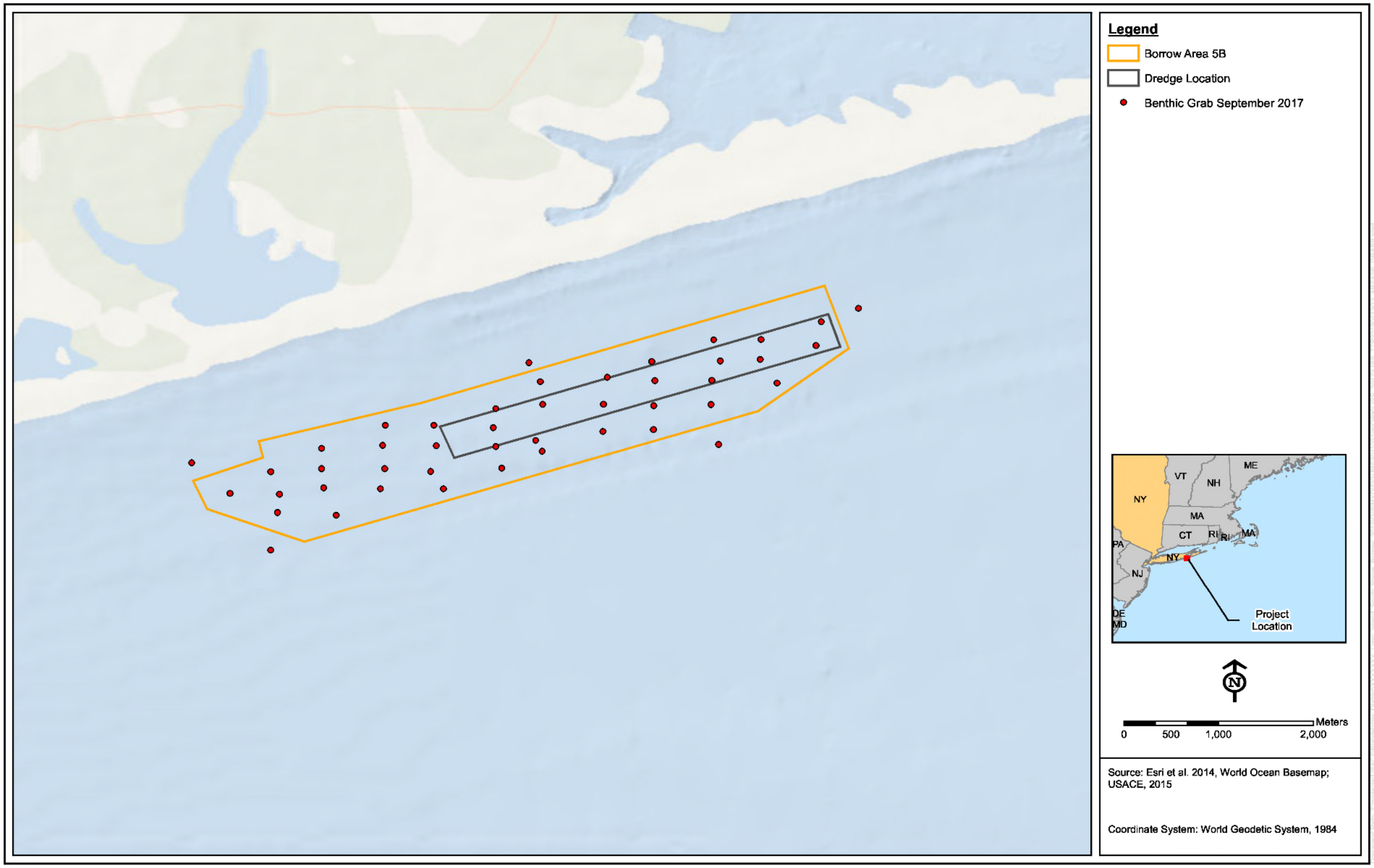

Figure 11: Benthic Grab Sampling Sites in FIMI Borrow Area 5B Collected in the Fall

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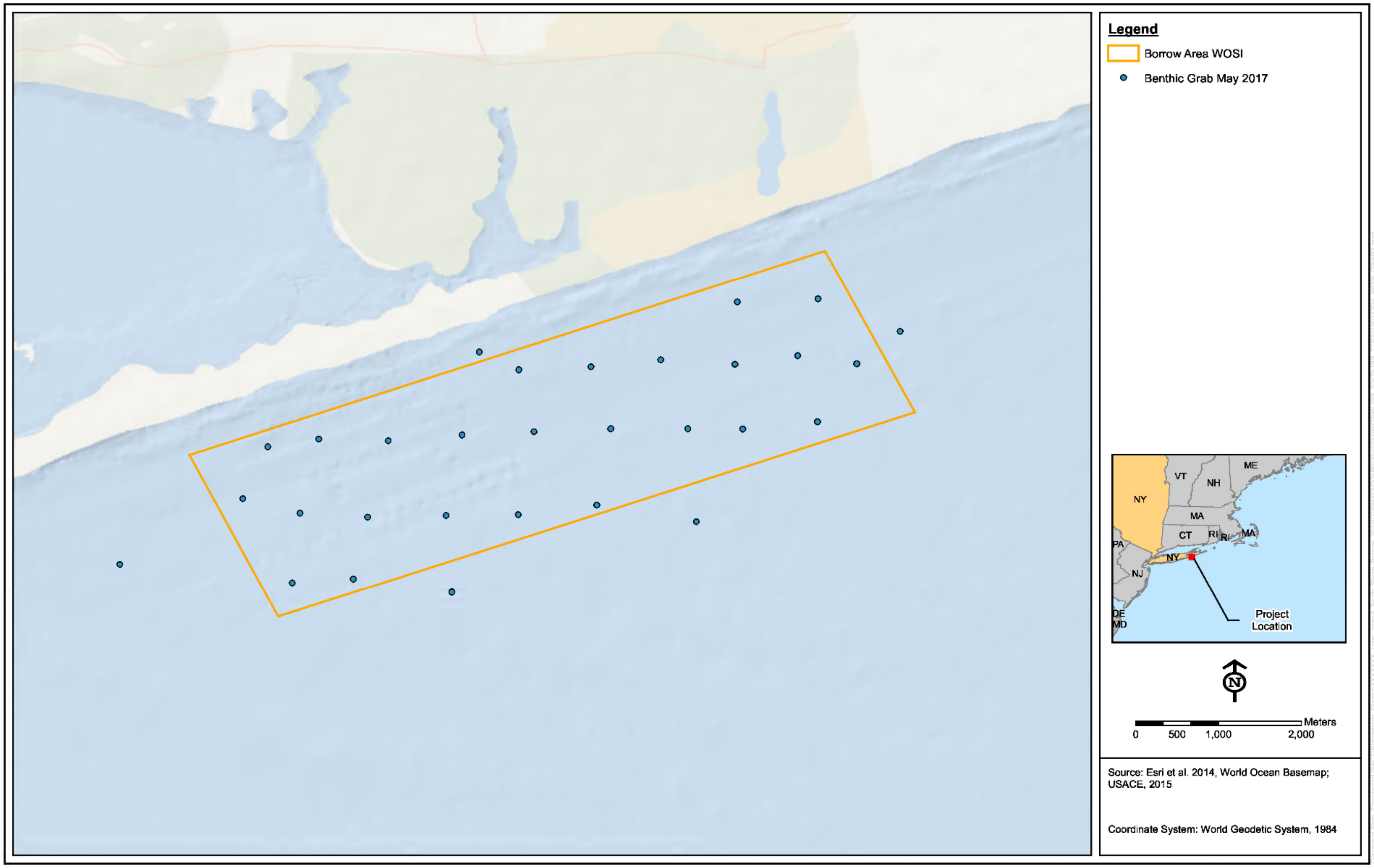

Figure 12: Benthic Grab Sampling Sites in WOSI Borrow Area Collected in the Spring

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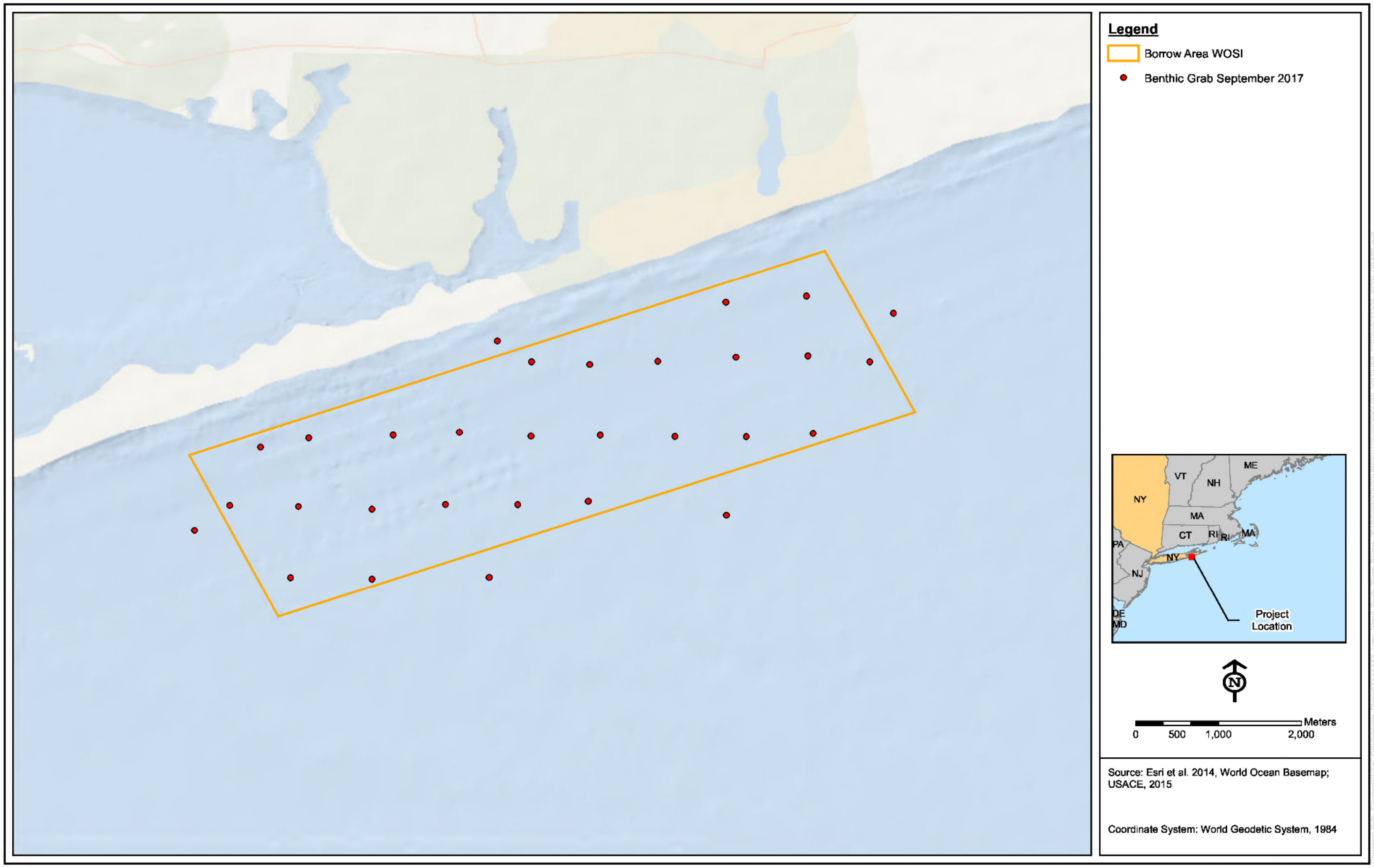

Figure 13: Benthic Grab Sampling Sites in WOSI Borrow Area Collected in the Fall

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All sampling containers were pre-labeled for sieved benthic organisms and grain size. No samples were composited; all samples were handled individually. For the grain size sample, two types of samples were collected, a whole sample and a top sample. Whole samples were collected to represent the composition of the whole sample by taking a vertical portion of the material from the sediment grab. For the top samples, surface sediments were removed from the top 1 in. (2.54 cm) of each sediment grab. Both types of samples were placed in quart-sized bags, double bagged, and kept in a cooler until transfer for laboratory processing (Appendix D). Within 1-2 days of collection, the samples were picked up by or delivered to Ecological Consulting Organization, located in Lake Ronkonkoma, NY (Appendix F). In the field, grab samples were then processed for laboratory analysis of benthic infauna identification (Figure 14; see Appendix E for details). After sieving and preserving, the benthic organism samples were packed securely in sealed 5-gallon buckets and shrink-wrapped for pick-up by Ecological Consulting Organization (Appendix F).

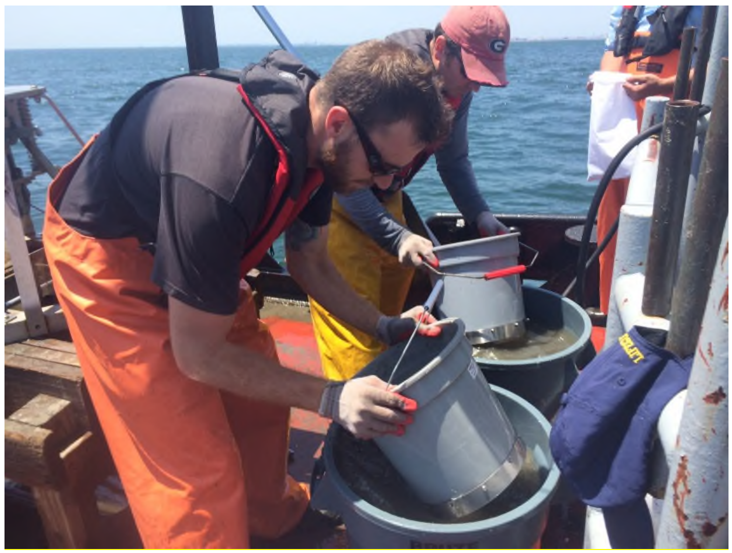

Figure 14: Benthic Sample Processing

2.3 Laboratory Analysis

2.3.1 Grain Size

Grain size analysis was performed in a laboratory using the ASTM Standard D422-63, Particle-Size Analysis of Soils (ASTM International 2007). In this method, sediment was sifted through progressively smaller, nested sieves. After the sample was dried, the weight retained in each sieve was then divided by the total sample weight. Cobble gravel was sediment greater than 2.5000 inches (in.). Pebble gravel was retained in US sieve Number (No.) 5 (0.1570-in.). Granule gravel was retained in the No. 10 sieve (0.0787-in.). Very coarse and coarse sand passed through the No. 10 sieve and was retained in the No. 35 sieve (0.0197-in.). Medium sand was retained in the No. 60 sieve (0.0098-in.). Very fine and fine sand passed through the No. 60 sieve and was retained in the No. 230 sieve (0.0025-in.). Silt and clay passed through all sieves and were collected in the bottom tray, with no further differentiation.

2.3.2 Invertebrate Analysis

Benthic invertebrates, preserved in the field, remained in 10% buffered formalin and rose bengal stain until laboratory sorting. To remove preservative and any sediment, samples were gently rinsed with water over a 0.020-in. (0.5 mm) mesh sieve. If not processed immediately, samples were kept in alcohol for longer-term storage. All species were identified on a sorting tray using a stereoscope. Each individual was identified to the lowest practical taxonomic level and counted.

2.4 FISH TRAWLS

Fish trawls were conducted within the borrow areas and at nearby reference sites between May and September of 2017 (Figures 15, 16, 17 and 18; Appendix C). The weather conditions and effort of each sampling event are summarized in Table 5. Each tow was processed for the identification, enumeration, length, and weight of each species collected. All common and scientific names of fishes are based on Page et al. 2013.

Table 5: Fish Sampling Effort within the Borrow Areas

Fish Sampling Effort within all Borrow Areas				
Borrow area	**Collection date (2017)**	**Weather conditions**	**Number of borrow area trawls**	**Number of reference trawls**
May 2017				
2C	5/1/2017	SE Winds, 5-15 knots, fog	6	1
2C	5/3/2017	Clear, W Winds ~10-15 kts	6	1
5B	5/4/2017	Clear, calm wind, 1-2' seas	6	1
WOSI	5/4/2017	Clear, calm wind, 1-2' seas	3	0
5B	5/8/2014	Sunny, 48-52° F, W-SW winds 10-15 kts, seas 3-4'	7	1
ER	5/9/2017	*Mostly cloudy, 50-60°, Variable winds 5-10 kts	5	2
ER	5/10/2017	*Mostly cloudy, 50-60°, Variable winds 5-10 kts	6	0
June 2017				
WOSI	6/5/2017	Foggy, 61-65° F, S winds 5-10 kts, 2-4' seas	11	1
5B	6/6/2017	Cloudy, rain, NE Winds, 15-20 kts, seas 4-5'	8	1
5B	6/7/2017	Cloudy, 53-60° F, NE winds 5-10 kts, 3-5' seas	4	1
WOSI	6/7/2017	Cloudy, 53-60° F, NE winds 5-10 kts, 3-5' seas	4	1
2C	6/8/2017	Partly sunny, 55-60° F, E winds 5-10 kts, ~3' seas	5	1
2C	6/9/2017	Sunny, 60-67° F, W winds 10-15 kts, seas 3-5'	7	1
ER	6/21/2017	*Mostly cloudy, 73-80° F, W winds 10-15 kts	5	2
ER	6/22/2017	*Cloudy, 71-78° F, SE winds 10-15 ts	5	2

Fish Sampling Effort within all Borrow Areas				
Borrow area	Collection date (2017)	Weather conditions	Number of borrow area trawls	Number of reference trawls
July 2017				
5B	7/17/2017	Sunny, 73-79 F, S-SE winds 5-10 kts	11	1
5B	7/18/2017	Cloudy, 75-82 F, S winds 5-10 kts	4	1
WOSI	7/18/2017	Cloudy, 75-82 F, S winds 5-10 kts	4	1
WOSI	7/19/2017	Hazy, 76-81 F, SW winds 10-15 kts, seas ~3'	12	1
2C	7/20/2017	Hot, Hazy, 78-86 F, SW winds 10-15 kts, seas ~3'	7	1
2C	7/21/2017	Hot, humid, 77-84 F, W-SW winds 10-15 kts, seas ~3'	5	1
ER	7/12/2017	*Mostly cloudy, 76-90° F, SW winds 10-15 kts	5	2
ER	7/13/2017	*Mostly cloudy, 77-92° F, SW winds 10-15 kts	6	1
Early August 2017				
5B	7/31/2017	Sunny, 65-77 F, SW winds 5-10 kts, seas ~3'	12	1
5B	8/1/2017	Sunny, 69-78 F, SW winds 5-10 kts, seas ~ 3'	4	1
WOSI	8/1/2017	Sunny, 69-78 F, SW winds 5-10 kts, seas ~ 3'	4	1
WOSI	8/2/2017	Partly cloudy, 72-76 F, S winds ~10 kts, seas ~3'	12	1
2C	8/3/2017	Cloudy, 71-80 F, S winds 5-10 kts	7	1
2C	8/4/2017	Partly cloudy, 73-76 F, S winds 5-10 kts, increasing to 10-15 kts w/ gusts of 20 kts, seas ~3'	8	1
ER	8/14/2017	*Mostly cloudy, 68-80° F, SE winds 5-10 kts	5	2
ER	8/15/2017	*Rain, 69-74°F, SE winds 5-10 kts	5	2
Late August 2017				
5B	8/21/2017	Partly cloudy, 67-80 F, winds W 5 kts, seas 2-3'	12	1
5B	8/22/2017	Cloudy, 75-80 F, SW winds 10-20 kts, seas 2-4'	4	1
WOSI	8/22/2017	Cloudy, 75-80 F, SW winds 10-20 kts, seas 2-4'	4	1
WOSI	8/23/2017	Cloudy, 73-80 F, SW-W winds 10-15 kts, seas 4-7'	11	1

Fish Sampling Effort within all Borrow Areas				
Borrow area	Collection date (2017)	Weather conditions	Number of borrow area trawls	Number of reference trawls
2C	8/24/2017	Sunny, 60-78 F, NE winds 5-10 kts, seas ~3'	8	1
2C	8/25/2017	Sunny, 64-75 F, NW winds 5-10 kts, Seas 2-3'	8	1
September 2017				
5B	9/12/2017	Sunny, 60-75, NW winds 5-10 kts, seas ~3'	4	1
WOSI	9/12/2017	Sunny, 60-75, NW winds 5-10 kts, seas ~3'	4	1
WOSI	9/13/2017	Sunny, 65-70, SW winds 5-10 kts, seas 4-5'	12	1
5B	9/14/2017	Cloudy, 70-75 F, SW winds 5-10 kts, seas ~4'	7	1
2C	9/16/2017	Cloudy, 70-75 F, SE winds 5-10 kts, seas ~4'	7	1
2C	9/17/2017	Cloudy, 67-72 F, E winds 5-10 kts, seas ~5'	8	1
ER	9/27/2017	*Mostly cloudy, 69-86° F, NE winds 10-15 kts	3	0
ER	9/28/2017	*Overcast, 74-77° F, NNW winds 15-18 kts	4	0
ER	9/29/2017	*Partly cloudy, 55-66° F, NW winds 5-10 kts	2	0
*Indicates weather conditions were collected from NOAA 2017c				

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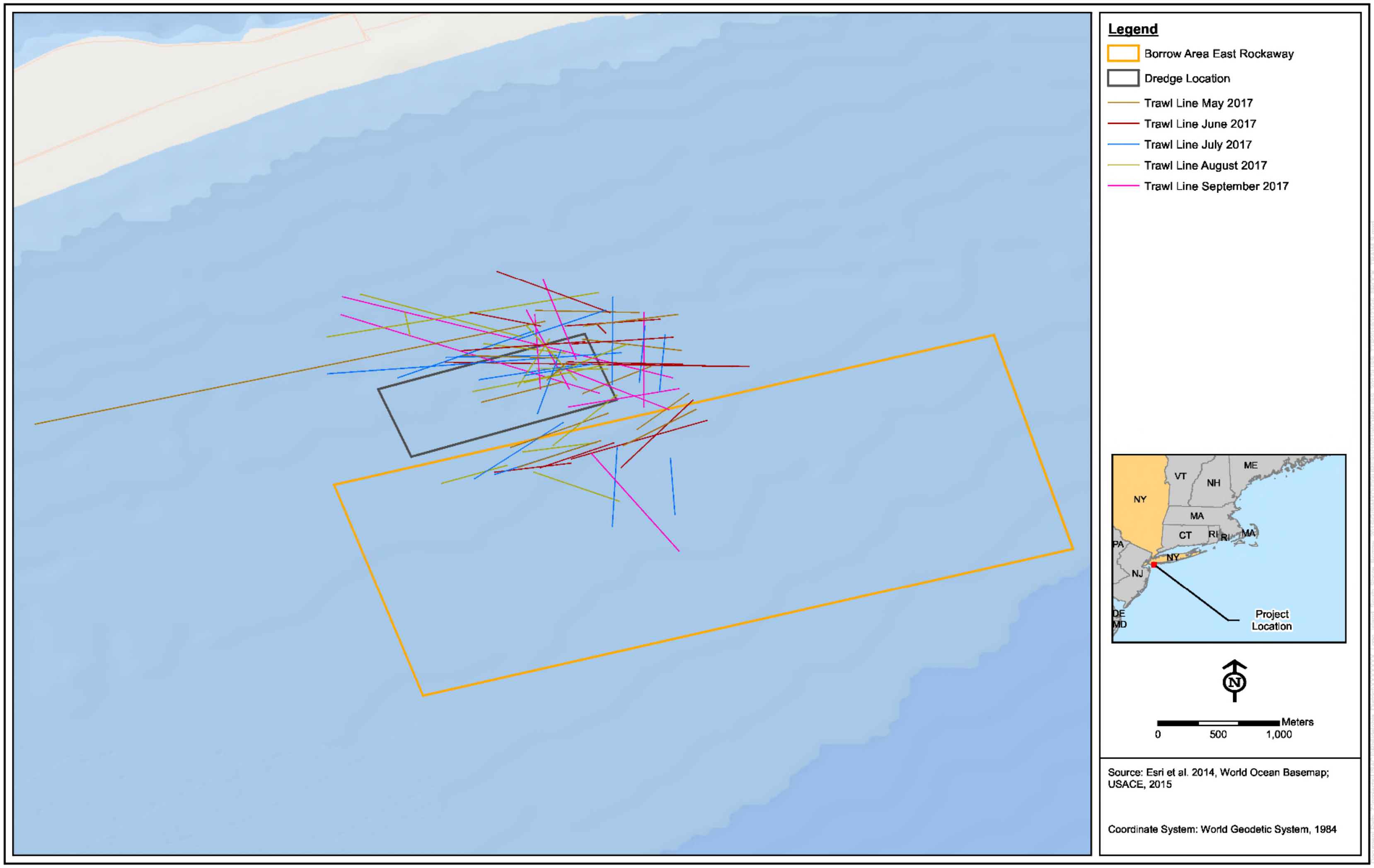

Figure 15: Trawls Conducted for Monthly Fish Sampling in East Rockaway Borrow Area

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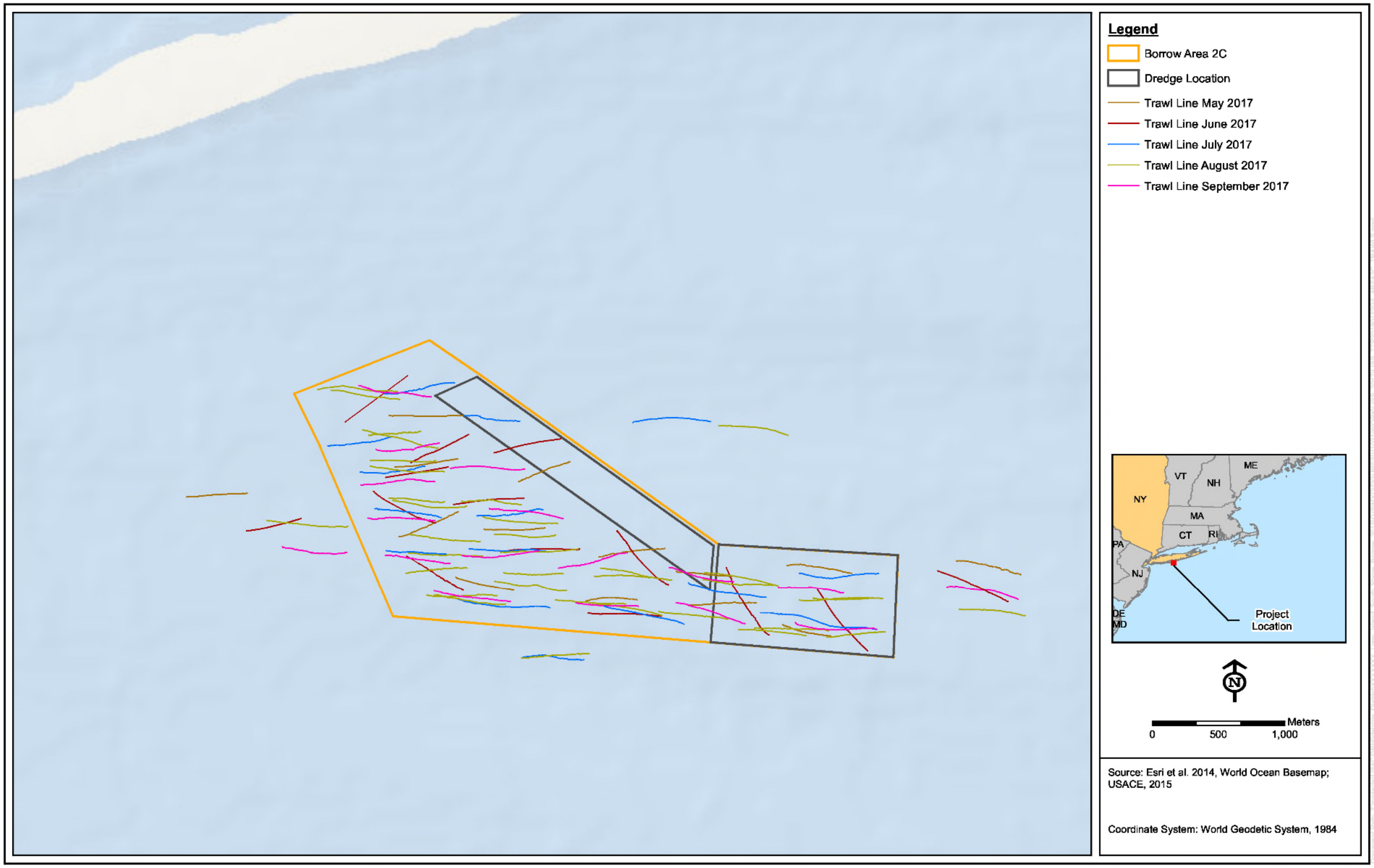

Figure 16: Trawls Conducted for Monthly Fish Sampling in FIMI Borrow Area 2C

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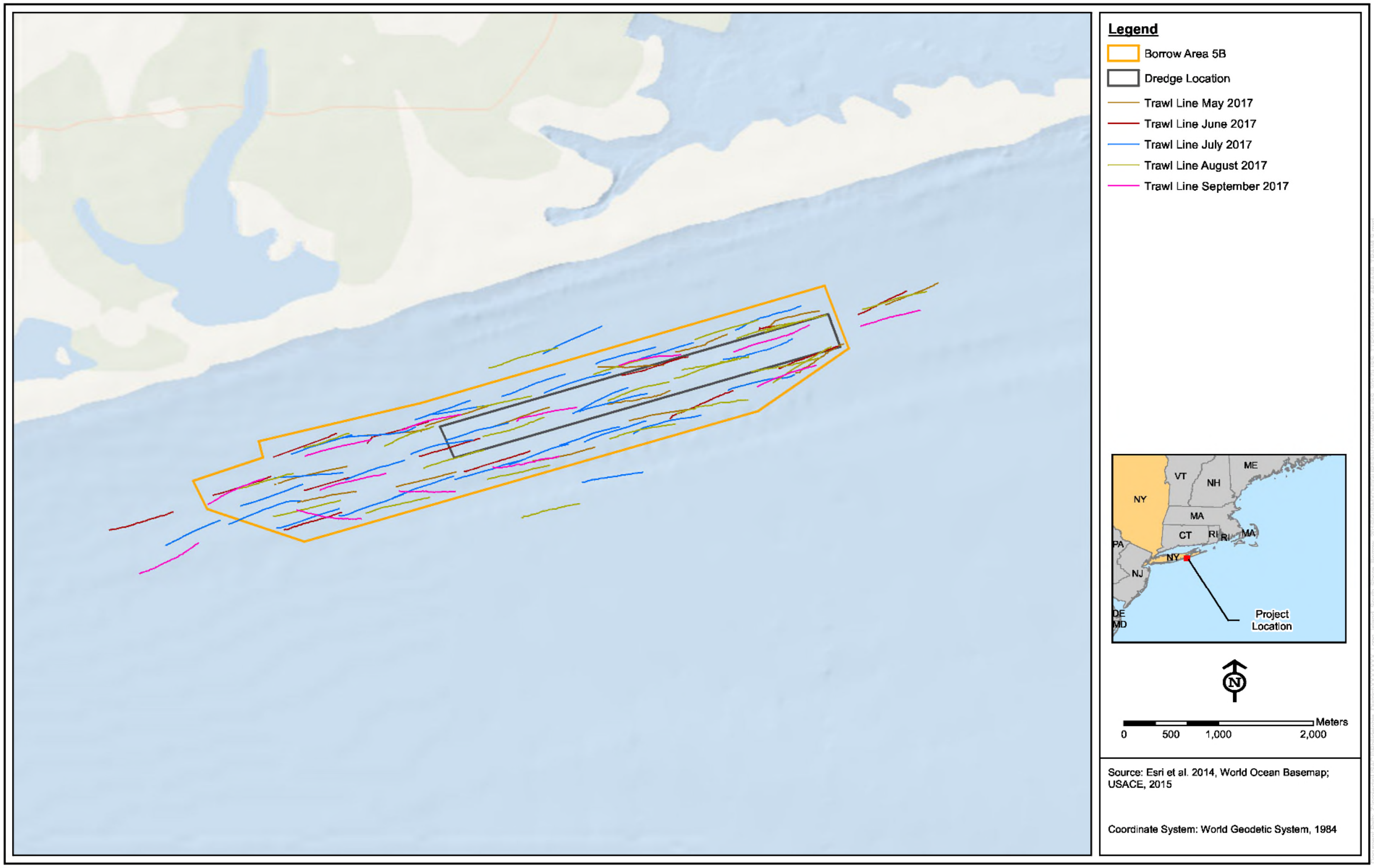

Figure 17: Trawls Conducted for Monthly Fish Sampling in FIMI Borrow Area 5B

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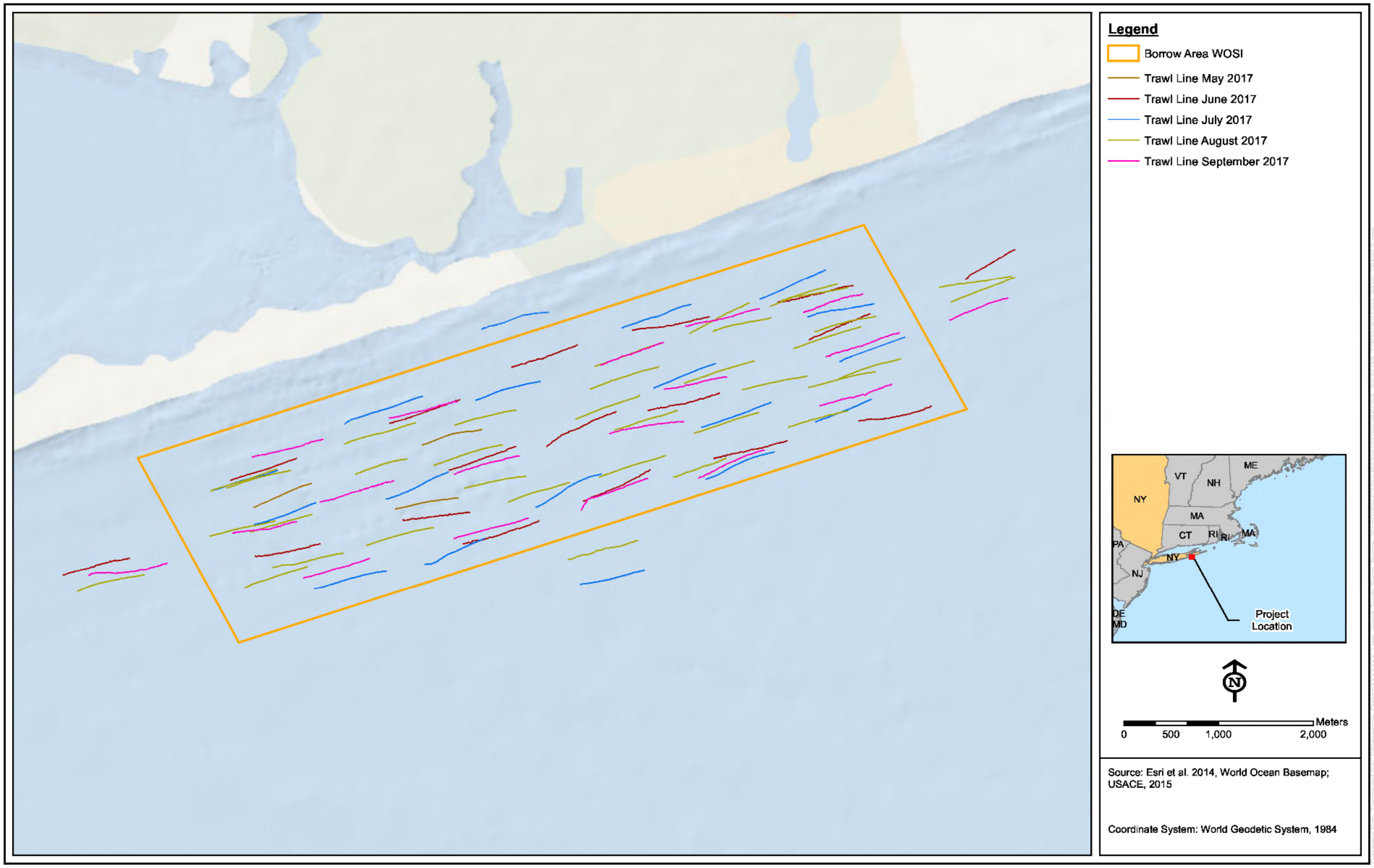

Figure 18: Trawls Conducted for Monthly Fish Sampling in WOSI Borrow Area

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A 30-ft. headrope bottom otter trawl with a ¼-in. codend liner was towed for approximately 0.25 nautical miles at a speed of 2 to 3 knots, which equates to 8 to 10 minutes. Contents of the trawl net were processed on board the vessel (Figure 19). Each species of teleost, elasmobranch, and squid was identified to the lowest taxonomic level. The standard length (SL), the distance from the snout to the hypural bone, was measured to the nearest millimeter (mm) for each individual. For elasmobranchs, the total length (TL) from the nose to the tail was measured. Weight was collected to the nearest gram (g). For species with high abundance (i.e., >30 individuals), a bulk composite weight was measured for the additional individuals. Except for squid (due to their commercial importance), all mollusks were noted for presence but were otherwise not enumerated, weighed, or measured. Mantle length and weight were collected for squid.

Although abundance, length, and weight was collected for all fish species, in this report, attention is given to species of interest, which are identified as organisms that support a fishery valued at over $1 million.

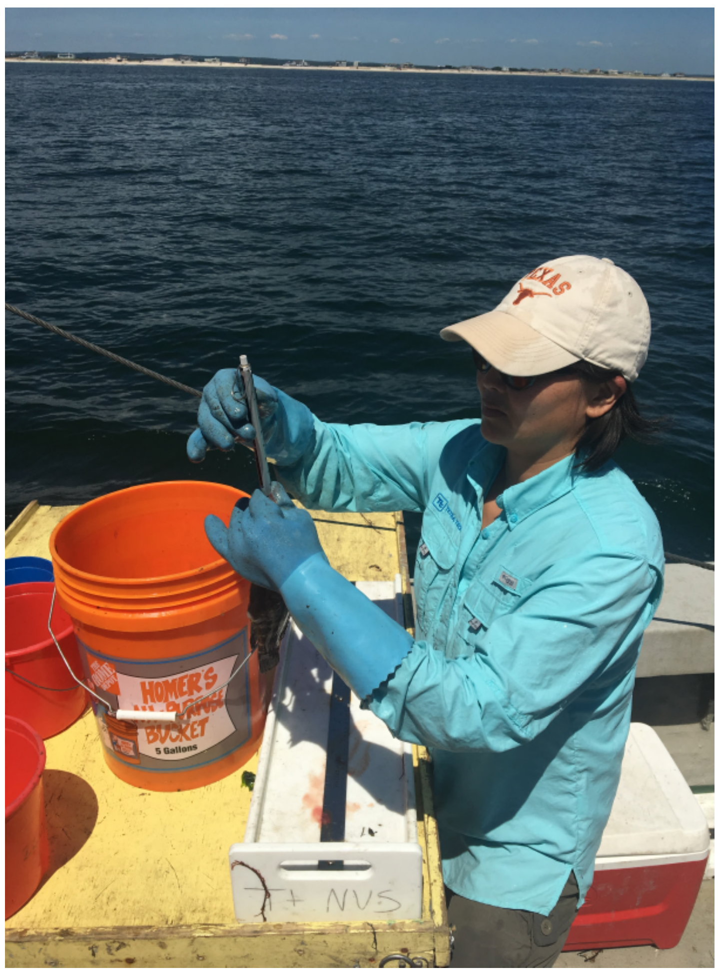

Figure 19: Fish Sample Processing

2.5 DATA ANALYSIS

To analyze characteristics and patterns within the benthic data, several different parameters were investigated. Species richness (R) is the overall number of species. To measure diversity, the Shannon Diversity Index (H') was calculated as:

$$H' = -\sum_{i=1}^{R} p_i \ln p_i$$

For taxon *i*, p_i is the proportion of individuals from the particular taxon relative to the total number of individuals. Greater values of H' correspond to higher diversity. This diversity index can then be used to look at relative abundances of different species, or evenness. Pielou's evenness index, calculated as:

$$J' = \frac{H'}{H'_{max}}$$

estimates the evenness of different species. H'_{max} is the maximum value of H', equivalent to the natural log (ln) of R (where R = total number of species). J' ranges from 0 to 1, with low values representing greater variation between species and high values indicative of more even abundances.

Species dominance was measured using Simpson's Dominance Index calculated as:

$$\lambda = \sum_{i=1}^{R} p_i^2$$

λ ranges from 0 to 1; a community not dominated by just a few species would have a value below 0.5 while a community dominated by one or a few species would have a value greater than 0.5. A comparison of these infauna community measures between spring and fall was conducted using a two-tailed student's t-test. To focus on spatial changes in the benthic community, these statistics were run separately for grabs conducted on-site and reference site grabs. However, the disproportionate number of grabs collected within the Borrow Area and at reference sites are not suitable for comparing the two types of areas using student's t-tests.

Finfish abundance is reported as percent composition, as well as catch per unit effort (CPUE). CPUE is a way to standardize abundance and is calculated as number of fishes captured per tow. During quality control (QC) of trawl data, the length-weight relationship of each individual organism, if available, was used to identify possible outliers. An assumption was made that if an inconsistency in the length-weight relationship was apparent, the error was in the weight measurement, rather than the length measurement. The movement of a vessel, an inescapable and common challenge working at sea, may impact a weight measurement, especially for smaller individuals. Therefore, based on the fish's length, an expected weight was calculated (Lange and Johnson 1978, NOAA 2003, Robinette 1983). All statistical tests were conducted in Microsoft Excel 2013 and used an error-rate of P = 0.05 to determine statistical significance or as adjusted with the Bonferroni correction.

3.0 RESULTS

3.1 WATER QUALITY

Water quality measurements were taken at the surface, middle, and bottom of the water column at Borrow Areas 2C, 5B, and WOSI during benthic grab and trawl surveys from May to September 2017 (Table 6). Though more parameters were measured (Appendix B), temperature, conductivity, salinity, and dissolved oxygen (DO) are highlighted here due to the biological relevance of these measurements, as well as the seasonal patterns evidenced. When did not function properly, the data was omitted from the analysis and the meters were repaired or replaced, if possible.

Seasonal changes in water quality were evident. Wave action and photosynthetic organisms may have contributed to increased oxygen in surface waters in April, June and July (Millero 2006). As is common at temperate latitudes, a pycnocline was evident during the summer months. Although the densest water (which is also the coldest and saltiest) is in the bottom layer for all months, it is only from May to August that the surface temperature is warm enough to become less dense, thus creating a pycnocline (i.e., density gradient). In September, surface waters began to cool, breaking down the pycnocline. Increased wind and storms facilitated the mixing of the water column, maintaining high levels of DO, which would be expected to remain as winter storms replenished atmospheric oxygen into the water.

Table 6: Average Water Quality Parameters by Month at Borrow Areas 2C, 5B, and WOSI

Average Water Quality Parameters by Month at Borrow Areas 2C , 5B, and WOSI								
Sampling month	**Borrow Area**	**Depth (ft.)**	**Reading depth**	Temperature (°C)	Conductivity (µS/cm)	Salinity (ppt)	DO (mg/L)	DO (%)
May[a]	**2C**	63.86	Surface	9.97	--	31.98	8.25	88.55
			Middle	9.50	--	32.07	7.97	86.51
			Bottom	8.15	--	32.62	7.53	79.41
	5B	46.32	Surface	9.18	--	28.93	5.49	60.39
			Middle	8.82	--	28.98	5.66	60.95
			Bottom	8.64	--	29.00	5.65	60.07
	WOSI	46.31	Surface	6.80	--	32.59	7.19	76.77
			Middle	7.96	--	32.86	7.30	76.37
			Bottom	7.59	--	33.00	7.42	77.67
June	**2C**	61.25	Surface	14.41	32,086.22	--	10.62	--
			Middle	14.04	33,971.46	--	10.00	--
			Bottom	13.98	32,989.52	--	10.00	--
	5B	46.25	Surface	13.95	32,992.73	--	10.62	--
			Middle	13.93	4,909.35	--	10.61	--
			Bottom	13.88	33,640.25	--	10.68	--
	WOSI	50.60	Surface	13.45	33,350.21	--	10.83	--
			Middle	12.90	34,561.80	--	10.55	--
			Bottom	12.73	33,932.46	--	10.47	--
July	**2C**	56.58	Surface	17.89	32,701.74	--	9.01	--
			Middle	17.14	32,993.26	--	8.59	--

Average Water Quality Parameters by Month at Borrow Areas 2C , 5B, and WOSI								
Sampling month	**Borrow Area**	**Depth (ft.)**	**Reading depth**	Temperature (°C)	Conductivity (µS/cm)	Salinity (ppt)	DO (mg/L)	DO (%)
			Bottom	16.66	32,024.77	--	8.19	--
	5B	44.53	Surface	20.03	33,546.99	--	10.23	--
			Middle	19.06	33,866.89	--	9.36	--
			Bottom	18.06	32,509.31	--	8.74	--
	WOSI	48.73	Surface	19.27	32,828.55	--	10.31	--
			Middle	18.63	33,201.75	--	9.40	--
			Bottom	18.31	32,353.13	--	9.05	--
Early August	**2C**	57.47	Surface	21.42	35,431.31	--	8.26	--
			Middle	19.95	34,436.14	--	7.81	--
			Bottom	18.32	33,553.44	--	7.83	--
	5B	43.5	Surface	19.91	34,480.80	--	10.47	--
			Middle	19.26	34,023.02	--	8.38	--
			Bottom	18.72	33,357.03	--	8.30	--
	WOSI	47.19	Surface	19.57	34,364.71	--	10.38	--
			Middle	18.84	33,812.70	--	9.37	--
			Bottom	18.57	33,280.44	--	9.32	--
Late August	**2C**	51.63	Surface	20.10	35,793.59	--	7.56	--
			Middle	17.16	33,741.93	--	6.15	--
			Bottom	17.00	32,057.26	--	6.09	--
	5B	45.88	Surface	20.10	35,793.59	--	7.56	--
			Middle	17.16	33,741.93	--	6.15	--
			Bottom	17.00	32,057.26	--	6.09	--
	WOSI	43.87	Surface	19.43	35,311.70	--	8.86	--
			Middle	18.43	34,432.19	--	7.40	--
			Bottom	17.86	32,327.19	--	7.12	--
September	**2C**	58.38	Surface	20.06	35,904.79	--	9.22	--
			Middle	18.60	34,602.24	--	8.28	--
			Bottom	18.44	33,664.68	--	7.96	--
	5B	45.02	Surface	18.95	35,601.91	--	9.89	--
			Middle	18.97	34,909.14	--	9.55	--
			Bottom	18.66	33,642.56	--	9.34	--
	WOSI	50.46	Surface	19.29	35,763.92	--	10.09	--
			Middle	19.15	34,890.88	--	9.45	--
			Bottom	18.96	33,756.18	--	9.38	--

*Cells with "--" indicate water quality parameter was not colleceted.
[a] In May, water quality collected using YSI 6920

3.2 BENTHIC GRABS

Benthic sample collection occurred in May and September 2017. Physical attributes, such as sediment type, are presented separately for the spring and fall seasons for each borrow area. Collectively, they provide a characterization of the borrow area benthic habitat. Benthic organisms and communities displayed temporal differences, which are explored in the following section based on the month of collection.

3.2.1 BENTHIC HABITAT AND SEDIMENT TYPES

Each benthic sample collected in the spring and fall of 2017 was described quantitatively through laboratory analysis of grain size. Field data sheets of benthic sample collection are included in Appendix A; detailed laboratory results are provided in Appendix D. In this section, reference sites are distinguished with an "R" after the site number.

Samples collected for grain size analysis were taken in replicate from each sampling site in Borrow Areas 2C and 5B, one to represent the whole grab sample and one to represent the top layer of the sediment. For Borrow Areas East Rockaway and WOSI, whole and top layer samples were collected in the fall but not in the spring. Refer to Section 2.2 for an explanation of how the samples were procured. Whole and top samples were taken to see if finer sediment sizes were filling in depressed areas of the borrow areas that had already been dredged. Borrow Areas 2C and 5B were utilized prior to this survey. For comparisons between whole and top samples, a "ɫ" indicates a significant difference between seasons at the P = 0.008 level.

3.2.1.1 Borrow Area East Rockaway

Overall, samples collected in both the spring and fall were predominantly medium- and fine-sized sand. Borrow Area East Rockaway was utilized in 2013, but not in the year prior to this survey. In addition, only whole samples were collected in the spring; whole and top samples were collected in the fall. Accordingly, spring samples were analyzed as On-site or Reference samples and fall samples were analyzed as whole and top, On-site or Reference samples. Due to the inaccuracy of the GPS unit, not all On-site samples are depicted within the dredge box area in Figure 6 and Figure 7 . Reference samples were collected at the furthest extent from the dredge box.

<u>Spring</u>

On average, combined whole samples (herein after identified as "W") were dominated by fine particles at 43.01% (Table 7). A closer look at this data revealed that for the whole samples, the on-site samples had higher percentages of silt particles compared to the reference sites which had higher presence of coarse-size sand.

Table 7: Average Particle-size Distribution of Spring Benthic Grabs for Borrow Area East Rockaway

Average Particle-size Distribution of Spring Benthic Grabs for Borrow Area East Rockaway								
Benthic sample type	Location	Gravel-size (%)			Sand-size (%)			Silt-size & clay-size (%)
		Cobble	Pebble	Granule	Coarse	Medium	Fine	
Whole	On-site	0.00	1.89	2.14	10.93	30.02	43.11	11.91
	Reference	0.00	1.17	4.19	18.04	30.31	42.31	3.97
	Combined	0.00	1.80	2.41	11.88	30.06	43.01	10.85

Note: "Reference" is the data from areas outside of the borrow area; "Combined" is the On-site and Reference location data together.

For sediment collected at East Rockaway in the spring, fine sand was the dominant type for 15 samples, medium sand was the dominant size in 10 samples, coarse size-sand was the dominant size in 2 samples, silt particles were the dominant size in 1 sample, and pebble gravel-size was the dominant size in 1 sample (Table 8). Cobble-gravel size particles were not dominant in any samples. The quantitative analysis of sediment size is depicted in Figure 20.

Table 8: Dominant Sediment Type Based on Lab Analysis of Spring Benthic Grabs for Borrow Area East Rockaway

Dominant Sediment Type Based on Lab Analysis of Spring Benthic Grabs for Borrow Area East Rockaway		
Site	**Depth (ft.)**	**Whole sample**
ER01	46	Fine sand
ER02	49	Medium sand
ER03	56	Medium sand
ER04	48	Fine sand
ER05	56	Fine sand
ER06	46	Medium sand
ER07	45	Medium sand
ER08	53	Fine sand
ER09	51	Fine sand
ER10	49	Medium sand
ER11	54	Silt/clay
ER12	56	Silt/clay
ER13	54	Fine sand
ER14	43	Fine sand
ER15	46	Coarse sand
ER16	58	Medium sand
ER17	51	Medium sand
ER18	51	Medium sand
ER19	52	Fine sand
ER20	52	Fine sand
ER21	44	Medium sand
ER22	50	Medium sand
ER23	43	Pebble
ER24	49	Fine sand
ER25	51	Fine sand
ER26	51	Fine sand
ER27 R	41	Coarse sand
ER28 R	41	Fine sand
ER29 R	34	Fine sand

Dominant Sediment Type Based on Lab Analysis of Spring Benthic Grabs for Borrow Area East Rockaway		
Site	**Depth (ft.)**	**Whole sample**
ER30 R	36	Fine sand

Note: R = reference

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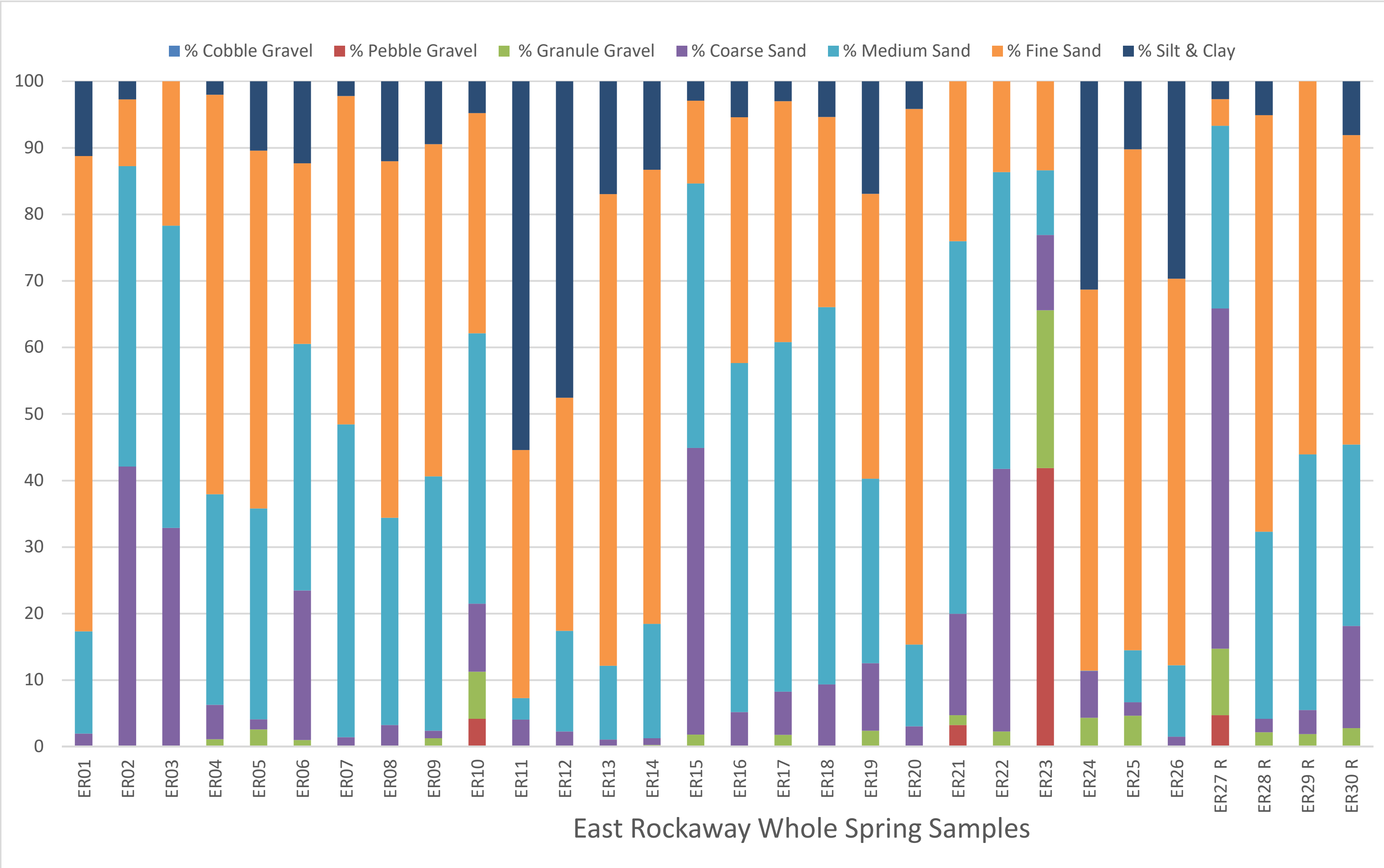

Figure 20: Sediment Composition of Whole Spring Benthic Grabs by Site for Borrow Area East Rockaway (*R=reference site)

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Fall

On average, combined whole and top grab samples (herein after identified as “W” and “T”) were dominated by fine-size sand at 42.51% and 41.31%, respectively (Table 9). On-site samples had higher percentages of fine-size sand than reference samples. W and T reference samples had higher percentages of coarse-size sand.

Table 9: Average Particle-size Distribution of Fall Benthic Grabs for Borrow Area East Rockaway

Average Particle-size Distribution of Fall Benthic Grabs for Borrow Area East Rockaway								
Benthic sample type	Location	Gravel-size (%)			Sand-size (%)			Silt-size & clay-size (%)
		Cobble	Pebble	Granule	Coarse	Medium	Fine	
Whole	On-site	0.00	0.27	2.29	13.85	29.86	44.45	9.27
	Reference	0.00	0.97	9.35	23.40	19.68	29.91	16.70
	Combined	0.00	0.37	3.24	15.12	28.51	42.51	10.26
Top	On-site	0.00	0.00	1.17	12.25	30.91	44.13	11.53
	Reference	0.00	2.30	8.40	27.48	20.08	22.92	18.83
	Combined	0.00	0.31	2.13	14.28	29.47	41.31	12.51

Note: “On-site” is data for the entire borrow area; “Reference” is the data from areas outside of the borrow area; “Combined” is the On-site and Reference location data together.

For sediment collected at East Rockaway, 17 W grab samples and 14 T grab samples were dominated by fine-sized sand, 7 W and 7 T samples were dominated by medium-size sand, 4 W and 5 T samples were dominated by coarse-size sand, and 2 W and 4 T samples were dominated by silt-size (Table 10). Cobble- and pebble size-gravel, and silt/clay-size particles were not dominant sediment types in the fall samples.

Table 10: Dominant Sediment Type Based on Lab Analysis of Fall Benthic Grabs for Borrow Area East Rockaway

Dominant Sediment Type Based on Lab Analysis of Fall Benthic Grabs for Borrow Area East Rockaway			
Site	Depth (ft.)	Whole sample	Top sample
ER01	42	Fine sand	Fine sand
ER02	44	Medium sand	Medium sand
ER03	54	Fine sand	Medium sand
ER04	46	Fine sand	Fine sand
ER05	52	Fine sand	Fine sand
ER06	47	Fine sand	Fine sand
ER07	47	Fine sand	Fine sand
ER08	57	Fine sand	Silt/clay
ER09	53	Fine sand	Silt/clay
ER10	43	Fine sand	Fine sand
ER11	53	Fine sand	Silt/clay
ER12 R	56	Silt/clay	Silt/clay
ER13	54	Medium sand	Medium sand

Dominant Sediment Type Based on Lab Analysis of Fall Benthic Grabs for Borrow Area East Rockaway			
Site	Depth (ft.)	Whole sample	Top sample
ER14	47	Fine sand	Fine sand
ER15	45	Coarse sand	Coarse sand
ER16	57	Fine sand	Fine sand
ER17	52	Medium sand	Medium sand
ER18	41	Medium sand	Medium sand
ER19	51	Fine sand	Fine sand
ER20	51	Fine sand	Fine sand
ER21	45	Medium sand	Medium sand
ER22	46	Coarse sand	Coarse sand
ER23	42	Medium sand	Medium sand
ER24	48	Fine sand	Fine sand
ER25	52	Silt/clay	Fine sand
ER26	53	Fine sand	Fine sand
ER27 R	34	Coarse sand	Coarse sand
ER28 R	40	Fine sand	Fine sand
ER29	32	Medium sand	Coarse sand
ER30 R	36	Coarse sand	Coarse sand

Note: R = reference

Comparisons of dominant sediment sizes between whole and top samples for each site show that 20 of 26 were the same for On-site samples. Three of the On-site samples had W samples that had bigger dominant grain sizes than the T sample. Three of the On-site samples had T samples that had bigger dominant grain sizes than the W sample. W and T samples for all four reference sites had the same dominant grain size. The quantitative analysis of sediment size is depicted in Figure 21 and Figure 22.

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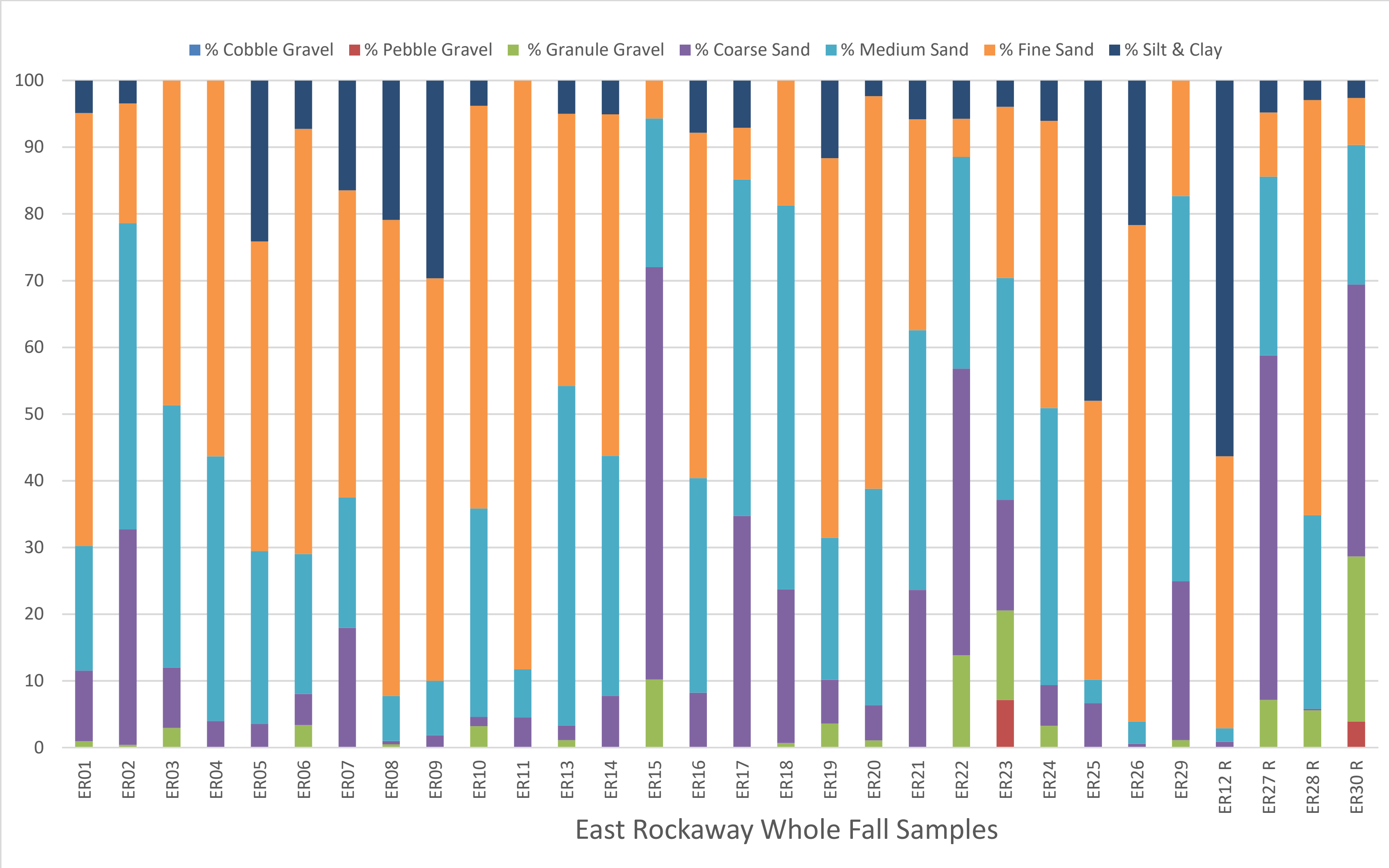

Figure 21: Sediment Composition of Whole Fall Benthic Grabs by Site for Borrow Area East Rockaway (R=reference site)

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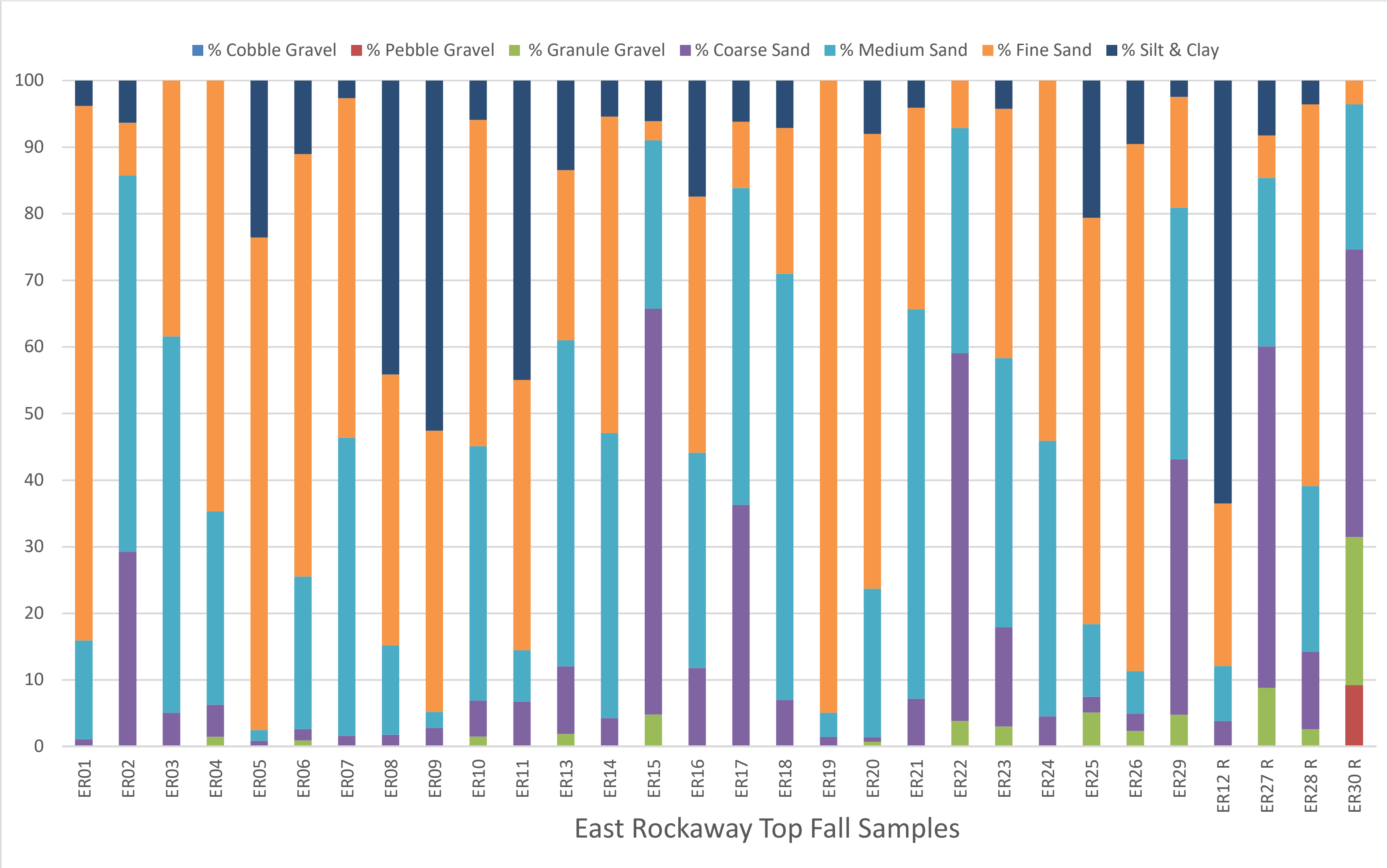

Figure 22: Sediment Composition of Top Fall Benthic Grabs by Site for Borrow Area East Rockaway (R=reference site)

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3.2.1.2 Borrow Area 2C

Overall, samples collected in both the spring and fall were dominated by coarse-sized sand. Samples were analyzed as On-site or reference, with the On-site samples further split into categories of On-site OUT of dredged box, and On-site IN dredged box. The On-site samples were divided to determine if the previously dredged area was filling in with fine sediment.

Spring

On average, combined whole grab samples (herein after identified as "W") contained 55.05% of coarse particles and top grab samples (herein after identified as "T") contained 56.71% of coarse particles (Table 11). A closer look at this data revealed that for both the whole and top samples, the on-site samples had higher percentages of coarse sand particles compared to the reference sites. Medium-sized sand (0.0098-0.0197 in.) made up 30.19% W and 28.88% T of the samples. Fine to very fine-sized sand (0.0025-0.0098 in.) made up 8.45% W and 7.73% T; silt and clay (<0.0025 in.) made up 4.03% W and 4.75% T, granule gravel (0.1570-0.0787 in.) made up 1.97% W and 1.48% T and pebble gravel (0.1570-2.5 in.) made up 0.31% W and 0.45% T of the samples. Cobble-sized particles were not identified in the spring 2C samples. The On-site IN dredged box W and T samples had less pebble and granule gravel-size, and coarse-sized sand; more medium-, fine-, and silt- and clay-sized particles than samples On-site OUT of dredged box and the reference samples. The W and T On-site OUT of dredged box samples had less granule gravel- size, fine- and medium-sized sand, and silt/clay-sized particles; and more pebble and coarse-sized sand than reference samples.

Table 11: Average Particle-size Distribution of Spring Benthic Grabs for Borrow Area 2C

Average Particle-size Distribution of Spring Benthic Grabs for Borrow Area 2C									
Benthic sample type	Location		Gravel-size (%)			Sand-size (%)			Silt-size & clay-size (%)
			Cobble	Pebble	Granule	Coarse	Medium	Fine	
Whole	On-site	Entire borrow area	0.00	0.35	1.80	55.91	30.24	7.55	4.15
		IN dredged box	0.00	0.16	1.06	36.77	37.63	15.18	9.19
		OUT of dredged box	0.00	0.43	2.11	64.11	27.07	4.28ɫ	2.00
	Reference		0.00	0.00	3.35	48.22	29.75	15.68	3.00
	Combined		0.00	0.31	1.97	55.05	30.19	8.45	4.03
Top	On-site	Entire borrow area	0.00	0.51	1.46	57.31	28.89	6.76	5.07
		IN dredged box	0.00	0.74	0.99	34.85	36.73	14.33	12.35
		OUT of dredged box	0.00	0.41	1.67	66.93	25.53	3.51ɫ	1.95
	Reference		0.00	0.00	1.62	51.91	28.75	15.48	2.24
	Combined		0.00	0.45	1.48	56.71	28.88	7.73	4.75

Comparisons of whole to top grain size samples were conducted using two-tailed student's t-tests for paired samples. These tests were run separately for grabs conducted on-site and reference site grabs. A "ɫ" symbol indicates a significant difference between types at the P = 0.008 level. The only significant difference found was between whole and top samples for fine sand in on-site OUT of dredged box. The whole samples (4.28%) had more fine sized-sand than top samples (3.51%).

In the field, the most common descriptor of samples collected in the spring for Borrow Area 2C was "brown sand." Traces of organic matter, invertebrates, and pieces of shell were apparent in several samples. Reference site descriptions included brown sand, gray sand and black muck. Table 12 shows the dominant sediment type for each benthic grab separated by whole and top samples as quantified through lab analysis. For sediment collected at 2C in the spring, 34 of 45 whole grab samples and 36 of 45 top grab samples were dominated by coarse-sized sand (0.0197-0.0787 in.). Medium sand was the dominant size in 8 W and 6 T samples, fine sand was the dominant size in 1 W and 1 T samples, and silt was the dominant size in 2 W and 2 T samples. In the dredged box, the W and T samples for each sample had the same dominant size. Coarse sand was the dominant size for five dredged box samples, medium sand was the dominant size in five samples, and silt/clay was the dominant size in two samples. None of the gravel size sediment types were dominant in any samples. The quantitative analysis of sediment size is depicted in Figure 23 and Figure 24. The figures show the percentage composition for each sediment type in the benthic samples; each sediment type is signified by a color.

Table 12: Dominant Sediment Type Based on Lab Analysis of Spring Benthic Grabs for Borrow Area 2C

Dominant Sediment Type Based on Lab Analysis of Spring Benthic Grabs for Borrow Area 2C			
Site	**Depth (ft.)**	**Whole sample**	**Top sample**
2C01 R	58	Coarse sand	Coarse sand
2C02	55	Coarse sand	Coarse sand
2C03 R	55	Coarse sand	Coarse sand
2C04	57	Coarse sand	Coarse sand
2C05	59	Coarse sand	Coarse sand
2C06	61	Coarse sand	Coarse sand
2C07	60	Coarse sand	Coarse sand
2C08	56	Coarse sand	Coarse sand
2C09	58	Coarse sand	Coarse sand
2C10	59	Coarse sand	Coarse sand
2C11	58	Coarse sand	Coarse sand
2C12	56	Coarse sand	Coarse sand
2C13	61	Coarse sand	Coarse sand
2C14	62	Coarse sand	Coarse sand
2C15	58	Coarse sand	Coarse sand
2C16	59	Coarse sand	Coarse sand
2C17*	75	Silt/clay	Silt/clay
2C18	63	Coarse sand	Coarse sand
2C19	59	Coarse sand	Coarse sand
2C20	56	Coarse sand	Coarse sand
2C21	56	Coarse sand	Coarse sand
2C22	68	Coarse sand	Coarse sand
2C23 R	74	Medium sand	Medium sand

Dominant Sediment Type Based on Lab Analysis of Spring Benthic Grabs for Borrow Area 2C			
Site	**Depth (ft.)**	**Whole sample**	**Top sample**
2C24	59	Medium sand	Coarse sand
2C25	59	Coarse sand	Coarse sand
2C26	58	Medium sand	Coarse sand
2C27	56	Coarse sand	Coarse sand
2C28*	67	Coarse sand	Coarse sand
2C29*	66	Coarse sand	Coarse sand
2C30 R	67	Fine sand	Fine sand
2C31*	62	Medium sand	Medium sand
2C32	54	Coarse sand	Coarse sand
2C33	47	Coarse sand	Coarse sand
2C34	47	Coarse sand	Coarse sand
2C35	49	Coarse sand	Coarse sand
2C36	49	Coarse sand	Coarse sand
2C37*	61	Coarse sand	Coarse sand
2C38*	66	Medium sand	Medium sand
2C39*	66	Coarse sand	Coarse sand
2C40*	70	Medium sand	Medium sand
2C41*	69	Silt/clay	Silt/clay
2C42*	66	Medium sand	Medium sand
2C43*	70	Coarse sand	Coarse sand
2C44*	69	Medium sand	Medium sand
2C45 R	64	Coarse sand	Coarse sand

Note: * = site inside the dredged box and R = reference

Another way to look at the possible differences between whole (W) and top (T) samples is to see if the dominant sediment type differs between them. The majority of dominant sediment types did not change from the W to T parts of each sediment grab which could indicate that the borrow area is not filling in with finer sediment, including the On-site IN dredged box. All 12 of the On-site IN dredged box samples had the same dominant sediment type for W and T samples. Of the 28 On-site OUT of dredged box samples, 26 samples had the same dominant sediment type for W and T samples; 2 samples had T samples with a larger sediment type than the W samples. All five reference samples had the same dominant size for W and T samples.

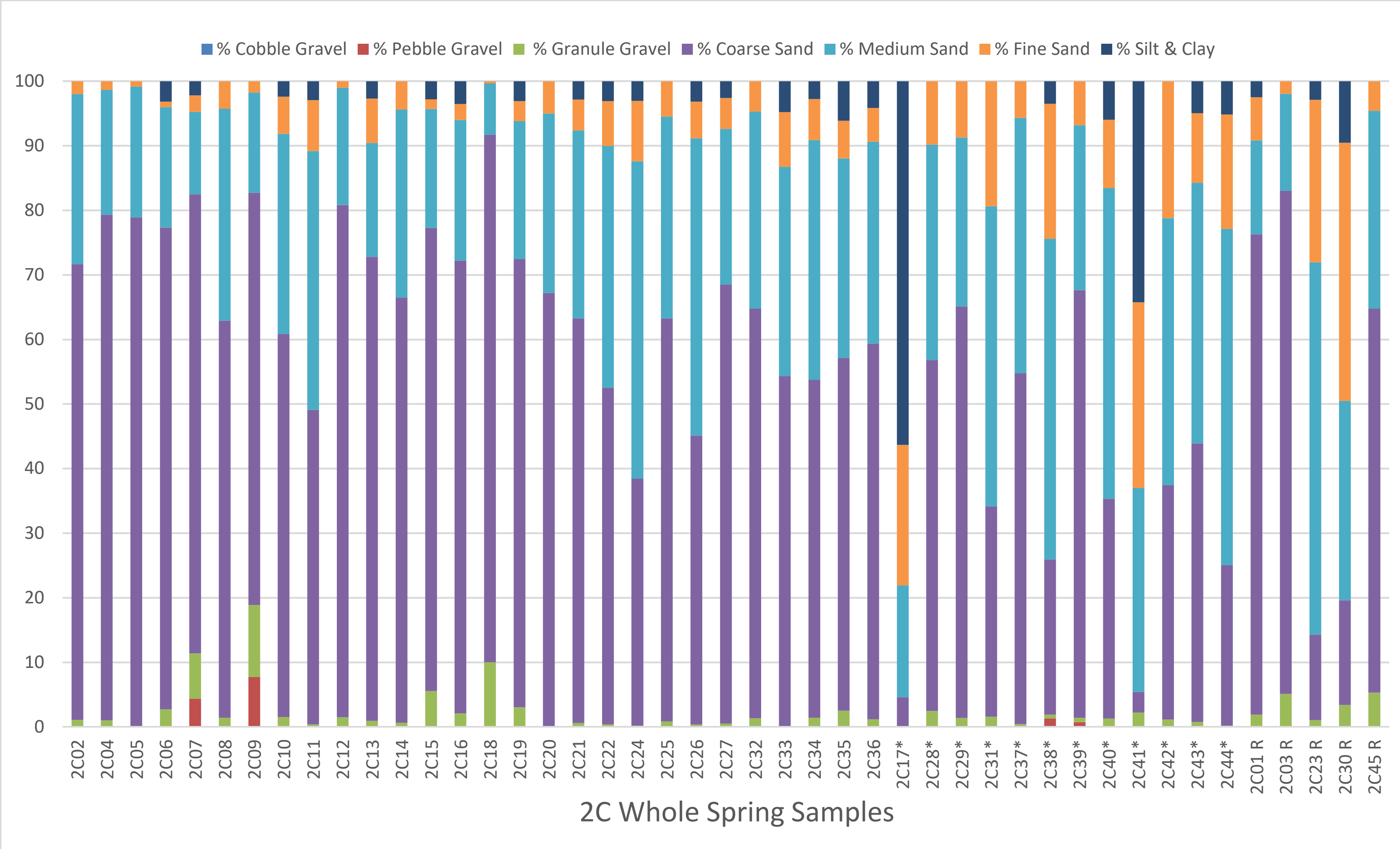

Figure 23: Sediment Composition of Whole Spring Benthic Grabs by Site for Borrow Area 2C
(* = inside dredged box site, R=reference site)

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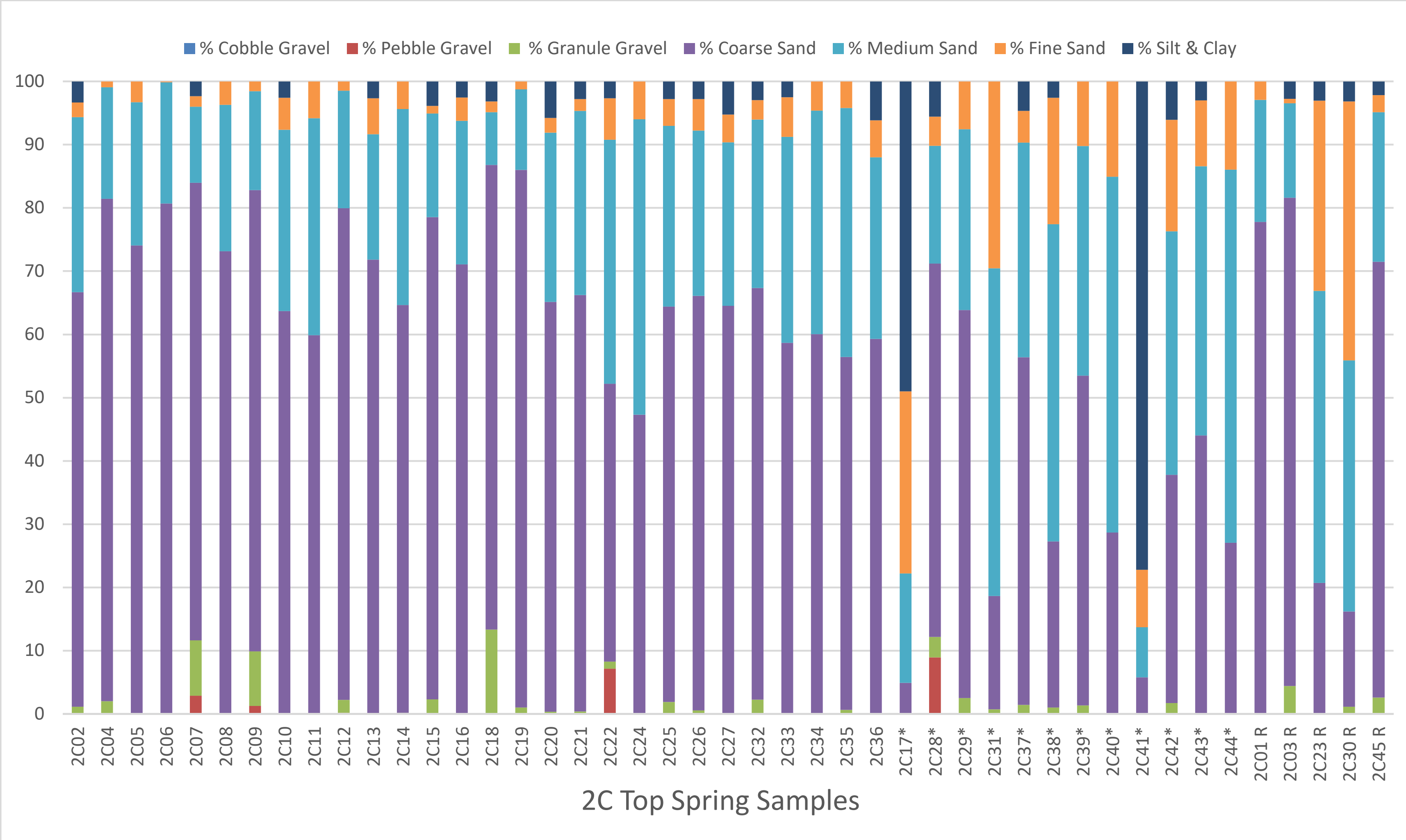

Figure 24: Sediment Composition of Top Spring Benthic Grabs by Site for Borrow Area 2C
(*= inside dredged box site, R =reference site)

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Fall

On average, samples contained 62.42% W and 61.76% T of coarse particles (Table 13). Medium-sized sand (0.0098-0.0197 in.) made up 26.29% W and 27.89% T of the samples. Fine to very fine-sized sand (0.0025-0.0098 in.) made up 6.30% W and 6.29.00% T; granule gravel (0.1570-0.0787 in.) made up 2.59% W and 1.63% T, silt and clay (<0.0025 in.) made up 1.84% W and 2.09% T, and pebble gravel (0.1570-2.5 in.) made up 0.56% W and 0.34% T of the samples. Cobble-sized particles were not identified in the fall 2C samples. The On-site IN dredged box W samples had less coarse-sized sand than samples On-site OUT of dredged box. Compared to the reference samples, the On-site IN dredged box W samples had less pebble sized-gravel but other sediment sizes were similar. On-site OUT W samples had more coarse sized-sand than reference samples. The On-site IN dredged box T samples had less coarse-size sand and more medium-and fine-size sand compared to On-site OUT of dredged box samples, and more fine-size sand than reference samples. On-site OUT of dredged box T samples had more coarse-sized sand compared to reference samples.

Table 13: Average Particle-size Distribution of Fall Benthic Grabs for Borrow Area 2C

Average Particle-size Distribution of Fall Benthic Grabs for Borrow Area 2C									
Benthic sample type	Location		Gravel-size (%)			Sand-size (%)			Silt-size & clay-size (%)
			Cobble	Pebble	Granule	Coarse	Medium	Fine	
Whole	On-site	Entire borrow area	0.00	0.09	2.27	63.62	26.16	6.01	1.85
		IN dredged box	0.00	0.28	3.30	51.71	31.29	11.04	2.37
		OUT of dredged box	0.00	0.00	1.83	68.72	23.96	3.86	1.63
	Reference		0.00	4.35	5.14	52.82	27.32	8.62	1.76
	Combined		0.00	0.56	2.59	62.42	26.29	6.30	1.84
Top	On-site	Entire borrow area	0.00	0.34	1.40	62.33	27.88	5.91	2.15
		IN dredged box	0.00	0.08	2.13	47.40	34.91	12.47	3.02
		OUT of dredged box	0.00	0.44	1.09	68.73	24.87	3.09	1.78
	Reference		0.00	0.40	3.48	57.19	27.94	9.35	1.65
	Combined		0.00	0.34	1.63	61.76	27.89	6.29	2.09

Note: "On-site Entire borrow area" is data for the entire borrow area including the dredged box; "On-site IN dredged box" is only the data for the previously dredged area; "On-site OUT of dredged box" is the borrow area data without the dredged box data; "Reference" is the data from areas outside of the borrow area; "Combined" is the On-site and Reference location data together.

Comparisons of whole to top grain size samples were conducted using two-tailed student's t-tests for paired samples. There were no significant differences between whole and top samples for either on-site or reference site samples. Most of the fall samples were described as "tan or light brown sand." Pieces of shell were present, as well as sand dollars and bits of organic matter. For sediment collected at 2C in the fall and analyzed in the lab, 41 of 45 W grab samples and 38 of 45 T grab samples were dominated by coarse-sized sand (Table 14). Medium sand was the dominant size in 4 W and 7 T. None of the gravel sizes were dominant in any samples.

Table 14: Dominant Sediment Type Based on Lab Analysis of Fall Benthic Grabs for Borrow Area 2C

Dominant Sediment Type Based on Lab Analysis of Fall Benthic Grabs for Borrow Area 2C			
Site	**Depth (ft.)**	**Whole sample**	**Top sample**
2C01 R	63	Coarse sand	Coarse sand
2C02*	70	Coarse sand	Coarse sand
2C03	60	Coarse sand	Coarse sand
2C04	53	Coarse sand	Coarse sand
2C05	55	Coarse sand	Coarse sand
2C06	55	Coarse sand	Coarse sand
2C07	57	Coarse sand	Coarse sand
2C08 R	70	Medium sand	Medium sand
2C09	57	Coarse sand	Medium sand
2C10	53	Coarse sand	Coarse sand
2C11	55	Coarse sand	Coarse sand
2C12	57	Coarse sand	Coarse sand
2C13	60	Coarse sand	Coarse sand
2C14*	71	Medium sand	Medium sand
2C15*	58	Coarse sand	Coarse sand
2C16	57	Coarse sand	Coarse sand
2C17	60	Coarse sand	Coarse sand
2C18	58	Coarse sand	Coarse sand
2C19	54	Coarse sand	Coarse sand
2C20	57	Coarse sand	Coarse sand
2C21	58	Coarse sand	Coarse sand
2C22	58	Coarse sand	Coarse sand
2C23	54	Coarse sand	Coarse sand
2C24	57	Coarse sand	Coarse sand
2C25	59	Coarse sand	Coarse sand
2C26	57	Coarse sand	Coarse sand
2C27	54	Coarse sand	Coarse sand
2C28 R	54	Coarse sand	Coarse sand
2C29	55	Coarse sand	Coarse sand
2C30 R	56	Coarse sand	Coarse sand
2C31 R	65	Coarse sand	Coarse sand
2C32*	60	Coarse sand	Medium sand
2C33*	70	Coarse sand	Coarse sand
2C34*	70	Medium sand	Medium sand
2C35*	70	Coarse sand	Coarse sand

Dominant Sediment Type Based on Lab Analysis of Fall Benthic Grabs for Borrow Area 2C			
Site	**Depth (ft.)**	**Whole sample**	**Top sample**
2C36*	68	Coarse sand	Coarse sand
2C37*	67	Medium sand	Medium sand
2C38*	66	Coarse sand	Medium sand
2C39*	61	Coarse sand	Coarse sand
2C40	60	Coarse sand	Coarse sand
2C41	61	Coarse sand	Coarse sand
2C42	59	Coarse sand	Coarse sand
2C43	58	Coarse sand	Coarse sand
2C44	57	Coarse sand	Coarse sand
2C45*	64	Coarse sand	Coarse sand

Note: * = site inside the dredged box and R = reference

T and W samples were compared to help determine if finer sediment sizes were filling in depressed areas of the borrow areas that had already been dredged. The majority of dominant sediment types did not change from the W to T parts of each sediment grab which may indicate that the On-site IN dredged box is not filling in with finer sediment. Of the On-site IN dredged box samples 10 W and T samples had the same dominant sediment type and two T samples were smaller than the W samples. Of the On-site OUT of dredged box samples, 27 samples had the same dominant sediment type for W and T samples and 1 had W a dominant grain size that was larger than the T sample. In reference samples, all W and T samples had the same dominant sediment size. The quantitative analysis of sediment size is depicted in Figure 25 and Figure 26.

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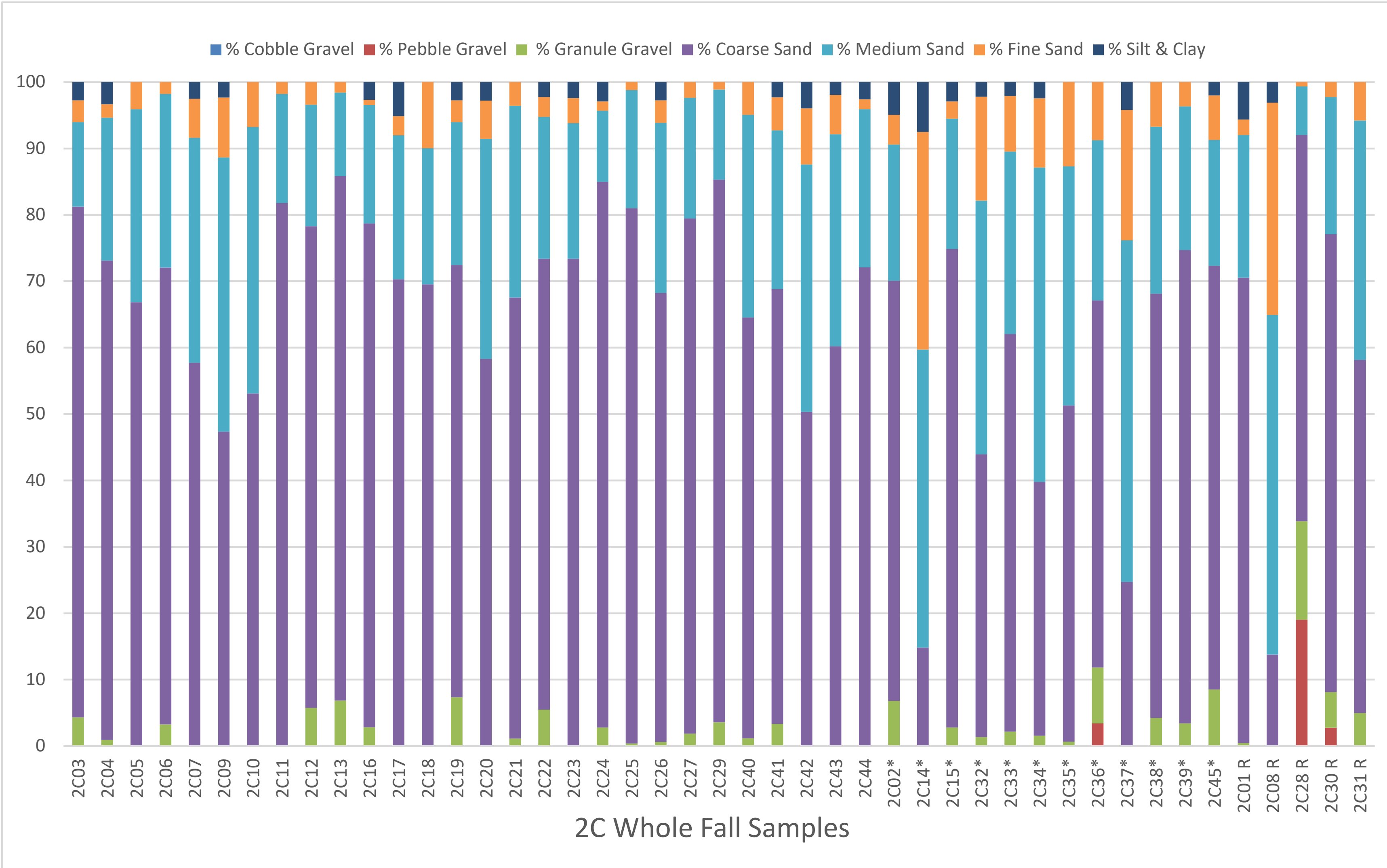

Figure 25: Sediment Composition of Whole Fall Benthic Grabs by Site for Borrow Area 2C (*= inside dredged box site, R=reference site)

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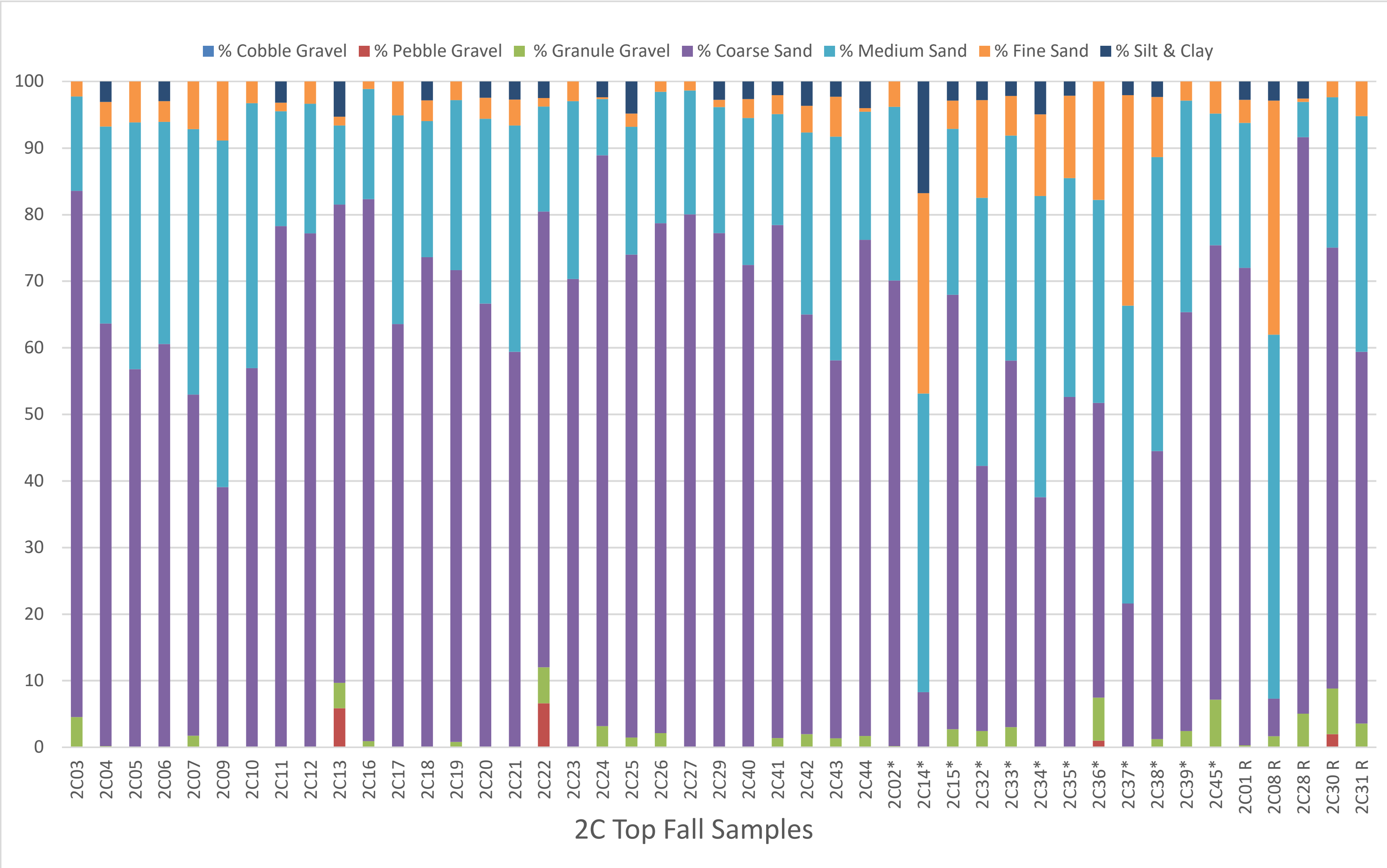

Figure 26: Sediment Composition of Top Fall Benthic Grabs by Site for Borrow Area 2C (*= inside dredged box site, R=reference site)

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3.2.1.3 Borrow Area 5B

Overall, samples collected in both the spring and fall were predominantly coarse and medium-sized sand. Samples were analyzed as On-site or Reference, with the On-site samples further split into categories of On-site OUT of dredged box, and On-site IN dredged box. The On-site samples were divided to determine if the previously dredged area was filling in with fine sediment.

Spring

On average, combined whole and top grab samples (herein after identified as “W” and “T”) were dominated by coarse particles at 50.20% and 50.53%, respectively (Table 15). A closer look at this data revealed that for both the whole and top samples, the on-site samples had higher percentages of coarse sand particles compared to the reference sites which had higher presence of medium-size sand. The On-site IN dredged box W and T samples had more coarse-size sand than On-site OUT of dredged box samples.

Table 15: Average Particle-size Distribution of Spring Benthic Grabs for Borrow Area 5B

Average Particle-size Distribution of Spring Benthic Grabs for Borrow Area 5B									
Benthic sample type	Location		Gravel-size (%)			Sand-size (%)			Silt-size & clay-size (%)
			Cobble	Pebble	Granule	Coarse	Medium	Fine	
Whole	On-site	Entire borrow area	0.00	0.86	1.92	52.57	30.12	12.17	2.36
		IN dredged box	0.00	0.95	2.16	59.28	27.30	8.24	2.07
		OUT of dredged box	0.00	0.83	1.84	50.02	31.18	13.66	2.47
	Reference		0.00	0.00	0.00	31.24	44.03‡	21.38	3.35
	Combined		0.00	0.77	1.71	50.20	31.66	13.19	2.47
Top	On-site	Entire borrow area	0.00	0.56	2.23	53.20	29.88	12.15	1.98
		IN dredged box	0.00	0.70	1.53	60.96	27.12	7.89	1.80
		OUT of dredged box	0.00	0.51	2.49	50.26	30.93	13.76	2.05
	Reference		0.00	0.00	0.00	29.12	47.74‡	21.52	1.62
	Combined		0.00	0.50	1.98	50.53	31.87	13.19	1.94

Note: “On-site Entire borrow area” is data for the entire borrow area including the dredged box; “On-site IN dredged box” is only the data for the previously dredged area; “On-site OUT of dredged box” is the borrow area data without the dredged box data; “Reference” is the data from areas outside of the borrow area; “Combined” is the On-site and Reference location data together.

For Borrow Area 5B, student’s t-tests for paired comparisons were run separately for grabs conducted on-site, in reference sites, and in the dredged box. Whole and top reference samples were significantly different for medium-size sand (P=0.002). Top reference samples had more medium sand compared to whole samples. In the field, the most common descriptors of samples collected in the spring for Borrow Area 5B was “light brown sand.” Traces of organic matter, invertebrates, and pieces of shell were apparent in several samples. For sediment collected at 5B in the spring, coarse sand was the dominant type for 30 W and 31 T, medium sand was the dominant size in 12 W and 10 T, fine sand was the dominant size in 3 W and 3 T, granule-size gravel was the dominant size in 1 T samples (Table 16). Pebble -gravel size and silt/clay particles were not dominant in any samples.

Table 16: Dominant Sediment Type Based on Lab Analysis of Spring Benthic Grabs for Borrow Area 5B

Dominant Sediment Type Based on Lab Analysis of Spring Benthic Grabs for Borrow Area 5B			
Site	**Depth (ft.)**	**Whole sample**	**Top sample**
5B01 R	43	Medium sand	Medium sand
5B02*	44	Coarse sand	Coarse sand
5B03*	50	Medium sand	Medium sand
5B04	52	Coarse sand	Coarse sand
5B05	44	Coarse sand	Coarse sand
5B06*	40	Coarse sand	Coarse sand
5B07	38	Coarse sand	Coarse sand
5B08*	45	Medium sand	Medium sand
5B09	49	Coarse sand	Coarse sand
5B10	51	Medium sand	Coarse sand
5B11 R	62	Medium sand	Medium sand
5B12	56	Coarse sand	Granule gravel
5B13	52	Medium sand	Coarse sand
5B14*	48	Coarse sand	Coarse sand
5B15*	41	Coarse sand	Coarse sand
5B16*	37	Coarse sand	Coarse sand
5B17*	47	Coarse sand	Coarse sand
5B18	50	Coarse sand	Coarse sand
5B19	53	Coarse sand	Coarse sand
5B20*	46	Coarse sand	Coarse sand
5B21*	44	Coarse sand	Coarse sand
5B22	40	Coarse sand	Coarse sand
5B23 R	30	Coarse sand	Coarse sand
5B24*	43	Coarse sand	Coarse sand
5B25	47	Coarse sand	Coarse sand
5B26	52	Coarse sand	Coarse sand
5B27	52	Medium sand	Coarse sand
5B28	47	Medium sand	Medium sand
5B29	44	Coarse sand	Coarse sand
5B30	39	Coarse sand	Coarse sand
5B31	36	Coarse sand	Coarse sand
5B32	41	Coarse sand	Coarse sand
5B33	45	Coarse sand	Medium sand
5B34	49	Medium sand	Medium sand
5B35	51	Coarse sand	Coarse sand

Dominant Sediment Type Based on Lab Analysis of Spring Benthic Grabs for Borrow Area 5B			
Site	**Depth (ft.)**	**Whole sample**	**Top sample**
5B36	44	Coarse sand	Coarse sand
5B37	41	Coarse sand	Coarse sand
5B38	37	Coarse sand	Coarse sand
5B39 R	26	Medium sand	Medium sand
5B40	37	Fine sand	Fine sand
5B41	44	Medium sand	Medium sand
5B42 R	52	Medium sand	Medium sand
5B43	48	Fine sand	Fine sand
5B44	40	Fine sand	Fine sand
5B45	35	Coarse sand	Coarse sand

Note: * = site inside the dredged box and R = reference

W and T samples were compared to help determine if finer sediment sizes were filling in depressed areas of the borrow areas that had already been dredged (On-site IN dredged box). The dominant sediment type did not change from the W to T parts of each sediment grab which may indicate that the On-site IN dredged box is not filling in with finer sediment. Of the On-site OUT of dredged box samples, 25 samples had the same dominant sediment type for W and T samples and 4 T samples were bigger than the W samples. All five reference site W and T samples had the same dominant sediment type. The quantitative analysis of sediment size is depicted in Figure 27 and Figure 28.

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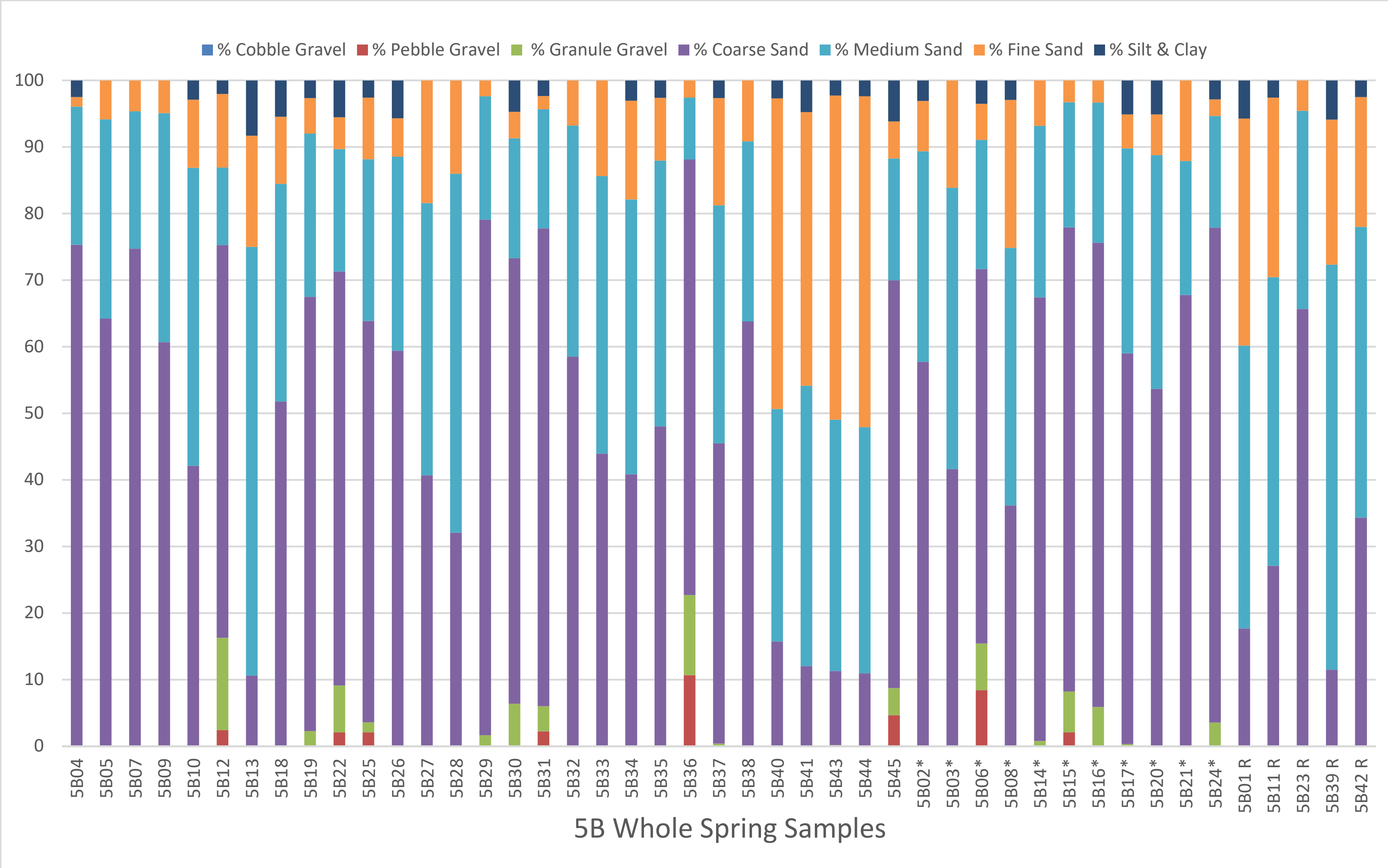

Figure 27: Sediment Composition of Whole Spring Benthic Grabs by Site for Borrow Area 5B (*in Dredged Box, R=reference site)

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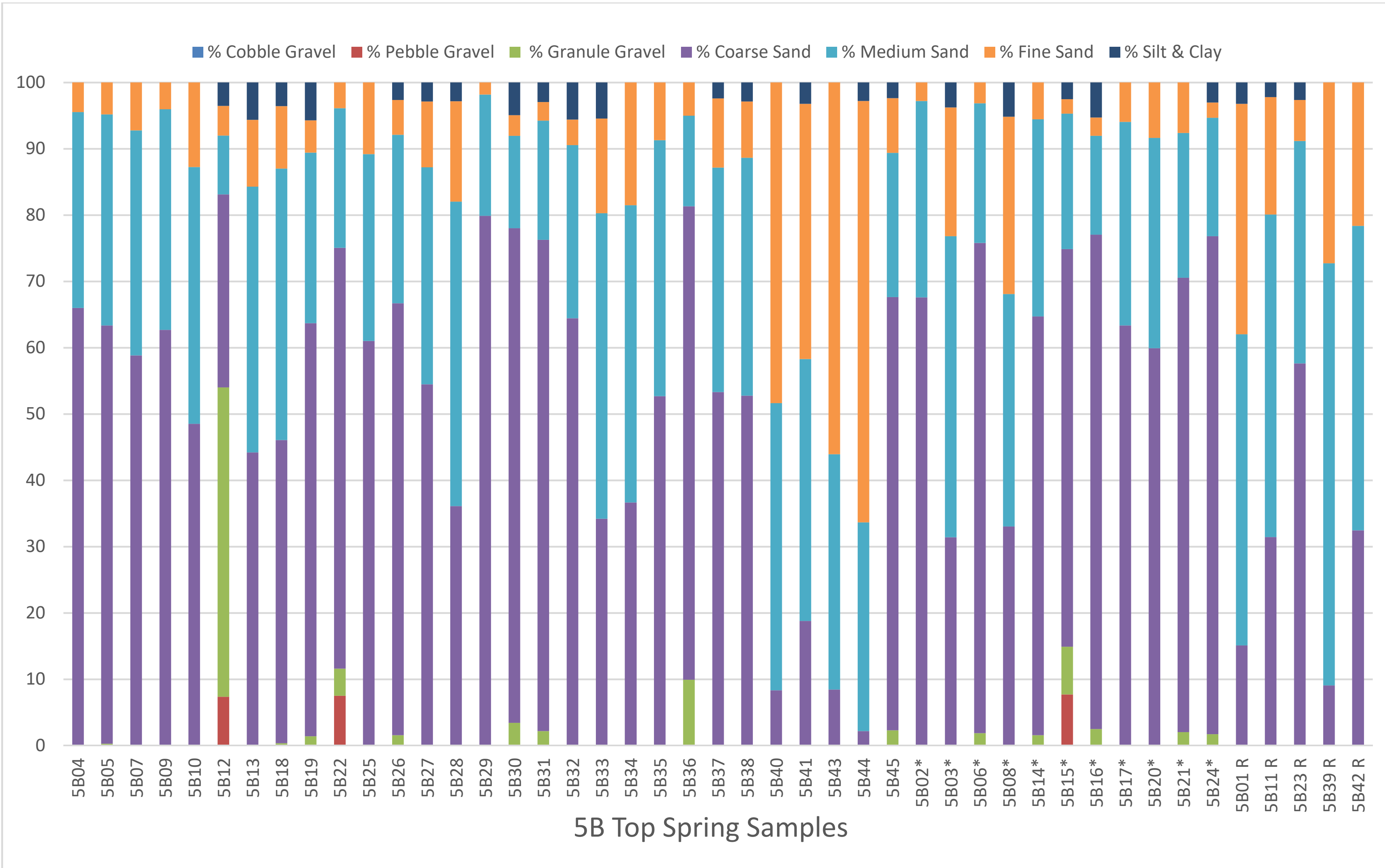

Figure 28: Sediment Composition of Top Spring Benthic Grabs by Site for Borrow Area 5B (*in Dredged Box, R=reference site)

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Fall

On average, combined whole and top grab samples (herein after identified as "W" and "T") were dominated by coarse particles at 46.64% and 48.77%, respectively (Table 17). On-site samples had higher percentages of coarse-size sand than reference samples. The On-site IN dredged box W and T samples had more coarse-size sand than On-site OUT of dredged box samples.

Table 17: Average Particle-size Distribution of Fall Benthic Grabs for Borrow Area 5B

Average Particle-size Distribution of Fall Benthic Grabs for Borrow Area 5B									
Benthic sample type	Location		Gravel-size (%)			Sand-size (%)			Silt-size & clay-size (%)
			Cobble	Pebble	Granule	Coarse	Medium	Fine	
Whole	On-site	Entire borrow area	0.00	0.56	1.58	47.01	32.34	16.53	1.97
		IN dredged box	0.00	0.00	2.24	53.57	27.48	14.24	2.46
		OUT of dredged box	0.00	0.82	1.34	43.98	34.42	17.62	1.83
	Reference		0.00	0.00	2.69	43.69	30.17	20.57	2.88
	Combined		0.00	0.49	1.71	46.64	32.10	16.98	2.07
Top	On-site	Entire borrow area	0.00	0.69	1.15	49.72	31.83	14.55	2.06
		IN dredged box	0.00	0.00	1.94	62.14	24.90	8.87	2.16
		OUT of dredged box	0.00	1.02	0.84	44.21	34.78	17.15	1.99
	Reference		0.00	0.00	1.65	41.17	33.12	22.46	1.60
	Combined		0.00	0.61	1.21	48.77	31.97	15.43	2.01

Note: None of the comparisons between whole and top samples were significantly different. "On-site Entire borrow area" is data for the entire borrow area including the dredged box; "On-site IN dredged box" is only the data for the previously dredged area; "On-site OUT of dredged box" is the borrow area data without the dredged box data; "Reference" is the data from areas outside of the borrow area; "Combined" is the On-site and Reference location data together.

None of the W and T samples were significantly different (Table 17). In the field, the most common descriptors of samples collected in the fall for Borrow Area 5B were "light sand" and "dark sand." Traces of organic matter, invertebrates, and pieces of shell were apparent in several samples. For sediment collected at 5B, 34 W grab samples and 33 T grab samples were dominated by coarse-sized sand, 8 W and 9 T samples were dominated by medium sand, and 3 W and 3 T samples were dominated by fine sand (Table 18). Cobble- and pebble size-gravel, and silt/clay-size particles were not dominant sediment types in the fall samples.

Table 18: Dominant Sediment Type Based on Lab Analysis of Fall Benthic Grabs for Borrow Area 5B

Dominant Sediment Type Based on Lab Analysis of Fall Benthic Grabs for Borrow Area 5B			
Site	Depth (ft.)	Whole sample	Top sample
5B01	49	Coarse sand	Medium sand

Dominant Sediment Type Based on Lab Analysis of Fall Benthic Grabs for Borrow Area 5B			
Site	**Depth (ft.)**	**Whole sample**	**Top sample**
5B02	47	Coarse sand	Coarse sand
5B03*	42	Coarse sand	Coarse sand
5B04	38	Fine sand	Medium sand
5B05 R	33	Coarse sand	Coarse sand
5B06*	40	Fine sand	Coarse sand
5B07*	45	Medium sand	Medium sand
5B08	49	Medium sand	Medium sand
5B09	51	Coarse sand	Coarse sand
5B10	54	Coarse sand	Coarse sand
5B11	49	Coarse sand	Coarse sand
5B12	46	Coarse sand	Coarse sand
5B13	41	Coarse sand	Coarse sand
5B14	37	Coarse sand	Coarse sand
5B15	43	Coarse sand	Coarse sand
5B16	45	Coarse sand	Coarse sand
5B17	51	Medium sand	Fine sand
5B18	52	Medium sand	Medium sand
5B19	46	Coarse sand	Coarse sand
5B20	42	Coarse sand	Coarse sand
5B21	32	Coarse sand	Coarse sand
5B22	39	Coarse sand	Coarse sand
5B23	45	Coarse sand	Medium sand
5B24	51	Medium sand	Medium sand
5B25 R	57	Coarse sand	Coarse sand
5B26	43	Fine sand	Fine sand
5B27 R	33	Medium sand	Fine sand
5B28 R	43	Coarse sand	Coarse sand
5B29*	42	Coarse sand	Coarse sand
5B30*	48	Coarse sand	Coarse sand
5B31	53	Coarse sand	Coarse sand
5B32*	48	Coarse sand	Coarse sand
5B33*	44	Coarse sand	Coarse sand
5B34	40	Coarse sand	Coarse sand
5B35*	47	Coarse sand	Coarse sand
5B36*	48	Coarse sand	Coarse sand
5B37	53	Coarse sand	Coarse sand

Dominant Sediment Type Based on Lab Analysis of Fall Benthic Grabs for Borrow Area 5B			
Site	Depth (ft.)	Whole sample	Top sample
5B38 R	60	Medium sand	Medium sand
5B39	55	Coarse sand	Coarse sand
5B40	51	Medium sand	Medium sand
5B41*	47	Coarse sand	Coarse sand
5B42*	42	Coarse sand	Coarse sand
5B43*	41	Coarse sand	Coarse sand
5B44*	48	Coarse sand	Coarse sand
5B45	51	Coarse sand	Coarse sand

Note: * = site inside the dredged box and R = reference

T and W samples were compared to help determine if finer sediment sizes were filling in depressed areas of the borrow areas that had already been dredged. Only 1 the 13 On-site IN dredged box samples had a different dominant sediment types in W to T samples comparisons. The sample had a larger sediment size in the T sample. This may indicate that the On-site IN dredged box is not filling in with finer sediment. Comparisons of dominant sediment sizes between whole and top samples for each site show that 23 of them were the same for On-site OUT of dredged box samples. Four of the on-site samples had W samples that had bigger dominant grain sizes than the T sample. Of the reference sites W and T samples, four were the same and one W sample was larger than the T sample. The quantitative analysis of sediment size is depicted in Figure 29 and Figure 30.

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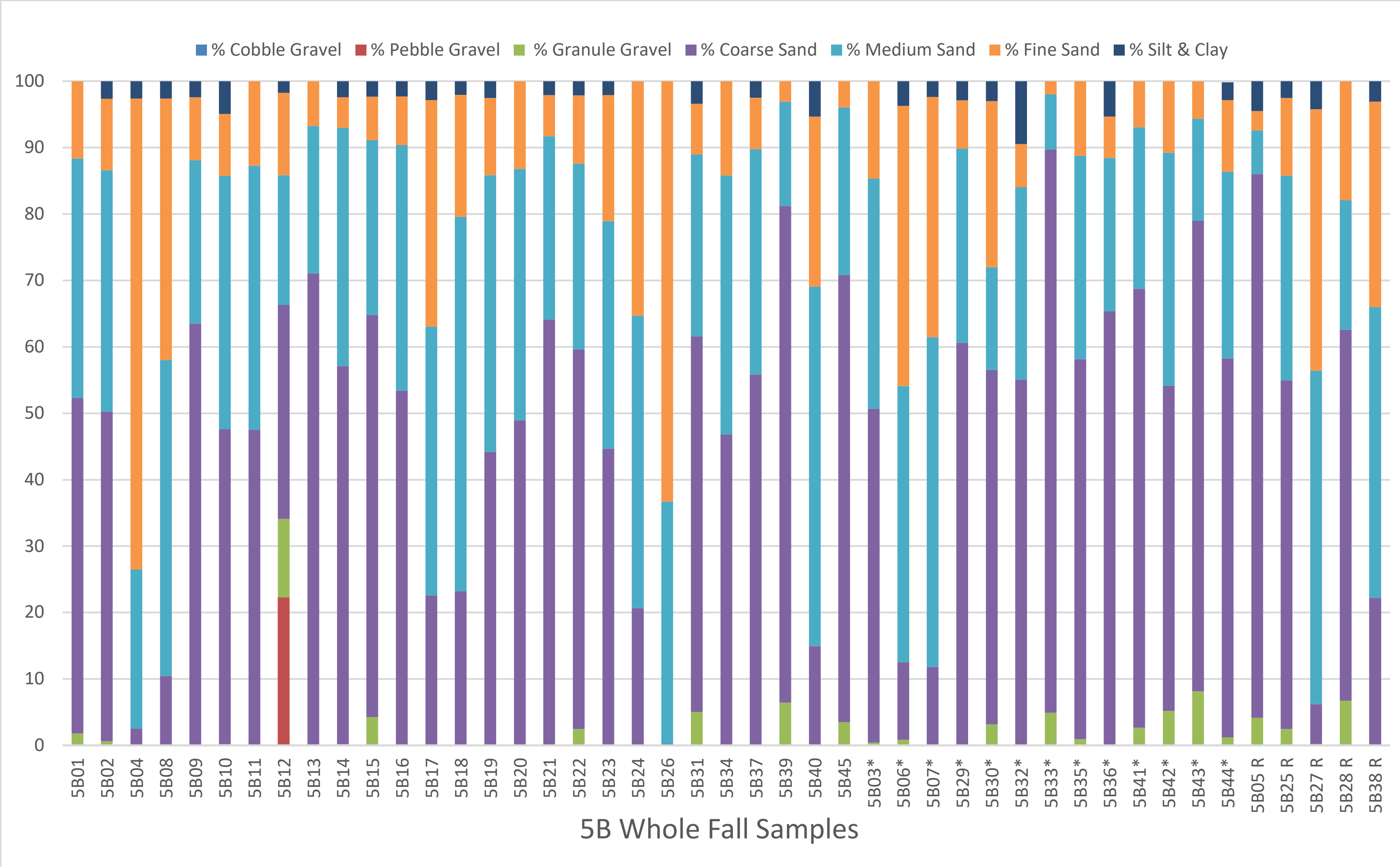

Figure 29: Sediment Composition of Whole Fall Benthic Grabs by Site for Borrow Area 5B (*in Dredged Box, R=reference site)

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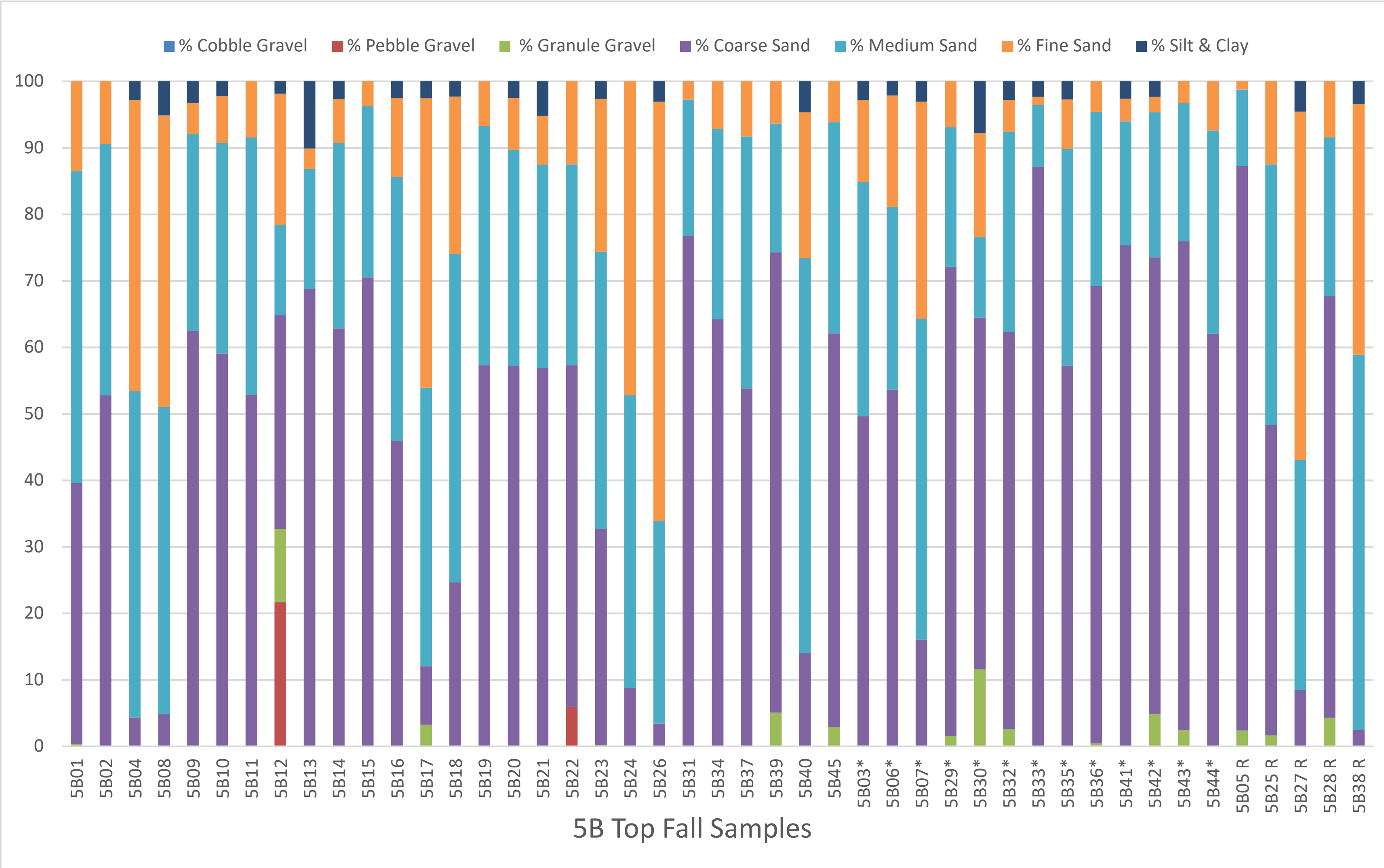

Figure 30: Sediment Composition of Top Fall Benthic Grabs by Site for Borrow Area 5B (*in Dredged Box, R=reference site)

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3.2.1.4 Borrow Area WOSI

Overall, samples collected in both the spring and fall were predominantly coarse and medium-sized sand. Prior to this survey, Borrow Area WOSI had not been utilized. In addition, only whole samples were collected in the spring; whole and top samples were collected in the fall. Accordingly, spring samples were analyzed as On-site or Reference samples and fall samples were analyzed as whole and top, On-site or Reference samples.

Spring

On average, combined whole samples (herein after identified as "W") were dominated by coarse particles at 48.80% (Table 19). A closer look at this data revealed that for the whole samples, the on-site samples had higher percentages of coarse sand particles compared to the reference sites which had higher presence of medium- and fine-size sand.

Table 19: Average Particle-size Distribution of Spring Benthic Grabs for Borrow Area WOSI

Average Particle-size Distribution of Spring Benthic Grabs for Borrow Area WOSI								
Benthic sample type	Location	Gravel-size (%)			Sand-size (%)			Silt-size & clay-size (%)
		Cobble	Pebble	Granule	Coarse	Medium	Fine	
Whole	On-site	0.00	0.00	0.74	52.16	35.31	8.41	3.38
	Reference	0.00	0.00	0.97	31.96	43.44	21.92	1.71
	Combined	0.00	0.00	0.77	48.80	36.67	10.66	3.10

Note: "On-site" is data for the entire borrow area; "Reference" is the data from areas outside of the borrow area; "Combined" is the On-site and Reference location data together.

In the field, the most common descriptors of samples collected in the spring for Borrow Area WOSI was "tan sand" and "grey sand." Traces of organic matter, invertebrates, and pieces of shell were apparent in several samples. For sediment collected at WOSI in the spring, coarse sand was the dominant type for 19 W samples; medium sand was the dominant size in 10 W samples; and fine sand was the dominant size in 1 W sample (Table 20). Cobble- and pebble -gravel size and silt/clay particles were not dominant in any samples. The quantitative analysis of sediment size is depicted in Figure 31 and Figure 32.

Table 20: Dominant Sediment Type Based on Lab Analysis of Spring Benthic Grabs for Borrow Area WOSI

Dominant Sediment Type Based on Lab Analysis of Spring Benthic Grabs for Borrow Area WOSI		
Site	**Depth (ft.)**	**Whole sample**
WOSI01 R	52	Medium sand
WOSI02	65	Medium sand
WOSI03	64	Medium sand
WOSI04 R	71	Medium sand
WOSI05 R	74	Medium sand
WOSI06	64	Medium sand
WOSI07	60	Coarse sand
WOSI08	60	Coarse sand
WOSI09	56	Coarse sand
WOSI10	52	Coarse sand
WOSI11	45	Coarse sand
WOSI12	34	Coarse sand
WOSI13	38	Coarse sand
WOSI14	48	Fine sand
WOSI15	47	Coarse sand
WOSI16	50	Coarse sand
WOSI17	53	Medium sand
WOSI18	56	Coarse sand
WOSI19	60	Medium sand
WOSI20	58	Coarse sand
WOSI21	56	Medium sand
WOSI22 R	52	Coarse sand
WOSI23	41	Coarse sand
WOSI24	36	Coarse sand
WOSI25	52	Coarse sand
WOSI26	47	Coarse sand
WOSI27	43	Coarse sand
WOSI28	39	Coarse sand
WOSI29	34	Coarse sand
WOSI30 R	23	Medium sand

Note: R = reference

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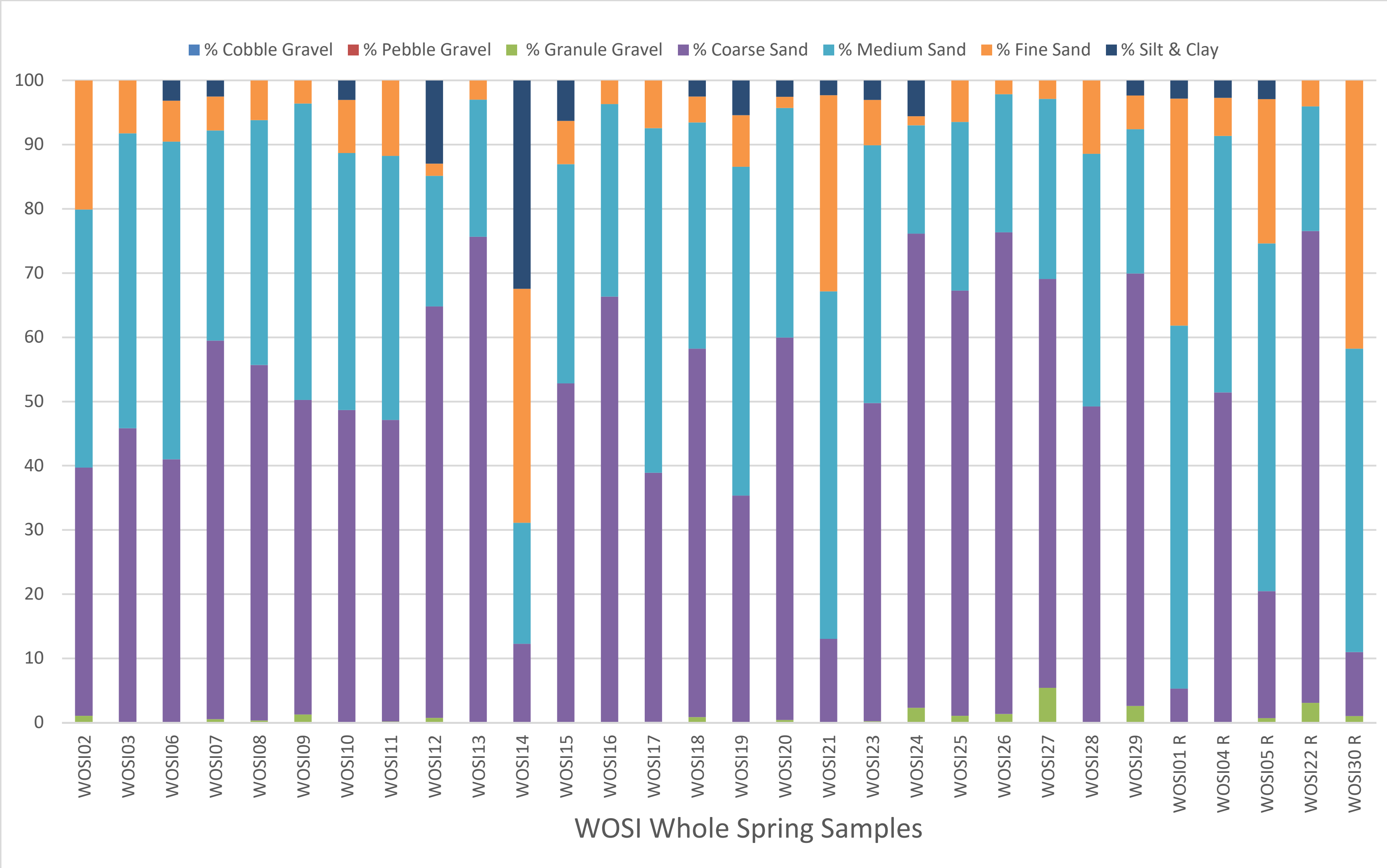

Figure 31: Sediment Composition of Whole Spring Benthic Grabs by Site for Borrow Area WOSI (R=reference site)

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Fall

On average, combined whole and top grab samples (herein after identified as "W" and "T") were dominated by coarse particles at 52.44% and 50.96%, respectively (Table 21). W On-site samples had more coarse-sand size, and W and T reference samples had more fine-sand size samples.

Table 21: Average Particle-size Distribution of Fall Benthic Grabs for Borrow Area WOSI

Average Particle-size Distribution of Fall Benthic Grabs for Borrow Area WOSI								
Benthic sample type	Location	Gravel-size (%)			Sand-size (%)			Silt-size & clay-size (%)
		Cobble	Pebble	Granule	Coarse	Medium	Fine	
Whole	On-site	0.00	0.00	1.43	52.86	30.33	13.35	2.03
	Reference	0.00	0.00	1.04	50.36	31.80	15.06	1.74
	Combined	0.00	0.00	1.36	52.44	30.58	13.63	1.98
Top	On-site	0.00	0.00	1.26	50.83	33.08	13.43	1.40
	Reference	0.00	0.00	0.00	51.62	32.00	15.28	1.10
	Combined	0.00	0.00	1.05	50.96	32.90	13.74	1.35

Note: None of the comparisons between whole and top samples were significantly different. "On-site Entire borrow area" is data for the entire borrow area including the dredged box; "On-site IN dredged box" is only the data for the previously dredged area; "On-site OUT of dredged box" is the borrow area data without the dredged box data; "Reference" is the data from areas outside of the borrow area; "Combined" is the On-site and Reference location data together.

None of the W and T samples were significantly different (Table 21). In the field, the most common descriptors of samples collected in the fall for Borrow Area WOSIB were "tan sand." Traces of organic matter, invertebrates, and pieces of shell were apparent in several samples. For sediment collected at WOSI, 24 W grab samples and 21 T grab samples were dominated by coarse-sized sand, 2 W and 6 T samples were dominated by medium sand, and 4 W and 3 T samples were dominated by fine sand (Table 22). Cobble- and pebble size-gravel, and silt/clay-size particles were not dominant sediment types in the fall samples.

Table 22: Dominant Sediment Type Based on Lab Analysis of Fall Benthic Grabs for Borrow Area WOSI

Dominant Sediment Type Based on Lab Analysis of Fall Benthic Grabs for Borrow Area WOSI			
Site	Depth (ft.)	Whole sample	Top sample
WOSI01	34	Coarse sand	Coarse sand
WOSI02	40	Coarse sand	Coarse sand
WOSI03 R	50	Coarse sand	Coarse sand
WOSI04	53	Coarse sand	Coarse sand
WOSI05	52	Coarse sand	Coarse sand
WOSI06	47	Coarse sand	Coarse sand
WOSI07	44	Coarse sand	Coarse sand
WOSI08	33	Coarse sand	Coarse sand
WOSI09	33	Fine sand	Fine sand
WOSI10 R	21	Fine sand	Fine sand

Dominant Sediment Type Based on Lab Analysis of Fall Benthic Grabs for Borrow Area WOSI			
Site	Depth (ft.)	Whole sample	Top sample
WOSI11	54	Medium sand	Medium sand
WOSI12	56	Coarse sand	Coarse sand
WOSI13	61	Coarse sand	Coarse sand
WOSI14	59	Coarse sand	Coarse sand
WOSI15	60	Coarse sand	Medium sand
WOSI16	46	Coarse sand	Coarse sand
WOSI17	43	Coarse sand	Coarse sand
WOSI18	43	Fine sand	Fine sand
WOSI19	32	Coarse sand	Coarse sand
WOSI20	33	Fine sand	Medium sand
WOSI21	42	Coarse sand	Medium sand
WOSI22 R	42	Coarse sand	Coarse sand
WOSI23	60	Medium sand	Medium sand
WOSI24	61	Coarse sand	Coarse sand
WOSI25	47	Coarse sand	Coarse sand
WOSI26	51	Coarse sand	Coarse sand
WOSI27	54	Coarse sand	Coarse sand
WOSI28	57	Coarse sand	Coarse sand
WOSI29 R	64	Coarse sand	Coarse sand
WOSI30 R	64	Coarse sand	Medium sand

Note: R = reference

Sediment size was the same for 22 samples between W and T samples. Only 3 On-site samples had a different dominant sediment types in W to T sample comparisons. Two samples had a smaller sediment size in the T sample, and one T sample had a larger sediment size compared to the W sample. Of the reference sites W and T samples, four were the same and one W sample was larger than the T sample. The quantitative analysis of sediment size is depicted in Figure 32 and Figure 33.

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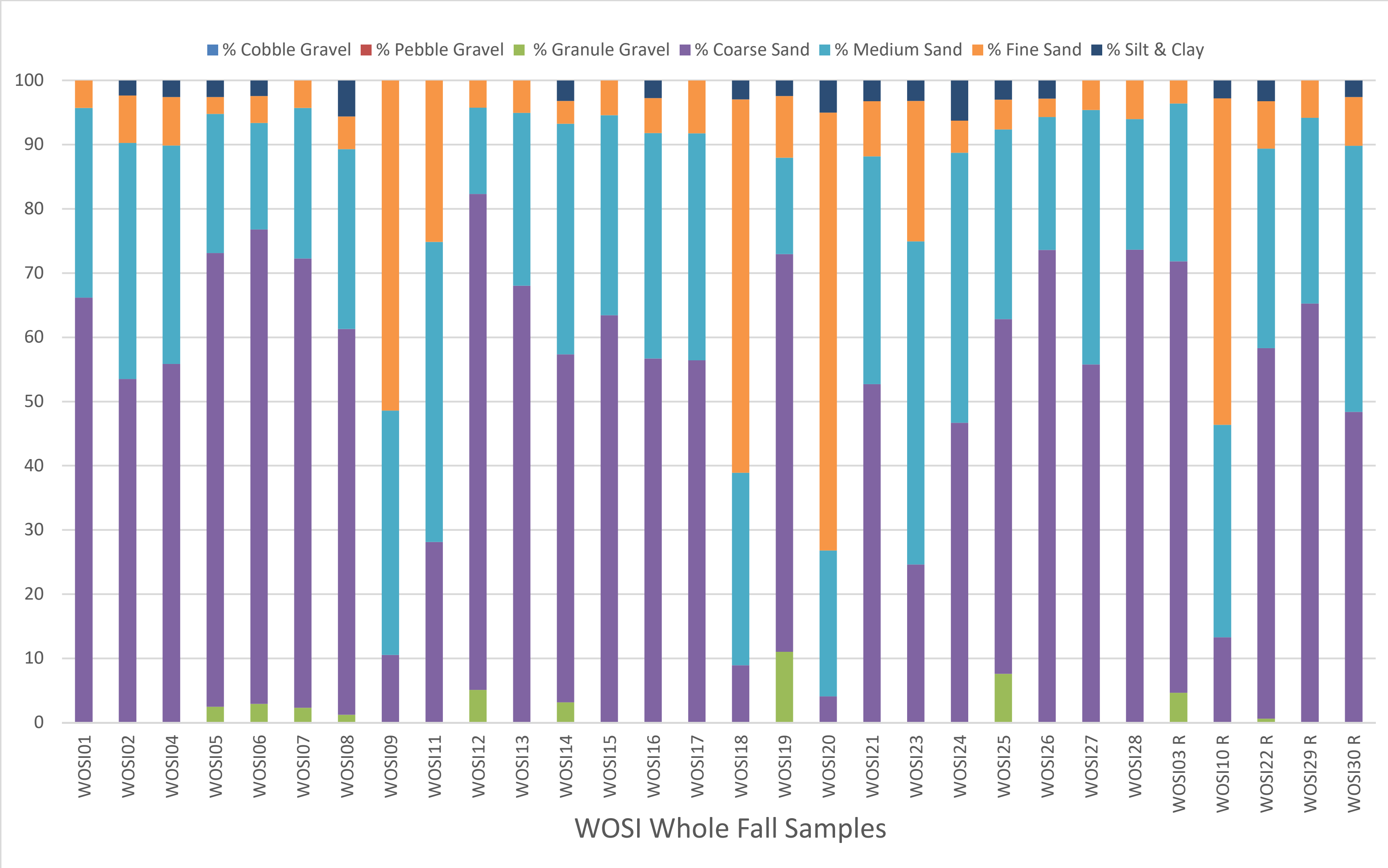

Figure 32: Sediment Composition of Whole Fall Benthic Grabs by Site for Borrow Area WOSI (R=reference site)

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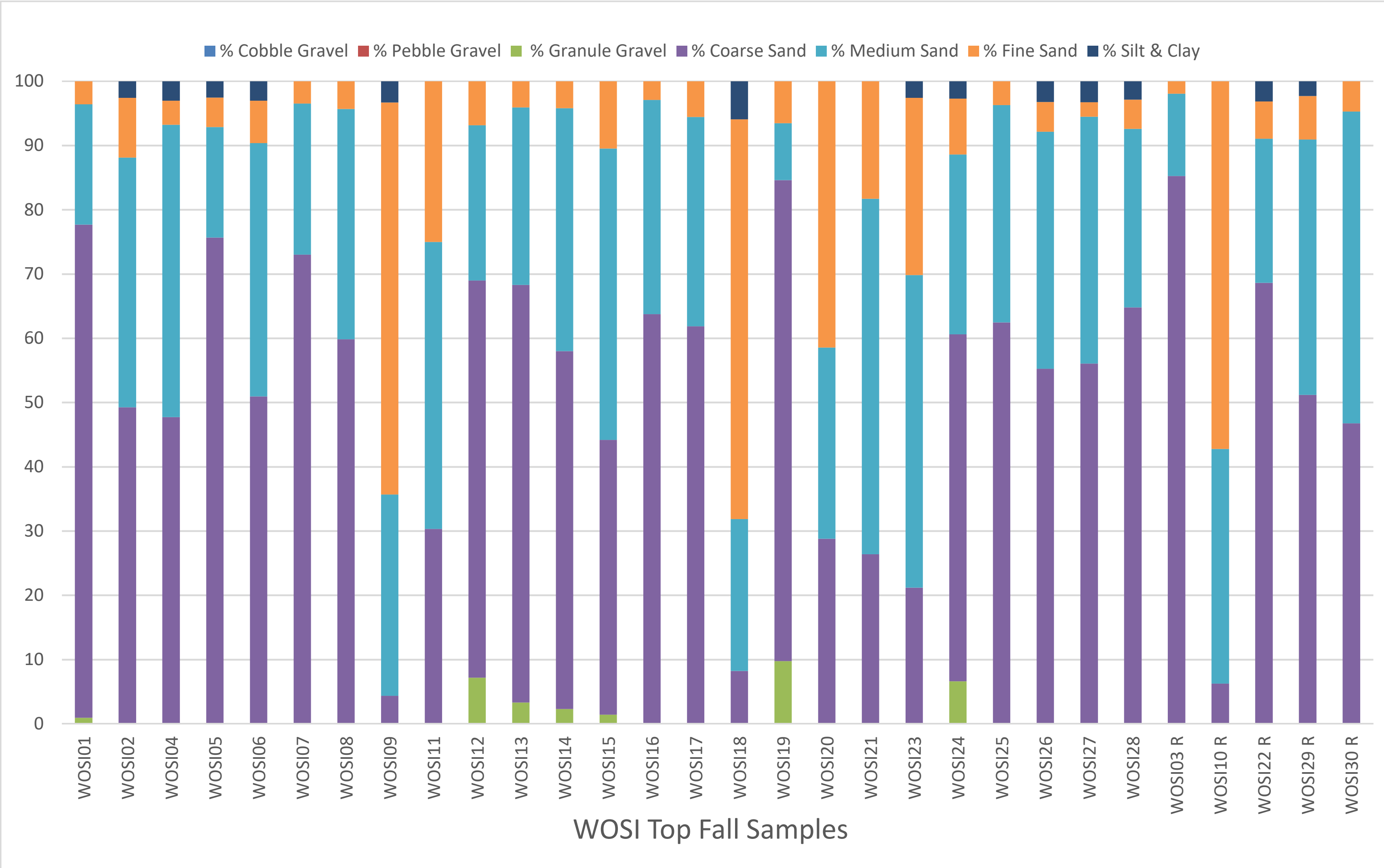

Figure 33: Sediment Composition of Top Fall Benthic Grabs by Site for Borrow Area WOSI (R=reference site)

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3.2.2 BENTHIC INFAUNA

Although the benthic community in the borrow areas showed species overlap in the spring and fall, there were significant differences in some of the calculated community parameters in some of the borrow areas. To focus on the benthic environment of the borrow areas, the following comparisons separate grabs conducted within the borrow areas (Onsite [East Rockaway and WOSI] or On-site outside and On-site inside the dredged box [2C and 5B only]), and those conducted at nearby reference sites. Detailed laboratory results are provided in Appendix E.

3.2.2.1 Borrow Area East Rockaway

To focus on the benthic environment of the borrow areas, the following comparisons separate grabs conducted within the borrow areas (On-site) and those conducted at nearby reference sites. In Table 23, a "ɫ" indicates a significant difference between seasons at the P = 0.01 level. For Borrow Area East Rockaway, none of the parameters were significantly different between seasons. The presence of pollution sensitive species (*Acanthohaustorius millsi*, *Protohaustorius wigleyi*, and *Chiridotea tuftsi*) indicate that the benthic environment in Borrow Area East Rockaway is not impacted by pollution (Pelletier et al. 2010).

Table 23: Comparison of Average Benthic Parameters for Borrow Area East Rockaway

Comparison of Average Benthic Parameters for Borrow Area ER					
Season	**Average species richness (R)**	**Individuals per grab**	**Shannon diversity index (H')**	**Simpson's dominance index (λ)**	**Pielou's evenness index (J')**
On-site (n = 26 spring, n = 26 fall)					
Spring	10.73	103.35	1.51	0.38	0.63
Fall	11.96	177.81	1.36	0.45	0.55
Reference (n = 4 spring, n = 4 fall)					
Spring	12.25	338.00	1.86	0.23	0.74
Fall	9.75	102.75	1.40	0.42	0.62

Note: P=0.01; none of the comparisons were significantly different

In Borrow Area East Rockaway, a total of 9,073 individual organisms representing 91 different species from 8 phyla were collected for the spring and fall benthic grabs (Table 24; Appendix E). Of these, 4,039 (44.52%) were collected in the spring, 5,034 (55.48%) and were collected in the fall. At the species level, Borrow Area East Rockaway spring and fall samples were dominated by a few taxa and had 46.15% of species in common. As was indicated by the On-site community parameters, the fall had greater species richness with 69 distinct taxa identified, while the spring had 64 taxa.

The most abundant phylum in the spring for On-site samples was Molluska (48.20%) followed by Annelida-Polychaeta (31.30%) and Nematoda (14.55%). The dominant phyla in spring Reference samples were Arthropoda (56.06%), Annelida-Oligochaeta (23.52%), and Nematoda (14.13%). Similar to spring, the fall top phylum for On-site samples was Molluska (67.94%). Arthropoda (16.20%) and Annelida-Polychaeta (11.79%) were also abundant. Dominant phyla in reference samples were Molluska (67.64%), Annelida-Polychaeta (13.38%), and Nematoda (10.22%).

Table 24: Benthic Community Composition in Borrow Area East Rockaway

Benthic Community Composition in Borrow Area East Rockaway				
Spring 2017				
Phylum	**On-site**		**Reference**	
	Individ	**%**	**Individ**	**%**
Molluska	1,295	48.20	6	0.44
Annelida - Polychaeta	841	31.30	76	5.62
Nematoda	391	14.55	191	14.13
Arthropoda	113	4.21	758	56.07
Annelida - Oligochaeta	26	0.97	318	23.52
Nemertinea	14	0.52	2	0.15
Echinodermata	5	0.19	1	0.07
Platyhelminthes	2	0.00	0	0.00
Total	2,687	100	1,352	100
Fall 2017				
Phylum	**On-site**		**Reference**	
	Individ	**%**	**Individ**	**%**
Molluska	3,141	67.94	278	67.64
Arthropoda	749	16.20	35	8.52
Annelida - Polychaeta	545	11.79	55	13.38
Nematoda	149	3.22	42	10.22
Annelida - Oligochaeta	33	0.71	0	0.00
Echinodermata	4	0.09	0	0.00
Nemertinea	1	0.02	0	0.00
Platyhelminthes	1	0.02	0	0.00
Sipuncula	0	0.00	1	0.24
Total	4,623	100	411	100

Nucula proxima was the dominant species for On-site samples in the spring and fall (Table 25 and Table 26). *Notomastus luridus* and Nematoda were also abundant in the spring. In reference samples, *Pseudunciola obliquua* was the most abundant species in the spring. Oligochaeta and Nematoda were also abundant in reference samples. In fall On-site samples, *Pseudunciola obliquua* and *Notomastus* sp. were also abundant. Like On-site samples, reference samples in the fall are dominated by *Nucula proxima.* Nematoda and *Ampelisca verrilli* were also abundant in fall reference samples.

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Table 25: Twenty Most Abundant Benthic Infauna Present in Borrow Area East Rockaway in Spring

Twenty Most Abundant Benthic Infauna Present in Borrow Area ER in Spring							
On-site				Reference			
Taxon	**Species**	**Total**	**%**	**Taxon**	**Species**	**Total**	**%**
Molluska - Bivalvia	*Nucula proxima*	1,169	43.51	Arthropoda - Amphipoda	*Pseudunciola obliquua*	740	55.06
Annelida - Polychaeta	*Notomastus luridus*	395	14.70	Annelida - Oligochaeta	Oligochaeta spp.	318	23.66
Nematoda	Nematoda spp.	391	14.55	Nematoda	Nematoda spp.	191	14.21
Annelida - Polychaeta	*Polydora* spp (juveniles)	166	6.18	Annelida - Polychaeta	*Notomastus luridus*	24	1.79
Molluska - Bivalvia	*Tellina agilis*	96	3.57	Arthropoda - Amphipoda	*Protohaustorius wigleyi*	13	0.97
Annelida - Polychaeta	*Polygordius jouinae*	82	3.05	Annelida - Polychaeta	*Apoprionospio pygmaea*	12	0.89
Annelida - Polychaeta	*Apoprionospio pygmaea*	77	2.87	Annelida - Polychaeta	*Polygordius jouinae*	9	0.67
Arthropoda - Amphipoda	*Pseudunciola obliquua*	41	1.53	Molluska - Bivalvia	*Tellina agilis*	6	0.45
Annelida - Oligochaeta	Oligochaeta spp.	26	0.97	Annelida - Polychaeta	*Spiophanes bombyx*	6	0.45
Annelida - Polychaeta	*Spiophanes bombyx*	21	0.78	Annelida - Polychaeta	*Onuphis eremita*	6	0.45
Arthropoda - Amphipoda	*Protohaustorius wigleyi*	20	0.74	Annelida - Polychaeta	*Aricidea catherinae*	5	0.37
Nemertinea	Nemertinea spp.	14	0.52	Nemertinea	Nemertinea spp.	2	0.15
Molluska - Bivalvia	*Spisula solidissima*	12	0.45	Annelida - Polychaeta	*Nephtys bucera*	2	0.15
Annelida - Polychaeta	*Caulleriella venefica*	12	0.45	Annelida - Polychaeta	Maldanidae spp (juveniles)	2	0.15
Annelida - Polychaeta	*Onuphis eremita*	12	0.45	Annelida - Polychaeta	*Sigalion arenicola*	2	0.15
Arthropoda - Amphipoda	*Acanthohaustorius millsi*	11	0.41	Annelida - Polychaeta	*Exogone* spp. (*E. dispar, E. hebes*)	2	0.15
Annelida - Polychaeta	*Aricidea catherinae*	11	0.41	Annelida - Polychaeta	*Caulleriella venefica*	1	0.07
Arthropoda - Amphipoda	*Ampelisca verrilli*	10	0.37	Arthropoda - Amphipoda	*Ampelisca verrilli*	1	0.07
Arthropoda - Amphipoda	*Rhepoxynuis epistomus*	8	0.30	Arthropoda - Amphipoda	*Rhepoxynuis epistomus*	1	0.07
Arthropoda - Amphipoda	*Unciola irrorata*	8	0.30	Arthropoda - Cumacea	*Diastylis sculpta*	1	0.07

Table 26: Twenty Most Abundant Benthic Infauna Present in Borrow Area East Rockaway in Fall

Twenty Most Abundant Benthic Infauna Present in Borrow Area ER in Fall							
On-site				Reference			
Taxon	Species	Total	%	Taxon	Species	Total	%
Molluska - Bivalvia	*Nucula proxima*	3,023	65.39	Molluska - Bivalvia	*Nucula proxima*	271	65.94
Arthropoda - Amphipoda	*Pseudunciola obliquua*	555	12.01	Nematoda	Nematoda spp.	42	10.22
Annelida - Polychaeta	*Notomastus* sp.	196	4.24	Arthropoda - Amphipoda	*Ampelisca verrilli*	18	4.38
Annelida - Polychaeta	*Polygordius jouinae*	154	3.33	Annelida - Polychaeta	*Polygordius jouinae*	13	3.16
Nematoda	Nematoda spp.	149	3.22	Annelida - Polychaeta	*Apoprionospio pygmaea*	13	3.16
Molluska - Bivalvia	*Tellina agilis*	95	2.05	Arthropoda - Amphipoda	*Pseudunciola obliquua*	8	1.95
Arthropoda - Amphipoda	*Ampelisca verrilli*	57	1.23	Annelida - Polychaeta	*Notomastus* sp.	7	1.70
Arthropoda - Amphipoda	*Protohaustorius wigleyi*	47	1.02	Annelida - Polychaeta	*Aricidea wassi*	4	0.97
Annelida - Polychaeta	*Apoprionospio pygmaea*	33	0.71	Annelida - Polychaeta	*Goniadella gracilis*	4	0.97
Annelida - Oligochaeta	Oligochaeta spp.	33	0.71	Molluska - Bivalvia	*Tellina agilis*	3	0.73
Annelida - Polychaeta	*Kirkegaardia baptisteae*	28	0.61	Annelida - Polychaeta	*Nephtys incisa*	3	0.73
Arthropoda - Amphipoda	*Rhepoxynuis epistomus*	22	0.48	Arthropoda - Tanaidacea	*Tanaissus psammophilus*	3	0.73
Arthropoda - Amphipoda	*Acanthohaustorius millsi*	20	0.43	Molluska - Bivalvia	*Yoldia limatula*	3	0.73
Annelida - Polychaeta	*Leitoscoloplos robustus*	14	0.30	Annelida - Polychaeta	*Kirkegaardia baptisteae*	2	0.49
Annelida - Polychaeta	*Caulleriella venefica*	13	0.28	Annelida - Polychaeta	*Onuphis eremita*	2	0.49
Annelida - Polychaeta	*Streblospio benedicti*	12	0.26	Annelida - Polychaeta	*Spiophanes bombyx*	2	0.49
Arthropoda - Amphipoda	*Unciola irrorata*	11	0.24	Annelida - Polychaeta	*Aricidea catherinae*	2	0.49
Annelida - Polychaeta	*Onuphis eremita*	11	0.24	Arthropoda - Amphipoda	*Rhepoxynuis epistomus*	1	0.24
Annelida - Polychaeta	*Sigalion arenicola*	10	0.22	Arthropoda - Amphipoda	*Acanthohaustorius millsi*	1	0.24
Annelida - Polychaeta	*Diopatra cuprea*	9	0.19	Annelida - Polychaeta	*Polydora* spp (juveniles)	1	0.24

3.2.2.2 Borrow Area 2C Infauna

For Borrow Area 2C On-site outside samples, species richness and the number of individuals per grab were significantly different between samples collected in the spring relative to those collected in the fall (Table 27). On-site inside sample species richness was significantly different between spring and fall. In all sample types, species richness and the number of individuals per grab were greater in the fall. Reference areas for Borrow Area 2C did not differ between spring and fall sampling events for any of the calculated community parameters. The presence of pollution sensitive species (*Acanthohaustorius intermedius*, *Acanthohaustorius millsi*, *Parahaustorius attenuateu*, *Protohaustorius wigleyi*, *Chiridotea tuftsi*, *Nucula proxima*, and *Tanaissus psammophilus*) indicate that the benthic environment in Borrow Area 2C is not impacted by pollution (Pelletier et al. 2010).

Table 27: Comparison of Average Benthic Parameters for Borrow Area 2C

Comparison of Average Benthic Parameters for Borrow Area 2C					
Season	**Average species richness (R)**	**Individuals per grab**	**Shannon diversity index (H')**	**Simpson's dominance index (λ)**	**Pielou's evenness index (J')**
On-site outside of dredged box (n = 28 spring, n =28 fall)					
Spring	16.43ⱡ	174.36ⱡ	1.40	0.45	0.50
Fall	19.39ⱡ	324.82ⱡ	1.42	0.44	0.48
On-site inside dredged box (n =12 spring, n = 12 fall)					
Spring	12.167ⱡ	114.75	1.52	0.37	0.61
Fall	20.00ⱡ	365.00	1.41	0.43	0.47
Reference (n = 5 spring, n = 5 fall)					
Spring	13.60	113.60	1.73	0.29	0.67
Fall	17.75	358.67	1.38	0.43	0.49

Note: P=0.01; ⱡ indicates significantly different values between seasons.

In Borrow Area 2C, a total of 22,051 individual organisms representing 108 different species from 6 phyla were collected for the spring and fall benthic grabs (Table 28, Appendix E). Spring samples account for only 30.96% (6,827) of individuals collected during the project. The majority of the organisms, 69.04% (15,224) were collected in the fall. At the species level, Borrow Area 2C spring and fall samples were dominated by a few taxa and had 58.33% of species in common. As was indicated by the community parameters, the fall had greater species richness, with 93 distinct taxa identified, while the spring had 78 taxa.

The most abundant phylum in the spring for On-site outside samples was Nematoda (59.01%) followed by Arthropoda (22.33%) and Annelida-Polychaeta (14.15%). On-site inside samples were similar to On-site outside samples with Nematoda (56.14%), Arthropoda (24.98%) and Annelida-Polychaeta (17.36%) as the most abundant phyla. Reference samples had the same dominant phyla as On-site samples, Annelida-Polychaeta (46.13%), Arthropoda (25.18%) and Nematoda (23.94%). In the fall the top three phyla didn't change for On-site outside samples but the proportions changed (Nematoda [61.50%], Annelida-Polychaeta [25.55%], Arthropoda [11.69%]). On-site inside samples looked very similar to On-site outside samples (Nematoda [67.08%], Annelida-Polychaeta [27.44%], Arthropoda [4.16%]). Fall reference samples had the same dominant phyla as On-site samples, (Nematoda [47.66%], Arthropoda [36.60%] and Annelida-Polychaeta [15.14%].

Table 28: Benthic Community Composition in Borrow Area 2C

Benthic Community Composition in Borrow Area 2C						
Spring 2017						
Phylum	**On-site**				**Reference**	
	Outside Dredged Box		**Inside Dredged Box**			
	Individ	**%**	**Individ**	**%**	**Individ**	**%**
Nematoda	2,881	59.01	773	56.14	136	23.94
Arthropoda	1,090	22.33	344	24.98	143	25.18
Annelida - Polychaeta	691	14.15	239	17.36	262	46.13
Annelida - Oligochaeta	123	2.52	1	0.07	8	1.41
Echinodermata	50	1.02	7	0.51	2	0.35
Molluska	40	0.82	12	0.87	15	2.64
Nemertinea	7	0.14	1	0.07	2	0.35
Total	4,882	100	1,377	100	568	100
Fall 2017						
Phylum	**On-site**				**Reference**	
	Outside Dredged Box		**Inside Dredged Box**			
	Individ	**%**	**Individ**	**%**	**Individ**	**%**
Nematoda	5,593	61.50	2887	67.08	1196	65.53
Annelida - Polychaeta	2324	25.55	1181	27.44	424	23.23
Arthropoda	1063	11.69	179	4.16	188	10.30
Annelida - Oligochaeta	63	0.69	3	0.07	9	0.49
Echinodermata	23	0.25	4	0.09	2	0.11
Molluska	23	0.25	47	1.09	4	0.22
Nemertinea	5	0.05	2	0.05	2	0.11
Platyhelminthes	1	0.01	1	0.02	0	0.00
Total	9,095	100	4,304	100	1,825	100

The top two dominant taxa were the same for all sample types in the spring, Nematoda spp and *Pseudunciola obliquua* (Table 29). Likewise, all fall sample types were dominated by Nematoda (Table 30). The second most abundant species for all fall sample types was *Polygordius jouinae.* All three sample types included pollution sensitive species in spring and fall.

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Table 29: Twenty Most Abundant Benthic Infauna Present in Borrow Area 2C in Spring

Twenty Most Abundant Benthic Infauna Present in Borrow Area 2C in Spring											
On-site								Reference			
Outside box				Inside box							
Taxon	Species	Total	%	Taxon	Species	Total	%	Taxon	Species	Total	%
Nematoda	Nematoda spp.	2,881	59.01	Nematoda	Nematoda spp.	773	56.14	Nematoda	Nematoda spp.	136	23.94
Arthropoda - Amphipoda	*Pseudunciola obliquua*	878	17.98	Arthropoda - Amphipoda	*Pseudunciola obliquua*	249	18.08	Arthropoda - Amphipoda	*Pseudunciola obliquua*	124	21.83
Annelida - Polychaeta	*Kirkegaardia baptisteae*	157	3.22	Annelida - Polychaeta	*Polygordius jouinae*	119	8.64	Annelida - Polychaeta	*Polygordius jouinae*	123	21.65
Annelida - Oligochaeta	Oligochaeta spp.	123	2.52	Annelida - Polychaeta	*Notomastus* sp.	35	2.54	Annelida - Polychaeta	*Notomastus* sp.	39	6.87
Annelida - Polychaeta	*Polygordius jouinae*	110	2.25	Arthropoda - Cumacea	*Diastylis sculpta*	27	1.96	Annelida - Polychaeta	*Kirkegaardia baptisteae*	27	4.75
Arthropoda - Tanaidacea	*Tanaissus psammophilus*	73	1.50	Arthropoda - Amphipoda	*Hippomedon serratus*	20	1.45	Annelida - Polychaeta	*Pseudomystides* sp.	14	2.46
Echinodermata	*Echinarachnius parma*	49	1.00	Annelida - Polychaeta	*Kirkegaardia baptisteae*	16	1.16	Molluska - Bivalvia	*Nucula proxima*	12	2.11
Annelida - Polychaeta	*Cirrophorus lyriformis*	48	0.98	Arthropoda	Harpacticoid copepod spp.	14	1.02	Arthropoda - Tanaidacea	*Tanaissus psammophilus*	10	1.76
Annelida - Polychaeta	*Cirrophorus lyra*	46	0.94	Arthropoda - Amphipoda	*Protohaustorius wigleyi*	12	0.87	Annelida - Polychaeta	*Aricidea wassi*	10	1.76
Annelida - Polychaeta	*Streptosyllis* spp. (*S. arenae, S. varians*)	39	0.80	Annelida - Polychaeta	*Megalona* sp.	9	0.65	Annelida - Polychaeta	*Nephtys bucera*	8	1.41
Annelida - Polychaeta	*Parapionosyllis longicirrata*	34	0.70	Annelida - Polychaeta	*Nepthys picta*	9	0.65	Annelida - Polychaeta	*Parougia caeca*	8	1.41
Arthropoda - Amphipoda	*Protohaustorius wigleyi*	33	0.68	Arthropoda - Amphipoda	*Rhepoxynuis epistomus*	8	0.58	Oligochaeta	Oligochaeta spp.	8	1.41
Annelida - Polychaeta	*Pseudomystides* sp.	33	0.68	Arthropoda - Tanaidacea	*Tanaissus psammophilus*	8	0.58	Annelida - Polychaeta	*Exogone* spp. (*E. dispar, E. hebes*)	5	0.88
Annelida - Polychaeta	*Typosyllis* sp.	31	0.63	Annelida - Polychaeta	*Nephtys bucera*	8	0.58	Annelida - Polychaeta	*Cirrophorus lyriformis*	4	0.70

Twenty Most Abundant Benthic Infauna Present in Borrow Area 2C in Spring											
On-site								Reference			
Outside box				Inside box							
Taxon	Species	Total	%	Taxon	Species	Total	%	Taxon	Species	Total	%
Arthropoda - Amphipoda	*Rhepoxynuis epistomus*	30	0.61	Molluska - Bivalvia	*Tellina agilis*	7	0.51	Arthropoda - Amphipoda	*Rhepoxynuis epistomus*	3	0.53
Arthropoda	Harpacticoid copepod spp	30	0.61	Echinodermat a	*Echinarachnius parma*	7	0.51	Arthropoda - Cumacea	*Pseudoleptocum a minor*	3	0.53
Annelida - Polychaeta	*Goniadella gracilis*	29	0.59	Annelida - Polychaeta	*Capitella* sp.	6	0.44	Annelida - Polychaeta	*Parapionosyllis longicirrata*	3	0.53
Annelida - Polychaeta	*Aricidea catherinae*	26	0.53	Annelida - Polychaeta	*Lumbrinereis fragilis*	6	0.44	Annelida - Polychaeta	*Streptosyllis* spp. (*S. arenae, S. varians*)	3	0.53
Annelida - Polychaeta	*Parougia caeca*	26	0.53	Annelida - Polychaeta	*Parougia caeca*	6	0.44	Molluska - Bivalvia	*Astarte castanea*	2	0.35
Molluska - Bivalvia	*Tellina agilis*	16	0.33	Molluska - Bivalvia	*Nucula tenuis*	4	0.29	Annelida - Polychaeta	*Apoprionospio pygmaea*	2	0.35

Table 30: Twenty Most Abundant Benthic Infauna Present in Borrow Area 2C in Fall

Twenty Most Abundant Benthic Infauna Present in Borrow Area 2C in Fall											
On-site								Reference			
Outside box				Inside box							
Taxon	Species	Total	%	Taxon	Species	Total	%	Taxon	Species	Total	%
Nematoda	Nematoda spp.	5,593	61.50	Nematoda	Nematoda spp.	2,887	67.08	Nematoda	Nematoda spp.	1,196	65.53
Annelida - Polychaeta	*Polygordius jouinae*	960	10.56	Annelida - Polychaeta	*Polygordius jouinae*	667	15.50	Annelida - Polychaeta	*Polygordius jouinae*	198	10.85
Arthropoda - Amphipoda	*Pseudunciola obliquua*	805	8.85	Annelida - Polychaeta	*Kirkegaardia baptisteae*	207	4.81	Arthropoda - Amphipoda	*Pseudunciola obliquua*	172	9.42
Annelida - Polychaeta	*Kirkegaardia baptisteae*	351	3.86	Arthropoda - Amphipoda	*Pseudunciola obliquua*	127	2.95	Annelida - Polychaeta	*Typosyllis* sp.	45	2.47
Annelida - Polychaeta	*Typosyllis* sp.	168	1.85	Annelida - Polychaeta	Notomastus sp.	82	1.91	Annelida - Polychaeta	*Kirkegaardia baptisteae*	30	1.64
Arthropoda - Tanaidacea	*Tanaissus psammophilus*	139	1.53	Molluska - Bivalvia	*Nucula proxima*	42	0.98	Annelida - Polychaeta	*Apoprionospio pygmaea*	21	1.15
Annelida - Polychaeta	*Cirrophorus lyriformis*	115	1.26	Annelida - Polychaeta	*Caulleriella venefica*	30	0.70	Annelida - Polychaeta	*Cirrophorus lyriformis*	14	0.77
Annelida - Polychaeta	*Streptosyllis* spp. (*S. arenae, S. varians*)	104	1.14	Annelida - Polychaeta	*Parougia caeca*	24	0.56	Annelida - Polychaeta	*Notomastus* sp.	11	0.60
Annelida - Polychaeta	*Caulleriella venefica*	90	0.99	Annelida - Polychaeta	*Microphthalmus sckelkowii*	20	0.46	Annelida - Polychaeta	*Parougia caeca*	11	0.60
Annelida - Polychaeta	*Polydora* spp. (juveniles)	68	0.75	Arthropoda - Amphipoda	*Ampelisca verrilli*	19	0.44	Annelida - Polychaeta	Streptosyllis spp. (*S. arenae, S. varians*)	11	0.60
Annelida - Oligochaeta	Oligochaeta spp.	63	0.69	Annelida - Polychaeta	*Aricidea catherinae*	14	0.33	Annelida - Polychaeta	*Brania wellfleetensis*	9	0.49
Annelida - Polychaeta	*Parougia caeca*	59	0.65	Annelida - Polychaeta	*Apoprionospio pygmaea*	13	0.30	Annelida - Oligochaeta	Oligochaeta spp.	9	0.49
Annelida - Polychaeta	*Pseudomystides* sp.	52	0.57	Annelida - Polychaeta	Streptosyllis spp. (S. arenae, S. varians)	12	0.28	Annelida - Polychaeta	*Caulleriella venefica*	8	0.44

Twenty Most Abundant Benthic Infauna Present in Borrow Area 2C in Fall											
On-site								Reference			
Outside box				Inside box							
Taxon	Species	Total	%	Taxon	Species	Total	%	Taxon	Species	Total	%
Annelida - Polychaeta	*Ophelia denticulata*	45	0.49	Annelida - Polychaeta	*Onuphis eremita*	11	0.26	Annelida - Polychaeta	*Goniadella gracilis*	8	0.44
Annelida - Polychaeta	*Brania wellfleetensis*	39	0.43	Annelida - Polychaeta	*Parapionosyllis longicirrata*	11	0.26	Annelida - Polychaeta	*Parapionosyllis longicirrata*	8	0.44
Arthropoda - Amphipoda	*Rhepoxynuis epistomus*	38	0.42	Arthropoda - Amphipoda	*Rhepoxynuis epistomus*	8	0.19	Annelida - Polychaeta	*Aricidea catherinae*	5	0.27
Arthropoda - Amphipoda	*Protohaustorius wigleyi*	36	0.40	Annelida - Polychaeta	*Nepthys picta*	8	0.19	Annelida - Polychaeta	Exogone spp. (*E. dispar, E. hebes*)	5	0.27
Annelida - Polychaeta	*Goniadella gracilis*	33	0.36	Annelida - Polychaeta	*Spiophanes bombyx*	7	0.16	Arthropoda - Tanaidacea	*Tanaissus psammophilus*	4	0.22
Annelida - Polychaeta	*Parapionosyllis longicirrata*	28	0.31	Annelida - Polychaeta	*Goniadella gracilis*	6	0.14	Annelida - Polychaeta	*Cabira incerta*	4	0.22
Annelida - Polychaeta	*Pista cristata*	24	0.26	Annelida - Polychaeta	*Typosyllis* sp.	6	0.14	Annelida - Polychaeta	*Cirrophorus lyra*	4	0.22

3.2.2.3 Borrow Area 5B Infauna

To focus on the benthic environment of the borrow areas, the following comparisons separate grabs conducted within the borrow areas (On-site: outside and inside the dredged box) and those conducted at nearby reference sites. In Table 31, a "ɫ" indicates a significant difference between seasons at the P = 0.01 level. For Borrow Area 5B On-site outside samples, species richness was greater in the fall and was significantly different between seasons. None of the other parameters for were significantly different for any sample type. The presence of pollution sensitive species (*Acanthohaustorius intermedius*, *Acanthohaustorius millsi*, *Protohaustorius wigleyi*, *Chiridotea tuftsi*, and *Tanaissus psammophilus*) indicate that the benthic environment in Borrow Area 5B is not impacted by pollution (Pelletier et al. 2010).

Table 31: Comparison of Average Benthic Parameters for Borrow Area 5B

Comparison of Average Benthic Parameters for Borrow Area 5B					
Season	**Average species richness (R)**	**Individuals per grab**	**Shannon diversity index (H')**	**Simpson's dominance index (λ)**	**Pielou's evenness index (J')**
On-site outside of dredged box (n = 29 spring, n = 27 fall)					
Spring	11.86ɫ	480.34	0.89	0.59	0.36
Fall	15.63ɫ	581.74	1.17	0.46	0.43
On-site inside dredged box (n =11 spring, n = 13 fall)					
Spring	11.64	549.55	0.61	0.73	0.25
Fall	16.08	667.46	0.93	0.58	0.35
Reference (n = 5 spring, n = 5 fall)					
Spring	15.20	172.00	1.58	0.37	0.57
Fall	16.00	383.20	1.04	0.57	0.39
Note: P=0.01; ɫ indicates significantly different values between seasons.					

In Borrow Area 5B, a total of 47,134 individual organisms representing 103 different species from 7 phyla were collected for the spring and fall benthic grabs (

Table 32; Appendix E). Of these, 20,835 (44.20%) were collected in the spring, and 26,299 (55.80%) were collected in the fall. At the species level, Borrow Area 5B spring and fall samples were dominated by a few taxa and had 52.42% of species in common. As was indicated by the community parameters, the fall had greater species richness, with 87 distinct taxa identified, while the spring had 70 taxa.

The most abundant phylum in the spring for On-site outside samples was Nematoda (69.11%) followed by Arthropoda (25.37%) and Annelida-Polychaeta (4.01%). On-site inside samples were similar to On-site outside samples with Nematoda (86.12%), Arthropoda (10.21%) and Annelida-Polychaeta (2.96%) as the most abundant phyla. Reference samples had the same dominant phyla as On-site samples, Nematoda (42.21%), Annelida-Polychaeta (37.91%), and Arthropoda (10.58%). In the fall the top three phyla did not change for On-site outside samples but the proportions changed (Nematoda [52.64%], Arthropoda [37.85%], Annelida-Polychaeta [9.03%]). On-site inside samples looked very similar to On-site outside samples Nematoda [77.04%], Arthropoda [16.33%], Annelida-Polychaeta [5.89%]). Fall reference samples had the same dominant phyla as On-site samples, (Nematoda [69.52%], Annelida-Polychaeta [23.70%], and Arthropoda [5.79%].

Table 32: Benthic Community Composition in Borrow Area 5B

Benthic Community Composition in Borrow Area 5B						
Spring 2017						
Phylum	On-site				Reference	
	Outside Dredged Box		Inside Dredged Box			
	Individ	%	Individ	%	Individ	%
Nematoda	9,627	69.11	5,206	86.12	363	42.21
Arthropoda	3,534	25.37	617	10.21	91	10.58
Annelida - Polychaeta	558	4.01	179	2.96	326	37.91
Molluska	174	1.25	29	0.48	55	6.40
Annelida - Oligochaeta	15	0.11	8	0.13	12	1.40
Nemertinea	12	0.09	3	0.05	12	1.40
Echinodermata	10	0.07	2	0.03	1	0.12
Platyhelminthes	0	0	1	0.01	0	0.00
Total	13,930	100	6,045	100	860	100
Fall 2017						
Phylum	On-site				Reference	
	Outside Dredged Box		Inside Dredged Box			
	Individ	%	Individ	%	Individ	%
Nematoda	8,268	52.64	6,685	77.04	1,332	69.52
Arthropoda	5,944	37.85	1,417	16.33	111	5.79
Annelida - Polychaeta	1,419	9.03	511	5.89	454	23.70
Molluska	26	0.17	40	0.46	4	0.21
Annelida - Oligochaeta	20	0.13	11	0.13	9	0.47
Echinodermata	16	0.10	6	0.07	2	0.10
Nemertinea	13	0.08	7	0.08	4	0.21
Total	15,706	100	8,677	100	1,916	100
Note: Individ = number of individuals						

Nematoda spp was the dominant taxa for all sample types in the spring and fall (Table 33 and Table 34). *Pseudunciola obliquua* was the second most abundant species for spring and fall On-site (inside and outside box) samples. *Notomastus luridus* and *Notomastus* sp. were the second most abundant taxa in spring and fall reference samples, respectively.

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Table 33: Twenty Most Abundant Benthic Infauna Present in Borrow Area 5B in Spring

Twenty Most Abundant Benthic Infauna Present in Borrow Area 5B in Spring											
On-site								Reference			
Outside box				Inside box							
Taxon	Species	Total	%	Taxon	Species	Total	%	Taxon	Species	Total	%
Nematoda	Nematoda spp.	9,627	69.11	Nematoda	Nematoda spp.	5,206	86	Nematoda	Nematoda spp.	363	42.21
Arthropoda - Amphipoda	*Pseudunciola obliquua*	3,418	24.54	Arthropoda - Amphipoda	*Pseudunciola obliquua*	554	9.16	Annelida - Polychaeta	*Notomastus luridus*	171	19.88
Annelida - Polychaeta	*Notomastus luridus*	176	1.26	Annelida - Polychaeta	*Notomastus luridus*	50	0.83	Annelida - Polychaeta	*Apoprionospio pygmaea*	86	10.00
Annelida - Polychaeta	*Polygordius jouinae*	116	0.83	Arthropoda	Harpacticoid copepod spp.	26	0.43	Arthropoda - Amphipoda	*Protohaustorius wigleyi*	47	5.47
Molluska - Bivalvia	*Mytilis edulis*	106	0.76	Annelida - Polychaeta	*Goniadella gracilis*	25	0.41	Molluska - Bivalvia	*Tellina agilis*	32	3.72
Molluska - Bivalvia	*Tellina agilis*	58	0.42	Annelida - Polychaeta	*Polygordius jouinae*	22	0.36	Molluska - Bivalvia	*Mytilis edulis*	21	2.44
Arthropoda - Amphipoda	*Protohaustorius wigleyi*	46	0.33	Annelida - Polychaeta	*Parougia caeca*	22	0.36	Arthropoda - Amphipoda	*Pseudunciola obliquua*	15	1.74
Annelida - Polychaeta	*Kirkegaardia baptisteae*	44	0.32	Molluska - Bivalvia	*Tellina agilis*	13	0.22	Annelida - Polychaeta	*Nepthys picta*	13	1.51
Annelida - Polychaeta	*Parougia caeca*	36	0.26	Annelida - Polychaeta	*Paraonis fulgens*	13	0.22	Annelida - Oligochaeta	Oligochaeta spp.	12	1.40
Annelida - Polychaeta	*Exogone* spp. (*E. dispar, E. hebes*)	21	0.15	Molluska - Bivalvia	*Mytilis edulis*	12	0.20	Nemertinea	Nemertinea spp.	12	1.40
Annelida - Polychaeta	*Goniadella gracilis*	20	0.14	Arthropoda - Amphipoda	*Rhepoxynuis epistomus*	9	0.15	Annelida - Polychaeta	*Paraonis fulgens*	11	1.28
Annelida - Polychaeta	*Nepthys picta*	18	0.13	Annelida - Polychaeta	*Kirkegaardia baptisteae*	8	0.13	Annelida - Polychaeta	*Aricidea wassi*	11	1.28
Annelida - Oligochaeta	Oligochaeta spp.	15	0.11	Annelida - Oligochaeta	Oligochaeta spp.	8	0.13	Arthropoda - Cumacea	*Diastylis sculpta*	11	1.28

Twenty Most Abundant Benthic Infauna Present in Borrow Area 5B in Spring											
On-site								Reference			
Outside box				Inside box							
Taxon	**Species**	**Total**	**%**	**Taxon**	**Species**	**Total**	**%**	**Taxon**	**Species**	**Total**	**%**
Annelida - Polychaeta	*Apoprionospio pygmaea*	13	0.09	Annelida - Polychaeta	*Ophelia denticulata*	8	0.13	Arthropoda - Amphipoda	*Psammonyx nobilis*	8	0.93
Annelida - Polychaeta	*Paraonis fulgens*	13	0.09	Arthropoda - Amphipoda	*Protohaustorius wigleyi*	6	0.10	Annelida - Polychaeta	*Kirkegaardia baptisteae*	5	0.58
Annelida - Polychaeta	*Paraonis pygoenigmatica*	13	0.09	Arthropoda - Amphipoda	*Psammonyx nobilis*	6	0.10	Annelida - Polychaeta	*Travisia carnea*	5	0.58
Nemertinea	Nemertinea spp.	12	0.09	Annelida - Polychaeta	*Pisione* sp.	6	0.10	Annelida - Polychaeta	*Microphthalmu s sckelkowii*	4	0.47
Arthropoda - Cumacea	*Diastylis sculpta*	12	0.09	Arthropoda - Tanaidacea	*Tanaissus psammophilus*	5	0.08	Annelida - Polychaeta	*Leitoscoloplos robustus*	3	0.35
Annelida - Polychaeta	*Aricidea catherinae*	12	0.09	Annelida - Polychaeta	*Apoprionospio pygmaea*	4	0.07	Arthropoda	Harpacticoid copepod spp.	2	0.23
Annelida - Polychaeta	*Aricidea wassi*	10	0.07	Arthropoda - Cumacea	*Pseudoleptocum a minor*	4	0.07	Annelida - Polychaeta	*Megalona* sp.	2	0.23

Table 34: Twenty Most Abundant Benthic Infauna Present in Borrow Area 5B in Fall

Twenty Most Abundant Benthic Infauna Present in Borrow Area 5B in Fall											
On-site								Reference			
Outside box				Inside box							
Taxon	Species	Total	%	Taxon	Species	Total	%	Taxon	Species	Total	%
Nematoda	Nematoda spp.	8,268	52.64	Nematoda	Nematoda spp.	6,685	77.04	Nematoda	Nematoda spp.	1,332	69.52
Arthropoda - Amphipoda	*Pseudunciola obliquua*	5,662	36.05	Arthropoda - Amphipoda	*Pseudunciola obliquua*	1,334	15.37	Annelida - Polychaeta	*Notomastus* sp.	220	11.48
Annelida - Polychaeta	*Notomastus* sp.	567	3.61	Annelida - Polychaeta	*Notomastus* sp.	213	2.45	Annelida - Polychaeta	*Apoprionospio pygmaea*	93	4.85
Annelida - Polychaeta	*Apoprionospio pygmaea*	418	2.66	Annelida - Polychaeta	*Polygordius jouinae*	68	0.78	Arthropoda - Amphipoda	*Pseudunciola obliquua*	48	2.51
Arthropoda - Amphipoda	*Protohaustorius wigleyi*	142	0.90	Annelida - Polychaeta	*Apoprionospio pygmaea*	48	0.55	Annelida - Polychaeta	*Kirkegaardia baptisteae*	44	2.30
Annelida - Polychaeta	*Polygordius jouinae*	84	0.53	Annelida - Polychaeta	*Paraonis fulgens*	37	0.43	Arthropoda - Amphipoda	*Protohaustoriu s wigleyi*	35	1.83
Annelida - Polychaeta	*Kirkegaardia baptisteae*	72	0.46	Arthropoda - Amphipoda	*Protohaustoriu s wigleyi*	31	0.36	Annelida - Polychaeta	*Polygordius jouinae*	25	1.30
Annelida - Polychaeta	*Caulleriella venefica*	60	0.38	Annelida - Polychaeta	*Kirkegaardia baptisteae*	21	0.24	Annelida - Polychaeta	*Aricidea wassi*	16	0.84
Arthropoda - Tanaidacea	*Tanaissus psammophilus*	39	0.25	Molluska - Gastropoda	*Crepidula fornicata*	19	0.22	Annelida - Polychaeta	*Paraonis fulgens*	12	0.63
Annelida - Polychaeta	*Exogone* spp. (*E. dispar, E. hebes*)	29	0.18	Arthropoda - Tanaidacea	*Tanaissus psammophilus*	14	0.16	Arthropoda - Amphipoda	*Corophium* sp.	10	0.52
Arthropoda - Amphipoda	*Rhepoxynuis epistomus*	26	0.17	Annelida - Polychaeta	*Parougia caeca*	13	0.15	Annelida - Oligochaeta	Oligochaeta spp.	9	0.47
Annelida - Polychaeta	*Paraonis fulgens*	25	0.16	Annelida - Polychaeta	*Goniadella gracilis*	13	0.15	Annelida - Polychaeta	*Caulleriella venefica*	7	0.37
Annelida - Oligochaeta	Oligochaeta spp.	20	0.13	Annelida - Polychaeta	*Caulleriella venefica*	11	0.13	Arthropoda - Amphipoda	*Ampelisca verrilli*	7	0.37

Twenty Most Abundant Benthic Infauna Present in Borrow Area 5B in Fall											
On-site								Reference			
Outside box				Inside box							
Taxon	**Species**	**Total**	**%**	**Taxon**	**Species**	**Total**	**%**	**Taxon**	**Species**	**Total**	**%**
Annelida - Polychaeta	*Nepthys picta*	18	0.11	Annelida - Oligochaeta	Oligochaeta spp.	11	0.13	Annelida - Polychaeta	*Ophelia denticulata*	5	0.26
Arthropoda - Amphipoda	*Acanthohaustorius intermedius*	17	0.11	Annelida - Polychaeta	*Aricidea catherinae*	10	0.12	Annelida - Polychaeta	*Exogone* spp. (*E. dispar, E. hebes*)	5	0.26
Echinodermata	*Echinarachnius parma*	16	0.10	Arthropoda - Copepoda	Harpacticoid copepod spp.	10	0.12	Nemertinea	Nemertinea spp	4	0.21
Annelida - Polychaeta	*Aricidea catherinae*	15	0.10	Annelida - Polychaeta	*Typosyllis* sp.	8	0.09	Arthropoda - Amphipoda	*Unciola irrorata*	4	0.21
Annelida - Polychaeta	*Aricidea wassi*	14	0.09	Annelida - Polychaeta	*Pisione* sp.	8	0.09	Annelida - Polychaeta	*Typosyllis* sp.	3	0.16
Annelida - Polychaeta	*Parougia caeca*	13	0.08	Arthropoda - Amphipoda	*Rhepoxynuis epistomus*	7	0.08	Annelida - Polychaeta	*Leitoscoloplos robustus*	3	0.16
Nemertinea	Nemertinea spp.	13	0.08	Nemertinea	Nemertinea spp.	7	0.08	Annelida - Polychaeta	*Goniadella gracilis*	2	0.10

3.2.2.4 Borrow Area WOSI

To focus on the benthic environment of the borrow areas, the following comparisons separate grabs conducted within the borrow areas (On-site) and those conducted at nearby reference sites. In Table 35, a "ɫ" indicates a significant difference between seasons at the P = 0.01 level. For Borrow Area WOSI, none of the parameters were significantly different between seasons. The presence of pollution sensitive species (*Acanthohaustorius millsi*, *Acanthohaustorius intermedius, Protohaustorius wigleyi*, *Tanaissus psammophilus*, and *Chiridotea tuftsi*) indicate that the benthic environment in Borrow Area WOSI is not impacted by pollution (Pelletier et al. 2010).

Table 35: Comparison of Average Benthic Parameters for Borrow Area WOSI

Comparison of Average Benthic Parameters for Borrow Area WOSI					
Season	Average species richness (R)	Individuals per grab	Shannon diversity index (H')	Simpson's dominance index (λ)	Pielou's evenness index (J')
On-site (n = 25 spring, n = 25 fall)					
Spring	14.84	455.4	0.92	0.63	0.34
Fall	16.88	445.24	1.08	0.60	0.39
Reference (n = 5 spring, n = 5 fall)					
Spring	15.20	185.80	1.31	0.46	0.50
Fall	19.20	500.00	0.97	0.62	0.33

Note: P=0.01, none of the comparisons were significantly different

In Borrow Area WOSI, a total of 25,945 individual organisms representing 88 different species from 7 phyla were collected for the spring and fall benthic grabs (

Table 36; Appendix E). Of these, 12,314 (47.46%) were collected in the spring, 13,631 (52.54%) and were collected in the fall. At the species level, Borrow Area WOSI spring and fall samples were dominated by a few taxa and had 55.68% of species in common. As was indicated by the On-site community parameters, the fall had greater species richness with 70 distinct taxa identified, while the spring had 67 taxa.

The most abundant phylum in the spring for On-site samples was Nematoda (82.35%) followed by Arthropoda (9.08%), and Annelida-Polychaeta (6.31%). The dominant phyla in spring Reference samples were the same as On-site samples; Nematoda (59.42%), Annelida-Polychaeta (25.62%), and Arthropoda (12.38%). The fall top phyla for On-site and reference samples were the same as spring samples. On-site top taxa were Nematoda (67.94%), Arthropoda (17.00%) and Annelida-Polychaeta (10.08%); and reference top taxa were Nematoda (75.92%), Arthropoda (12.19%) and Annelida-Polychaeta (6.32%).

Table 36: Benthic Community Composition in Borrow Area WOSI

Benthic Community Composition in Borrow Area WOSI				
Spring 2017				
Phylum	**On-site**		**Reference**	
	Individ	**%**	**Individ**	**%**
Nematoda	9375	82.35	552	59.42
Arthropoda	1034	9.08	115	12.38
Annelida - Polychaeta	718	6.31	238	25.62
Annelida - Oligochaeta	208	1.83	9	0.97
Molluska	41	0.00	12	1.29
Echinodermata	4	0.00	0	0.00
Nemertinea	3	0.00	3	0.00
Actiniaria	2	0.00	0	0.00
Total	11,385	100	929	100
Fall 2017				
Phylum	**On-site**		**Reference**	
	Individ	**%**	**Individ**	**%**
Nematoda	8,480	76.18	1898	75.92
Arthropoda	1357	12.19	425	17.00
Annelida - Polychaeta	1122	10.08	158	6.32
Annelida - Oligochaeta	130	1.17	10	0.40
Molluska	21	0.19	7	0.28
Echinodermata	16	0.14	1	0.04
Nemertinea	4	0.04	1	0.04
Cnidaria - Actiniaria	1	0.01	0	0.00
Total	11,131	100	2,500	100

Nematoda spp. was the dominant taxa, making up more than 59.00% of spring and fall, On-site and reference samples (Table 37 and Table 38). *Notomastus luridus* were also abundant in the spring On-site samples. In reference samples, *Apoprionospio pygmaea* was the second most abundant species in the spring.

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Table 37: Twenty Most Abundant Benthic Infauna Present in Borrow Area WOSI in Spring

Twenty Most Abundant Benthic Infauna Present in Borrow Area WOSI in Spring							
On-site				Reference			
Taxon	Species	Total	%	Taxon	Species	Total	%
Nematoda	Nematoda spp.	9,375	82.35	Nematoda	Nematoda spp.	552	59.42
Arthropoda - Amphipoda	*Pseudunciola obliquua*	813	7.14	Annelida - Polychaeta	*Apoprionospio pygmaea*	90	9.69
Annelida - Polychaeta	*Notomastus luridus*	211	1.85	Annelida - Polychaeta	*Notomastus luridus*	49	5.27
Annelida - Oligochaeta	Oligochaeta spp.	208	1.83	Arthropoda - Amphipoda	*Pseudunciola obliquua*	46	4.95
Annelida - Polychaeta	*Polygordius jouinae*	123	1.08	Arthropoda - Amphipoda	*Protohaustorius wigleyi*	35	3.77
Annelida - Polychaeta	*Caulleriella venefica*	68	0.60	Annelida - Polychaeta	*Aricidea wassi*	16	1.72
Arthropoda - Tanaidacea	*Tanaissus psammophilus*	66	0.58	Annelida - Polychaeta	*Polygordius jouinae*	14	1.51
Annelida - Polychaeta	*Exogone* spp. *(E. dispar, E. hebes)*	41	0.36	Annelida - Polychaeta	*Aricidea catherinae*	13	1.40
Arthropoda - Amphipoda	*Protohaustorius wigleyi*	39	0.34	Arthropoda - Amphipoda	*Acanthohaustorius millsi*	10	1.08
Annelida - Polychaeta	*Paraonis fulgens*	39	0.34	Annelida - Oligochaeta	*Oligochaeta* spp.	9	0.97
Annelida - Polychaeta	*Aricidea catherinae*	38	0.33	Molluska - Bivalvia	*Tellina agilis*	9	0.97
Arthropoda - Cumacea	*Diastylis sculpta*	37	0.32	Annelida - Polychaeta	*Caulleriella venefica*	8	0.86
Annelida - Polychaeta	*Pseudomystides* sp.	29	0.25	Arthropoda - Amphipoda	*Bathyporeia quoddyensis*	7	0.75
Molluska - Bivalvia	*Tellina agilis*	23	0.20	Arthropoda - Amphipoda	*Tanaissus psammophilus*	5	0.54
Arthropoda - Amphipoda	*Acanthohaustorius millsi*	22	0.19	Annelida - Polychaeta	*Exogone* spp. *(E. dispar, E. hebes)*	5	0.54
Annelida - Polychaeta	*Streptosyllis* spp. *(S. arenae, S. varians)*	22	0.19	Annelida - Polychaeta	*Paraonis fulgens*	5	0.54
Arthropoda - Amphipoda	*Rhepoxynuis epistomus*	22	0.19	Annelida - Polychaeta	*Nepthys picta*	5	0.54
Annelida - Polychaeta	*Parougia caeca*	19	0.17	Annelida - Polychaeta	*Pseudomystides* sp.	4	0.43
Annelida - Polychaeta	*Apoprionospio pygmaea*	15	0.13	Annelida - Polychaeta	*Goniadella gracilis*	4	0.43
Annelida - Polychaeta	*Goniadella gracilis*	15	0.13	Annelida - Polychaeta	*Typosyllis* sp.	4	0.43

Table 38: Twenty Most Abundant Benthic Infauna Present in Borrow Area WOSI in Fall

Twenty Most Abundant Benthic Infauna Present in Borrow Area WOSI in Fall							
On-site				Reference			
Taxon	Species	Total	%	Taxon	Species	Total	%
Nematoda	Nematoda spp.	8,480	76.18	Nematoda	Nematoda spp.	1,898	75.92
Arthropoda - Amphipoda	*Pseudunciola obliquua*	902	8.10	Arthropoda - Amphipoda	*Pseudunciola obliquua*	163	6.52
Annelida - Polychaeta	*Apoprionospio pygmaea*	189	1.70	Arthropoda - Amphipoda	*Protohaustorius wigleyi*	120	4.80
Annelida - Polychaeta	*Notomastus* sp.	188	1.69	Arthropoda - Copepoda	Harpacticoid copepod spp.	80	3.20
Annelida - Tanaidacea	*Tanaissus psammophilus*	165	1.48	Annelida - Polychaeta	*Notomastus* sp.	23	0.92
Arthropoda - Amphipoda	*Protohaustorius wigleyi*	147	1.32	Arthropoda - Amphipoda	*Acanthohaustorius millsi*	23	0.92
Annelida - Polychaeta	*Polygordius jouinae*	146	1.31	Annelida - Tanaidacea	*Tanaissus psammophilus*	21	0.84
Annelida - Polychaeta	*Kirkegaardia baptisteae*	134	1.20	Annelida - Polychaeta	*Polygordius jouinae*	18	0.72
Annelida - Oligochaeta	Oligochaeta spp.	130	1.17	Annelida - Polychaeta	*Apoprionospio pygmaea*	17	0.68
Annelida - Polychaeta	*Caulleriella venefica*	89	0.80	Annelida - Polychaeta	*Streptosyllis* spp. (*S. arenae, S. varians*)	14	0.56
Annelida - Polychaeta	*Aricidea catherinae*	46	0.41	Annelida - Polychaeta	*Kirkegaardia baptisteae*	13	0.52
Annelida - Polychaeta	*Paraonis fulgens*	41	0.37	Annelida - Oligochaeta	Oligochaeta spp.	10	0.40
Arthropoda - Amphipoda	*Acanthohaustorius millsi*	38	0.34	Annelida - Polychaeta	*Caulleriella venefica*	10	0.40
Annelida - Polychaeta	*Streptosyllis* spp. (*S. arenae, S. varians*)	38	0.34	Annelida - Polychaeta	*Aricidea catherinae*	10	0.40
Annelida - Polychaeta	*Pseudomystides* sp.	36	0.32	Annelida - Polychaeta	*Typosyllis* sp.	7	0.28
Arthropoda - Copepoda	Harpacticoid copepod spp.	31	0.28	Arthropoda - Amphipoda	*Rhepoxynius epistomus*	6	0.24
Arthropoda - Amphipoda	*Rhepoxynius epistomus*	28	0.25	Annelida - Polychaeta	*Parougia caeca*	5	0.20
Annelida - Polychaeta	*Typosyllis* sp.	27	0.24	Molluska - Bivalvia	*Spisula solidissima*	5	0.20
Arthropoda - Amphipoda	*Acanthohaustorius intermedius*	25	0.22	Annelida - Polychaeta	*Ophelia denticulata*	5	0.20
Annelida - Polychaeta	*Goniadella gracilis*	23	0.21	Annelida - Polychaeta	*Pisione* sp.	5	0.20

3.3 FISH TRAWLS

Between May and September 2017, 274 trawls were conducted within and adjacent to the FIMI Borrow Areas (64 trawls in Borrow Area East Rockaway, 94 trawls in Borrow Area 2C, 89 trawls in Borrow Area 5B, and 91 trawls in Borrow Area WOSI). In total, 63 fish species and 28 macroinvertebrate species were identified. A total of 102,998 individual fish were captured.

3.3.1 BORROW AREA EAST ROCKAWAY TRAWLS

Overall, 45 species were collected in the project trawls. The total biomass of the trawls in Borrow Area East Rockaway was 463,847 g (Table 39). Throughout all months the most numerically abundant species was scup (*Stenotomus chrysops*), followed by longfin squid (*Doryteuthis pealeii*), spotted hake (*Urophycis regia*), and northern searobin (*Urophycis regia*). Clearnose skate (*Raja eglanteria*) had the greatest biomass, followed by little skate (*Leucoraja erinacea*) and summer flounder (*Paralichthys dentatus*). The fish trawl results are presented in more detail in the following sections, first by temporal trends, then by sample location type. Due to the inaccuracy of the GPS unit, not all on-site samples are depicted within the dredge box area in Figure 15. Reference trawls were collected at the furthest extent from the dredge box.

3.3.1.1 MONTHLY COMPARISONS

By month, clearnose skate had the greatest biomass only in July and August even though it had the greatest overall biomass (Table 40). Little skate had the second greatest overall biomass and had the greatest biomass in May, June, and September. Summer flounder had the third highest overall biomass although it never dominated in a single month.

Although many species showed overlap from month to month, the overall catch composition showed variation depending on the time of year (Table 40). In May anchovy spp. were the most abundant taxa collected. Numbers dropped considerably as the survey progressed, striped anchovy and anchovy species collected in small numbers in August. In September, bay anchovy peaked and was the most abundant species collected that month. In June longfin squid was the most abundant species collected. Northern searobin was most abundant in July. Scup accounted for most of the individuals caught in August. Of the 45 species collected, 12 species were collected during all monthly trawls: black sea bass (*Centropristis striata*), butterfish (*Peprilus triacanthus*), clearnose skate (*Raja eglanteria*), little skate (*Leucoraja erinacea*), longfin squid, northern sea robin, scup, smallmouth flounder (*Etropus microstomus*), spotted hake, striped searobin, summer flounder (*Paralichthys dentatus*), and windowpane (*Scophthalmus aquosus*). Three species occurred in four months of trawls, four species were captured in three months of trawls, 10 species were captured in two months of trawls, and 17 species were captured in only one monthly trawl.

Catch per unit effort (CPUE) is a standardization of abundance based on the number of trawls (i.e., effort). In this case the number of individuals of each species is divided by the number of trawls. Level of effort was similar among months, with between 10 and 11 total trawls. CPUE did display the same patterns as abundance. For example, the same species that dominated each month numerically also had the highest CPUE (Figure 34). Of the 45 species collected, four are among the commercially landed species that generated over $1 million in New York (Table 1): longfin squid, summer flounder, scup, and silver hake (*Merluccius bilinearis*). All four species were present in May through June. Three species were present in September.

Longfin squid was present in all five sampling periods. CPUE peaked in June and was the lowest in May. Summer flounder were present in all five sampling periods. CPUE was highest in July and August; in all other months CPUE was relatively low. Scup was present in all five sampling periods. CPUE peaked in August and was the lowest inSeptember. CPUE for silver hake peaked in May and dropped considerably as the survey progressed. Silver hake were not present in August and September.

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Table 39: Monthly Biomass (g) of Each Species for Borrow Area East Rockaway

Monthly Biomass (g) of Each Species for Borrow Area East Rockaway							
Species	Monthly weight					Total weight (g)	Average length (mm)
	May	June	July	August	September		
Clearnose skate	13,700	22,900	46,220	60,200	1,265	144,285	578.85
Little skate	34,940	46,360	3,320	2,230	11,020	97,870	408.39
Summer flounder	1,210	3,990	15,570	11,580	3,075	35,425	251.59
Scup	7,606	1,461	3,760	15,190	762	28,779	110.67
Winter skate	18,932	4,820	--	--	--	23,752	560.76
Cownose ray	--	--	--	20,740	--	20,740	361.25
Spotted hake	1,521	8,549	2,382	2,980	4,380	19,812	121.57
Northern searobin	400	1,865	8,877	4,069	154	15,365	112.46
Windowpane	408	1,327	1,730	5,373	1,450	10,288	184.34
Northern kingfish	--	--	1,910	4,950	2,422	9,282	159.29
Smooth dogfish	--	4,410	1,040	2,590	310	8,350	463.92
Thresher shark sp.	--	--	7,500	--	--	7,500	1,420.00
Longfin squid	35	3,340	1,869	1,235	514	6,993	49.22
Weakfish	--	--	--	--	6,660	6,660	124.39
Striped searobin	300	955	2,030	1,198	680	5,163	219.32
Black sea bass	155	845	740	2,541	120	4,401	182.71
Butterfish	1,180	933	134	756	655	3,658	93.97
Spiny dogfish	2,500	--	--	--	--	2,500	815.00
Bay anchovy	--	--	--	--	2,155	2,155	50.37
Searobin sp.	99	85	1,600	35	--	1,819	92.84
Anchovy sp.	1,428	--	--	20	--	1,448	72.79
Smallmouth flounder	3	160	681	233	97	1,174	71.40
Dogfish sp.		850	100	220	--	1,170	421.00
Atlantic menhaden	570	--	--	310	--	880	336.50
Skate spp.	395	220	--	--	--	615	370.00

Monthly Biomass (g) of Each Species for Borrow Area East Rockaway							
Species	Monthly weight					Total weight (g)	Average length (mm)
	May	June	July	August	September		
Silver hake	373	178	42	--	--	593	100.23
Bluefish	--	--	--	65	465	530	136.14
Burrfish sp.	--	--	--	490	--	490	195.00
Striped anchovy	--	--	--	30	435	465	108.57
Fourspot flounder	--	--	--	223	126	349	81.15
Spot	--	--	--	--	250	250	158.50
Northern puffer	--	--	--	150	170	320	124.50
American eel	--	170	--	--	--	170	309.00
Northern cenate	--	--	--	--	110	110	187.00
Red hake	38	2	--	30	36	106	83.25
Scup YOY	--	--	--	100	--	100	32.30
Juvenile longfin squid	--	--	--	52	--	52	17.00
Blueback herring	44	--	6	--	1	51	94.50
Conger eel	--	--	--	--	41	41	195.00
Winter flounder	38	--	--	--	--	38	141.00
Alewife	28	--	--	--	--	28	123.00
Smooth flounder	--	26	--	--	--	26	84.50
Goatfish sp.	--	--	9	13	--	22	44.67
Atlantic moonfish	--	--	--	11	3	14	44.67
Naked goby	--	--	--	6	--	6	51.00
Northern pipefish	--	--	--	2	--	2	160.00
Leptocephalus	1	--	--	--	--	1	190.00
Total	**85,904**	**103,446**	**99,520**	**137,621**	**37,356**	**463,847**	

Table 40: Abundance and Composition of Monthly Trawls for Borrow Area East Rockaway

Abundance and Composition of Monthly Trawls for Borrow Area East Rockaway												
Species	May		June		July		August		September		Total	
	Individ	%	Individ	%	Individ	%	Individ	%	Individ	%	Individ	%
Scup	223	25.43%	67	6.23%	76	8.03%	268	25.40%	20	2.81%	654	14.01%
Longfin squid	1	0.11%	306	28.44%	240	25.34%	60	5.69%	15	2.10%	622	13.32%
Spotted hake	129	14.71%	275	25.56%	77	8.13%	39	3.70%	47	6.59%	567	12.15%
Northern searobin	1	0.11%	145	13.48%	250	26.40%	103	9.76%	10	1.40%	509	10.90%
Anchovy sp.	300	34.21%	--	--	--	--	15	1.42%	--	--	315	6.75%
Bay anchovy	--	--	--	--	--	--	--	--	277	38.85%	277	5.93%
Butterfish	39	4.45%	77	7.16%	8	0.84%	85	8.06%	26	3.65%	235	5.03%
Little skate	74	8.44%	87	8.09%	8	0.84%	4	0.38%	20	2.81%	193	4.13%
Smallmouth flounder	1	0.11%	20	1.86%	85	8.98%	37	3.51%	19	2.66%	162	3.47%
Weakfish	--	--	--	--	--	--	--	--	141	19.78%	141	3.02%
Summer flounder	4	0.46%	15	1.39%	46	4.86%	54	5.12%	19	2.66%	138	2.96%
Clearnose skate	4	0.46%	17	1.58%	54	5.70%	47	4.45%	3	0.42%	125	2.68%
Scup YOY	--	--	4	0.37%	--	--	92	8.72%	--	--	96	2.06%
Northern kingfish	--	--	--	--	5	0.53%	35	3.32%	50	7.01%	90	1.93%
Windowpane	5	0.57%	10	0.93%	23	2.43%	38	3.60%	13	1.82%	89	1.91%
Searobin sp.	19	2.17%	16	1.49%	40	4.22%	1	0.09%	--	--	76	1.63%
Juvenile longfin squid	--	--	--	--	--	--	68	6.45%	--	--	68	1.46%
Silver hake	45	5.13%	10	0.93%	1	0.11%	--	--	--	--	56	1.20%
Fourspot flounder	--	--	--	--	--	--	45	4.27%	8	1.12%	53	1.14%
Black sea bass	1	0.11%	10	0.93%	11	1.16%	14	1.33%	1	0.14%	37	0.79%
Striped searobin	1	0.11%	5	0.46%	13	1.37%	9	0.85%	6	0.84%	34	0.73%
Striped anchovy	--	--	--	--	--	--	2	0.19%	19	2.66%	21	0.45%
Red hake	5	0.57%	1	0.09%	--	--	5	0.47%	2	0.28%	13	0.28%
Smooth dogfish	--	--	4	0.37%	2	0.21%	6	0.57%	1	0.14%	13	0.28%
Winter skate	13	1.48%	--	--	--	--	--	--	--	--	13	0.28%
Northern puffer	--	--	--	--	--	--	8	0.76%	2	0.28%	10	0.21%

Abundance and Composition of Monthly Trawls for Borrow Area East Rockaway												
Species	May		June		July		August		September		Total	
	Individ	%	Individ	%	Individ	%	Individ	%	Individ	%	Individ	%
Bluefish	--	--	--	--	--	--	1	0.09%	6	0.84%	7	0.15%
Goatfish sp.	--	--	--	--	5	0.53%	2	0.19%	--	--	7	0.15%
Atlantic moonfish	--	--	--	--	--	--	3	0.28%	3	0.42%	6	0.13%
Cownose ray	--	--	--	--	--	--	6	0.57%	--	--	6	0.13%
Blueback herring	3	0.34%	--	--	1	0.11%	--	--	1	0.14%	5	0.11%
American eel	--	--	3	0.28%	--	--	--	--	--	--	3	0.06%
Atlantic menhaden	2	0.23%	--	--	--	--	1	0.09%	--	--	3	0.06%
Dogfish sp.	--	--	1	0.09%	1	0.11%	1	0.09%	--	--	3	0.06%
Naked goby	--	--	--	--	--	--	3	0.28%	--	--	3	0.06%
Skate spp.	2	0.23%	1	0.09%	--	--	--	--	--	--	3	0.06%
Alewife	2	0.23%	--	--	--	--	--	--	--	--	2	0.04%
Northern pipefish	--	--	--	--	--	--	2	0.19%	--	--	2	0.04%
Smooth flounder	--	--	2	0.19%	--	--	--	--	--	--	2	0.04%
Spot	--	--	--	--	--	--	--	--	2	0.28%	2	0.04%
Burrfish sp.	--	--	--	--	--	--	1	0.09%	--	--	1	0.02%
Conger eel	--	--	--	--	--	--	--	--	1	0.14%	1	0.02%
Leptocephalus	1	0.11%	--	--	--	--	--	--	--	--	1	0.02%
Northern cenate	--	--	--	--	--	--	--	--	1	0.14%	1	0.02%
Spiny dogfish	1	0.11%	--	--	--	--	--	--	--	--	1	0.02%
Thresher shark sp.	--	--	--	--	1	0.11%	--	--	--	--	1	0.02%
Winter flounder	1	0.11%	--	--	--	--	--	--	--	--	1	0.02%
Total	**877**	**100%**	**1,076**	**100%**	**947**	**100%**	**1,055**	**100%**	**713**	**100%**	**4,668**	**100.0%**

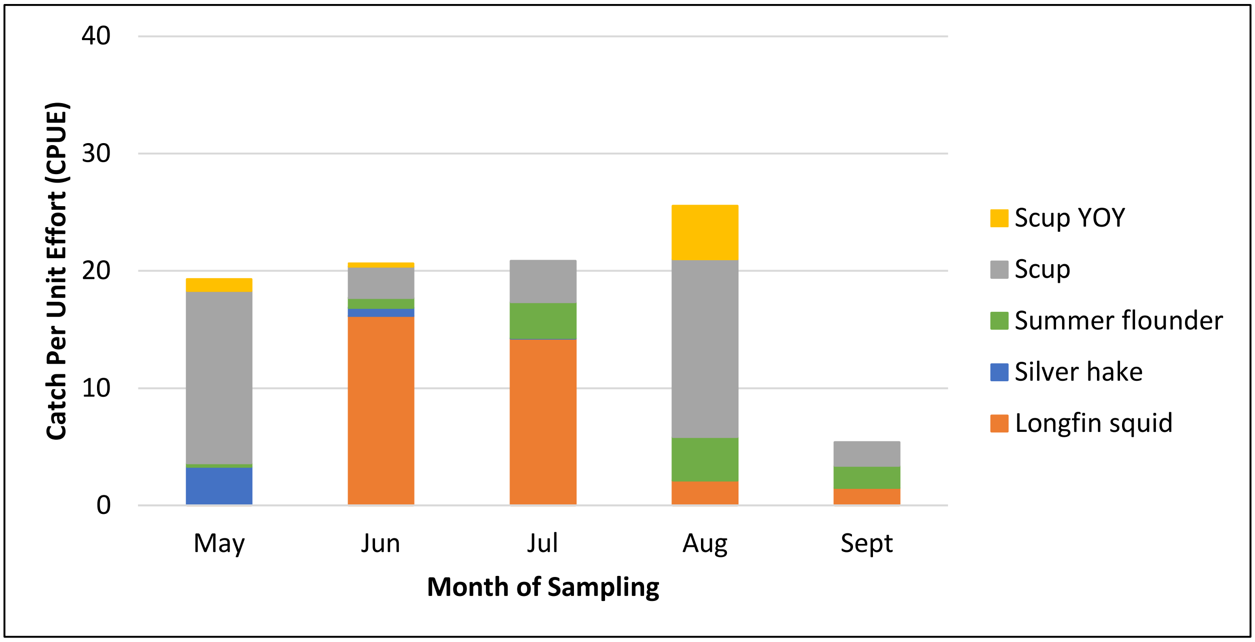

Figure 34: Monthly Catch Per Unit Effort (CPUE) of the Most Commercially Important Species for Borrow Area East Rockaway

Except for squid species, invertebrates were not enumerated, measured, or weighed. However, the presence of other organisms in the catch was noted (Table 45). A total of 15 species were observed: 8 arthropods, 4 mollusks, 1 echinoderms, 1 cnidarian and 1 mollusk egg masses. Three of these species were encountered in all months of the survey: horseshoe crab, shrimp sp., and spider crab. Hermit crab, moon snail, and sand dollar were present in four months of the trawls. Blue crab, jonah crab, mussel, rock crab, and squid egg were present in three months. Lady crab were present in two months and the rest were only present of one of the monthly trawl surveys.

Table 41: Presence of Macroinvertebrates Collected in Monthly Fish Trawls in Borrow Area East Rockaway

Presence of Macroinvertebrates Collected in Monthly Fish Trawls in Borrow Area East Rockaway					
Species	**May**	**June**	**July**	**August**	**September**
Blue crab			X	X	X
Hermit crab		X	X	X	X
Horseshoe crabs	X	X	X	X	X
Jellyfish					X
Jonah crabs	X	X	X		
Lady crab				X	X
Moon snails		X	X	X	X
Mussels		X	X	X	
Periwinkles		X			
Rock crab	X			X	X
Sand dollar		X	X	X	X
Shrimp	X	X	X	X	X

Presence of Macroinvertebrates Collected in Monthly Fish Trawls in Borrow Area East Rockaway					
Species	**May**	**June**	**July**	**August**	**September**
Spider crabs	X	X	X	X	X
Squid eggs		X		X	X
Surf clam					X

3.3.1.2 REFERENCE SITE COMPARISONS

To provide a local comparison, as well as a baseline for future projects, reference tows were conducted adjacent to Borrow Area East Rockaway during monthly sampling events from May to August (Table 42). No reference samples were conducted during September surveys. Since more tows were conducted within Borrow Area East Rockaway, it was expected that a greater number of species would be observed on-site when compared to reference sites. This section presents the overlap of species and presence/absence of species in the reference tows relative to the on-site tows for all months combined and then by month.

As expected, for all months combined there were a greater number of species (45 species) collected in on-site trawls compared to the number of species collected in the reference trawls (28 species) which was likely due to the larger number of on-site trawls. There were 20 species that were collected in on-site trawls that were not also collected in reference trawls. It is important to note that 12 of these species individually accounted for less than 0.1% of the catch composition of monthly trawls. The great overlap of species between on-site and reference trawls indicates that the same fish assemblages populate on-site and reference areas.

CPUE was much higher in on-site trawls than reference trawls (Figure 35). Additionally, on-site trawls showed little fluctuation over all months while reference sites showed a much greater fluctuation. CPUE was higher in June and August. Four reference trawls were collected in June and August, while only three reference trawls were collected in May and July. Additionally, higher abundances were collected in June and August than in May and July.

Table 42: Monthly Comparisons of Catch Composition of On-site and Reference Trawls at Borrow Area East Rockaway

Monthly Comparisons of Catch Composition of On-site and Reference Trawls at Borrow Area East Rockaway										
Species	May		June		July		August		September	
	On-site %	Ref. %	On-site %	Ref. %	On-site %	Ref. %	On-site %	Ref. %	On-site %	Ref. %
Alewife	0.25%	--	--	--	--	--	--	--	--	--
American eel	--	--	0.37%	--	--	--	--	--	--	--
Anchovy sp.	34.37%	32.43%	--	--	--	--	1.81%	--	--	--
Atlantic menhaden	0.25%	--	--	--	--	--	--	0.45%	--	--
Atlantic moonfish	--	--	--	--	--	--	0.36%	--	0.42%	--
Bay anchovy	--	--	--	--	--	--	--	--	38.85%	--
Black sea bass	0.12%	--	0.74%	1.50%	1.31%	--	1.44%	0.89%	0.14%	--
Blueback herring	0.37%	--	--	--	--	0.91%	--	--	0.14%	--
Bluefish	--	--	--	--	--	--	0.12%	--	0.84%	--
Burrfish sp.	--	--	--	--	--	--	0.12%	--	0.00%	--
Butterfish	4.86%	--	5.80%	11.28%	0.96%	--	10.23%	--	3.65%	--
Clearnose skate	0.25%	2.70%	1.73%	1.13%	6.21%	1.82%	5.29%	1.34%	0.42%	--
Conger eel	--	--	--	--	--	--	--	--	0.14%	--
Cownose ray	--	--	--	--	--	--	0.60%	0.45%	--	--
Dogfish sp.	--	--	0.12%	--	0.12%	--	0.12%	--	--	--
Fourspot flounder	--	--	--	--	--	--	5.42%	--	1.12%	--
Goatfish sp.	--	--	--	--	0.60%	--	0.12%	0.45%	--	--
Longfin squid juvenile	--	--	--	--	--	--	1.32%	25.45%	--	--
Leptocephalus	0.12%	--	--	--	--	--	--	--	--	--
Little skate	8.59%	6.76%	8.15%	7.89%	0.96%	--	0.48%	--	2.81%	--
Longfin squid	0.12%	--	27.90%	30.08%	23.78%	37.27%	3.61%	13.39%	2.10%	--
Naked goby	--	--	--	--	--	--	0.12%	0.89%	--	--
Northern cenate	--	--	--	--	--	--	--	--	0.14%	--
Northern kingfish	--	--	--	--	0.60%	--	3.85%	1.34%	7.01%	--
Northern pipefish	--	--	--	--	--	--	0.12%	0.45%	--	--
Northern puffer	--	--	--	--	--	--	--	3.57%	0.28%	--

Monthly Comparisons of Catch Composition of On-site and Reference Trawls at Borrow Area East Rockaway										
Species	May		June		July		August		September	
	On-site %	Ref. %	On-site %	Ref. %	On-site %	Ref. %	On-site %	Ref. %	On-site %	Ref. %
Northern searobin	0.12%	--	13.21%	14.29%	27.48%	18.18%	10.83%	5.80%	1.40%	--
Red hake	0.62%	--	--	0.38%	--	--	0.60%	--	0.28%	--
Scup	23.79%	43.24%	4.57%	11.28%	5.85%	24.55%	25.51%	25.00%	2.81%	--
Scup YOY	--	--	0.49%	--	--	--	7.70%	12.50%	--	--
Searobin sp.	2.12%	2.70%	1.98%	--	3.70%	8.18%	--	0.45%	--	--
Silver hake	5.23%	4.05%	1.23%	--	0.12%	--	--	--	--	--
Skate spp.	0.12%	1.35%	--	0.38%	--	--	--	--	--	--
Smallmouth flounder	0.12%	--	1.60%	2.63%	9.68%	3.64%	3.01%	5.36%	2.66%	--
Smooth dogfish	--	--	0.37%	0.38%	0.24%	--	0.72%	--	0.14%	--
Smooth flounder	--	--	0.25%	--	--	--	--	--	--	--
Spiny dogfish	0.12%	--	--	--	--	--	--	--	--	--
Spot	--	--	--	--	--	--	--	--	0.28%	--
Spotted hake	15.44%	6.76%	28.40%	16.92%	9.08%	0.91%	4.69%	--	6.59%	--
Striped anchovy	--	--	--	--	--	--	0.24%	--	2.66%	--
Striped searobin	0.12%	--	0.37%	0.75%	1.43%	0.91%	1.08%	--	0.84%	--
Summer flounder	0.50%	--	1.48%	1.13%	5.14%	2.73%	6.26%	0.89%	2.66%	--
Thresher shark sp.	--	--	--	--	0.12%	--	--	--	--	--
Weakfish	--	--	--	--	--	--	--	--	19.78%	--
Windowpane	0.62%	--	1.23%	--	2.63%	0.91%	4.21%	1.34%	1.82%	--
Winter flounder	0.12%	--	--	--	--	--	--	--	--	--
Winter skate	1.62%	--	--	--	--	--	--	--	--	--
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

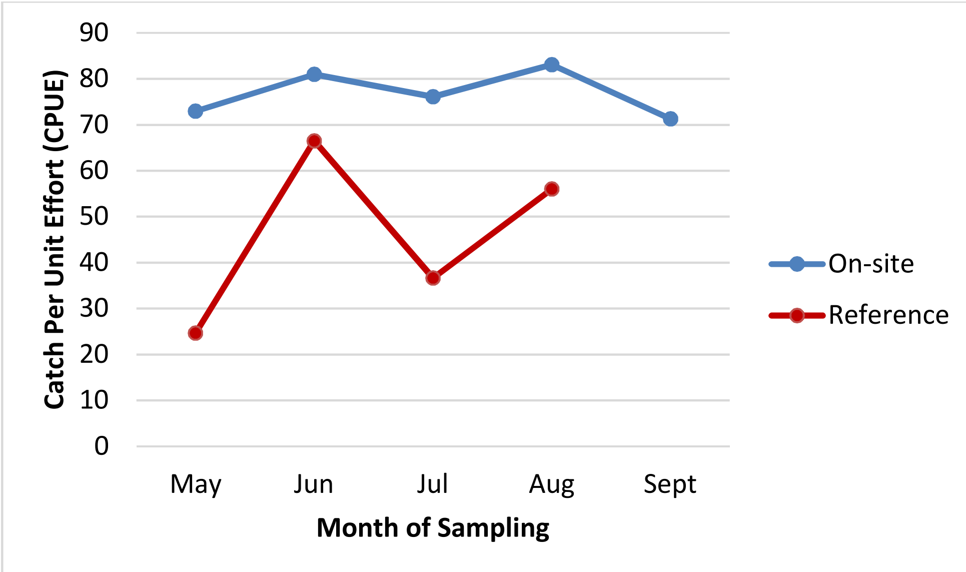

Figure 35: Average Catch per Unit Effort (CPUE) of Monthly Fish Trawls for Borrow Area East Rockaway

3.3.1.3 Length-Frequency Distributions

Lengths of all fish species were collected (Appendix A), but the length-frequency distribution data focus on the most important New York commercial species (longfin squid, summer flounder, scup, silver hake and goosefish) which generated over $1 million of revenue individually in 2016.

Figure 36 represents the length-frequency distributions for longfin squid, summer flounder, scup, and silver hake. Longfin squid ranged in mantle length from a minimum of 7 mm to a maximum of 175 mm. The average length was 48 mm. The majority of longfin squid fell between 7-50 mm. Summer flounder ranged from 60 to 445 mm in standard length, with an average of 257 mm. Most fish fell between 251-300 mm standard length. The standard length of scup ranged from 24 to 260 mm and averaged 100 mm. The most common lengths were between 101 and 150 mm. Silver hake standard lengths were between 44 and 183 mm, averaging 100 mm. The most common lengths were between 51 and 100 mm.

Figure 36: Length Frequency Distribution of Commercially Important New York Fish Species Collected in Borrow Area East Rockaway Which Generated Over $1 Million in Revenue in 2016

3.3.2 Borrow Area 2C Trawls

Overall, 37 species were collected in the project trawls. The total biomass of the trawls in Borrow Area 2C was 2,203,421 g (Table 43). Throughout all months the most numerically abundant species was scup (*Stenotomus chrysops*), followed by northern searobin (*Prionotus carolinus*), longfin squid (*Doryteuthis pealeii*), and spotted hake (*Urophycis regia*). Winter skate (*Leucoraja ocellata*) had the greatest biomass, followed by little skate (*Leucoraja erinacea*) and northern searobin (*Prionotus carolinus*). The fish trawl results are presented in more detail in the following sections, first by temporal trends, then by sample location type.

3.3.2.1 Monthly Comparisons

Winter skate had the greatest total biomass followed by little skate (Table 43). By month, winter skate had the greatest biomass only in May and June despite having the greatest overall biomass. Northern searobin dominated by biomass in July and August. Little skate had the highest biomass in September. Clearnose skate had the fourth highest overall biomass although it never dominated in a single month.

Although many species showed overlap from month to month, the overall catch composition showed variation depending on the time of year (Table 44). In May spotted hake was the most abundant species but numbers dropped considerably as the survey progressed. In June longfin squid was the most abundant. Northern searobin was most abundant in July and early August. Scup young-of-the-year (YOY) catches accounted for most of the individuals caught in late August. Scup accounted for most of the individuals caught in September. Of the 35 species collected, nine species were collected during all monthly trawls: black sea bass, little skate, longfin squid, northern sea robin, scup, smallmouth flounder (*Etropus microstomus*), spotted hake, summer flounder (*Paralichthys dentatus*), and windowpane (*Scophthalmus aquosus*). Five species occurred in five months of trawls, two species were captured in four months of trawls, and three species were captured in three months of trawls. Seven species occurred in two monthly trawls and 11 species were captured in only one monthly trawl.

Catch per unit effort (CPUE) is a standardization of abundance based on the number of trawls (i.e., effort). In this case the number of individuals of each species is divided by the number of trawls.

Although the level of effort was not similar among months, with between 12 and 16 total trawls, CPUE did display the same patterns as abundance. For example, the same species that dominated each month numerically also had the highest CPUE (Figure 37). Of the 35 species collected, five are among the commercially landed species that generated over $1 million in New York (Table 1): longfin squid, summer flounder, scup, silver hake (*Merluccius bilinearis*), and goosefish (*Lophius americanus*). All five species were present in May. Four species were present in June and three species were present from July through September. Only one goosefish was collected, so it was not included in the analysis.

Longfin squid was present in all six sampling periods. CPUE peaked in June and was the lowest in May. Scup was present in all six sampling periods. CPUE peaked in late August and was the lowest in early August. The peak in late August can be attributed to the high abundance of YOY scup collected. Summer flounder were present in all six sampling periods with a relatively low CPUE in all months. In May, silver hake had the highest CPUE of any commercially important species at 2C. Silver hake CPUE decreased in June and was not present again until September when CPUE was relatively low.

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Table 43: Monthly Biomass (g) of Each Species for Borrow Area 2C

Monthly Biomass (g) of Each Species for Borrow Area 2C								
Species	Monthly weight						Total weight (g)	Average length (mm)
	May	June	July	Early August	Late August	September		
Winter skate	342,000	294,400	--	300	--	1,700	638,400	518.85
Little skate	299,450	144,005	35,080	850	12,680	29,240	521,305	430.03
Northern searobin	849	12,140	157,580	87,160	70,300	23,391	351,420	156.40
Clearnose skate	--	37,400	45,980	42,120	31,503	7,450	164,453	605.90
Skate spp.	73,280	9,730	120	--	--	--	83,130	326.73
Scup	21,270	8,896	4,510	1,370	3,340	33,225	72,611	97.13
Spiny dogfish	14,000	58,500	--	--	--	--	72,500	837.13
Spotted hake	7,585	3,437	49,335	20	9,184	980	70,541	123.07
Summer flounder	8,170	3,335	9,020	14,941	17,305	3,560	56,331	319.91
Smooth dogfish	11,500	10,400	7,850	--	1,700	12,600	44,050	693.61
Windowpane	15,820	6,050	2,530	1,140	1,120	1,220	27,880	201.31
Striped searobin	--	14,830	2,540	4,590	640	1,690	24,290	211.31
Longfin squid	865	3,721	5,305	5,882	2,934	4,545	23,252	58.70
Winter flounder	11,205	832	75	--	--	--	12,112	232.64
Butterfish	11,378	37	45	--	47	269	11,776	87.02
Scup YOY	--	--	--	--	9,325	--	9,325	33.46
Silver hake	3,872	29	420	--	--	3	4,324	97.52
Juvenile longfin squid	--	--	--	--	3,535	--	3,535	--
Smallmouth flounder	1,335	521	777	215	450	34	3,332	63.64
Black sea bass	408	304	577	975	1	1,040	3,305	147.46
Fourspot flounder	--	1,295	470	1	12	10	1,788	164.88
Goosefish	1,300	--	--	--	--	--	1,300	355.00
Northern puffer	--	--	--	8	--	1,122	1,130	73.30
Bay anchovy	570	--	--	--	--	334	904	62.40
Bluefish	--	--	--	--	--	130	130	177.00

Monthly Biomass (g) of Each Species for Borrow Area 2C								
Species	**Monthly weight**						**Total weight (g)**	**Average length (mm)**
	May	**June**	**July**	**Early August**	**Late August**	**September**		
Alewife	90	--	--	--	--	--	90	175.00
Rough scad	--	--	--	--	16	41	57	99.80
Red hake	--	45	--	--	--	--	45	109.33
Conger eel	--	--	30	--	--	--	30	292.00
Bluespotted cornetfish	--	--	--	--	22	--	22	373.00
Lined seahorse	--	--	--	10	6	2	18	61.60
Naked goby	--	--	--	--	6	4	10	48.60
Dwarf goatfish	--	--	--	--	6	--	6	68.00
Northern pipefish	--	--	2	--	4	--	6	115.50
Weakfish	--	--	--	--	--	5	5	36.00
Cunner	--	--	--	--	--	4	4	31.50
Tomcod	1	1	--	--	--	--	2	42.00
Atlantic moonfish	--	--	--	--	--	1	1	48.00
Juvenile hake spp.	--	1	--	--	--	--	1	41.00
Total	**824,948**	**609,909**	**322,246**	**159,582**	**164,136**	**122,600**	**2,203,421**	

Note: weight is total weight of each species in grams; length is average standard length of measured individuals in mm; ▫ = estimated weight.

Table 44: Abundance and Composition of Monthly Trawls for Borrow Area 2C

Abundance and Composition of Monthly Trawls for Borrow Area 2C														
Species	May		June		July		Early August		Late August		September		Total	
	Individ	%	Individ	%	Individ	%	Individ	%	Individ	%	Individ	%	Individ	%
Scup YOY	--	--	--	--	--	--	--	--	17,189	91.53%	--	--	17,189	52.52%
Northern searobin	117	4.55%	136	6.93%	2,476	58.20%	1,182	67.70%	1,022	5.44%	316	9.25%	5,249	16.04%
Scup	205	7.97%	354	18.04%	82	1.93%	18	1.03%	58	0.31%	2,389	69.94%	3,106	9.49%
Longfin squid	22	0.86%	632	32.21%	424	9.97%	365	20.90%	210	1.12%	348	10.19%	2,001	6.11%
Spotted hake	573	22.28%	40	2.04%	937	22.03%	1	0.06%	83	0.44%	9	0.26%	1,643	5.02%
Little skate	313	12.17%	274	13.97%	78	1.83%	2	0.11%	51	0.27%	58	1.70%	776	2.37%
Smallmouth flounder	276	10.73%	149	7.59%	123	2.89%	65	3.72%	61	0.32%	8	0.23%	682	2.08%
Winter skate	206	8.01%	192	9.79%	--	--	1	0.06%	--	--	4	0.12%	403	1.23%
Bay anchovy	163	6.34%	--	--	--	--	--	--	--	--	190	5.56%	353	1.08%
Silver hake	288	11.20%	3	0.15%	8	0.19%	--	--	--	--	1	0.03%	300	0.92%
Skate spp.	176	6.84%	45	2.29%	1	0.02%	--	--	--	--	--	--	222	0.68%
Butterfish	133	5.17%	10	0.51%	5	0.12%	--	--	22	0.12%	38	1.11%	208	0.64%
Clearnose skate	--	--	25	1.27%	46	1.08%	40	2.29%	28	0.15%	7	0.20%	146	0.45%
Windowpane	51	1.98%	31	1.58%	19	0.45%	7	0.40%	5	0.03%	6	0.18%	119	0.36%
Summer flounder	12	0.47%	6	0.31%	18	0.42%	30	1.72%	30	0.16%	3	0.09%	99	0.30%
Striped searobin	--	--	21	1.07%	13	0.31%	21	1.20%	3	0.02%	7	0.20%	65	0.20%
Black sea bass	8	0.31%	2	0.10%	6	0.14%	8	0.46%	1	0.01%	7	0.20%	32	0.10%
Winter flounder	5	0.19%	9	0.46%	6	0.14%	--	--	2	0.01%	5	0.15%	27	0.08%
Smooth dogfish	19	0.74%	3	0.15%	7	0.16%	--	--	--	--	--	--	29	0.09%
Spiny dogfish	2	0.08%	18	0.92%	--	--	--	--	--	--	--	--	20	0.06%
Northern puffer	--	--	--	--	--	--	1	0.06%	--	--	9	0.26%	10	0.03%
Fourspot flounder	--	--	7	0.36%	3	0.07%	1	0.06%	2	0.01%	2	0.06%	15	0.05%
Lined seahorse	--	--	--	--	--	--	4	0.23%	2	0.01%	1	0.03%	7	0.02%
Naked goby	--	--	--	--	--	--	--	--	4	0.02%	1	0.03%	5	0.02%
Rough scad	--	--	--	--	--	--	--	--	3	0.02%	2	0.06%	5	0.02%
Red hake	--	--	3	0.15%	--	--	--	--	--	--	--	--	3	<0.01%
Tomcod	--	--	--	--	--	--	--	--	--	--	2	0.06%	2	<0.01%

Abundance and Composition of Monthly Trawls for Borrow Area 2C														
Species	**May**		**June**		**July**		**Early August**		**Late August**		**September**		**Total**	
	Individ	**%**	**Individ**	**%**	**Individ**	**%**	**Individ**	**%**	**Individ**	**%**	**Individ**	**%**	**Individ**	**%**
Cunner	--	--	--	--	1	0.02%	--	--	1	0.01%	--	--	2	<0.01%
Northern pipefish	1	0.04%	1	0.05%	--	--	--	--	--	--	--	--	2	<0.01%
Alewife	1	0.04%	--	--	--	--	--	--	--	--	--	--	1	<0.01%
Goosefish	--	--	--	--	--	--	--	--	--	--	1	0.03%	1	<0.01%
Atlantic moonfish	--	--	--	--	--	--	--	--	--	--	1	0.03%	1	<0.01%
Bluefish	--	--	--	--	--	--	--	--	1	0.01%	--	--	1	<0.01%
Bluespotted cornetfish	1	0.04%	--	--	--	--	--	--	--	--	--	--	1	<0.01%
Juvenile hake spp.	--	--	1	0.05%	--	--	--	--	--	--	--	--	1	<0.01%
Weakfish	--	--	--	--	--	--	--	--	--	--	1	0.03%	1	<0.01%
Conger eel	--	--	--	--	1	0.02%	--	--	--	--	--	--	1	<0.01%
Dwarf goatfish	--	--	--	--	0	0.00%	--	--	1	0.01%	--	--	1	<0.01%
Total	**2,572**	**100%**	**1,962**	**100%**	**4,254**	**100%**	**1,746**	**100%**	**18,779**	**100%**	**3,416**	**100%**	**32,727**	**100%**

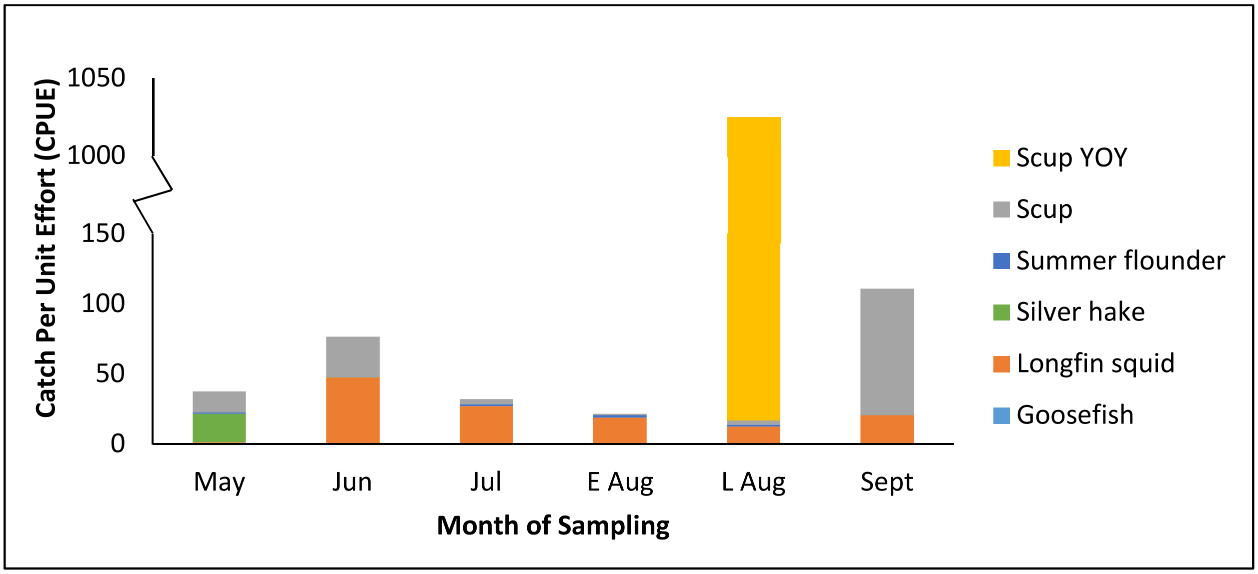

Figure 37: Monthly Catch Per Unit Effort (CPUE) of the Most Commercially Important Species for Borrow Area 2C (E Aug = Early August, L Aug = Late August)

Except for squid species, invertebrates were not enumerated, measured, or weighed. However, the presence of other organisms in the catch was noted (Table 45). A total of 17 species were observed: 7 arthropods, 5 mollusks, 2 echinoderms, 1 cnidarian and 2 mollusk egg masses. Four of these species were encountered in all months of the survey: hermit crab, mahogany clam, moon snail, and sand dollar. Spider crab were present in five months of the trawls. Jonah crab were present in four months. Surf clam and skate egg case were present in three months. Horseshoe crab, jellyfish, octopus, and sea star were present in two months and the rest were only present in one of the monthly trawl surveys.

Table 45: Presence of Macroinvertebrates Collected in Monthly Fish Trawls in Borrow Area 2C

Presence of Macroinvertebrates Collected in Monthly Fish Trawls in Borrow Area 2C						
Species	**May**	**June**	**July**	**Early August**	**Late August**	**September**
Hermit crab	X	X	X	X	X	X
Mahogany clam	X	X	X	X	X	X
Moon snail	X	X	X	X	X	X
Sand dollar	X	X	X	X	X	X
Spider crab	X		X	X	X	X
Jonah crab	X	X	X	X		
Skate egg case*			X		X	X
Surf clam		X		X		X
Horseshoe crab	X				X	
Jellyfish			X			X
Octopus	X	X				
Sea star			X	X		
Blue mussel				X		

Presence of Macroinvertebrates Collected in Monthly Fish Trawls in Borrow Area 2C						
Species	**May**	**June**	**July**	**Early August**	**Late August**	**September**
Calico crab			X			
Lady crab					X	
Shrimp sp.		X				
Squid egg mass				X		

Note: Organisms with * are not invertebrates but their presence is documented here.

3.3.2.2 Reference Site Comparisons

To provide a local comparison, as well as a baseline for future projects, reference tows were conducted adjacent to Borrow Area 2C during each monthly sampling event from May to September (Table 46). Since more tows were conducted within Borrow Area 2C, it was expected that a greater number of species would be observed on-site when compared to reference sites. This section presents the overlap of species and presence/absence of species in the reference tows relative to the on-site tows for all months combined and then by month.

As expected, for all months combined there were a greater number of species (35 species) collected in on-site trawls compared to the number of species collected in the reference trawls (24 species) which was likely due to the larger number of on-site trawls. There were 13 species that were collected in on-site trawls that were not also collected in reference trawls. It is important to note that none of these species individually accounted for more than 0.1% of the catch composition of monthly trawls. The great overlap of species between on-site and reference trawls indicates that the same fish assemblages populate on-site and reference areas.

Except for July, the CPUE of the total catch from month to month followed the same pattern both within the borrow area and at the reference sites, maintaining a similar CPUE throughout all months, with a peak in late August (Figure 38). In July, the reference site CPUE increased greatly driven by a large abundance of northern searobin.

Table 46: Monthly Comparisons of Catch Composition of On-site and Reference Trawls at Borrow Area 2C

Monthly Comparisons of Catch Composition of On-site and Reference Trawls at Borrow Area 2C												
Species	May		June		July		Early August		Late August		September	
	On-site %	Ref. %	On-site %	Ref. %	On-site %	Ref. %	On-site %	Ref. %	On-site %	Ref. %	On-site %	Ref. %
Alewife	0.04%	--	--	--	--	--	--	--	--	--	--	--
Atlantic moonfish	--	--	--	--	--	--	--	--	--	--	0.04%	--
Bay anchovy	5.68%	11.04%	--	--	--	--	--	--	--	--	7.92%	0.72%
Black sea bass	0.31%	0.32%	0.11%	--	0.17%	0.11%	0.54%	--	--	0.07%	0.30%	--
Bluefish	--	--	--	--	--	--	--	--	--	--	0.04%	0.09%
Bluespotted cornetfish	--	--	--	--	--	--	--	--	0.01%	--	--	--
Butterfish	5.72%	1.26%	0.40%	1.44%	0.17%	0.05%	--	--	0.05%	0.94%	1.48%	0.36%
Clearnose skate	--	--	1.43%	--	1.57%	0.44%	2.42%	1.56%	0.13%	0.36%	0.30%	--
Conger eel	--	--	--	--	--	0.05%	--	--	--	--	--	--
Cunner	--	--	--	--	--	--	--	--	--	--	0.09%	--
Dwarf goatfish	--	--	--	--	--	--	--	--	--	0.07%	--	--
Fourspot flounder	--	--	0.23%	1.44%	--	0.16%	0.07%	--	0.01%	0.07%	0.09%	--
Goosefish	0.04%	--	--	--	--	--	--	--	--	--	--	--
Hake spp. juvenile	--	--	0.06%	--	--	--	--	--	--	--	--	--
Lined seahorse	--	--	--	--	--	--	0.20%	0.39%	0.01%	0.07%	0.04%	--
Little skate	11.40%	17.67%	13.52%	17.70%	1.78%	1.91%	0.13%	--	0.13%	2.03%	2.35%	0.36%
Longfin squid	0.62%	2.52%	32.52%	29.67%	13.43%	5.40%	19.07%	31.52%	1.15%	0.72%	13.48%	3.40%
Naked goby	--	--	--	--	--	--	--	--	0.02%	--	0.04%	--
Northern pipefish	--	--	--	--	0.04%	--	--	--	0.01%	--	--	--
Northern puffer	--	--	--	--	--	--	0.07%	--	--	--	0.39%	--
Northern searobin	4.75%	3.15%	6.96%	6.70%	70.79%	41.60%	68.91%	60.70%	4.97%	11.45%	12.88%	1.79%
Red hake	--	--	0.17%	--	--	--	--	--	--	--	--	--
Rough scad	--	--	--	--	--	--	--	--	0.02%	--	0.09%	--
Scup	7.98%	7.89%	19.51%	5.74%	1.90%	1.96%	1.01%	1.17%	0.28%	0.65%	58.68%	93.02%
Scup YOY	--	--	--	--	--	--	--	--	92.67%	77.17%	--	--
Silver hake	10.86%	13.56%	0.17%	--	--	0.44%	--	--	--	--	0.04%	--

Monthly Comparisons of Catch Composition of On-site and Reference Trawls at Borrow Area 2C												
Species	**May**		**June**		**July**		**Early August**		**Late August**		**September**	
	On-site %	**Ref. %**	**On-site %**	**Ref. %**	**On-site %**	**Ref. %**	**On-site %**	**Ref. %**	**On-site %**	**Ref. %**	**On-site %**	**Ref. %**
Skate spp.	6.87%	6.62%	2.28%	2.39%	--	0.05%	--	--	--	--	--	--
Smallmouth flounder	11.44%	5.68%	6.62%	15.79%	2.60%	3.27%	3.96%	2.33%	0.21%	1.74%	0.30%	0.09%
Smooth dogfish	0.09%	--	0.46%	--	0.21%	0.38%	--	--	0.01%	--	0.22%	--
Spiny dogfish	0.09%	--	0.80%	1.91%	--	--	--	--	--	--	--	--
Spotted hake	22.84%	18.30%	2.11%	1.44%	5.99%	43.18%	0.07%	--	0.16%	3.99%	0.39%	--
Striped searobin	--	--	1.20%	--	0.29%	0.33%	1.34%	0.39%	0.02%	--	0.30%	--
Summer flounder	0.44%	0.63%	0.17%	1.44%	0.62%	0.16%	1.75%	1.56%	0.13%	0.58%	0.13%	--
Tomcod	0.04%	--	0.06%	--	--	--	--	--	--	--	--	--
Weakfish	--	--	--	--	--	--	--	--	--	--	0.04%	--
Windowpane	1.82%	3.15%	1.43%	2.87%	0.45%	0.44%	0.40%	0.39%	0.02%	0.07%	0.26%	--
Winter flounder	0.84%	0.95%	0.17%	0.48%	--	0.05%	--	--	--	--	--	--
Winter skate	8.12%	7.26%	9.64%	11.00%	--	--	0.07%	--	--	--	0.09%	0.18%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

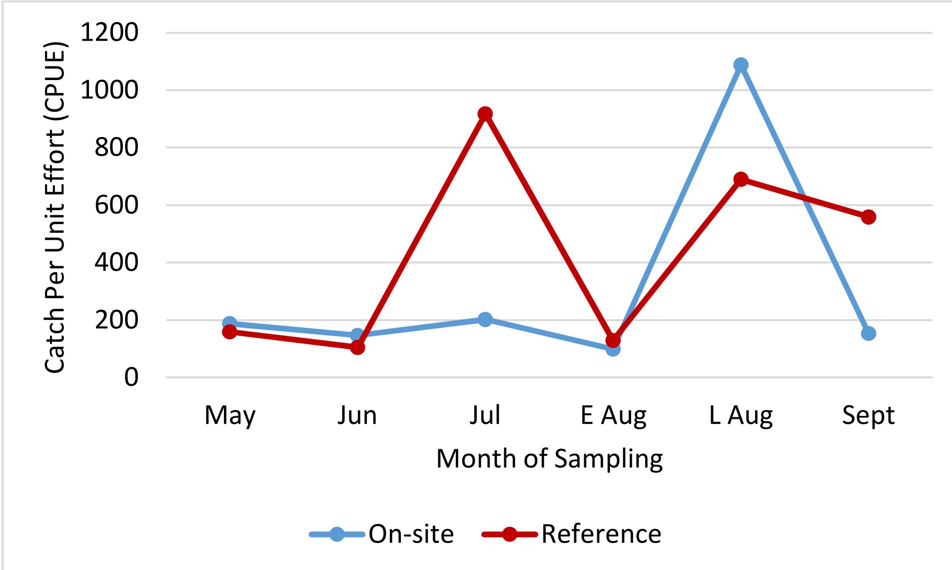

Figure 38: Average Catch per Unit Effort (CPUE) of Monthly Fish Trawls for Borrow Area 2C (E Aug = Early August, L Aug = Late August)

3.3.2.3 LENGTH-FREQUENCY DISTRIBUTIONS

Lengths of all fish species were collected (Appendix A), but the length-frequency distribution data focus on the most important New York commercial species (longfin squid, summer flounder, scup, silver hake and goosefish) which generated over $1 million of revenue individually in 2016. Figure 39 represents the length-frequency distributions for longfin squid, summer flounder, scup, and silver hake; there was only one goosefish collected so it was not included in the figure. Longfin squid ranged in mantle length from a minimum of 15 mm to a maximum of 262 mm. The average length was 59 mm. The majority of longfin squid fell between 15-50 mm. Summer flounder ranged from 221 to 500 mm in standard length, with an average of 320 mm. Most fish fell between 301-350 mm standard length. The standard length of scup ranged from 14 to 235 mm and averaged 72 mm. The most common lengths were between 14 and 50 mm. Silver hake standard lengths were between 38 and 286 mm, averaging 98 mm. The most common lengths were between 51 and 100 mm. Only one goosefish was collected and it was 355 mm.

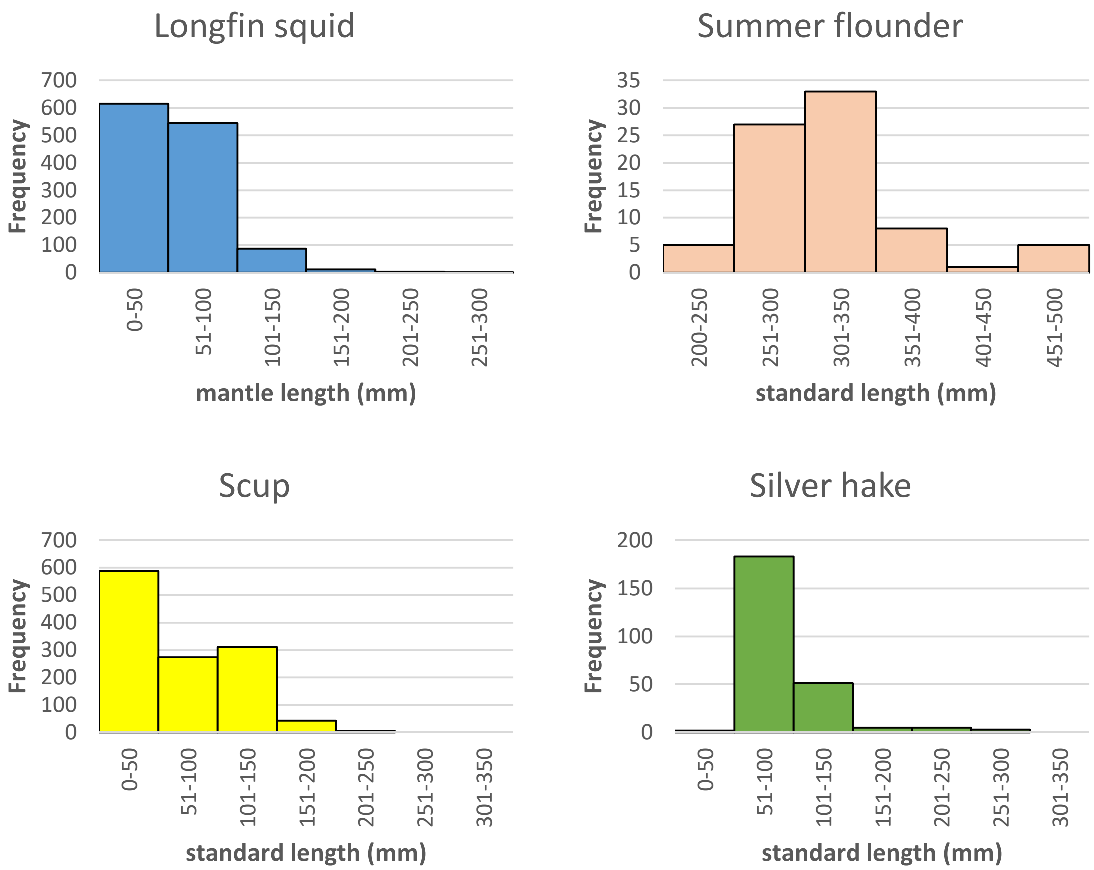

Figure 39: Length Frequency Distribution of Commercially Important New York Fish Species Collected in Borrow Area 2C Which Generated Over $1 Million in Revenue in 2016

3.3.3 Borrow Area 5B Trawls

Overall, 49 species were collected in the project trawls. The total biomass of the trawls in Borrow Area 5B was 3,226,639.5 g (Table 47). Winter skate had the greatest biomass, followed by clearnose skate and little skate. Overall, the most numerically abundant species was bay anchovy, followed by longfin squid and northern searobin. The fish trawl results are presented in more detail in the following sections, first by temporal trends, then by sample location type.

3.3.3.1 Monthly Comparisons

By month, winter skaten had the greatest biomass in May and June (Table 48). In July, early August, and late August, clearnose skate had the greatest biomass. In September, little skate had the highest biomass.

Although many species showed overlap from month to month, the overall catch composition showed variation depending on the time of year (Table 48). Bay anchovy, longfin squid, and northern searobin were the most abundant species in Borrow Area 5B during the monthly trawls. In May, bay anchovy was the most abundant species. In June, July, and early August longfin squid was the most abundant. Northern searobin was the most abundant species in late August. Bay anchovy was the most abundant species in September. Of the 49 species collected, 12 species were collected during all six months: black seabass, clearnose skate, little skate, longfin squid, northern puffer, northern searobin, scup, smooth dogfish, spotted hake, striped searobin, summer flounder, and windowpane. Two species occurred in five months of trawls, and three species were captured in four of the trawls. Eight species were caught in three months and eight species in two months of trawls. There were 16 species that were captured in only one month.

Catch per unit effort (CPUE) is a standardization of abundance based on the number of trawls (i.e., effort). In this case the number of individuals of each species is divided by the number of trawls. Although the level of effort was not similar among months, with between 7 and 16 total trawls, CPUE did display the same patterns as abundance (i.e., the same species that dominated each month numerically also had the highest CPUE). Of the 49 species collected, six are among the commercially important species (Table 1): longfin squid, summer flounder, scup, silver hake, striped bass and goosefish (Figure 40). There were only two striped bass collected in May, and two goosefish collected in June. These species are not included in the figure. In May and June five of these species were present. Three species were present from July through September.

Longfin squid was present in all six sampling periods. CPUE peaked in July and was the lowest in May. Scup was present in all six sampling periods. CPUE peaked in early August and was the lowest in July. The peak in early August can be attributed to the high abundance of YOY scup collected. Summer flounder were present in all six sampling periods and had relatively low CPUEs in all months. Silver hake were present in May and June with relatively low CPUE in both months.

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Table 47: Monthly Biomass of Each Fish Species for Borrow Area 5B

Monthly Biomass (g) of Each Species for Borrow Area 5B								
Species	Monthly weight						Total weight (g)	Average length (mm)
	May	June	July	Early August	Late August	September		
Winter skate	631,270	791,400	3,500	--	--	1,640	1,427,810	517.59
Clearnose skate	11,560	165,350	134,980	174,200	190,500	15,560	692,150	623.13
Little skate	235,000	119,100	77,280	10,230	47,610	29,490	518,710	436.15
Northern searobin	10,932	7,823	77,547	13,050	190,250	14,360	313,962	156.93
Scup	67,037	22,700	18,315	21,455	21,675	17,340	168,522	116.30
Skate spp.	148,050	10,090	220	--	--	--	158,360	309.76
Striped searobin	30,188	19,470	4,970	150	7,105	11,465	73,348	216.65
Spotted hake	35,030	1,973	10,440	765	7,115	14,400	69,723	140.70
Longfin squid	264	14,360	11,750	13,957	7,618	3,340	51,289	61.28
Summer flounder	11,740	3,720	9,110	930	17,172	2,582	45,254	262.93
Windowpane	15,182	9,044	8,078	2,020	8,241	2,570	45,135	198.58
Smooth dogfish	6,000	9,100	1,200	1,810	9,400	9,700	37,210	715.18
Bay anchovy	7,765	1,083	--	--	--	10,860	19,708	57.74
Atlantic sturgeon	--	13,500	--	--	--	--	13,500	1,060.00
Black sea bass	418	3,980	1,315	650	304	4,140	10,807	138.95
Butterfish	--	2,172	17	--	637	6,090	8,916	72.19
Winter flounder	6,495	66	--	--	--	--	6,561	217.24
Tautog	--	3,510	--	520	--	1,100	5,130	249.17
Northern puffer	419	2,309	180	2	19	1,491	4,420	89.15
Gray triggerfish	--	--	--	1,300	--	1,400	2,700	252.50
Bluefish	1,078	--	--	--	--	1,226	2,304	160.60
Red hake	2,197	46	--	--	--	--	2,243	121.45
Weakfish	210	--	--	--	--	1,960	2,170	138.78
Smallmouth flounder	663	638	255	37	124	--	1,717	73.27
Northern kingfish	220	430	--	--	--	880	1,530	267.00
Juvenile longfin squid	--	--	--	--	1,350	--	1,350	--

Monthly Biomass (g) of Each Species for Borrow Area 5B								
Species	**Monthly weight**						**Total weight (g)**	**Average length (mm)**
	May	**June**	**July**	**Early August**	**Late August**	**September**		
Scup YOY	--	--	--	370	445	--	815	28.68
Goosefish	--	502	--	--	--	--	502	160.50
Striped bass	380	--	--	--	--	--	380	229.00
Atlantic menhaden	--	--	350				350	263.00
American eel	250	--	--	--	--	--	250	455.00
American sand lance	--	170	--	2	5	--	177	114.55
Silver hake	119	34	--	--	--	3	156	94.67
Alewife	141	--	--	--	--	--	141	153.67
Fourspot flounder	110	--	--	--	1.5	--	112	126.00
Juvenile hake spp.	--	51	--	--	30	--	81	47.25
Conger eel	72	--	--	--	--	--	72	307.00
Tomcod	6	61	--	--	--	1	68	52.15
Rough scad	--	9	10	28	14	--	61	51.40
Lined seahorse	--	--	--	--	11	47	58	68.11
Northern pipefish	--	--	5	6	2	29	42	144.38
Planehead filefish	--	--	--	--	--	34	34	84.00
Cunner	30	--	--	--	--	--	30	85.50
Glasseye snapper	--	--	--	2	--	20	22	87.00
Atlantic moonfish	--	--	2	1	--	14	17	43.75
Bluespotted cornetfish	--	--		15	--	--	15	262.00
Naked goby	--	--	--	--	10	--	10	44.25
Blueback herring	9	--	--	--	--	--	9	88.00
Dwarf goatfish	--	--	4	--	--	--	4	50.00
Fourhorn sculpin	--	--	--	2			2	41.0
Atlantic stingray	--	--	--	--	--	--	--	1,219.00
Total	**1,222,835**	**1,202,691**	**359,528**	**241,502**	**509,638.5**	**151,742**	**3,687,936.5**	

Note: weight is total weight of each species in grams; length is average standard length of measured individuals in mm.

Table 48: Abundance and Composition of Monthly Trawls for Borrow Area 5B

Abundance and Composition of Monthly Trawls for Borrow Area 5B														
Species	May		June		July		Early August		Late August		September		Total	
	Individ	%	Individ	%	Individ	%	Individ	%	Individ	%	Individ	%	Individ	%
Bay anchovy	3,447	56.34%	465	7.69%	--	--	--	--	--	--	11,389	91.13%	15,301	43.40%
Longfin squid	15	0.25%	1,748	28.91%	1,779	50.77%	1,369	45.41%	314	7.70%	76	0.61%	5,301	15.03%
Northern searobin	148	2.42%	258	4.27%	849	24.23%	167	5.54%	2,240	54.93%	132	1.06%	3,794	10.76%
Scup	379	6.19%	1,046	17.30%	394	11.24%	883	29.29%	358	8.78%	354	2.83%	3,414	9.68%
Butterfish	31	0.51%	1,114	18.43%	4	0.11%	--	--	85	2.08%	135	1.08%	1,369	3.88%
Scup YOY	--	--	--	--	--	--	385	12.77%	663	16.26%	--	--	1,048	2.97%
Winter skate	467	7.63%	521	8.62%	2	0.06%	--	--	--	--	2	0.02%	992	2.81%
Little skate	377	6.16%	227	3.75%	148	4.22%	20	0.66%	93	2.28%	50	0.40%	915	2.60%
Spotted hake	424	6.93%	118	1.95%	75	2.14%	6	0.20%	40	0.98%	97	0.78%	760	2.16%
Clearnose skate	13	0.21%	131	2.17%	111	3.17%	127	4.21%	145	3.56%	13	0.10%	540	1.53%
Skate spp.	464	7.58%	64	1.06%	1	0.03%	--	--	--	--	--	--	529	1.50%
Striped searobin	78	1.27%	84	1.39%	19	0.54%	1	0.03%	25	0.61%	48	0.38%	255	0.72%
Windowpane	48	0.78%	49	0.81%	52	1.48%	14	0.46%	49	1.20%	13	0.10%	225	0.64%
Smallmouth flounder	71	1.16%	50	0.83%	40	1.14%	7	0.23%	13	0.32%	--	--	181	0.51%
Summer flounder	32	0.52%	12	0.20%	9	0.26%	3	0.10%	27	0.66%	15	0.12%	98	0.28%
Black sea bass	35	0.57%	27	0.45%	8	0.23%	2	0.07%	5	0.12%	19	0.15%	96	0.27%
Northern puffer	5	0.08%	30	0.50%	1	0.03%	1	0.03%	1	0.02%	52	0.42%	90	0.26%
Weakfish	1	0.02%	--	--	--	--	--	--	--	--	43	0.34%	44	0.12%
American sand lance	--	--	41	0.68%	--	--	1	0.03%	1	0.02%	--	--	43	0.12%
Red hake	32	0.52%	2	0.03%	--	--	--	--	--	--	--	--	34	0.10%
Juvenile hake spp.	--	--	25	0.41%	--	--	--	--	1	0.02%	--	--	26	0.07%
Smooth dogfish	1	0.02%	6	0.10%	2	0.06%	3	0.10%	5	0.12%	7	0.06%	24	0.07%
Silver hake	16	0.26%	5	0.08%	--	--	--	--	--	--	1	0.01%	22	0.06%
Rough scad	--	--	3	0.05%	4	0.11%	13	0.43%	1	0.02%	--	--	21	0.06%
Lined seahorse	--	--	--	--	--	--	--	--	3	0.07%	16	0.13%	19	0.05%

Abundance and Composition of Monthly Trawls for Borrow Area 5B														
Species	**May**		**June**		**July**		**Early August**		**Late August**		**September**		**Total**	
	Individ	**%**	**Individ**	**%**	**Individ**	**%**	**Individ**	**%**	**Individ**	**%**	**Individ**	**%**	**Individ**	**%**
Winter flounder	16	0.26%	1	0.02%	--	--	--	--	--	--	--	--	17	0.05%
Northern pipefish	--	--	--	--	2	0.06%	5	0.17%	1	0.02%	9	0.07%	17	0.05%
Tomcod	4	0.07%	10	0.17%	--	--	--	--	--	--	1	0.01%	15	0.04%
Atlantic moonfish	--	--	--	--	1	0.03%	1	0.03%	--	--	8	0.06%	10	0.03%
Bluefish	--	--	--	--	--	--	--	--	--	--	7	0.06%	7	0.02%
Northern kingfish	1	0.02%	3	0.05%	--	--	--	--	--	--	3	0.02%	7	0.02%
Tautog	--	--	2	0.03%	--	--	1	0.03%	--	--	3	0.02%	6	0.02%
Naked goby	--	--	--	--	--	--	--	--	6	0.15%	--	--	6	0.02%
Gray triggerfish	--	--	--	--	--	--	2	0.07%	--	--	2	0.02%	4	0.01%
Alewife	3	0.05%	--	--	--	--	--	--	--	--	--	--	3	0.01%
Atlantic sturgeon	--	--	2	0.03%	--	--	--	--	--	--	--	--	2	0.01%
Conger eel	2	0.03%	--	--	--	--	--	--	--	--	--	--	2	0.01%
Cunner	2	0.03%	--	--	--	--	--	--	--	--	--	--	2	0.01%
Dwarf goatfish	--	--	--	--	2	0.06%	--	--	--	--	--	--	2	0.01%
Fourspot flounder	1	0.02%	--	--	--	--	--	--	1	0.02%	--	--	2	0.01%
Goosefish	--	--	2	0.03%	--	--	--	--	--	--	--	--	2	0.01%
Striped bass	2	0.03%	--	--	--	--	--	--	--	--	--	--	2	0.01%
American eel	2	0.03%	--	--	--	--	--	--	--	--	--	--	2	0.01%
Glasseye snapper	--	--	--	--	--	--	1	0.03%	--	--	1	0.01%	2	0.01%
Planehead filefish	--	--	--	--	--	--	--	--	--	--	2	0.02%	2	0.01%
Bluespotted cornetfish	--	--	--	--	--	--	2	0.07%	--	--	--	--	2	0.01%
Atlantic stingray	--	--	--	--	--	--	--	--	1	0.02%	--	--	1	<0.01%
Blueback herring	1	0.02%	--	--	--	--	--	--	--	--	--	--	1	<0.01%
Atlantic menhaden	--	--	--	--	1	0.03%	--	--	--	--	--	--	1	<0.01%
Fourhorn sculpin	--	--	--	--	--	--	1	0.03%	--	--	--	--	1	<0.01%
Total	**6,118**	**100.0%**	**6,046**	**100.0%**	**3,504**	**100.0%**	**3,015**	**100.0%**	**4,078**	**100.0%**	**12,498**	100.0%	**35,259**	**100.0%**

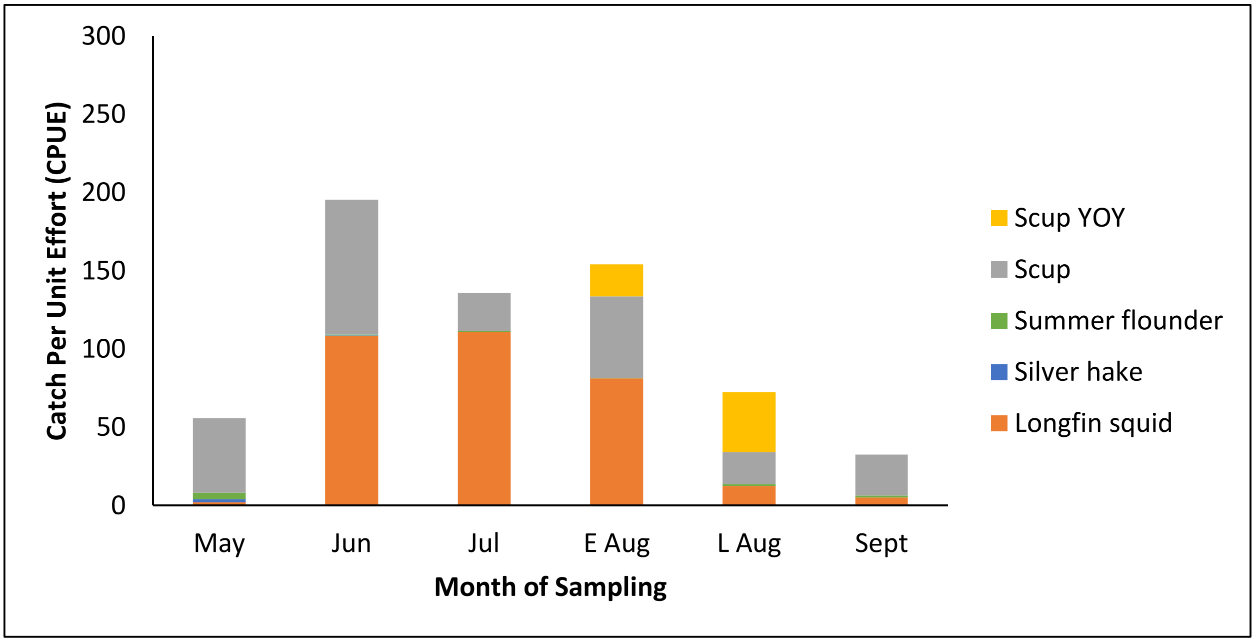

Figure 40: Monthly Catch Per Unit Effort (CPUE) of the Most Commercially Important Species for Borrow Area 5B (E Aug = Early August, L Aug = Late August)

Except for squid species, invertebrates were not enumerated, measured, or weighed. However, the presence of other organisms in the catch was noted (Table 49). A total of 23 species were observed: 8 arthropods, 6 mollusks, 2 echinoderm, 1 chordate, 2 cnidarian, 2 mollusk egg masses, 1 fish egg case, and 1 algae. Three of these species were encountered during all months of the survey: hermit crab, Jonah crab, and sand dollar. Horseshoe crab were present in five months; jellyfish, mussels, squid egg, and ulva were present in four of the months. Skate egg cases were collected in three of the months. Species that were collected in two months include: American lobster, angle wing clam, calico crab, mysis shrimp, and surf clam. The remaining two species, whelk and lady crab, were present in only one of the six months.

Table 49: Presence of Macroinvertebrates Collected in Monthly Fish Trawls in Borrow Area 5B

Presence of Macroinvertebrates Collected in Monthly Fish Trawls in Borrow Area 5B						
Species	May	June	July	Early August	Late August	September
Hermit crab	X	X	X	X	X	X
Jonah crab	X	X	X	X	X	X
Sand dollar	X	X	X	X	X	X
American lobster	X	X		X	X	X
Blue mussel		X	X	X	X	X
Moon snail	X	X	X	X	X	
Spider crab	X	X	X	X	X	
Horseshoe crab	X	X	X		X	
Blue crab			X			X
Coral			X		X	
Skate egg case*	X		X			

Presence of Macroinvertebrates Collected in Monthly Fish Trawls in Borrow Area 5B						
Species	**May**	**June**	**July**	**Early August**	**Late August**	**September**
Surf clam		X	X			
Ulva*				X		X
Angel wing clam			X			
Whelk						X
Jellyfish						X
Lady crab						X
Moon snail egg case						X

Note: Organisms with * are not invertebrates but their presence is documented here.

3.3.3.2 Reference Site Comparisons

To provide a local comparison, as well as a baseline for future projects, reference tows were conducted adjacent to the Borrow Area 5B during each monthly sampling event from May to September (Table 50). Since more tows were conducted within Borrow Area 5B, it was expected that greater diversity (i.e., more species) would be observed on-site when compared to reference sites. This section presents the overlap of species and presence/absence of species in the reference tows relative to the on-site tows for all months combined and then by month.

As expected, for all months combined there were a greater number of species (49 species) collected in on-site trawls compared to the number of species collected in reference trawls (36 species) which was likely due to the larger number of on-site trawls. There were 13 species that were collected in on-site trawls that were not also collected in reference trawls. It is important to note that none of these species individually accounted for more than 1% of the catch composition of monthly trawls. The great overlap of species between on-site and reference trawls indicates that the same fish assemblages populate on-site and reference areas.

Except for May, the CPUE of the total catch from month to month followed the same pattern both within the borrow area and at the reference sites, showing decreases in CPUE from June until late August, peaking in September (Figure 41). In May, the on-site CPUE was higher than the reference CPUE, driven by very large catches of bay anchovy.

Table 50: Monthly Comparisons of Catch Composition of On-site and Reference Trawls at Borrow Area 5B

Monthly Comparisons of Catch Composition of On-site and Reference Trawls at Borrow Area 5B												
Species	May		June		July		Early August		Late August		September	
	On-site %	Ref. %	On-site %	Ref. %	On-site %	Ref. %	On-site %	Ref. %	On-site %	Ref. %	On-site %	Ref. %
Alewife	0.05%	--	--	--	--	--	--	--	--	--	--	--
American eel	0.02%	0.20%	--	--	--	--	--	--	--	--	--	--
American sand lance	--	--	0.76%	0.13%	--	--	0.04%	--	0.03%	--	--	--
Atlantic menhaden	--	--	--	--	--	0.27%	--	--	--	--	--	--
Atlantic moonfish	--	--	--	--	--	0.27%	0.04%	--	--	--	0.06%	0.08%
Atlantic stingray	--	--	--	--	--	--	--	--	0.03%	--	--	--
Atlantic sturgeon	--	--	0.04%	--	--	--	--	--	--	--	--	--
Bay anchovy	58.20%	33.46%	8.82%	0.25%	--	--	--	--	--	--	91.57%	87.08%
Black sea bass	0.48%	1.57%	0.50%	0.13%	0.26%	--	0.07%	--	0.15%	--	0.15%	0.16%
Blueback herring	0.02%	--	--	--	--	--	--	--	--	--	--	--
Bluefish	--	--	--	--	--	--	--	--	--	--	0.04%	0.16%
Bluespotted cornetfish	--	--	--	--	--	--	--	0.77%	--	--	--	--
Butterfish	0.50%	0.59%	19.22%	13.17%	0.10%	0.27%	--	--	2.50%	0.37%	1.03%	1.55%
Clearnose skate	0.23%	--	2.19%	2.01%	3.29%	2.16%	4.10%	5.41%	3.91%	2.12%	0.12%	--
Conger eel	0.04%	--	--	--	--	--	--	--	--	--	--	--
Cunner	0.04%	--	--	--	--	--	--	--	--	--	--	--
Dwarf goatfish	--	--	--	--	0.06%	--	--	--	--	--	--	--
Fourhorn sculpin	--	--	--	--	--	--	--	0.39%	--	--	--	--
Fourspot flounder	0.02%	--	--	--	--	--	--	--	0.03%	--	--	--
Glasseye snapper	--	--	--	--	--	--	--	0.39%	--	--	0.01%	--
Goosefish	--	--	0.04%	--	--	--	--	--	--	--	--	--
Gray triggerfish	--	--	--	--	--	--	0.07%	--	--	--	0.02%	--
Hake spp. juvenile	--	--	0.21%	1.76%	--	--	--	--	0.03%	--	--	--
Lined seahorse	--	--	--	--	--	--	--	--	0.09%	--	0.13%	0.08%
Little skate	5.65%	11.61%	3.73%	3.89%	4.02%	5.95%	0.54%	1.93%	2.05%	3.24%	0.35%	0.90%

Monthly Comparisons of Catch Composition of On-site and Reference Trawls at Borrow Area 5B												
Species	May		June		July		Early August		Late August		September	
	On-site %	Ref. %	On-site %	Ref. %	On-site %	Ref. %	On-site %	Ref. %	On-site %	Ref. %	On-site %	Ref. %
Longfin squid	0.27%	--	24.77%	56.21%	53.16%	30.54%	47.31%	25.10%	6.08%	14.32%	0.50%	1.64%
Naked goby	--	--	--	--	--	--	--	--	0.12%	0.25%	--	--
Northern kingfish	0.02%	--	0.02%	0.25%	--	--	--	--	--	--	0.02%	0.08%
Northern pipefish	--	--	--	--	0.03%	0.27%	0.18%	--	0.03%	--	0.08%	--
Northern puffer	0.09%	--	0.57%	--	0.03%	--	--	0.39%	0.03%	--	0.43%	0.33%
Northern searobin	2.43%	2.17%	3.92%	6.52%	21.76%	45.14%	4.06%	21.24%	52.09%	66.50%	1.09%	0.74%
Planehead filefish	--	--	--	--	--	--	--	--	--	--	0.01%	0.08%
Red hake	0.34%	2.56%	0.02%	0.13%	--	--	--	--	--	--	--	--
Rough scad	--	--	0.06%	--	0.13%	--	0.44%	0.39%	0.03%	--	--	--
Scup	5.93%	8.86%	19.74%	1.25%	11.65%	7.84%	30.30%	18.53%	10.08%	3.49%	2.56%	5.31%
Scup YOY	--	--	--	--	--	--	11.79%	23.17%	18.69%	6.35%	--	--
Silver hake	0.25%	0.39%	0.08%	0.13%	--	--	--	--	--	--	--	0.08%
Skate spp.	7.25%	11.02%	0.97%	1.63%	0.03%	--	--	--	--	--	--	--
Smallmouth flounder	0.98%	3.15%	0.67%	1.88%	1.05%	1.89%	0.15%	1.16%	0.21%	0.75%	--	--
Smooth dogfish	0.02%	--	0.10%	0.13%	--	0.54%	0.11%	--	0.15%	--	0.04%	0.16%
Spotted hake	6.43%	12.20%	2.02%	1.51%	2.04%	2.97%	0.15%	0.77%	1.04%	0.75%	0.75%	0.98%
Striped bass	0.04%	--	--	--	--	--	--	--	--	--	--	--
Striped searobin	1.31%	0.79%	1.47%	0.88%	0.54%	0.54%	0.04%	--	0.58%	0.75%	0.39%	0.33%
Summer flounder	0.52%	0.59%	0.15%	0.50%	0.29%	--	0.07%	0.39%	0.64%	0.75%	0.13%	--
Tautog	--	--	0.04%	--	--	--	0.04%	--	--	--	0.03%	--
Tomcod	0.05%	0.20%	0.17%	0.13%	--	--	--	--	--	--	0.01%	--
Weakfish	0.02%	--	--	--	--	--	--	--	--	--	0.35%	0.25%
Windowpane	0.76%	0.98%	0.74%	1.25%	1.50%	1.35%	0.51%	--	1.40%	0.37%	0.12%	--
Winter flounder	0.28%	--	0.02%	--	--	--	--	--	--	--	--	--
Winter skate	7.80%	9.65%	8.97%	6.27%	0.06%	--	--	--	--	--	0.02%	--
Grand Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

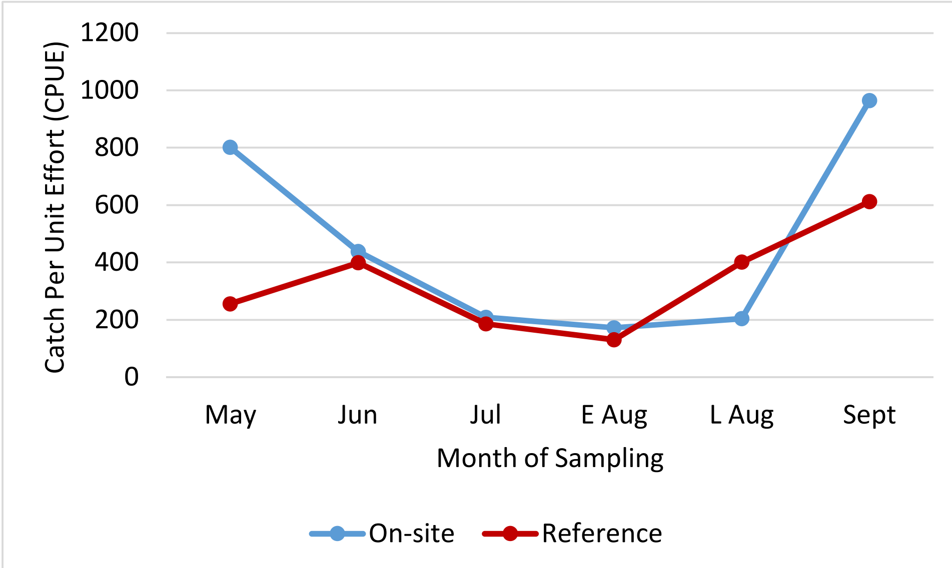

Figure 41: Average Catch per Unit Effort (CPUE) of Monthly Fish Trawls for Borrow Area 5B

3.3.2.3 Length-Frequency Distributions

Lengths of all fish species were collected (Appendix A), but the length-frequency distribution data focus on the most important New York commercial species (longfin squid, summer flounder, scup, silver hake, striped bass, and goosefish) which generated over $1 million of revenue individually in 2016. Figure 42 represents the length-frequency distributions for longfin squid, summer flounder, scup, and silver hake; there were only two striped bass (224 mm and 234 mm) and two goosefish (57 mm and 264 mm) collected were not included in the figure. Longfin squid ranged in mantle length from a minimum of 13 mm to a maximum of 243 mm. The average length was 61 mm. The most common length was between 51 and 100 mm. Summer flounder ranged from 98 to 580 mm in standard length, with an average of 268 mm. A peak in length frequency was apparent at lengths between 200 and 250 mm. The standard length of scup ranged from 15 to 352 mm and averaged 96 mm. The most common length was between 101 and 150 mm. A total of 18 silver hake were collected with standard lengths between 63 and 137 mm, averaging 93 mm. The two striped bass that were collected measured 224 mm and 234 mm standard length. The two goosefish that were collected measured 57 mm and 264 mm standard length.

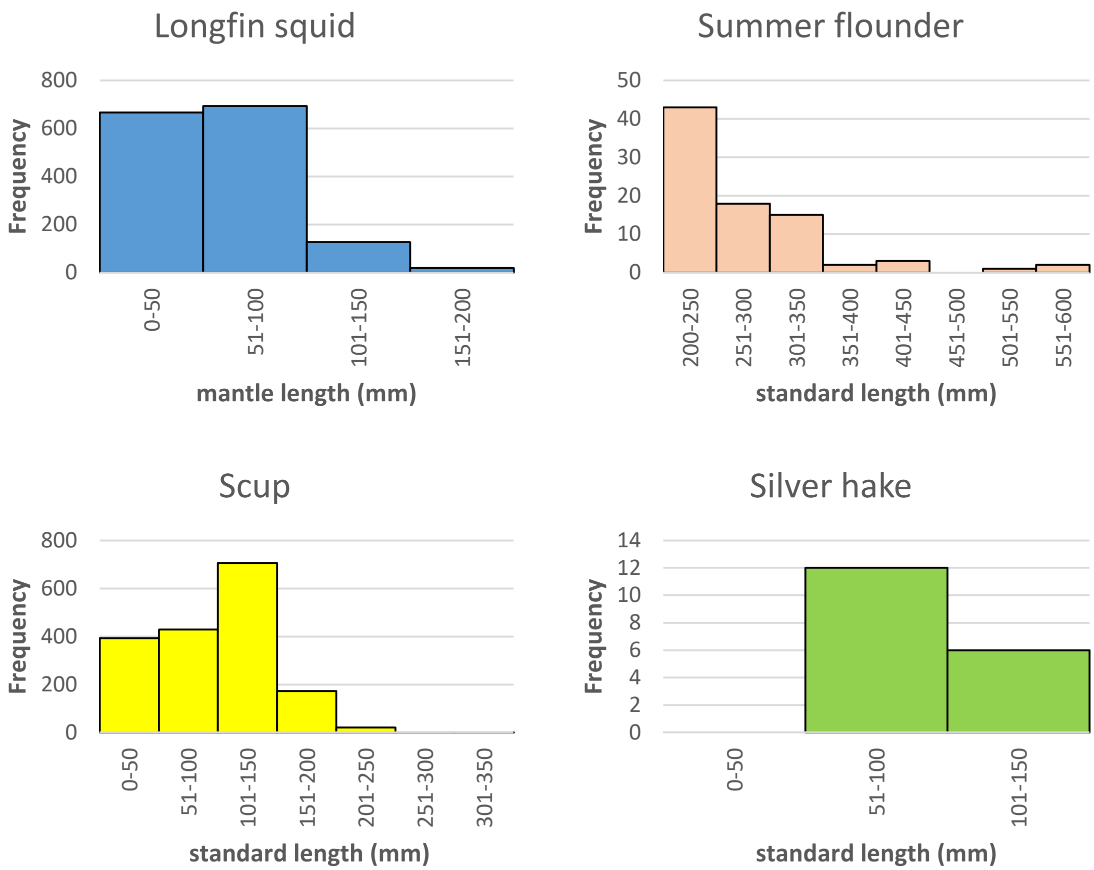

Figure 42: Length Frequency Distributions of Commercially Important Fish New York Fish Species Collected in Borrow Area 5B Which Generated Over $1 Million in Revenue in 2016

3.3.4 Borrow Area WOSI Trawls

Overall, 41 species were collected in the project trawls. The total biomass of the trawls in Borrow Area WOSI was 2,237,632.5 g (Table 51). Winter skate had the greatest biomass, followed by northern searobin, and clearnose skate. Overall, the most numerically abundant species was scup, followed by northern searobin and bay anchovy. The fish trawl results are presented in more detail in the following sections, first by temporal trends, then by sample location type.

3.3.4.1 Monthly Comparisons

By month, winter skate had the greatest biomass in May and June (Table 51). Northern searobin dominated by biomass in July, early August, and late August. In September, little skate had the highest biomass. Clearnose skate had the third highest overall biomass although it never dominated in a single month.

Although many species showed overlap from month to month, the overall catch composition showed variation depending on the time of year (Table 52). Scup and northern searobin were the most abundant species by number in Borrow Area WOSI across all monthly trawls. In May, bay anchovy was the most abundant species. As the survey progressed, numbers dropped considerably until September, where it was the most abundant species collected. In June, scup was the most abundant. Northern searobin was most abundant in July. YOY scup dominated the collections in early and late August. Of the 41 species collected, 11 species were collected during all monthly trawls: black seabass, clearnose skate, little skate, longfin squid, northern searobin, scup, smallmouth founder, spotted hake, striped searobin, summer flounder, and windowpane. Four species occurred in five months of trawls and four species were captured in three months of trawls. Six species occurred in two monthly trawls and 16 species were captured in only one monthly trawl.

Catch per unit effort (CPUE) is a standardization of abundance based on the number of trawls (i.e., effort). In this case the number of individuals of each species is divided by the number of trawls. Although the level of effort was not similar among months, with between 3 and 16 total trawls, CPUE did display the same patterns as abundance. For example, the same species that dominated each month numerically also had the highest CPUE. Of the 41 species collected, six are among the commercially important species (Table 1): longfin squid, summer flounder, scup, silver hake, striped bass and goosefish (Figure 43). There were only three striped bass collected in May, two silver hake collected between May and June, and one goosefish collected in June. These species are not included in Figure 43. In May and June, five of these species were present. Three species were present from July through September.

Longfin squid was present in all six sampling periods. CPUE peaked in June and was the lowest in May. Scup was present in all six sampling periods. CPUE peaked in early August and was the lowest in May. The peak in early August can be attributed to the high abundance of YOY scup collected. Summer flounder were present in all six sampling periods with a relatively low CPUE in all months.

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Table 51: Monthly Biomass (g) of Each Species for Borrow Area WOSI

Monthly Biomass (g) of Each Species for Borrow Area WOSI								
Species	Monthly weight						Total weight (g)	Average length (mm)
	May	June	July	Early August	Late August	September		
Winter skate	157,000	423,000	2,200	3,160	--	--	585,360	560.12
Northern searobin	22	21,128	266,590	181,110	67,400	9,863	546,113	178.66
Clearnose skate	1,500	67,800	145,300	74,510	31,053	6,300	326,463	622.86
Scup	5,660	54,598	87,930	20,390	50,882	28,360	247,820	115.37
Little skate	58,000	77,700	19,400	7,300	5,600	33,580	201,580	434.52
Summer flounder	6,190	5,950	20,370	15,900	7,720	960	57,090	321.10
Windowpane	3,950	15,430	6,060	4,720	2,730	7,750	40,640	224.43
Striped searobin	1,850	21,112	4,610	3,055	750	6,900	38,277	224.72
Smooth dogfish	--	770	4,280	3,090	9,260	17,475	34,875	712.65
Skate spp.	28,000	6,310	260	--	--	--	34,570	312.58
Spotted hake	3,140	925	3,209	1,415	3,630	16,225	28,544	159.05
Longfin squid	6	13,626	6,055	4,461	2,117	1,754	28,019	62.22
Black sea bass	98	2,122	7,865	1,810	2,100	6,235	20,230	170.29
Bay anchovy	710	1,327	350	--	42	5,480	7,909	62.32
Winter flounder	4,060	990	--	--	--	1,710	6,760	203.73
Northern puffer	--	3,054	--	--	355	3,003	6,412	87.67
Butterfish	817	2,305	815	--	116	2,303	6,356	63.65
Scup YOY	--	--	--	2,059	2,437	--	4,496	32.29
Tautog	1,000	2,500	420	--	--	--	3,920	316.33
Weakfish	--	--	--	--	--	3,413	3,413	129.16
Juvenile longfin squid	--	--	--	--	1,791	--	1,791	--
Fourspot flounder	--	1,730	--	--	--	--	1,730	292.17
Smallmouth flounder	82	602	256	202.5	29	1	1,173	67.18
Gray triggerfish	--	--	--	--	--	825	825	265.00
Goosefish	--	750	--	--	--	--	750	321.00

Monthly Biomass (g) of Each Species for Borrow Area WOSI								
Species	Monthly weight						Total weight (g)	Average length (mm)
	May	June	July	Early August	Late August	September		
Northern kingfish	--	--	--	--	--	741	741	225.00
Striped bass	480	--	--	--	--	--	480	222.33
Bluefish	--	--	35	--	--	337	372	89.14
Crevalle jack	--	--	--	--	--	303	303	181.00
American sand lance	--	180	--	--	--	--	180	76.65
Alewife	165	2	--	--	--	--	167	150.67
Spiny dogfish	55	--	--	--	--	--	55	302.00
Juvenile hake	--	54	--	--	--	--	54	47.07
Tomcod	--	34	--	--	--	--	34	65.00
Rough scad	--	4	9	19	--	--	32	51.90
Atlantic moonfish	--	--	2	--	--	27	29	42.13
Silver hake	8	12	--	--	--	--	20	107.50
Planehead filefish	--	0	19	--	--	--	19	79.00
Dwarf goatfish	--	--	--	--	--	18	18	97.00
Lined seahorse	--	--	--		4	4	8	66.33
Atlantic menhaden	--	--	--	--	--	3	3	63.00
Glasseye snapper	--	--	2	--	--	--	2	43.00
Atlantic stingray	--	--	--	--	--	--	--	1,067.00
Total	**272,793**	**724,015**	**573,837**	**323,201.5**	**188,016**	**153,570**	**2,237,632.5**	

Note: weight is total weight of each species in grams; length is average standard length of measured individuals in mm.

Table 52: Abundance and Composition of Monthly Trawls for Borrow Area WOSI

Abundance and Composition of Monthly Trawls for Borrow Area WOSI														
Species	May		June		July		Early August		Late August		September		Total	
	Individ	%	Individ	%	Individ	%	Individ	%	Individ	%	Individ	%	Individ	%
Scup	49	5.63%	3,082	41.02%	2,146	33.58%	475	6.51%	1,024	19.94%	643	20.48%	7,419	24.45%
Scup YOY	--	--	--	--	--	--	3,931	53.90%	3,226	62.81%	--	--	7,157	23.59%
Northern searobin	4	0.46%	275	3.66%	3,131	49.00%	2,451	33.61%	530	10.32%	97	3.09%	6,488	21.38%
Bay anchovy	437	50.23%	602	8.01%	105	1.64%	--	--	34	0.66%	1,695	54.00%	2,873	9.47%
Longfin squid	3	0.34%	1,195	15.90%	540	8.45%	238	3.26%	169	3.29%	51	1.62%	2,196	7.24%
Butterfish	15	1.72%	1,248	16.61%	73	1.14%	--	--	23	0.45%	105	3.35%	1,464	4.82%
Winter skate	72	8.28%	273	3.63%	1	0.02%	4	0.05%	--	--	3	0.10%	353	1.16%
Spotted hake	95	10.92%	73	0.97%	31	0.49%	3	0.04%	24	0.47%	106	3.38%	332	1.09%
Little skate	53	6.09%	140	1.86%	40	0.63%	14	0.19%	11	0.21%	63	2.01%	321	1.06%
Clearnose skate	1	0.11%	57	0.76%	112	1.75%	57	0.78%	25	0.49%	6	0.19%	258	0.85%
Windowpane	20	2.30%	78	1.04%	31	0.49%	26	0.36%	14	0.27%	32	1.02%	201	0.66%
Smallmouth flounder	7	0.80%	77	1.02%	55	0.86%	31	0.43%	8	0.16%	1	0.03%	179	0.59%
Northern puffer	--	--	48	0.64%	--	--	0	--	5	0.10%	115	3.66%	168	0.55%
Black sea bass	6	0.69%	18	0.24%	70	1.10%	14	0.19%	20	0.39%	39	1.24%	167	0.55%
Striped searobin	8	0.92%	103	1.37%	13	0.20%	13	0.18%	3	0.06%	25	0.80%	165	0.54%
American sand lance	--	--	126	1.68%	--	--	--	--	--	--	--	--	126	0.42%
Summer flounder	16	1.84%	18	0.24%	29	0.45%	22	0.30%	11	0.21%	11	0.35%	107	0.35%
Skate spp.	60	6.90%	29	0.39%	1	0.02%	--	--	--	--	--	--	90	0.30%
Weakfish	--	--	0	0.00%	--	--	--	--	--	--	87	2.77%	87	0.29%
Juvenile hake spp.	--	--	33	0.44%	--	--	--	--	--	--	--	--	33	0.11%
Smooth dogfish	--	--	2	0.03%	4	0.06%	4	0.05%	8	0.16%	9	0.29%	27	0.09%
Winter flounder	16	1.84%	10	0.13%	--	--	--	--	--	--	--	--	26	0.09%
Atlantic moonfish	--	--	--	--	1	0.02%	--	--	--	--	24	0.76%	25	0.08%
Bluefish	--	--	--	--	1	0.02%	--	--	--	--	14	0.45%	15	0.05%
Rough scad	--	--	2	0.03%	2	0.03%	10	0.14%	--	--	--	--	14	0.05%
Tomcod	--	--	12	0.16%	--	--	--	--	--	--	--	--	12	0.04%
Fourspot flounder	--	--	6	0.08%	--	--	--	--	--	--	--	--	6	0.02%

Abundance and Composition of Monthly Trawls for Borrow Area WOSI														
Species	**May**		**June**		**July**		**Early August**		**Late August**		**September**		**Total**	
	Individ	**%**	**Individ**	**%**	**Individ**	**%**	**Individ**	**%**	**Individ**	**%**	**Individ**	**%**	**Individ**	**%**
Tautog	1	0.11%	4	0.05%	1	0.02%	--	--	--	--	--	--	6	0.02%
Northern kingfish	--	--	--	--	--	--	--	--	--	--	5	0.16%	5	0.02%
Alewife	2	0.23%	1	0.01%	--	--	--	--	--	--	--	--	3	0.01%
Crevalle jack	--	--	--	--	--	--	--	--	--	--	3	0.10%	3	0.01%
Lined seahorse	--	--	--	--	--	--	--	--	1	0.02%	2	0.06%	3	0.01%
Striped bass	3	0.34%	--	--	--	--	--	--	--	--	--	--	3	0.01%
Silver hake	1	0.11%	1	0.01%	--	--	--	--	--	--	--	--	2	0.01%
Atlantic menhaden	--	--	--	--	--	--	--	--	--	--	1	0.03%	1	<0.01%
Atlantic stingray	--	--	--	--	1	0.02%	--	--	--	--	--	--	1	<0.01%
Dwarf goatfish	--	--	--	--	--	--	--	--	--	--	1	0.03%	1	<0.01%
Glasseye snapper	--	--	--	--	1	0.02%	--	--	--	--	--	--	1	<0.01%
Goosefish	--	--	1	0.01%	--	--	--	--	--	--	--	--	1	<0.01%
Gray triggerfish	--	--	--	--	--	--	--	--	--	--	1	0.03%	1	<0.01%
Planehead filefish	--	--	--	--	1	0.02%	--	--	--	--	--	--	1	<0.01%
Spiny dogfish	1	0.11%	--	--	--	--	--	--	--	--	--	--	1	<0.01%
Total	**870**	**100%**	**7,514**	**100%**	**6,390**	**100%**	**7,293**	**100%**	**5,136**	**100%**	**3,139**	**100%**	**30,342**	**100%**

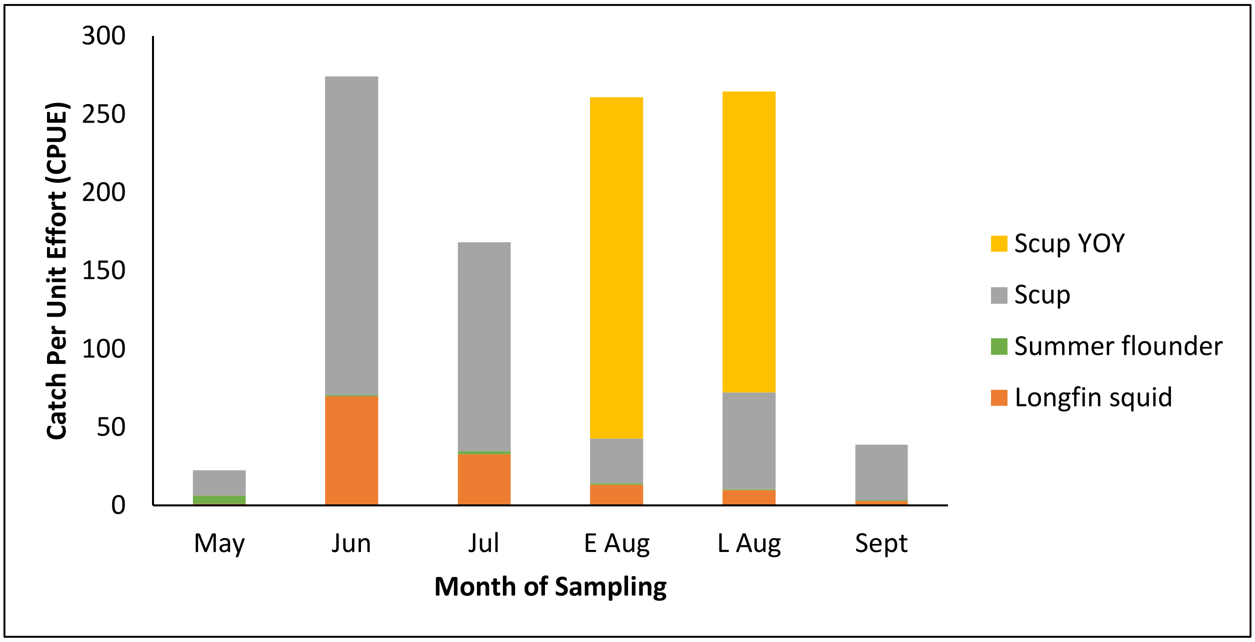

Figure 43: Monthly Catch Per Unit Effort (CPUE) of the Most Commercially Important Species for Borrow Area WOSI (E Aug = Early August, L Aug = Late August)

Except for squid species, invertebrates were not enumerated, measured, or weighed. However, the presence of other organisms in the catch was noted (Table 53). A total of 21 species were observed: 9 arthropods, 5 mollusks, 1 echinoderm, 1 polychaete, 2 cnidarian, 2 mollusk egg masses, and 1 fish egg case. Three of these species were encountered in all months of the survey: hermit crab, sand dollar, and spider crab. Horseshoe crab were present in four months of the trawls. Jonah crab, mahogany clam, moon snail, and surf clam were present in three months. Calico crab, coral, and skate egg case were present in two months and the rest were only present in one of the monthly trawl surveys.

Table 53: Presence of Macroinvertebrates Collected in Monthly Fish Trawls in Borrow Area WOSI

Presence of Macroinvertebrates Collected in Monthly Fish Trawls in Borrow Area WOSI						
Species	**May**	**June**	**July**	**Early August**	**Late August**	**September**
Hermit crab	X	X	X	X	X	X
Sand dollar	X	X	X	X	X	X
Spider crab	X	X	X	X	X	X
Horseshoe crab			X	X	X	X
Blue crab			X	X		X
Jonah crab		X	X	X		
Mahogany clam		X			X	X
Moon snail		X	X			X
Surf clam				X	X	X
Calico crab			X	X		
Coral				X	X	
Skate egg case*				X		X

Presence of Macroinvertebrates Collected in Monthly Fish Trawls in Borrow Area WOSI						
Species	**May**	**June**	**July**	**Early August**	**Late August**	**September**
Blue mussel					X	
Brown shrimp		X				
Crustacean larvae						X
Whelk						X
Isopod					X	
Jellyfish						X
Moon snail egg case				X		
Sand worm					X	
Squid egg mass					X	

Note: Organisms with * are not invertebrates but their presence is documented here.

3.3.4.2 Reference Site Comparisons

To provide a local comparison, as well as a baseline for future projects, reference tows were conducted adjacent to Borrow Area WOSI during monthly sampling event from June to September (Table 54). No reference trawls were collected in May and this sampling event was not included in this analysis. Since more tows were conducted within Borrow Area WOSI, it was expected that a greater number of species would be observed on-site when compared to reference sites. This section presents the overlap of species and presence/absence of species in the reference tows relative to the on-site tows for all months combined and then by month.

As expected, there were a greater number of species (37 species) collected in on-site trawls compared to the number of species collected in the reference trawls (28 species) which was likely due to the larger number of on-site trawls. There were 10 species that were collected in on-site trawls that were not also collected in reference trawls. It is important to note that none of these species individually accounted for more than 1% of the catch composition of monthly trawls. The great overlap of species between on-site and reference trawls indicates that the same fish assemblages populate on-site and reference areas.

Except for June and July, the CPUE of the total catch from month to month followed the same pattern both within the borrow area and at the reference sites with a peak in early August and a steady decrease in CPUE over time (Figure 44). In June and July, the on-site CPUE was higher than the reference CPUE, greatly driven by very large collections of scup.

Table 54: Monthly Comparisons of Catch Composition of On-site and Reference Trawls at Borrow Area WOSI

Abundance and Composition of Monthly Trawls for Borrow Area WOSI												
Species	May		June		July		Early August		Late August		September	
	On-site %	Ref. %	On-site %	Ref. %	On-site %	Ref. %	On-site %	Ref. %	On-site %	Ref. %	On-site %	Ref. %
Alewife	0.23%	--	0.01%	--	--	--	--	--	--	--	--	--
American sand lance	--	--	1.73%	0.84%	--	--	--	--	--	--	--	--
Atlantic menhaden	--	--	--	--	--	--	--	--	--	--	0.03%	3.32%
Atlantic moonfish	--	--	--	--	--	0.19%	--	--	--	--	0.55%	--
Atlantic stingray	--	--	--	--	0.02%	--	--	--	--	--	--	24.48%
Bay anchovy	50.23%	--	8.56%	--	--	20.31%	--	--	0.74%	--	56.45%	0.41%
Black sea bass	0.69%	--	0.26%	--	1.19%	--	0.22%	--	0.43%	--	1.31%	0.41%
Bluefish	--	--	--	--	0.02%	--	--	--	--	0.77%	0.45%	1.66%
Butterfish	1.72%	--	16.43%	19.25%	0.73%	5.80%	--	0.60%	0.41%	0.19%	3.49%	0.41%
Clearnose skate	0.11%	--	0.63%	2.72%	1.86%	0.58%	0.80%	--	0.52%	--	0.17%	0.83%
Crevalle jack	--	--	--	--	--	--	--	--	--	--	0.03%	--
Dwarf goatfish	--	--	--	--	--	--	--	--	--	--	0.03%	--
Fourspot flounder	--	--	0.09%	--	--	--	--	--	--	--	--	--
Glasseye snapper	--	--	--	--	--	0.19%	--	--	--	--	--	--
Goosefish	--	--	0.01%	--	--	--	--	--	--	--	--	--
Gray triggerfish	--	--	--	--	--	--	--	--	--	--	0.03%	--
Hake spp. juvenile	--	--	0.41%	0.84%	--	--	--	--	--	0.19%	--	0.83%
Lined seahorse	--	--	--	--	--	--	--	0.36%	--	0.19%	--	4.98%
Little skate	6.09%	--	1.28%	10.46%	0.60%	0.97%	0.17%	3.26%	0.22%	4.64%	1.76%	2.07%
Longfin squid	0.34%	--	14.89%	30.75%	8.94%	2.90%	3.26%	--	3.14%	--	1.59%	0.83%
Northern kingfish	--	--	--	--	--	--	--	--	--	--	0.10%	6.64%
Northern puffer	--	--	0.61%	1.05%	--	--	--	38.96%	0.11%	8.12%	3.42%	8.30%
Northern searobin	0.46%	--	3.72%	2.72%	47.83%	62.28%	32.92%	--	10.57%	--	2.66%	--
Planehead filefish	--	--	--	--	0.02%	--	--	0.24%	--	--	--	--
Rough scad	--	--	--	0.42%	0.03%	--	0.12%	2.29%	--	18.18%	--	31.12%
Scup	5.63%	--	43.38%	6.28%	36.42%	1.35%	7.05%	53.44%	20.13%	66.15%	19.60%	--

Abundance and Composition of Monthly Trawls for Borrow Area WOSI												
Species	**May**		**June**		**July**		**Early August**		**Late August**		**September**	
	On-site %	**Ref. %**	**On-site %**	**Ref. %**	**On-site %**	**Ref. %**	**On-site %**	**Ref. %**	**On-site %**	**Ref. %**	**On-site %**	**Ref. %**
Scup YOY	--	--	--	--	--	--	53.96%	--	62.44%	--	--	--
Silver hake	0.11%	--	0.01%	--	--	--	--	--	--	--	--	--
Skate spp.	6.90%	--	0.24%	2.51%	--	0.19%	--	0.24%	--	0.39%	--	--
Smallmouth flounder	0.80%	--	0.97%	1.88%	0.80%	1.55%	0.45%	--	0.13%	--	0.03%	0.41%
Smooth dogfish	--	--	0.03%	--	0.07%	--	0.06%	--	0.17%	--	0.28%	--
Spiny dogfish	0.11%	--	--	--	--	--	--	--	--	0.97%	--	6.22%
Spotted hake	10.92%	--	0.88%	2.30%	0.39%	1.55%	0.05%	--	0.41%	--	3.14%	--
Striped bass	0.34%	--	--	--	--	--	--	--	--	0.19%	--	2.07%
Striped searobin	0.92%	--	1.34%	1.88%	0.19%	0.39%	0.20%	0.36%	0.04%	--	0.69%	1.66%
Summer flounder	1.84%	--	0.18%	1.05%	0.48%	0.19%	0.29%	--	0.24%	--	0.24%	--
Tautog	0.11%	--	0.06%	--	0.02%	--	--	--	--	--	--	--
Tomcod	--	--	0.11%	0.84%	--	--	--	--	--	--	--	0.41%
Weakfish	--	--	--	--	--	--	--	0.12%	--	--	2.97%	2.90%
Windowpane	2.30%	--	0.97%	2.09%	0.39%	1.55%	0.39%	--	0.30%	--	0.86%	--
Winter flounder	1.84%	--	0.09%	0.84%	--	--	--	0.12%	--	--	--	--
Winter skate	8.28%	--	3.11%	11.30%	0.02%	--	0.05%	--	--	--	0.10%	--
Grand Total	**100%**	**--**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

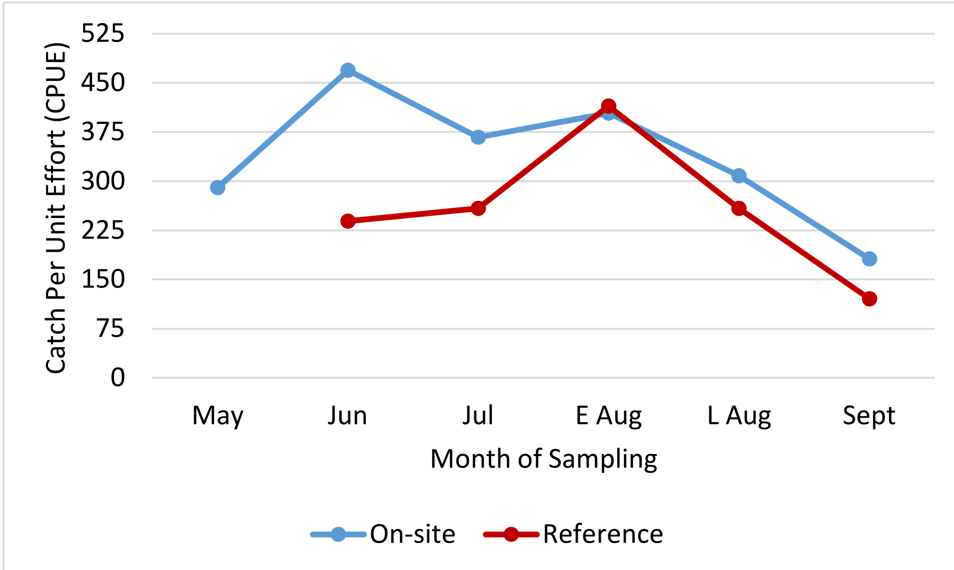

Figure 44: Average Catch per Unit Effort (CPUE) of Monthly Fish Trawls for Borrow Area WOSI

3.3.4.3 LENGTH-FREQUENCY DISTRIBUTIONS

Lengths of all fish species were collected (Appendix A), but the length-frequency distribution data focus on the most important New York commercial species (longfin squid, summer flounder, scup, silver hake and goosefish) which generated over $1 million of revenue individually in 2016. Figure 45 represents the length-frequency distributions for longfin squid, summer flounder, and scup. Only three striped bass (188 mm, 237 mm, and 242 mm), two silver hake (95 mm and 120 mm), and one goosefish (321 mm) were collected and were not included in the figure. Longfin squid ranged in mantle length from a minimum of 14 mm to a maximum of 251 mm. The average length was 62 mm. The majority of longfin squid fell between 14-50 mm. Summer flounder ranged from 110 to 595 mm in standard length, with an average of 312 mm. Most fish fell between 301-350 mm standard length. The standard length of scup ranged from 19 to 308 mm and averaged 95 mm. The most common lengths were between 101 and 150 mm.

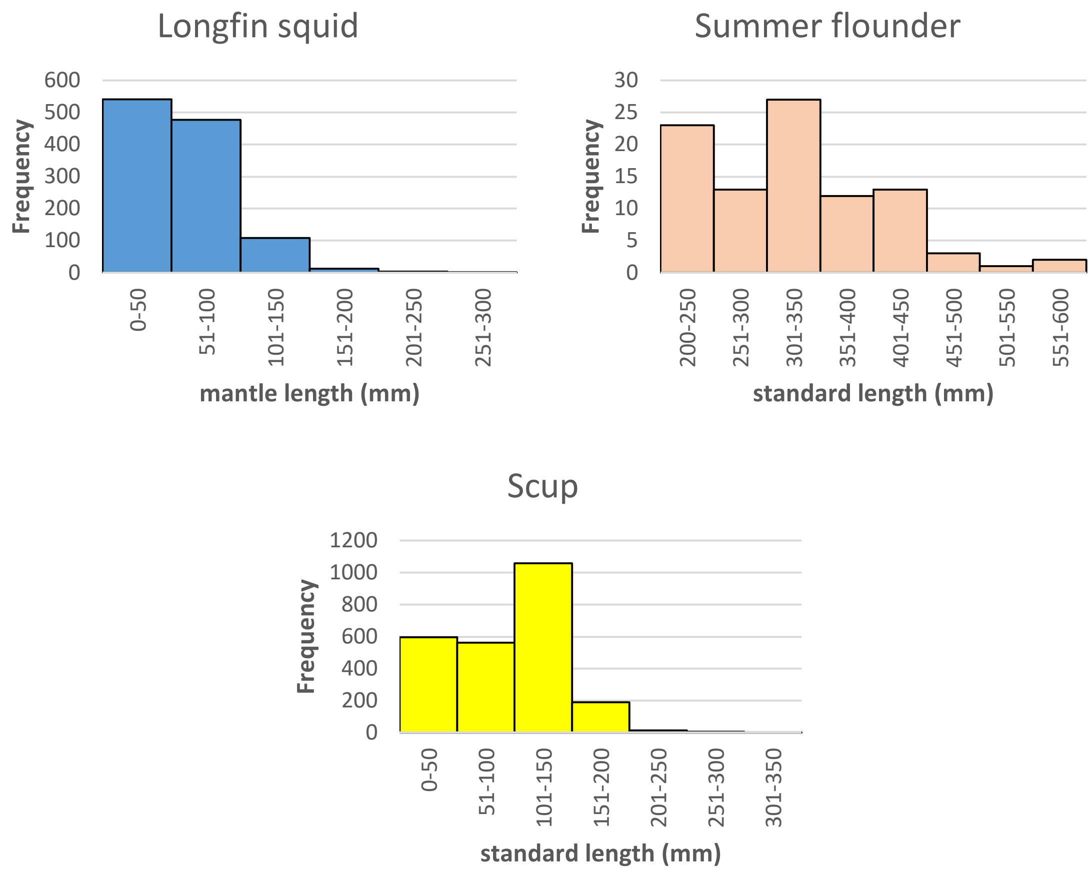

Figure 45: Length Frequency Distribution of Commercially Important New York Fish Species Collected in Borrow Area WOSI Which Generated Over $1 Million in Revenue in 2016

4.0 DISCUSSION

The structure and mixing of the water column impacts both benthic invertebrates and fish species. For biological organisms, spring is usually a time of increased growth, due to abundant food and prey resources (e.g., Malloy and Targett 1994). However, abiotic factors can effect habitat utilization. A behavioral response to temperature changes varies greatly by species; though, most fishes strive to remain in their thermal niche (i.e., ±2 or 5°C of the preferred temperature; Magnuson and Destasio 1997). Bottom-dwelling species, such as flatfish, often experience less temperature variation and therefore, move less, while more mobile fishes, like bluefish (*Pomatomus saltatrix*), must seek out their thermal niche, which results in a broader distribution and greater movement (Cranshaw and O'Connor 1997). The greatest temperature-induced movement, however, occurs in species like Atlantic herring (*Clupea harengus*), which may migrate over 100 km in response to a 1°C temperature change (Cranshaw and O'Connor 1997). Locally, thermal refuge may be found in bottom waters; however, if oxygen levels drop below 5 mg/L, non-demersal animals may not remain in the bottom layer for long periods of time. Eventually, these animals would need to move farther offshore until temperatures dropped and oxygen increased in the fall. Warm-water fish species would likely benefit from the competitive advantage of being capable of utilizing the entire water column in the spring months, but may need to migrate southward during the winter. Benthic organisms are more vulnerable to stress due to temperature extremes or oxygen levels since they are less mobile. The existing conditions, as well as the potential impacts of dredge activities, are discussed for both benthos and fishes in the following sections.

4.1 BENTHIC COMMUNITY COMPARISONS

Comparisons of benthic infauna data provide insight into trends in species richness, dominant species, species richness, and abundance over time. Differences in benthic community parameters for each borrow area in this study were mainly attributed to seasonal differences in temperature and light exposure. The findings of this study are largely consistent with previous studies and reports conducted in the borrow areas.

4.1.1 BORROW AREA EAST ROCKAWAY

This study found that the offshore benthic environment in Borrow Area East Rockaway is dominated by fine sand (Table 55). Compared to similar studies conducted in areas near the 2017 Borrow Area in 2014 (USACE 2015) and in 2006 by the USACE (2007), the overall dominant sediment type has not changed. This study followed the increasing trend in the average number of individuals from spring to fall as the previous studies. The dominant infauna and average species richness in this study varied from previous studies.

Table 55: Summary of Parameters and Comparison with Past Studies in New York Borrow Areas for East Rockaway

Summary of Parameters and Comparison with Past Studies in New York Borrow Areas for East Rockaway						
Parameters	**Current study**		**USACE (2015)**		**USACE (2007)**	
	9-May	**11-Sep**	**18-Jun**	**9-Oct**	**Spring**	**Fall**
Borrow Area	East Rockaway		East Rockaway		East Rockaway	
Number of grabs	30	30	50	50	50	50
Dominant sediment	Fine sand	Fine sand	Fine sand	Fine sand	Fine sand	Fine sand
Avg H' diversity index	1.50	1.37	1.99	2.28	-	-
Dominant infauna	*Nucula proxima* (Molluska)	*Nucula proxima* (Molluska)	Capitellidae spp. (Annelida)	*Ampelisca verrilli* (Arthropoda)	*Prionospio pygmaea* (Annelida)	*Asabellides oculata* (Annelida)
Avg species richness	10.9	11.7	20	21	22	22
Avg individuals per grab	134.6	167.8	159.3	188.3	195.8	289.5

4.1.2 BORROW AREA 2C

Borrow Area 2C was surveyed in 2015 and 2016 (USACE 2016, 2017). The 2015 and 2016 surveys investigated all the same parameters as the current study. Borrow Area 2C was surveyed in two previous USACE projects: the Draft Benthic Invertebrate Survey: East of Shinnecock Inlet to east of Fire Island Inlet surveyed Borrow Area 2C (USACE 2004a), and Benthic Invertebrate Survey: Napeague to East of Fire Island Inlet (USACE 2001). The East of Shinnecock Inlet to east of Fire Island Inlet survey characterized the dominant sediment type as sand but did not indicate the breakdown of coarse, medium, or fine sand and the Napeague to East of Fire Island Inlet survey did not provide the dominant sediment type.

Comparing this current study to previous studies shows that the difference in the timing of the surveys impacts the results greatly due to temperature changes and the amount of sunlight exposure (Table 56). In this current study, the first set of samples were collected in the May and the second set of samples were collected in September. Studies conducted before 2016 collected the first samples in June, July and August when the water temperature and productivity are much higher. In turn, the second set of samples were collected much later compared to this study. Previous studies in the area resulted in greater species richness and abundance in the first set of samples compared to the second. These USACE (2004a and 2001) fall results are likely due to lower productivity which is typical in cooler months. Productivity starts to decrease in the fall in temperate climates when sunlight is limited and thermoclines develop which prevents the mixing of nutrients.

Table 56: Summary of Parameters and Comparison with Past Studies in New York Borrow Areas for 2C

Summary of Parameters and Comparison with Past Studies in New York Borrow Areas for 2C										
Parameters	Current study		USACE (2016)		USACE (2015)		USACE (2004a)		USACE (2001)	
	11-May	15-Sep	16-Apr	16-Sep	15-Jul	15-Oct	1-Jun	Nov-00	Aug-99	Dec-99
Borrow Area	2C		2C		2C		2C		2C	
Number of grabs	45	45	45	45	45	45	20	20	33	33
Dominant sediment	Coarse sand	Coarse sand	Coarse sand	Coarse sand	Coarse sand	Coarse sand	Sand◊	Sand◊	-	-
Avg H' diversity index	1.47	1.4	1.6	1.16	1.8	1.8	2.08	2.06	2.53	1.49
Dominant infauna	Nematoda spp. (Nematoda)	Nematoda spp. (Nematoda)	*Polygordius jouinae* (Arthropoda)	Nematoda spp. (Nematoda)	*Pseudunciola obliquua* (Arthropoda)	Nematoda spp. (Nematoda)	Nematoda spp. (Nematoda)	Polygoriidae spp. (Annelida)	*Polygordius triestinus* (Annelida)	*Polygordius triestinus* (Annelida)
Avg species richness	15	19	10	24	18	14	-	-	-	-
Avg individuals per grab	151.71	338.31	43.93	706.55	176.1	94	106.6	66.15	169.09	154.7

Note: Sand◊ = not described further. Current study used a 0.1-m^2 grab sampler; USACE 2001 and 2004a used 0.025-m^2 grab sampler.

4.1.3 BORROW AREA 5B

Borrow Area 5B was surveyed in 2015 and 2016 (USACE 2016, 2017). The Borrow Area 5B 2015 and 2016 surveys investigated all the same parameters as the current study. Parts of Borrow Area 5 were surveyed in two previous USACE projects. The Draft Benthic Invertebrate Survey: East of Shinnecock Inlet to east of Fire Island Inlet surveyed Borrow Area 5 (USACE 2004a). USACE's Benthic Invertebrate Survey: Napeague to East of Fire Island Inlet surveyed Borrow Area 5A and 5B which were reported together (USACE 2001). The East of Shinnecock Inlet to east of Fire Island Inlet survey characterized the dominant sediment type as sand but did not indicate the breakdown of coarse, medium, or fine sand and the Napeague to East of Fire Island Inlet survey did not provide the dominant sediment type.

Comparing this current study to previous studies shows that the difference in the timing of when samples are procured impacts the results greatly due to temperature changes and the amount of sunlight exposure (Table 57). In this current study the first set of samples were collected in the May and the second set of samples were collected in September. Two of the previous studies collected the first samples in August and July when the water temperature and productivity are much higher. In turn, the second set of samples were collected much later compared to this study. The 2015 (USACE) survey in the area resulted in greater species richness and abundance in the first set of samples compared to the second. The lower average individuals per grab in the USACE (2004a, 2001) reports are likely due to lower productivity which is typical in cooler months. Productivity starts to decrease in the fall in temperate climates when sunlight is limited and thermoclines develop which prevents the mixing of nutrients.

Table 57: Summary of Parameters and Comparison with Past Studies in New York Borrow Areas for 5B

Summary of Parameters and Comparison with Past Studies in New York Borrow Areas for 5B										
Parameters	**Current study**		**USACE (2017)**		**USACE (2015)**		**USACE (2004a)**		**USACE (2001)**	
	9-May	**11-Sep**	**16-Apr**	**16-Sep**	**15-Aug**	**15-Oct**	**Nov-00**	**1-Jun**	**Jul-99**	**Nov-99**
Borrow Area	5B		5B		5B		5		5A & 5B	
Number of grabs	45	45	45	45	45	45	20	20	31	31
Dominant sediment	Coarse sand	Coarse sand	Coarse sand	Coarse sand	Medium sand	Coarse sand	Sand◊	Sand◊	-	-
Avg H' diversity index	0.90	1.08	0.97	1.11	1.17	1.52	2.39	2.04	2.6	2.7
Dominant infauna	Nematoda spp. (Nematoda)	Nematoda spp. (Nematoda)	Nematoda spp. (Nematoda)	Nematoda spp. (Nematoda)	*Pseudunciola obliquua* (Arthropoda)	Nematoda spp. (Nematoda)	*Gammarus oceanicus* (Arthropoda)	*Protohaustorius wigleyi* (Arthropoda)	*Protohaustorius wigleyi* (Arthropoda)	*Protohaustorius wigleyi* (Arthropoda)
Avg species richness	12	16	10	19	17	12	-	-	-	-
Avg individuals per grab	463	584.44	142.44	938.47	602.83	97.96	61.3	58.55	129.13	35.54

Note: Sand◊ = not described further. Current study used a 0.1-m2 grab sampler; USACE 2001 and 2004a used 0.025-m2 grab sampler.

4.1.4 BORROW AREA WOSI

Previous studies of benthic infauna for Borrow Area WOSI were summarized in the USACE 1999 Environmental Assessment (USACE 1999, B. A. Vittor & Associates 1998, RMC Environmental Service (1996). Many of the parameters that were documented for this study were not available for comparison to prior work (number of grabs, dominant sediment type, average H' diversity index, average species richness, and average individuals per grab). The 1999 study reported medium/fine sand as the dominant sediment size compared to the coarse sand findings in this study (USACE). The sample locations and the methods used to determine sediment size may have contributed to this difference. Comparing this current study to previous studies is challenging with only the dominant infauna data (Table 58). In this current study, the first set of samples were collected in May and September. The B. A. Vittor & Associates' data was collected in June when the water temperature and productivity are higher than in May. In turn, the second set of samples were collected later compared to this study. The RMC data was collected only in June. The difference in the timing (seasonal temperature changes and amount of sunlight exposure) of when samples were procured could have contributed to the differences in dominant infauna.

Table 58: Summary of Parameters and Comparison with Past Studies in New York Borrow Areas for WOSI

Summary of Parameters and Comparison with Past Studies in New York Borrow Areas for WOSI								
Parameters	**Current study**		**USACE (1999)**	**B. A. Vittor & Assoc. (1998)**				**RMC (1996)**
	May 2017	**Sept 2017**	-	**June 1997**	**Nov 1997**	**June 1998**	**Oct 1998**	**June 1996**
Borrow Area	WOSI		WOSI	WOSI				Shinnecock Station
Dominant sediment	Coarse sand	Coarse sand	Medium/fine sand	-	-	-	-	-
Dominant infauna	Nematoda spp. (Nematoda)	Nematoda spp. (Nematoda)	-	*Spiophanes bombyx* (Polychaeta), *Psammonyx nobilis* (Arthropoda), *Protohaustorius* sp (Amphipoda)	*Spisula solidissma, E. parma* (Echinodermata), *Polygordius* sp., and *Tanaissus psammophilus* (Tanaidacea)	Oligochatea, Rhynchocoela, *Scoleoepis squamata* (Polychaeta)	*Polygordius* sp (Polychaeta), *Protohaustorius* sp [*P. wigleyi*] (Amphipoda)	*P. wigleyi* (Amphipoda), *Psammonyx nobilis* (Amphipoda), *Grammarus annulatus* (Amphipoda), and *Acanthohaustori us mills* (Amphipoda), *T. agilis* (Molluska)
Number of Species represented	67	70	-	-	-	-	-	-

4.2 FISHERIES CONSIDERATIONS

There was considerable temporal variation in the species that were present every month. The number of species ranged from 20-29 in Borrow Area East Rockaway, 19-25 species in Borrow Area 2C, 21-30 species in Borrow Area 5B, and 14-27 Borrow Area WOSI. Most species were seen only once. This is also reflected in the fluctuation of the dominant species each month in all borrow areas. Similarly, abundance, indexed by CPUE, indicated that temporal changes were stronger than spatial variation (i.e., on-site and reference sites). That is, CPUE varied more month to month compared to the location of trawls within any given month.

The fishes collected in this study have both commercial and biological importance. This study revealed a high diversity of fishes, with 64 distinct species identified over six months of trawl sampling. Of these, 39 species have some commercial significance, based on the most recent information on landings in New York from 2016 (NOAA 2017a; Table 59). Six of the species collected in this study generated over $1 million in revenue last year: longfin squid, summer flounder, scup, goosefish, striped bass, and silver hake (Table 1). Since goosefish and striped bass were captured at very low abundances and are not state or federally threatened or endangered, they will not be discussed further. Maintaining these populations ensures an economic resource for the local fishing fleet. Within the study area, various types of gear are used to target species. Landings data indicate that commercial dredge, gillnet, and pot have low landings from the study areas; commercial otter trawls land relatively higher catches (NYS DOS 2013). No landings are evident from longline or seine. Recreational charter and party boats have high use around the borrow areas (NYS DOS 2013). Additionally, two Atlantic sturgeon were collected at Borrow Area 5B in June. The New York Bight Distinct Population Segments (DPSs) were listed as endangered under the Endangered Species Act in 2012 (77 FR 5880–5912).

Previous studies report that juvenile longfin squid show medium abundance in both the spring and fall (NYS DOS 2013). Adult squid near all borrow areas, however, have moderate abundance in the spring and medium abundance in the fall. Longfin squid spawn year round with peaks in spring and winter. They have a short life span (around 6 to 8 months), and can grow up to 488 mm, but usually reach a maximum of 305 mm (NOAA 2015a). Most of the individuals captured were juveniles, with peak abundances in June at all borrow areas. This seasonal pattern of squid abundance was also observed in New York waters near the study area (USACE 2004b).

In the New York Bight, summer flounder are typically found offshore in the spring and closer to shore in the fall (NYS DOS 2013). In Borrow Area 5B and Borrow Area WOSI summer flounder were most abundant in May. In Borrow Area 2C and Borrow Area East Rockaway, they were most abundant in August. If the fall trawls were done later in the season we may have seen higher numbers of summer flounder. Summer flounder spawn over open areas on the continental shelf during fall and winter. With sexes combined, half of the summer flounder population is sexually mature at 276 mm (MAFMC 2013a). Based on the lengths of the summer flounder in this study, it can be inferred that both juveniles and adults were collected.

Scup move seasonally, from offshore in the winter to inshore in the spring. Peak abundances of scup in all borrow areas occurred throughout August. These abundances were primarily driven by YOY scup. Scup spawn once a year in the spring over weedy or sandy areas; 50% are sexually mature at 2 years, or about 170 mm total length (MAFMC 2013b). Both juveniles and adults are likely present in the study areas, since, accounting for the use of standard length as measurement, some of the larger fishes would probably be sexually mature.

Silver hake inhabit shallow waters in spring and summer, moving to continental shelf and slope waters in the winter. They spawn multiple times in the spring, and about half reach sexual maturity at 2 years old, or 200-300 mm (NOAA 2014d; Col and Col & Traver 2006). Peak abundances of scup occurred in May in all borrow areas. Most of the fishes captured in this study were juveniles, though a few adults were likely captured.

Atlantic sturgeon have a long life span (up to 60 years), and can grow up to 4.3 m. Age at maturity ranges from 5 years old in more southern populations to 22 years in northern locations (NOAA 2015b). Both adults and sub-adults are capable of long-distance movements. In spring (April to May in the Mid-Atlantic), adults move up rivers to spawn. Males may stay in the river or estuary until the fall, while females usually leave the river within four to six weeks. The Atlantic sturgeon collected during this study were 1.0 m, 6 kg; and 1.1 m, 7.5 kg. Based on length, these individuals are likely sub-adults.

Essential Fish Habitat (EFH) is designated by life stage and is broadly defined in the 1996 Magnuson-Stevens Act as "water and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The Mid-Atlantic Fishery Management Council aims to designate EFH for each managed species in the study area. Fourteen of the captured fish species have EFH designated within these Borrow Areas (NOAA 2017b; Table 59). The Fire Island Stabilization Project EFH Assessment concluded that dredging and placement of dredged materials on beaches would not cause adverse effects to EFH-designated species of EFH in Borrow Areas 2C and 5B (USACE 2014a).

Table 59: Commercial Use and Essential Fish Habitat Overlap of Each Captured Fish Species

Commercial Use and Essential Fish Habitat Overlap of Each Captured Fish Species		
Species	**Commercial fishery**	**Essential Fish Habitat (EFH) in Borrow Areas**
Alewife	x	
American eel	x	
American sand lance		
Anchovy sp.		
Atlantic menhaden	x	
Atlantic moonfish		
Atlantic stingray		
Atlantic sturgeon		
Bay anchovy	x	
Black sea bass	x	x
Blueback herring	x	
Bluefish	x	x
Bluespotted cornetfish		
Burrfish sp.		
Butterfish	x	x
Clearnose skate	x (skates)	
Conger eel	x	
Cownose ray		

Commercial Use and Essential Fish Habitat Overlap of Each Captured Fish Species		
Species	**Commercial fishery**	**Essential Fish Habitat (EFH) in Borrow Areas**
Crevalle jack	x	
Cunner	x	
Dogfish sp.		
Dwarf goatfish		
Fourhorn sculpin		
Fourspot flounder	x	
Glasseye snapper	x (snappers)	
Goatfish sp.		
Goosefish	x	x
Gray triggerfish	x (triggerfishes)	
Hake spp. juvenile		
Leptocephalus		
Lined seahorse		
Little skate	x (skates)	
Longfin squid	x	x
Naked goby		
Northern cenate		
Northern kingfish	x	
Northern pipefish		
Northern puffer	x	
Northern searobin	x (searobins)	
Planehead filefish		
Red hake	x	x
Rough scad		
Scup	x	x
Searobin sp.	x (searobins)	
Silver hake	x	x
Skate spp.	x (skates)	
Smallmouth flounder		
Smooth dogfish	x	
Smooth flounder	x (flatfish)	
Spiny dogfish	x	x
Spot	x	
Spotted hake		
Striped anchovy		
Striped bass	x	
Striped searobin	x (searobins)	

Commercial Use and Essential Fish Habitat Overlap of Each Captured Fish Species		
Species	**Commercial fishery**	**Essential Fish Habitat (EFH) in Borrow Areas**
Summer flounder	x	x
Tautog	x	
Thresher shark sp.	x	x
Tomcod		
Weakfish	x	
Windowpane	x	x
Winter flounder	x	x
Winter skate	x (skates)	x
Note: species in bold support a >$1 million fishery		

Previous fish studies conducted in the East Rockaway Borrow Area (USACE 2007, Tetra Tech 2015), both found that little skates accounted for the greatest biomass, which is in agreement with the findings of the current study. Not in agreement, however, was the most dominant species by number. The 2007 East Rockaway study captured over 41,000 bay anchovy in September. Similarly, bay anchovy numerically dominated the catch in the Shinnecock Inlet study. During the 2014 study, only two anchovy were collected in October, and were abundant in May. In this current study, anchovy abundances peaked in both May and September, being the most abundant species in both months. Both bay and striped anchovies are important to coastal food webs. Feeding on plankton, anchovy are then consumed by larger predators that often have commercial or recreational significance (e.g., striped bass, bluefish, and spotted seatrout) (Murdy et al. 1997).

Borrow Area 2C and Borrow Area 5B were surveyed in 2015 and 2016 (USACE 2016, 2017). Surveys were conducted from July through October in 2015 and from April through September in 2016. Similar to this survey, winter skate dominated the biomass for both borrow areas for all years, except for 2C in 2016, where little skate dominated the biomass while winter skate had the second highest biomass. In Borrow Area 2C, longfin squid was the most abundant species collected in 2015 and 2016. During this survey, scup dominated abundance, which can be attributed to the high abundance of YOY scup collected in late August. Longfin squid was the third most abundant species collected. In Borrow Area 5B, anchovy was the most abundant species collected in 2016 and this survey. Scup was the most abundant species collected in 2015, anchovy had the second highest abundance. During, all survey years, abundance of summer flounder was greatest in the summer at Borrow Area 2C. In Borrow Area 5B, summer flounder abundances were highest in spring during this survey and the 2016 survey. Summer flounder abundance at Borrow Area 5B was highest during the fall in 2015, however, no samples were conducted in the spring. In Borrrow Area 5B, ancovy were collected in large numbers in spring and fall during all surveys years, excluding spring 2015. Anchovy were not collected in Borrow Area 2C in 2015, but were the most abundant species collected in September in 2016, and were present in spring and fall of this year's survey.

The number of commercially important species captured in the current study and in the previous two years are very similar (USACE 2016, 2017). In 2015, 28 commercially important species were caught. In 2016 and this study, 30 species were caught. The number of species with EFH were also very similar: 10

in 2015, 14 in 2016, and 13 in 2017. The comparable numbers of commercially important and EFH species from the past three surveys is an indicator of the stability of finfish populations in the area.

The USACE Fire Island to Montauk Point Reformulation Study summarized finfish data from surveys conducted from 1999 to 2002 (USACE 2004b). The CPUE in the current study (CPUE based on the number of monthly trawls) and the USACE report CPUE (based on trawl hours) are not equivalent metrics but illustrate some interesting trends for some key species. This study reflected the same trends in catches as those reported in past trawl surveys discussed in the USACE report (USACE 2004b). This study and the USACE Fire Island to Montauk Point Reformulation Study caught summer flounder in greatest abundance in the spring in Borrow Area 5B. The variation in the timing of the trawls between studies greatly influences the abundance of species at a particular time. Anchovy catches were not reported USACE Fire Island to Montauk Point Reformulation Study, but they are important to coastal food webs. In the current study, bay anchovy was the most abundant species in Borrow Area 5B in May and September bay anchovy were not in high abundances in Borrow Area 2C during any month. The two Atlantic sturgeon collected during this survey were the first collected during surveys within the borrow area. During previous surveys, however, one Atlantic sturgeon was collected previously at the adjacent WOSI Borrow Area during trawl surveys in 2006 (USACE 2008).

The previous study conducted in the WOSI Borrow Area summarized data for surveys conducted in 2000, 2002, and 2004-2006 (USACE 2008). The surveys found little skates accounted for the greatest biomass throughout all years. During this study, winter skate dominated total biomass while little skate accounted for the fifth highest biomass. Winter skate ranked second or third in all other previous surveys. Bay anchovy was the most abundant species collected in in all previous survey, except for 2000. Scup were the most abundant species collected during this study while bay anchovy accounted for the third highest abundance. In this current study, anchovy abundances peaked in both May and September, and was the most abundant species in both months. The previous studies show similar trends. Although not collected during this survey, Atlantic sturgeon have been collected within the WOSI borrow area during previous surveys (USACE 2008).

4.3 Potential Impacts and Recovery in FIMI Borrow Areas

The marine offshore environment, particularly the sea floor, would be impacted by dredging activities due to an acute disturbance, followed by a period of recovery. Dredging removes the surface sediments, creating a shallow depression. Typically, following this type of disturbance, a diverse benthic infaunal community would recolonize from adjacent undisturbed areas within a matter of 3 months to 3 years (Allen Brooks et al. 2006; Byrnes et al. 2004; Lundquist et al. 2010).

Physically, bottom sediment is suspended during dredge activities, resulting in increased turbidity and decreased water quality. Suspended particles usually remain within 49 to 131 ft. (15 to 40 m) of activity, so adjacent areas would be minimally impacted (Spencer 1997); however, local oceanographic features would determine the extent of dispersal. Most sediment resettles within 30 minutes to 24 hours (Lambert and Goudreau 1996), with coarse pebbles and shell settling before finer sand and clay (Ruffin 1995). The greatest turbidity and slowest dissipation rates generally result from dredging in shallow environments with high silt and clay (Tarnowski 2006). None of the borrow areas are dominated by silt or clay. Borrow Areas 2C, 5B, and WOSI are dominated by coarse- and medium-sized sand so turbidity would be expected to be minimal. Borrow Area East Rockaway is dominated by fine sand which may take longer to dissipate. Therefore, dredge activities in this expansion site are not expected to result in long-lasting sediment plumes.

The grain size data do not indicate that the dredged boxes (Borrow Areas 2C and 5B) are filling in with smaller grain size sediment from comparisons of the whole and top samples and comparisons of IN dredged box samples to other sample locations. If the IN dredged box areas were filling in with smaller grain sediment sizes the top samples would be expected to have a larger percentage of fine sand and silt-size particles. Comparisons between whole and top grain size samples of the IN dredged box samples in these borrow areas were not significantly different for either season. In addition, the spring 2C IN dredged box samples had similar percentages of fine-sized sand as reference samples. Fall 2C samples did not follow the same pattern. The 5B IN dredged box samples had the least amount of fine sand than all sample types in both seasons.

Mobile macroinvertebrates, such as crab, jellyfish, and squid species, are likely to avoid and evade dredge equipment. Any organism that cannot escape the dredge, however, would experience immediate mortality. A few months of recovery time between dredging any one particular area should provide sufficient time for recolonization by benthic invertebrates, due to their short life cycles, high reproductive potential, and recruitment of planktonic larvae from nearby areas (Naqvi and Pullen 1982). Recolonization usually occurs by an opportunistic species (either adult or larvae) from the surrounding area, if the sediment is similar (Boyd et al. 2005). The type of benthic organisms that are first to recruit may be affected by the timing of dredge activities; for example, ending dredge activities by spring would encourage the settlement of crustaceans, while ending in fall would benefit annelids (Diaz et al. 2004). *Nucula proxima* was the dominant species collected during this survey at Borrow Area East Rockaway in both spring and fall. This species is considered pollution sensitive (Pelletier et al. 2010). The shift in dominant taxa to a pollution sensitive species suggests a healthy benthic habitat. The dominant taxa at Borrow Areas 2C, 5B, and WOSI was Nematoda spp. in both the spring and fall. Marine nematodes typically dominate benthic habitats in all the world's oceans and help to maintain a healthy ecosystem (Platt et al. 1984). Shifts in marine nematode populations may be a result of change in sediment particle size (Gyedu-Ababio et al. 1999). A stable population of Nematoda spp. suggests stability in sediment particle size.

A change in sediment size following sediment extraction may result in restructuring of the marine benthic community (Desprez 2000). Moreover, if post-dredging sediment does not achieve physical stability, recovery of organisms may be stalled in an early successional stage (Boyd et al. 2005). The current environment of the borrow areas is primarily coarse- and medium-size sand (2C, 5B, WOSI) and fine-size sand (East Rockaway), and changes in the dominant sand type may alter the benthic community composition. Comparisons of this study to previous work in Borrow Areas East Rockaway, 2C, and 5B (except summer 2015) indicate that the dominant sediment size has not changed. Previous data for WOSI is limited to a 1999 report which reported a different dominant sediment size than this study.

Although dredging usually impacts benthos more than fish populations due to differences in mobility, fish species may also be affected. A recent USACE borrow area assessment off the New Jersey coast found that the habitats of ocean pout, black sea bass, and the early life history stages of winter flounder may be directly impacted by dredging (USACE 2014b). Black sea bass and winter flounder were collected in this study, though in relatively small numbers. In addition to direct impacts, indirect trophic effects may also impact fishes, since benthic organisms are an important prey resource (Diaz et al. 2004). Following benthic invertebrate recolonization after dredging activity, though, most fishes would be expected to return to the area in similar numbers as nearby reference areas, with natural seasonal variation in community composition (USACE 2008). Since fish community composition in the Borrow

Areas displayed variation among months, the timing of dredge activities will likely affect demersal species differently.

5.0 CONCLUSIONS

The recovery of this bottom habitat is contingent upon the homogeneity of the underlying sediment. Similar-sized sand particles are needed to provide habitat for invertebrates that make up the offshore benthic environment. Recolonization and the accumulation of biomass usually occurs quickly, but the complete recovery of species diversity usually takes longer, and depends on many factors, such as available sediment, hydrodynamics, nearby resources, and the intensity of dredging activity. This study identified the dominant sediment sizes for Borrow Areas East Rockaway, 2C, 5B, and WOSI and that similar suitable habitat should be available and stable for the re-settlement of benthic infauna. Comparisons to recent studies for Borrow Areas East Rockaway, 2C and 5B indicate stability in the dominant sediment size. Additionally, the grain size analysis of the whole and top samples of the sediment indicate that the sediment is relatively homogeneous even in On-site IN dredged box areas. This study revealed that overall, nearby sites have similar habitat and populations of benthic organisms, which could provide a source of recruits. However, if dredge activity occurs at a high intensity, the Borrow Areas would likely require a longer recovery period. Greater impacts such as trophic effects are unlikely given the expected rapid recovery of benthos which provides an important prey resource for organisms such as crustaceans and fishes.

6.0 REFERENCES

Allen Brooks, R., C. N. Purdy, S. S. Bell, and K. J. Sulak. 2006. The benthic community of the eastern US continental shelf: A literature synopsis of benthic faunal resources. Continental Shelf Research 26:804-818.

ASTM International. 2007. Standard D422-63. Standard Test Method for Particle-Size Analysis of Soils. ASTM International, West Conshohocken, PA. www.astm.org.

B.A. Vittor's Associates, Inc. 1998. Atlantic Coast of Long Island, Fire Island to Montauk Point, New York Reformulation Study, Fire Island and West of Shinnecock Interim Storm Damage Protection Project for USACE, New York Division.

Boyd, S. E., D. S. Limpenny, H. L. Rees, K. M. Cooper. 2005. The effects of marine sand and gravel extraction on the macrobenthos at a commercial dredging site (results 6 years post-dredging). ICES Journal of Marine Science 62:145-162.

Byrnes, M.R., R. M. Hammer, T. D. Thibaut, D. B. Snyder. 2004. Effects of Sand Mining on Physical Processes and Biological Communities Offshore New Jersey, U.S.A. Journal of Coastal Research 20: 25-43.

Cranshaw, Larry I., and Candace S. O'Connor. 1997. Behavioural compensation for long-term thermal change. *In* Global Warming: Implications for Freshwater and Marine Fish. Eds C. M. Wood and D. G. McDonald. Seminar Series-Society for Experimental Biology. Vol. 61. Cambridge University Press.

Col, Laurel and Michele Traver. 2006. Silver Hake. Status of Fishery Resources off the Northeastern US. National Oceanic and Atmospheric Administration Northeastern Fishery Science Center. Accessed http://www.nefsc.noaa.gov/sos/spsyn/pg/silverhake/ on January 2018.

Desprez M. 2000. Physical and biological impact of marine aggregate extraction along the French coast of the eastern English Channel: short- and long-term post-dredging restoration. ICES Journal of marine Science 57:1428-1438.

Diaz, R. J., G. R. Cutter, C. H. Hobbs. 2004. Potential impacts of sand mining offshore of Maryland and Delaware: Part 2 – Biological Considerations. Journal of Coastal Research 20:61-69.

Gyedu-Ababio, T. K., J. P. Furstenberg, D. Baird, A. Vanreusel. 1999. Nematodes as indicators of pollution: a case study form the Swartkops River system, South Africa. Hydrobiologia 397: 155-169, 1999.

Lambert, J. and P. Goudreau. 1996. Performance of the New England hydraulic dredge for the harvest of Stimpson's surf clams (*Mactromeris polynyma*). Canadian Industry Report of Fisheries and Aquatic Sciences 235:28.

Lange, A. M. T. and K. L. Johnson. 1978. Dorsal Mantle Length – Total Weight Relationships of Squid (*Loligo pealei* and *Illex illecebrosus*) from the Northwest Atlantic, off the Coast of the United States. US Department of Commerce, National Oceanic and Atmospheric Administration. 60 pp.

Lundquist, C. J., S. F. Thrush, G. Coco, J. E. Hewitt. 2010. Interactions between disturbance and dispersal reduce persistence thresholds in a benthic community. Marine Ecology Progress Series 413: 217-228.

Magnuson, J. J. and B. T. Destasio. 1997. Thermal niche of fishes and global warming. *In* Global Warming: Implications for Freshwater and Marine Fish. Eds C. M. Wood and D. G. McDonald. Seminar Series-Society for Experimental Biology. Vol. 61. Cambridge University Press.

Malloy, Kirk D., and Timothy E. Targett. 1994. Effects of ration limitation and low temperature on growth, biochemical condition, and survival of juvenile summer flounder from two Atlantic coast nurseries. Transactions of the American Fisheries Society 123.2: 182-193.

Mid-Atlantic Fishery Management Commission (MAFMC). 2013a. Scup Advisory Panel Information Document. August 2013.

Mid-Atlantic Fishery Management Commission (MAFMC). 2013b. Summer flounder Advisory Panel Information Document. August 2013.

Millero, Frank J. 2006. *Chemical Oceanography*. Third Edition. CRC Press. Boca Raton, FL.

Murdy, E. O., R. S. Birdsong, and J. A. Musick. 1997. Fishes of the Chesapeake Bay. Smithsonian Institution Press, Washington, DC.

Naqvi, S. M. and E. J. Pullen. 1982. Effects of beach nourishment and borrowing on marine organisms. US Army Corps of Engineers, Coastal Engineering Research Center, Fort Belvoir, VA.

National Oceanic and Atmospheric Administration (NOAA). 2003. Length-Weight Relationships for 74 Fish Species Collected during NEFSC Research Vessel Bottom Trawl Surveys, 1992-99. NOAA Technical Memorandum NMFS-NE-171. March 2003.

NOAA. 2015a. Longfin Squid. FishWatch, U.S. Seafood Facts. Accessed http://www.fishwatch.gov/profiles/longfin-squid on November 2015. Last updated 22 July 2014.

NOAA. 2015b. Atlantic Sturgeon (*Acipenser oxyrinchus oxyrinchus*). Available at http://www.fisheries.noaa.gov/pr/species/fish/atlantic-sturgeon.html, accessed 22 January 2018. Last updated 15 January 2015.

NOAA. 2017a. Commercial Fisheries Statistics. Accessed http://www.st.nmfs.noaa.gov/commercial-fisheries/commercial-landings/annual-landings/index on 12 December 2017.

NOAA. 2017b. Guide to Essential Fish Habitat Designations in the Northeastern United States. Accessed https://www.greateratlantic.fisheries.noaa.gov/hcd/STATES4/ConnNYNJ.htm 11 December 2017.

NOAA. 2017c. NOAA National Weather Service Forecast Office New York, NY. http://w2.weather.gov/climate/index.php?wfo=okx. Accessed 19 December 2017.

New York State Department of State (NYS DOS). 2013. New York Department of State Offshore Atlantic Ocean Study. July 2013.

Page, L. M., H. Espinosa-Pérez, L. T. Findley, C. R. Gilbert, R. N. Lea, N. E. Mandrak, R. L. Mayden, and J. S. Nelson. 2013. Common and Scientific Names of Fishes from the United States, Canada, and Mexico. 7th Edition. American Fisheries Society Special Publication 34. 243 p.

Pelletier, M., A. J. Gold, J. F. Heltshe, H. W. Buffum. 2010. Ecological Idicators 10:1037-1048.

Platt, H. M., K. M. Shaw, P. J. D. Lambshead. 1984. Nematode species abundance patterns and their use in the detection of environmental perturbations. Hydrobiologia 118: 59-66, 1984.

RMC Environmental Services. 1996. Fire Island to Montauk Point Reformulation Borrow Sites Macroinvertebrate Community Characterization. Prepared for USACE, New York District. Contract No. DACW51-94-D-0035.

Robinette, H. R. 1983. Species Profiles: Life Histories and Enfironmental Requirements of Coastal Fishes and Invertebrates (Gulf of Mexico), Bay Anchovy and Striped Anchovy. Department of Wildlife and Fisheries, Mississippi State University. Study performed for the US Fish and Wildlife Service and US Army Corps of Engineers. October 1983.

Ruffin, K. K. 1995. The effects of hydraulic clam dredging on nearshore turbidity and light attenuation in Chesapeake, MD. University of Maryland.

Spencer, B. E. 1997. Clam cultivation: Localized environmental effects: Results of an experiment in the river Exe, Devon (1991-1995). Ministry of Agriculture, Fisheries and Food, Directorate of Fisheries Research, Fisheries Laboratory, Conwy.

Tarnowski, M. 2006. A literature review of the ecological effects of hydraulic escalator dredging. Fisheries Technical Report Series Number 48. 30 pp.

Tetra Tech, Inc. 2015. Borrow Area Study for the Atlantic Coast of Long Island, East Rockaway NewYork, Storm Damage Reduction Project. Draft Report. Task Order 0019. Prepared For U.S. Army Corps of Engineers, New York District by Tetra Tech, Inc., January 2015.

USACE. 1999. Draft Environmental Assessment for the West of Shinnecock Inlet Interim Plan for Storm Damage Protection, Atlantic Coast of Long Island, Fire Island Inlet to Montauk Point, New York. US Army Corps of Engineers, New York District. New York, NY.

USACE. 2001. Benthic Invertebrate Survey: Napeague to East of Fire Island Inlet. US Army Corps of Engineers, New York District. New York, NY. August 2002. Prepared by EEA, Inc.

USACE. 2004a. Draft Benthic Invertebrate Survey: East of Shinnecock Inlet to East of Fire Island Inlet. US Army Corps of Engineers, New York District. New York, NY. July 2004.

USACE. 2004b. Fire Island Inlet to Montauk Point Reformulation Study: Compilation and Comparative Analysis of Physical and Biological Characteristics of Available Sand Sources. US Army Corps of Engineers, New York District. New York, NY. October 2004.

USACE. 2007. Borrow Area Study for the Atlantic Coast of Long Island, East Rockaway, New York, Storm Damage Reduction Project: Fish/Epibenthic Invertebrate Data Report. US Army Corps of Engineers, New York District. New York, NY. November 2007.

USACE. 2008. West of Shinnecock Inlet and “Bypass Area” Shore Protection Projects: Post-Construction Monitoring – Final Finfish/Epibenthic Invertebrate Data Report (2004-2008). US Army Corps of Engineers, New York District. New York, NY. September 2008.

USACE. 2014a. Fire Island Inlet to Moriches Inlet Fire Island Stabilization Project, Essential Fish Habitat Assessment, Attachment B to the Final Environmental Assessment. US Army Corps of Engineers, New York District. New York, NY. May 2014.

USACE. 2014b. Manasquan Inlet to Barnegat Inlet Storm Damage Reduction Project, Ocean County, NJ, Final Environmental Assessment. US Army Corps of Engineers, Philadelphia District. Philadelphia, PA. May 2014.

USACE. 2015. Borrow Area Study for the Atlantic Coast Long Island, East Rockaway, New York, NY, Storm Damage Reduction Report. Prepared for US Army Corps of Engineers, New York District. New York, NY. by Tetra Tech, Inc., January 2015.

USACE. 2016. Fire Island to Moriches Inlet (FIMI) Borrow Area Study for the Atlantic Coast Long Island, New York, Storm Damage Reduction Projects, 2015 Survey. Prepared for US Army Corps of Engineers, New York District. New York, NY. by Tetra Tech, Inc., February 2016.

USACE. 2017. Fire Island to Moriches Inlet (FIMI) Borrow Area Study for the Atlantic Coast Long Island, New York, Storm Damage Reduction Projects, 2016 Survey. Prepared for US Army Corps of Engineers, New York District. New York, NY. by Tetra Tech, Inc., February 2017.

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Appendix A – Field Data Sheets

Placeholder for Appendix A

Appendix B – Water Quality Data

Placeholder for Appendix B

Appendix C – Benthic and Trawl Site Coordinates

Placeholder for Appendix C

Appendix D – Raw Laboratory Data; Grain Size

Placeholder for Appendix D

Appendix E – Raw Laboratory Data; Benthic Infauna

Placeholder for Appendix E

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

February 14, 2019

Steven W. Brautigam
Clerk/Treasurer
Village of Ocean Beach
PO box 457
Ocean Beach, New York 11770-0457

Subject: Atlantic Coast of Long Island, Fire Island Inlet to Montauk Point (FIMP), New York Coastal Storm Risk Management Project, Local Waterfront Revitalization Program (LWRP) Consistency Determination.

Mr. Brautigam:

The U.S. Army Corps of Engineers, New York District (District) is pleased to provide the final project description for the FIMP General Reevaluation Report (GRR) and Environmental Impact Statement (EIS) (Enclosure 1) and the District's Final Local Waterfront Revitalization Program (LWRP) Policy Statements and Waterfront Assessment Forms (Enclosure 2).

The District, New York State Department of Environmental Conservation (NYSDEC) and local partners, and other agencies including the New York State Department of State (NYSDOS), have participated in extensive coordination to finalize the project description, in particular the details of the Coastal Process Features (CPFs) which are designed to achieve no net loss of sediment into the back bay system as part of the mutually acceptable plan as well as for compliance with Section 7 of the Endangered Species Act by creating early successional habitat for piping plovers (*Charadrius melodus*).

The following updates have been made to the project and are reflected in the LWRP consistency determination, based on the extensive sponsor, local partner, resource agency and public coordination since the release of the July 2016 Draft GRR and EIS:

1. Updated sand quantities in tables and text
2. Additional language regarding "no net loss" of sediment (how to achieve the goal of approximately 4.2 million cubic yards of sand)
3. Additional section on proactive breach response triggers (ex: Southampton transitioned from Proactive to Reactive for Real Estate purposes)
4. Updated discussion of Downtown Montauk related to beach nourishment

5. Additional language describing that vacant land will be acquired as part of mainland nonstructural plan
6. Updated description of current list of CPFs, including renumbering sites and the removal of sites that do not have landowner support and are no longer included (Cupsogue, Sunken Forest, Point of Woods, Carrington, Regan Property)
7. Incorporated an updated CPF table with quantities to achieve the approximate 4.2 MCY. The quantity in the table alone will not achieve the 4.2 MCY quantity and therefore Adaptive Management will be utilized to reach the overall total
8. Included a description of mainland CPF's.

The District requests that the Village of Ocean Beach please provide concurrence on the District's LWRP Determination no later than April 15, 2019 in order to be included in the Final EIS and maintain the overall project schedule for project approval

The District looks forward to working with your office to complete the Feasibility phase and throughout the Pre-Engineering and Design and Construction phases and thanks you for your continued assistance and input to this process which helps to advance the execution of this regionally-significant project.

If you require any additional information, please feel free to contact Mr. Robert Smith Project Biologist at 917-790-8726.

Sincerely,

Peter Weppler
Chief, Environmental section

Enclosure 1 FIMP Final Project Description
Enclosure 2 Final Village Ocean Beach LWRP Consistency Determination

cc: NYSDOS - Maraglio

INC. VILLAGE OF OCEAN BEACH

Waterfront Assessment Form (WAF)

A. INSTRUCTIONS (Please print or type all answers)

1. Applicants, or in the case of direct actions, Village of Ocean Beach agencies, shall complete this Waterfront Assessment Form (WAF) for proposed actions which are subject to the consistency review law. This assessment is intended to supplement other information used by the designated Village of Ocean Beach agency in making a determination of consistency.

2. Before answering the questions in Section C, the preparer of this form should review the policies and explanations of policy contained in the Local Waterfront Revitalization Program (LWRP), a copy of which is on file in the Village of Ocean Beach Village Clerk's office. A proposed action should be evaluated as to its significant beneficial and adverse effects upon the coastal area.

3. If any questions in Section C on this form are answered "yes", then the proposed action may affect the achievement of the LWRP policy standards contained in the consistency review law. Thus, the action should be analyzed in more detail and, if necessary, modified prior to making a determination regarding its consistency with the LWRP policy standards. If an action cannot be certified as consistent with the LWRP policy standards, it shall not be undertaken.

B. DESCRIPTION OF SITE AND PROPOSED ACTION

1. Type of agency action (check appropriate response):

__X__ (a) Directly undertaken (e.g. capital construction, planning activity, agency regulation, land transaction)
____ (b) Financial assistance (e.g. grant, loan, subsidy)
____ (c) Permit, approval, license, certification
____ (d) Agency undertaking action

2. Type of Approval Action Requested (check all that apply)

☐Site Plan Approval ☐ Variance
☐Rezoning ☐ Building Permit
☐Subdivision ☐ Special Use Permit
☒ Other

3. Describe nature and extent of action:
Atlantic Coast of Long Island, New York. The U.S. Army Corps of Engineers, New York District (CENAN) is proposing measures to provide shore protection and reduce storm damage for the south shore of Long Island, New York, from Fire Island Inlet to Montauk Point (Fire Island Montauk Point Reformulation Project). Beach fill from offshore sites, and other associated actions, to be placed on Fire Island barrier island in Ocean Beach, resulting in a +15 ft dune and 90 ft berm. Project will minimize damage to natural resources and property from flooding and erosion by protecting natural features including beaches, dunes, barrier islands and bluffs and through measures to reestablish coastal process features.

4. Location: *The project is located along the Atlantic coast shoreline from the Fire Island inlet to the Montauk Point and includes the segment within the Village of Ocean Beach.*

5. Size of site: *The project includes the 2,000 foot segment of Atlantic coast shoreline within the Village of Ocean Beach.*

6. Present land use*: The project area is an existing beach within the Fire Island National Seashore*.

7. Present zoning classification: N/A

8. Describe any unique or unusual land forms on the project site (i.e. steep slopes, swales, ground depressions, other geological formations):
The project generally includes the existing berm and dunes along the shoreline.

9. Percentage of site which contains slopes of 15% or greater: _N/A

10. Streams, lakes, ponds or wetlands existing within or contiguous to the project area?

(1) Name: N/A
(2) Size (in acres):

11. If an application for the proposed action has been filed with the agency, the following information shall be provided:
(a) Name of applicant: USACE- New York District
(b) Mailing address: 26 Federal Plaza, New York, NY 10278
(c) Telephone number: 917-790-8729 Robert Smith

12. Will the action be directly undertaken, require funding, or approval by a state or federal agency?
Yes X__No___If yes, which agency _US Army Corps of Engineers, New York State Department of Environmental Conservation

C. Waterfront ASSESSMENT (Check either "Yes" or "No" for each of the following questions)

1. Will the proposed action have a significant effect upon: YES NO
(a) Commercial or recreational use of fish and wildlife resources? __NO__
(b) Scenic quality of the waterfront environment? YES
(c) Development of future, or existing water dependent uses? _NO_
(d) Stability of the shoreline? YES
(e) Surface or groundwater quality? _NO___
(f) Existing or potential public recreation opportunities? _NO___
(g) Structures, sites or districts of historic, archeological or cultural significance to the Village of Ocean Beach, State or Nation? _NO___

2. Will the proposed action involve or result in any of the following: YES NO

(a) Physical alteration of land along the shoreline, land under water or waterways? YES
(b) Physical alteration of two (2) acres or more of land located elsewhere in the waterfront area? _YES_
(c) Expansion of existing public services or infrastructure in undeveloped or low density areas of the waterfront?NO
(d) Energy facility not subject to Article VII or VIII of the Public Service Law? __NO___

(e) Mining, excavation, filling or dredging?YES
(f) Reduction of existing or potential public access to or along the shore? NO
(g) Sale or change in use of publicly-owned lands located on the shoreline or under water? NO
(h) Development within a designated flood hazard area? NO
(i) Development on a natural feature that provides protection against flooding or erosion?Yes
(j) Diminished surface or groundwater quality? NO
(k) Removal of ground cover from the site? NO

3. PROJECT YES NO

(a) If a project is to be located adjacent to shore:

(1) Will water-related recreation be provided? NO
(2) Will public access to the foreshore be provided? NO
(3) Does the project require a waterfront site? YES
(4) Will it supplant a recreational or maritime use? NO
(5) Do essential public services and facilities presently exist at or near the site? NO
(6) Is it located in a flood prone area? YES
(7) Is it located in an area of high erosion? YES

(b) If the project site is publicly owned:

(1) Will the project protect, maintain and/or increase the level and types of public access to water-related recreation resources and facilities? YES
(2) If located in the foreshore, will access to those and adjacent lands be provided? NO
(3) Will it involve the siting and construction of major energy facilities? NO
(4) Will it involve the discharge of effluents from major steam electric generating and industrial facilities into waterfront facilities? NO

(c) Is the project site presently used by the community neighborhood as an open space or recreation area? YES

(d) Does the present site offer or include scenic views or vistas known to be important to the community? YES

(e) Is the project site presently used for commercial fishing or fish processing? NO

(f) Will the surface area of any waterways or wetland areas be increased or decreased by the proposal? NO

(g) Does any mature forest (over 100 years old) or other locally important vegetation exist on this site which will be removed by the project? NO

(h) Will the project involve any waste discharges into waterfront waters? NO

(i) Does the project involve surface or subsurface liquid waste disposal? NO

(j) Does th~~e project~~ involve transport, storage, treatment or disposal of solid waste or hazardous materials? NO

(k) Does the project involve shipment or storage of petroleum products? NO *(l)* Does the project involve discharge of toxics, hazardous substances or other pollutants into the *waterway?* _NO___

(m) Will the project affect any area designated as a tidal or freshwater wetland? _NO_

(n) Will the project alter drainage flow, patterns or surface water runoff on or from the site? _NO__

(o) Will best management practices be utilized to control stormwater runoff into waterfront waters? _NO_

(p) Will the project utilize or affect the quality or quantity of sole source or surface water supplies? _NO_

(q) Will the project cause emissions which exceed federal or state air quality standards or generate significant amounts of nitrates or sulfates? _YES__

D. REMARKS OR ADDITIONAL INFORMATION: (Add any additional sheets to complete this form.)

Refer to the attached policy statement which discusses project consistency with relevant policies of the Local Waterfront Revitalization Program of the Village of Ocean Beach.

If assistance or further information is needed to complete this form, please contact Village of Ocean Beach Building Inspector at (631) 583-7018.

Preparer's Name: Robert Smith
Title: Project Manager
Agency: U.S. Army Corps of Engineers, N.Y. District
Telephone Number: (917) 790-8729
Date: 2-14-2019

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
GREATER ATLANTIC REGIONAL FISHERIES OFFICE
55 Great Republic Drive
Gloucester, MA 01930-2276

MAY 3 2016

Peter Weppler, Chief
Environmental Analysis Branch
Planning Division
New York District
U.S. Army Corps of Engineers
26 Federal Plaza
New York, NY 10278-0900

RE: Fire Island Inlet to Montauk Point Reformulation Study

Dear Mr. Weppler:

We have reviewed the essential fish habitat (EFH) assessment dated December 17, 2015, and the information in your October 13, 2015, letter summarizing the Fire Island to Montauk Point Reformulation Study. The project area extends from Fire Island Inlet east to Montauk Point in Long Island, New York. This area includes the entire Atlantic coast of Suffolk County covering an ocean shoreline length of approximately 83 miles and over 200 miles of additional shoreline within the estuary system. The proposed action includes beach and dune restoration, inlet modifications, groin modifications, a breach response plan, and other non-structural measures, as well as, the continuation of the authorized dredging in Fire Island, Moriches and Shinnecock Inlets and the ebb shoals outside of the inlets with the placement of the dredged material in down drift areas. You previously consulted with us on a portion of this project under the Fire Island Inlet to Moriches Inlet; Fire Island Stabilization Project – Hurricane Sandy Reevaluation Report. We provided conservation recommendations for this Hurricane Sandy Reevaluation project in our letter dated May 14, 2014.

The Fish and Wildlife Coordination Act (FWCA) and the Magnuson-Stevens Fishery Conservation and Management Act (MSA) require federal agencies to consult with one another on projects such as this that may affect EFH and other aquatic resources. Because this project affects EFH, this process is guided by the requirements of our EFH regulation at 50 CFR 600.905, which mandates the preparation of EFH assessments, lists the required contents of EFH assessments, and generally outlines each agency's obligations in this consultation procedure.

Fish and Wildlife Coordination Act

The inlets of the project area provides access to the Great South Bay, Moriches Bay, Shinnecock Bay and their freshwater tributaries for many aquatic species including both state and federally managed species and their forage including bluefish (*Pomatomus saltatrix*), summer flounder (*Paralichthys dentatus*), scup (*Stenotomus chrysops*), black sea bass (*Centropristis striata*), Atlantic butterfish (*Peprilus triacanthus*), winter flounder (*Pseudopleuronectes americanus*), windowpane flounder (*Scophthalmus aquosus*), weakfish (*Cyanoscion regalis*), striped bass (*Morone saxatilis*), tautog (*Tautoga onitis*), spot (*Leiostomus xanthurus*), Atlantic croaker

(*Micropogonias undulatus*), blue crab (*Callinectes sapidus*), Atlantic menhaden (*Brevoortia tyrannus*), killifish (*Fundulus spp.*), Atlantic silversides (*Menidia menidia*), bay anchovies (*Anchoa mitchilli*) and other assorted baitfishes and shrimps (e.g., *Neomysis americana, Mysidopsis bigelowi*).

Anadromous species such as alewife (*Alosa pseudoharengus*), blueback herring (*Alosa aestivalis*), American shad (*Alosa sapidissima*), and striped bass transit the inlet to reach spawning and nursery habitat in the freshwater portions of the system. Alewife and blueback herring, collectively known as river herring, spend most of their adult life at sea, but return to freshwater areas to spawn in the spring. Both species are believed to be repeat spawners, generally returning to their natal rivers (Collette and Klein-MacPhee 2002). In the Mid-Atlantic, landings have declined dramatically since the mid-1960s and have remained very low in recent years (ASMFC 2007). Because landing statistics and the number of fish observed on annual spawning runs indicate a drastic decline in alewife and blueback herring populations throughout much of their range since the mid-1960's, river herring have been designated as a Species of Concern by NOAA. Species of Concern are those species about which we have concerns regarding status and threats, but for which insufficient information is available to indicate a need to list the species under the Endangered Species Act (ESA). We wish to draw proactive attention and conservation action to these species.

Catadromous American eel (*Anguilla rostrata*) spawn in the Sargasso Sea and transit the inlet as elvers to the freshwater habitats in bays' tributaries. They inhabit these freshwater areas until they return to the sea through the Moriches, Shinnecock and Fire Island Inlets as adults. According to the 2012 benchmark stock assessment, the American eel population is depleted in U.S. waters. The stock is at or near historically low levels due to a combination of historical overfishing, habitat loss, food web alterations, predation, turbine mortality, environmental changes, toxins and contaminants, and disease (ASMFC 2012). In order to minimize the adverse effects on anadromous and catadromous species, we recommend dredging within the inlet be avoided from March 1 through June 30 to avoid impeding the migration of these species into the inlet and to their upstream habitats.

Magnuson Stevens Fisheries Management and Conservation Act (MSA)
The project area has been designated as EFH for a number of federally managed species including Atlantic butterfish (*Peprilus triacanthus*), Atlantic sea herring (*Clupea harengus*), bluefish (*Pomatomus saltatrix*), black sea bass (*Centropristis striata*), haddock, (*Melanogrammus aeglefinus*), long-fined squid (*Loligo pealei*), monkfish (*Lophius americanus*), ocean pout (*Macrozoarces americanus*), pollock (*Pollachius virens*), red hake (*Urophycis chuss*), scup (*Stenotomus chrysops*), short-finned squid (*Illex illecebrosus*), spiny dogfish (*Squalus acanthias*), summer flounder (*Paralichthys dentatus*), whiting (*Merluccius bilinearis*), winter flounder (*Pseudopleuronectes americanus*), windowpane flounder (*Scophthalmus aquosus*), witch flounder (*Glyptocephalus cynoglossus*), yellowtail flounder (*Limanda ferruginea*), king mackerel (*Scomberomorus cavalla*), Spanish mackerel (*Scomberomorus maculates*), cobia (*Rachycentron canadum*), clearnose skate (*Raja eglanteria*), little skate (*Leucoraja erinacea*), winter skate (*Leucoraja ocellata*), ocean quahog (*Arctica islandica*), and surf clam (*Spisula solidissima*).

The project area is also EFH for several highly migratory species including common thresher shark (*Alopias vulpinus*), white shark (*Carcharodon carcharias*), tiger shark (*Galeocerdo cuvieri*), basking shark (*Cetorhinus maximus*), blue shark (*Prionace glauca*), dusky shark (*Carcharhinus obscurus*), sandbar shark (*Carcharhinus plumbeus*), sand tiger shark (*Odontaspis taurus*), shortfin mako shark (*Isurus oxyrhynchus*), bluefin tuna (*Thunnus thynnus*), skipjack tuna (*Katsuwonus pelamis*), and yellowfin tuna (*Thunnus albacares*). Sand tiger and dusky sharks have also been listed as Species of Concern by NOAA.

The EFH assessment evaluates some of the potential impacts to EFH that could result from the implementation of the Tentative, Federally-Supported Plan (TFSP), but it lacks any discussion of the specific details of the project components including the areal extent of the sand placement below the high tide line and the amount and extent of dredging within the inlets and ebb shoals. The offshore borrow areas are not identified and there are no estimates on the amount of material that will be removed or the frequency of the disturbance of each borrow area or inlet. Detailed, site specific information on the borrow areas and inlet ebb shoals is also lacking. The absence of these details prevents a full evaluation of the direct, indirect, individual and cumulative effects of the actions proposed. As a result, we can only provide general comments and EFH conservation recommendations. Additional consultation will be necessary for each individual action or dredging event undertaken as part of this project, so that site specific EFH conservation recommendations can be developed. We can work with your staff to complete a programmatic consultation for this entire project to reduce the need for individual consultations, but the additional information discussed above will be needed as part of any programmatic consultation.

The dredging of sand for beach nourishment and to construct feeder beaches has the potential to impact both the EFH of a particular species as well as the organisms themselves in a variety of ways. Dredging can result in the impingement of eggs and larvae in the dredge plant and create undesirable suspended sediment levels in the water column. Increased suspended sediment levels can reduce dissolved oxygen, can mask pheromones used by migratory fishes, and can smother immobile benthic organisms and newly-settled juvenile demersal fish (Auld and Schubel 1978; Breitburg 1988; Newcombe and MacDonald 1991; Burton 1993; Nelson and Wheeler 1997). Sustained water column turbulence can reduce the feeding success of sight-feeding fish such as winter flounder and summer flounder.

The inlets within the project area provide a hydrologic connection between the marine and estuarine environments, and are responsible for regulating local salinity regimes, and serve as the conduit for planktonic exchange and related movements of diadromous species, estuary dependent fishes, and invertebrates between the ocean and inland bays. Dredging within the inlet can impede the movements of fish into and out of the back bays. Dredging can also remove the substrate used by federally managed species as spawning, refuge and forage habitat. Benthic organisms that are food sources for federally managed species may also be removed during the dredging. These impacts may be temporary if the substrate conditions return to preconstruction condition and benthic community recovers with the same or similar organisms. The impacts may be permanent if the substrate is altered in a way that reduces its suitability as habitat, if the benthic community is altered in a way that reduces its suitability as forage habitat or if the dredging occurs so often that the area does not have time to recover.

Summer flounder may be impacted adversely by dredging the inlets in the project area. In a study of larval movements in Indian River, Delaware, Targett and Rhodes (2008) study found, ingress of summer flounder larvae peaked bimodally in December and mid-January with collections continuing through April. Movement into the estuary may involve intermittent settling to take advantage of tidal stream transport before permanent settlement once metamorphosis is complete (Able and Fahay 1998). Residual bottom inflow, a result of more dense oceanic water intruding beneath more buoyant outflow, provides some fishes with a mechanism of ingress (Weinstein *et al.*, 1980 in Rhodes 2008). Miller *et al.* (1984) proposed that to gain entry into North Carolina inlets spot (*Leiostomus xanthurus*), Atlantic croaker, summer flounder, and southern flounder (*Paralichthys lethostigma*) remain near the bottom (Rhodes 2008). Dredging and the placement of the pipeline across the bottom of the inlet may impede this inshore movement of summer flounder larvae. Larvae may also be entrained by the dredge as they move through the inlet.

Winter flounder also transit the inlets to reach spawning areas within the estuarine portions of the project area when water temperatures begin to drop in the fall. Tagging studies show that most return repeatedly to the same spawning grounds (Lobell 1939, Saila 1961, Grove 1982 in Collette and Klein -MacPhee 2002). They typically spawn in the winter and early spring although the exact timing is temperature dependent and thus varies with latitude (Able and Fahay 1998), but movements into these spawning areas occurs earlier, generally from mid-to late November through December (B. Phelan personal communication, January 13, 2014). Winter flounder have demersal eggs that sink and remain on the bottom until they hatch. After hatching, the larvae are initially planktonic, but following metamorphosis they assume an epibenthic existence. Winter flounder larvae are negatively buoyant (Pereira et al. 1999), and are typically more abundant near the bottom (Able and Fahay 1998). These life stages are less mobile and thus more likely to be affected adversely by dredging. To minimize impacts to winter flounder early life stages and their EFH, we recommend that dredging in the inlet and ebb shoals be avoided from January 15 to May 31 of each year.

According to the EFH assessment, the ebb shoals and offshore borrow areas provide habitat for surf clams (*Spisula solidissima*) and ocean quahogs (*Artica islandica*) although the document does not provide information of the specific densities of these species throughout the borrow sites. The assessment concludes that, where present in the borrow areas, these species will be lost during dredging, but that the "seeding" mechanisms of the surf clam and ocean quahog are at work continuously and, as a result, the populations will be reestablished after dredging. However, the EFH assessment does not provide any information on how much of each borrow area will be dredged and how often. Consequently, it is not possible to determine the scope of the impacts to surf clams and ocean quahogs or if the populations will have sufficient time between dredging events to recover. To ensure impacts to surf clams and ocean quahogs are minimized, the borrow areas should be surveyed prior to each dredging cycle and areas of high densities should be avoided. Copies of the shellfish survey results should also be provided to us prior to any dredging in the borrow area.

The use of the inlets and inlet ebb shoals as borrow areas can also affect EFH adversely through impacts to prey species. The EFH final rule states that the loss of prey may be an adverse effect on EFH and managed species because the presence of prey makes waters and substrate function as feeding habitat and the definition of EFH includes waters and substrate necessary to fish for feeding. Therefore, actions that reduce the availability of prey species, either through direct harm or capture, or through adverse impacts to the prey species' habitat may also be considered adverse effects on EFH.

Stemile et al. (2000) report that winter flounder diets include the siphons of surf clams. Buckel and Conover (1997) in Fahay et al. (1999) reports that diet items of juvenile bluefish include *Alosa* species. As a result, activities that adversely affect the surf clams or the spawning success and the quality of the nursery habitat for anadromous fish can adversely affect the EFH for winter flounder juvenile and bluefish by reducing the availability of prey items. Water quality degradation, increased turbidity, noise and vibrations from dredging operations may impede the migration of anadromous fish through the inlets to their upstream spawning grounds.

The Mid-Atlantic Fisheries Management Council (MAFMC) has developed policy statements on beach nourishment activities that may affect federally managed species under their purview including summer flounder, scup, black sea bass, monkfish and butterfish. These policies are intended to articulate the MAFMC's position on various development activities and facilitate the protection and restoration of fisheries habitat and ecosystem function. The MAFMC's policies on beach nourishment are:

1. Avoid sand mining in areas containing sensitive fish habitats (e.g., spawning and feeding sites, hard bottom, cobble/gravel substrate, shellfish beds).

2. Avoid mining sand from sandy ridges, lumps, shoals, and rises that are named on maps. The naming of these is often the result of the area being an important fishing ground.

3. Existing sand borrow sites should be used to the extent possible. Mining sand from new areas introduces additional impacts.

4. Conduct beach nourishment during the winter and early spring, when productivity for benthic infauna is at a minimum.

5. Seasonal restrictions and spatial buffers on sand mining should be used to limit negative impacts during fish spawning, egg development, young-of-year development, and migration periods, and to avoid secondary impacts to sensitive habitat areas such as SAV.

6. Preserve, enhance, or create beach dune and native dune vegetation in order to provide natural beach habitat and reduce the need for nourishment.

7. Each beach nourishment activity should be treated as a new activity (i.e., subject to review and comment), including those identified under a programmatic environmental assessment or environmental impact statement.

8. Bathymetric and biological monitoring should be conducted before and after beach nourishment to assess recovery in beach borrow and nourishment areas.

9. The effect of noise from mining operations on the feeding, reproduction, and migratory behavior of marine mammals and finfish should be assessed.

10. The cost effectiveness and efficacy of investments in traditional beach nourishment projects should be evaluated and consider alternative investments such as non-structural responses and relocation of vulnerable infrastructure given projections of sea level rise and extreme weather events.

In addition to the EFH conservation recommendations provided below, the MAMFC's policies should be incorporated in the final design of this project and its long-term management plan.

Essential Fish Habitat Conservation Recommendations
Pursuant to Section 305 (b) (4) (A) of the MSA, we recommend the following EFH conservation recommendations to minimize adverse effect on EFH and federally managed species.

1. Until a programmatic consultation is completed, reinitiate consultation prior to each dredging event.

2. To maintain access to estuarine areas of EFH for summer flounder, winter flounder, bluefish and others including their prey species, dredging in the inlets and ebb shoals should be avoided from January 15 to June 30 of each year. At other times of the year, at least 50 % of the channel should remain unobstructed to allow ingress and egress of aquatic species.

3. The intakes on the dredge plant should not be turned on until the dredge head is in the sediments and turned off before lifted to minimize larvae entrained in the dredge.

4. Dredging within the borrow areas should be designed and undertaken in a manner that maintains geomorphic characteristics of the borrow area and best management practices such as not dredging too deeply and leaving similar substrate in place to allow for the benthic community recovery should be employed.

5. Areas of high surf clam densities within the borrow area should be avoided.

Please note that Section 305 (b)(4)(B) of the MSA requires you to provide us with a detailed written response to these EFH conservation recommendations, including the measures adopted by you for avoiding, mitigating, or offsetting the impact of the project on EFH. In the case of a response that is inconsistent with our recommendations, Section 305 (b)(4)(B) of the MSA also indicates that you must explain your reasons for not following the recommendations. Included in such reasoning would be the scientific justification for any disagreements with us over the anticipated effects of the proposed action and the measures needed to avoid, minimize, mitigate or offset such effect pursuant to 50 CFR 600.920 (k). Please also note that a distinct and further EFH consultation must be reinitiated pursuant to 50 CRF 600.920 (j) if new information becomes available, or if the project is revised in such a manner that affects the basis for the above EFH conservation recommendations.

We look forward to our continued coordination with your office on this project as it moves forward. As stated above, because the EFH assessment provided lacks sufficient detail on each action proposed as part of the TFSP, individual consultations are needed prior to the initiation of each activity so that site specific conservation recommendations can be developed. We can work with your staff to complete a programmatic consultation to reduce the need for individual consultations. If you have any questions or need additional information, please do not hesitate to contact Karen Greene at karen.greene@noaa.gov or (732) 872-3023.

Sincerely,

Louis A. Chiarella,
Assistant Regional Administrator
for Habitat Conservation

cc: NYD Corps – R. Smith
PRD Daniel Marrone
NEFMC – T. Nies
MAFMC – C. Moore

Literature Cited

Able, K.W. and M.P. Fahey. 1998. The first year in the life of estuarine fishes of the Middle Atlantic Bight. Rutgers University Press, New Brunswick, NJ

Atlantic States Marine Fisheries Commission. 2012. American Eel Benchmark Stock Assessment. Stock Assessment Report No. 12-01. Washington, DC. 29 p.

Atlantic States Marine Fisheries Commission. 2007. Species Profile: shad and river herring: Atlantic states seek to improve knowledge of stock status and protect populations coast wide. www.asmfc.org. Washington, DC.

Auld, A.H. and J.R. Schubel. 1978. Effects of suspended sediments on fish eggs and larvae: a laboratory assessment. Estuar. Coast. Mar. Sci. 6:153-164.

Breitburg, D.L. 1988. Effects of turbidity on prey consumption by striped bass larvae. Trans. Amer. Fish. Soc. 117: 72-77.

Buckel, J.A. and D.O. Conover. 1997. Movements, feeding periods, and daily ration of piscivorous young-of-the-year bluefish, *Pomatomus saltatrix*, in the Hudson River estuary. *Fish. Bull.* (U.S.) 95(4):665-679.

Burton, W.H. 1993. Effects of bucket dredging on water quality in the Delaware River and the potential for effects on fisheries resources. Prepared for: Delaware Basin Fish and Wildlife Management Cooperative, by Versar Inc, Columbia MD.

Collette, B.B. and G. Klein-MacPhee. eds. 2002. Bigelow and Schroeder's fishes of the Gulf of Maine. Smithsonian Institution. Washington, D.C.

Fahay, M.P., P.L. Berrien, D.L. Johnson and W.W. Morse. 1999. Essential Fish Habitat Source Document: Bluefish, *Pomatomus saltatrix* life history and habitat characteristics. U.S. Dep. Commer., NOAA Technical Memorandum NMFS-NE-144.

Grove, C.A. 1982. Population biology of the winter flounder, *Pseudopleuronectes americanus*, in a New England estuary. M.S. thesis, University of Rhode Island, Kingston, 95 pp.

Lobell, M.J. 1939. A biological survey of the salt waters of Long Island. Report on certain fishes: Winter flounder (*Pseudopleuronectes americanus*). New York Conserv. Dept. 28th Ann. Rept. Suppl., Part I pp 63-96.

Miller J.M., Reed J.P., Pietrafesa LJ (1984) Patterns, mechanisms and approaches to the study of migrations of estuarine-dependent fish larvae and juveniles, p. 209-225. In J.D. McCleave, G.P. Arnold, J.J. Dodson, and W.H. Neill (eds.), Mechanisms of Migration in Fishes, Plenum Press, New York

Nelson, D.A. and J.L. Wheeler. 1997. The influence of dredging-induced turbidity and associated contaminants upon hatching success and larval survival of winter flounder, Pleuronectes americanus, a laboratory study. Final report, Grant CWF #321-R, to Connecticut Department Environmental Protection, by National Marine Fisheries Service, Milford CT.

Newcombe, C.P. and D.D. MacDonald. 1991. Effects of suspended sediments on aquatic ecosystems. N. Amer. J. Fish. Manag. 11:72-82.

Pearcy, W.C. 1962. Ecology of an estuarine population of winter flounder, *Pseudopleuronectes americanus* (Walbaum). Bull. Bingham Oceanogr. Coll. 18(1):1-78.

Pereira, J. J., R. Goldberg, J. J. Ziskowski, P.L. Berrien, W.W. Morse and D.L. Johnson. 1999. Essential Fish Habitat Source Document: Winter Flounder, *Pseudopleuronectes americanus*, life history and habitat characteristics. U.S. Dep. Commer., NOAA Technical Memorandum NMFS-NE-138.

Phelan, B. Personal Communication, January 13, 2014.

Rhodes, M.P. 2008. Dynamics of the larval fish assemblage at two coastal Delaware Inlets. M.S. thesis. University of Delaware, Lewes. 65 pp.

Saila, S.B. 1961. The contribution of estuaries to the offshore winter flounder fishery in Rhode Island. *Proc. Gulf. Carib. Fish. Inst.* 14:95-109.

Steimle, F.W., R.A. Pikanowski, D.G. McMillan, C.A. Zetlin, S.J. Wilk. 2000. Demersal fish and American lobster diets in the Lower Hudson-Raritan Estuary. NOAA Technical Memorandum NMFS-NE-161. Woods Hole, MA. 106 p.

Targett, T.E. and M.P. Rhode. 2008. Ingress of larval fishes through Indian River Inlet: patterns of abundance and development of a Juvenile Fish Index to assess water quality in the Inland Bay system. Final Report. University of Delaware, Lewes. Submitted to the Delaware Center for Inland Bays.

Weinstein MP, Weiss SL, Hodson RG, Gerry LR (1980) Retention of three taxa of postlarval fishes in an intensively flushed tidal estuary, Cape Fear River, North Carolina. Fishery Bulletin 78(2):419-436

Weinstein MP, Weiss SL, Hodson RG, Gerry LR (1980) Retention of three taxa of postlarval fishes in an intensively flushed tidal estuary, Cape Fear River, North Carolina. Fishery Bulletin 78(2):419-436

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
3817 Luker Road
Cortland, NY 13045

January 26, 2016

Mr. Peter M. Weppler
Chief, Environmental Analysis Branch
U.S. Army Corps of Engineers
26 Federal Plaza
New York, NY 10278-0900

Dear Mr. Weppler:

This is in response to the U.S. Army Corps of Engineers'(Corps) October 1, 2015, request (received via electronic mail) for the U.S. Fish and Wildlife Service (Service) to identify information that would be pertinent to the Endangered Species Act (ESA) of 1973, consultation (87 Stat., 884,. as amended; 16 U.S.C. 1531 *et seq.*) for the Corps' Fire Island Inlet to Montauk Point Reformulation Study (FIMP). This response is also provided pursuant to the Fish and Wildlife Coordination Act (FWCA) (48 Stat. 401, as amended; 16 U.S.C. 661 *et seq.*).

The Corps' October 1 request for information to assist in the ESA consultation followed guidance the Service provided to the Corps at the September 15, 2015, FIMP interagency coordination meeting. Specifically, the Service recommended that the Corps initiate informal consultation to extend discussions relative to conservation measures that could be incorporated into the project description and included in the formal consultation process.

In this letter, we provide recommendations and request information that would assist both our agencies in the ESA and FWCA consultations. The information that is requested for the FWCA consultation will assist us in moving forward on or analysis of the impacts of the project on fish and wildlife resources, identifying fish and wildlife resource concerns and opportunities, evaluating mitigation alternatives, and making recommendations to avoid, minimize, and compensate for loss of fish and wildlife species and or their habitats. The ESA recommendations will assist the Corps in meeting its section 7(a)(2) of the ESA responsibility of ensuring any project that it authorizes, carries out, or funds does not jeopardize the continued existence of listed species.

We would appreciate your immediate attention and written response so that we can continue to make progress on these consultations. Please note that we may have additional information needs as both consultations proceed.

ESA Recommendations/Information

1) Since 1999, we have recommended that the Corps undertake a comprehensive regional approach to listed species management for this project due to its geographical and temporal scope as part of the FIMP planning process. At that time, we indicated that a plan addressing protection and conservation of listed species and their habitat, experimental investigations into artificial habitat creation, and identification and protection of locations within the barrier island system where processes of overwashing and breaching could occur in as natural a setting as possible would greatly facilitate the formal ESA consultation. Specifically, we recommended, and continue to recommend, that the Corps incorporate a Long-term Regional Comprehensive Management Plan (LTRCMP) for Threatened and Endangered Species into the FIMP project description. During the early 2000s, both our agencies worked collaboratively on the initial phases of the LTRCMP, but the Corps discontinued the effort in 2004. We were encouraged to learn in your October 15, 2014, correspondence that the Corps would be re-engaging with us on its development, but we have not been approached to date. Our recommendations related to aspects of the LTRCMP are provided below.

2) We continue to recommend the inclusion of "Land Manager Protection Plans," which would address the project-induced effects of increased recreational disturbance (U.S. Fish and Wildlife Service 2001) in the FIMP study area. They would include, but not be limited to, intensive protection of breeding plovers on all habitats (natural, artificially enhanced, and stabilized) in the planning area from human disturbance and predation. Incorporation of these overall plans, would also assist in offsetting impacts of habitat degradation on the plover population's vulnerability by maximizing productivity on the remaining habitat.

3) We recommend that the Corps include a list, map, and detailed plans of habitat restoration activities in the FIMP project description, that directly benefit listed species and their habitats, so the Service can review and provide input on their viability and potential benefit to listed species. We reference the Corps' 2008 document entitled, "*Restoration Opportunities in Conjunction with Breach Response Alternatives*," as an early effort to undertake and incorporate this into the FIMP project description, but have seen no advancement of this effort. Habitat restoration will be key to addressing adverse effects to listed species and their habitat due to barrier island and inlet stabilization and loss of early successional habitat formation from overwashing and breaching events, or development spurred by the proposed plan.

4) Please provide your agency's plans for the distribution of naturally functioning and artificially-enhanced habitat areas across the planning area. Distribution of highly productive habitats and birds among multiple sites reduces a species' vulnerability to environmentally-driven variance due to predation, weather, etc. These might include not only undeveloped areas, but the potential "buy-out" of developments in areas that are sparsely-developed and/or have high potential habitat value (*e.g.*, proximity to feeding areas, prone to overwashes, etc. (see U.S. Fish and Wildlife Service 2001);

5) Please provide breach fill profiles for the Breach Response Plans that foster natural habitat creation and maintenance for piping plover (*Charadrius melodus*), seabeach amaranth (*Amaranthus pumilus*), and red knot (*Calidris canutus*), as well as other shore-dependent species.

6) Section 7(a)(1) of the ESA directs each federal agency to carry out programs for the conservation of threatened and endangered species in consultation with the Service. We recommend that the Corps include in the ESA consultation a list of section 7(a)(1) activities that the Corps has undertaken for the conservation of threatened and endangered species in the study area as part of its general civil works program. We also recommend that the Corps review the Service's conservation recommendations provided for prior federal projects and provide a report to the Service which summarizes the status and outcomes of their implementation.

7) Information related to the creation, restoration, or enhancement of habitat will be important in evaluating the project and developing the Biological Assessment and Biological Opinion. Please provide detailed reports on Corps' projects which created artificial and high quality plover habitats. Planning considerations for habitat creation and/or enhancement must include avoidance of hazards posed to plovers when habitats are bisected by a road (see U.S. Fish and Wildlife Service 2001);

8) Please provide maps which show planned implementation of the Corps' FIMP Restoration Framework, *i.e.*:

   "The five key physical processes that need to be sustained, restored, or enhanced to re-establish protective features are: 1. Longshore sediment transport; 2. Cross-shore sediment transport; 3. Dune growth and evolution; 4. Bayside shoreline processes; 5. Circulation and water quality," with particular attention to cross-shore sediment transport. (see U.S. Army Corps of Engineers 2009b)

9) Please provide plans which illustrate the Corps' planning criteria which states,

   "Preference will be given to measures that protect and restore coastal landforms and natural habitats, aid in recovery of threatened and endangered species, enhance public recreation and use, and ensure perpetuation of essential physical and biological processes." (see U.S. Army Corps of Engineers 2009a)

FWCA Comments

The Service has initiated the preparation of the a Draft FWCA report, however, in order for the Service to be able to fully assess the project's impacts to fish and wildlife resources, additional information, as listed below, is requested.

1) In order to fully assess the direct, indirect, and cumulative impacts of the nonstructural alternatives on fish and wildlife resources and their habitats, including an assessment of

sensitive habitats within or adjacent to the immediate project areas, please provide the following:

a) the techniques that will be used to elevate the roadways;
b) the footprint of the proposed road dikes;
c) the locations of all public and private structures to be elevated,
d) the area of jurisdictional wetlands filled, if any;
e) specific wetlands and upland areas to be acquired along with their final disposition (federally-, state-, or locally-owned);
f) the land uses that will be allowed on acquired properties; and
g) the area of coastal zones, wetlands, and uplands that may be indirectly impacted by the construction of the road dikes.

The Corps has indicated via electronic mail that separate environmental assessments will be conducted as non-structural components are developed. Please confirm if that is how the Corps plans on developing these components.

2) In order to assess the impacts of this offshore dredging and beach nourishment on nearshore and barrier island flora and fauna that may be directly impacted by construction activities, or indirectly impacted by increased recreational activities or reduction in overwash and breaching processes, please provide the following:

a) cross-sections of proposed beach nourishment/fill;
b) a detailed description and location of the proposed borrow areas;
c) any studies regarding use of the borrow areas by avian species;
d) beachfill volumes; volumes of sediment to be dredged from federal navigation channels at Fire Island, Moriches and Shinnecock Inlets;
e) the maintenance depths of these inlets; and
f) and the specifications for proposed beach grass plantings and sand fence placement (if proposed).

3) It is well established that the overwash and breaching regime on the south shore barrier islands has influenced back barrier saltmarsh development and that saltmarsh growth and development are important components to barrier island resiliency and occur over a significant portion of the barrier islands in the project area. In order to understand the measures the Corps is taking to address barrier island resiliency, which includes conservation and restoration of backbay saltmarshes, please provide a detailed assessment on how the rate and areas of saltmarsh development will be mitigated under the scenario of barrier island stabilization over 50 years.

4) In order to assess whether the habitat evaluation procedures (HEP) alternatives that create or restore wetlands are viable measures and will not result in a net loss of wetland functions and values in the project area, please provide any supporting research undertaken by the Corps or others that examines the ecological and functional roles of artificial wetland creation as a surrogate for natural marsh creation.

5) Implementation of the mitigation alternatives is necessary to address the attendant impacts of any alternative. In order to understand whether the construction and mitigation alternatives will actually be implemented across the project area, as described in the Corps' project description, and to better evaluate the project as whole, and more accurately determine whether a proposed alternative will be beneficial, adverse, or neutral in terms of its environmental impacts, please provide letters from the local cost share sponsor, the New York State Department of Environmental Conservation, and other jurisdictional landowners and environmental regulators that illustrate their position on wetland creation or sand filling in the back bays to mitigate for the prevention or reduction of barrier island breaching and overwashing.

6) In order to accurately assess impacts to backbay fish and wildlife resources, including invertebrate and vertebrate colonizing species, and submerged aquatic and terrestrial plants, please quantify the volumes and area and design for sub- and supra-tidal areas that would be created in the back bays as mitigation for the prevention of breaches.

Thank you for the opportunity to assist you in these consultations. We look forward to our continued participation in the consultation. If you have any questions, please have your staff contact Steve Papa (ESA consultation), and Steve Sinkevich (FWCA consultation), of the Long Island Field Office, at (631) 286-0485, extensions 2120 and 2121, respectively.

Sincerely,

Patricia Cole

for David A. Stilwell
Field Supervisor

Literature Cited

U.S. Army Corps of Engineers. 2009a. Evaluation of Restoration Opportunities Using the Habitat Evaluation Procedures (HEP) Method Final Phase II Report Volume 2 – Appendices. U.S. Army Corps of Engineers, New York District, Planning Division (CENAN-PL-E), New York, NY. 375 pp.

U.S. Army Corps of Engineers. 2009b. Fire Island Inlet to Montauk Point New York Reformulation Study Draft Formulation Report. U.S. Army Corps of Engineers, New York District, Planning Division (CENAN-PL-E), New York, NY. 381 pp.

U.S. Fish and Wildlife Service. 2001. Biological Opinion on the U.S. Army Corps of Engineers Atlantic Coast of Long Island, Fire Island Inlet to Montauk Point, Reach II: Moriches Inlet to Shinnecock Inlet, West of Shinnecock Inlet Interim Storm Damage Protection Project." U.S. Fish and Wildlife Service, Long Island Field Office, Islip, NY. 63 pp.

DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT
JACOB K. JAVITS FEDERAL BUILDING
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Environmental Branch

October 13, 2015

Mr. Jeffrey Zappieri
Consistency Review Unit
Office of Planning and Development
New York Department of State Suite 1010
One Commerce Place, 99 Washington Avenue
Albany, New York 12231-0001

Subject: Fire Island Inlet to Montauk Point Reformulation Study (FIMP)

Dear Mr. Zappieri:

This letter is in reference to the Fire Island Inlet to Montauk Point, New York Reformulation Study. This letter has been prepared to summarize our approach to conduct Coastal Zone Management (CZM) coordination and then to finalize the FIMP Reformulation Study and associated Environmental Impact Statement (EIS).

In March 2011, the U.S. Army Corps of Engineers (Corps), the U. S. Fish and Wildlife Service (USFWS) and the National Park Service (NPS) jointly signed and transmitted a letter to the New York State Department of Environmental Conservation (NYSDEC), identifying the Tentative, Federally Supported Plan (TFSP) as the basis for moving forward with the Project. New York State, by letter in June 2013, agreed in concept with the TFSP. This agreement noted the details that required refinement, which include the breach response, life-cycle management of the project, alignment, and nature-based features.

The Corps finds that the best course of action to resolve these remaining plan details is through the Corps' formal report review process, the National Environmental Policy Act (NEPA) process, and necessary regulatory coordination. The formal review process is an efficient means to formally describe the alternative plan in its entirety, and to finalize a mutually agreeable plan that has local sponsor support. The Corps intends to move forward with what we will identify as the Tentatively Selected Plan (TSP) in our EIS.

A description of the TSP is provided as an enclosure. The adjustments that have been made to the TFSP include the following:

- The TFSP recommended a conditional breach response plan in the portion of Smith Point County Park east of the pavilion and TWA Flight 800 Memorial, with a conventional beachfill plan for the remainder of Smith Point County Park. The updated TSP recommends a proactive breach response plan for this area, to more closely match the plan features, and level of risk reduction that has been provided by the Fire Island Stabilization Project.

- The TFSP recommended a beachfill alignment along Fire Island located seaward of the existing development, a line previously identified as the Minimum Real Estate Impact Alignment. The updated TSP recommends a dune alignment that is located further landward, consistent with the Fire Island Stabilization Project that includes the acquisition or relocation of approximately 40 homes.
- The TFSP identified a 50-yr period of renourishment that could be modified based upon adaptive management considerations. The TSP has been modified to recommend a 30-yr commitment of Federal and non-Federal renourishment that recognizes the potential for variable beach conditions between renourishment cycles. After 30 years, the Federal and non-Federal commitment would transition to a breach response plan for the remainder of the 50 years.
- The TFSP described land management regulations in general terms. The TSP will identify the improvements in land management regulations that will be recommended for implementation by others to complement the features recommended for FIMP.
- The TFSP recommended a conditional breach response plan that would include steps to allow for a delayed response in closing a breach if it was determined that a breach was closing naturally. The TSP includes a period of up to 60 days to allow for a decision to be made on whether to allow the natural processes to address the closure of the breach.

I look forward to working with you and your staff on finalizing this project. The corps will be sending a FIMP Reformulation Study CZM Assessment for your review in the next few weeks. We find the formal review process allows for a thoughtful evaluation of the interrelated features and their contributions to coastal storm risk reduction in a more formal, open process. If you should have any questions, please contact Mr. Robert J. Smith of my staff at 917-790-8729.

Sincerely,

Peter Weppler
Chief, Environmental Branch

Attachments

DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT
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Environmental Branch

October 13, 2015

Mr. David Stilwell
Field Supervisor
U.S. Fish and Wildlife Service
3817 Luker Road
Cortland, New York 13045

Subject: Fire Island Inlet to Montauk Point Reformulation Study (FIMP)

Dear Mr. Stilwell:

This letter is in reference to the Fire Island Inlet to Montauk Point, New York Reformulation Study. This letter has been prepared to summarize our approach request a Fish and Wildlife Coordination Act Report (FWCAR) and start the Section 7 coordination and then finalize the FIMP Reformulation Study and associated Environmental Impact Statement (EIS).

In March 2011, the U.S. Army Corps of Engineers (Corps), the U. S. Fish and Wildlife Service (USFWS) and the National Park Service (NPS) jointly signed and transmitted a letter to the New York State Department of Environmental Conservation (NYSDEC), identifying the Tentative, Federally Supported Plan (TFSP) as the basis for moving forward with the Project. New York State, by letter in June 2013, agreed in concept with the TFSP. This agreement noted the details that required refinement, which include the breach response, life-cycle management of the project, alignment, and nature-based features.

The Corps finds that the best course of action to resolve these remaining plan details is through the Corps' formal report review process, the NEPA process, and necessary regulatory coordination. The formal review process is an efficient means to formally describe the alternative plan in its entirety, and to finalize a mutually agreeable plan that has local sponsor support. The Corps intends to move forward with what we will identify as the Tentatively Selected Plan (TSP) in our EIS.

A description of the TSP is provided as an enclosure. The adjustments that have been made to the TFSP include the following:

- The TFSP recommended a conditional breach response plan in the portion of Smith Point County Park east of the pavilion and TWA Flight 800 Memorial, with a conventional beachfill plan for the remainder of Smith Point County Park. The updated TSP recommends a proactive breach response plan for this area, to more closely match the plan features, and level of risk reduction that has been provided by the Fire Island Stabilization Project.

- The TFSP recommended a beachfill alignment along Fire Island located seaward of the existing development, a line previously identified as the Minimum Real Estate Impact Alignment. The updated TSP recommends a dune alignment that is located further landward, consistent with the Fire Island Stabilization Project that includes the acquisition or relocation of approximately 40 homes.
- The TFSP identified a 50-yr period of renourishment that could be modified based upon adaptive management considerations. The TSP has been modified to recommend a 30-yr commitment of Federal and non-Federal renourishment that recognizes the potential for variable beach conditions between renourishment cycles. After 30 years, the Federal and non-Federal commitment would transition to a breach response plan for the remainder of the 50 years.
- The TFSP described land management regulations in general terms. The TSP will identify the improvements in land management regulations that will be recommended for implementation by others to complement the features recommended for FIMP.
- The TFSP recommended a conditional breach response plan that would include steps to allow for a delayed response in closing a breach if it was determined that a breach was closing naturally. The TSP includes a period of up to 60 days to allow for a decision to be made on whether to allow the natural processes to address the closure of the breach.

I look forward to working with you and your staff on finalizing this project. We have agreed to meet with your staff on a weekly basis to expedite the Fish and Wildlife Coordination Act Report (FWCAR) and section 7 consultation. The corps will be sending a FIMP Reformulation Study Biological Assessment for your review in the next few weeks. We find the formal review process allows for a thoughtful evaluation of the interrelated features and their contributions to coastal storm risk reduction in a more formal, open process. If you should have any questions, please contact Mr. Robert J. Smith of my staff at 917-790-8729.

Sincerely,

Peter Weppler
Chief, Environmental Branch

cc. USFWS-LIFO

DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT
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Environmental Branch

October 13, 2015

Melissa D. Alvarez, PWS
Marine Habitat Resource Specialist
Habitat Conservation Division
National Marine Fisheries

Subject: Fire Island Inlet to Montauk Point Reformulation Study (FIMP)

Dear Ms. Alvarez:

This letter is in reference to the Fire Island Inlet to Montauk Point, New York Reformulation Study. This letter has been prepared to summarize our approach to conduct Essential Fish Habitat (EFH) coordination under the Magnuson-Stevens Fishery Conservation and Management Act and then finalize the FIMP Reformulation Study and associated Environmental Impact Statement (EIS).

In March 2011, the U.S. Army Corps of Engineers (Corps), the U. S. Fish and Wildlife Service (USFWS) and the National Park Service (NPS) jointly signed and transmitted a letter to the New York State Department of Environmental Conservation (NYSDEC), identifying the Tentative, Federally Supported Plan (TFSP) as the basis for moving forward with the Project. New York State, by letter in June 2013, agreed in concept with the TFSP. This agreement noted the details that required refinement, which include the breach response, life-cycle management of the project, alignment, and nature-based features.

The Corps finds that the best course of action to resolve these remaining plan details is through the Corps' formal report review process, the National Environmental Policy Act (NEPA) process, and necessary regulatory coordination. The formal review process is an efficient means to formally describe the alternative plan in its entirety, and to finalize a mutually agreeable plan that has local sponsor support. The Corps intends to move forward with what we will identify as the Tentatively Selected Plan (TSP) in our EIS.

A description of the TSP is provided as an enclosure. The adjustments that have been made to the TFSP include the following:

- The TFSP recommended a conditional breach response plan in the portion of Smith Point County Park east of the pavilion and TWA Flight 800 Memorial, with a conventional beachfill plan for the remainder of Smith Point County Park. The updated TSP recommends a proactive breach response plan for this area, to more closely match the plan features, and level of risk reduction that has been provided by the Fire Island Stabilization Project.

- The TFSP recommended a beachfill alignment along Fire Island located seaward of the existing development, a line previously identified as the Minimum Real Estate Impact Alignment. The updated TSP recommends a dune alignment that is located further landward, consistent with the Fire Island Stabilization Project that includes the acquisition or relocation of approximately 40 homes.
- The TFSP identified a 50-yr period of renourishment that could be modified based upon adaptive management considerations. The TSP has been modified to recommend a 30-yr commitment of Federal and non-Federal renourishment that recognizes the potential for variable beach conditions between renourishment cycles. After 30 years, the Federal and non-Federal commitment would transition to a breach response plan for the remainder of the 50 years.
- The TFSP described land management regulations in general terms. The TSP will identify the improvements in land management regulations that will be recommended for implementation by others to complement the features recommended for FIMP.
- The TFSP recommended a conditional breach response plan that would include steps to allow for a delayed response in closing a breach if it was determined that a breach was closing naturally. The TSP includes a period of up to 60 days to allow for a decision to be made on whether to allow the natural processes to address the closure of the breach.

I look forward to working with you and your staff on finalizing this project. We find the formal review process allows for a thoughtful evaluation of the interrelated features and their contributions to coastal storm risk reduction in a more formal, open process. If you should have any questions, please contact Mr. Robert J. Smith of my staff at 917-790-8729.

Sincerely,

Peter Weppler
Chief, Environmental Branch

Attachments

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT
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August 10, 2015

Planning Division

Mr. Alan A, Fuchs, P.E.
Director, Bureau of Flood Protection and Dam Safety, Division of Water
New York State Department of Environmental Conservation
625 Broadway
Albany, NY 12233-3504

Dear Mr. Fuchs:

This letter is in reference to the Fire Island Inlet to Montauk Point, New York Reformulation Study. Identical copies of this letter have been provided to New York State DEC, Suffolk County, US Fish and Wildlife Service, and National Park Service. This letter has been prepared to summarize our approach to bring the FIMP Reformulation Study to a conclusion.

In March 2011, the Corps, USFWS and NPS jointly signed and transmitted a letter to NYSDEC, identifying the Tentative, Federally Supported Plan (TFSP) as the basis for moving forward with the Project. We recognize this as a significant milestone in advancing this Reformulation Study. New York State, by letter in June 2013, agreed in concept with the TFSP. This agreement noted the details that required refinement, which include the breach response, life-cycle management of the project, alignment, and nature-based features.

Following Hurricane Sandy, we have continued to work collaboratively to refine the TFSP to address the agency missions and respond to lessons learned during Hurricane Sandy. Participating agencies have coordinated their response to storm impacts and the breaches that occurred, to implement the stabilization efforts, and to advance the overall Reformulation Study. We have collectively recognized that adjustments to the TFSP were necessary for the stabilization efforts, and will be necessary to implement the overall Reformulation Plan.

Multiple meetings have convened to finalize the FIMP plan details, and it has become apparent that the interrelationship of the features within the recommended alternative and the level of risk tolerance acceptable to each agency impedes a multi-agency consensus on specific features. Therefore, the Corps finds that the best course of action to resolve these remaining plan details is to through the Corps' formal report review process, the NEPA process, and necessary regulatory coordination. The formal review process is an efficient means to formally describe the alternative plan in its entirety, and to finalize a mutually agreeable plan that has local sponsor support. Rather than ending the ongoing coordination between our respective offices, we find the formal review process allows for a thoughtful evaluation of the interrelated features and their contributions to coastal storm risk reduction in a more formal, open process.

The Corps intends to move forward with what the Corps will identify as the Tentatively Selected Plan (TSP) in our General Reevaluation Report and Environmental Impact Statement.

A description of the TSP is provided as an enclosure. The adjustments that have been made to the TFSP include the following:

- The TFSP recommended a conditional breach response plan in the portion of Smith Point County Park east of the pavilion and TWA Flight 800 Memorial, with a conventional beachfill plan for the remainder of Smith Point County Park. The updated TSP recommends a proactive breach response plan for this area, to more closely match the plan features, and level of risk reduction that has been provided by the Fire Island Stabilization Project.
- The TFSP recommended a beachfill alignment along Fire Island located seaward of the existing development, a line previously identified as the Minimum Real Estate Impact Alignment. The updated TSP recommends a dune alignment that is located further landward, consistent with the Fire Island Stabilization Project that includes the acquisition or relocation of approximately 40 homes.
- The TFSP identified a 50-yr period of renourishment that could be modified based upon adaptive management considerations. The TSP has been modified to recommend a 30-yr commitment of Federal and non-Federal renourishment that recognizes the potential for variable beach conditions between renourishment cycles. After 30 years, the Federal and non-Federal commitment would transition to a breach response plan for the remainder of the 50 years.
- The TFSP described land management regulations in general terms. The TSP will identify the improvements in land management regulations that will be recommended for implementation by others to complement the features recommended for FIMP.
- The TFSP recommended a conditional breach response plan that would include steps to allow for a delayed response in closing a breach if it was determined that a breach was closing naturally. The TSP includes a period of up to 60 days to allow for a decision to be made on whether to allow the natural processes to address the closure of the breach.

The District recognizes that prior to the distribution of the report for public review, several steps are necessary. The District will arrange an interagency meeting to communicate these steps. The point of contact for this correspondence is Mr. Frank Verga, Project Manager at 917-790-8212.

Sincerely,

Frank Santomauro

Frank Santomauro, P.E.
Chief, Planning Division

FIRE ISLAND INLET TO MONTAUK POINT, NY
Tentative Selected Plan with Post Sandy Amendments
Summary of Components

INLETS: FIRE ISLAND, MORICHES, SHINNECOCK

- Continuation of authorized navigation projects, and the scheduled Operations and Maintenance (O&M) dredging and beneficial reuse of sediment
- Additional dredging of the ebb shoal, outside of the navigation channel, with downdrift placement undertaken in conjunction with the scheduled Operations and Maintenance (O&M) dredging of the inlets
- Placement of a +13 ft dune and berm, as needed in identified placement areas
- Continual monitoring to facilitate adaptive management changes in the future

MAINLAND NON STRUCTURAL

- 10-year floodplain non-structural building retrofits, including 4,400 elevation, floodproofing, relocation, and acquisition
- Road raising in 4 locations

Road Raising Areas

Area #	Town	Community	Approx. Length of Raised Road (Ft)	Structures Protected[1]	Nonstructural Treatments In Same Area[2]
4a	Babylon	Amityville	6,600	97	24
8c	Babylon	Lindenhurst	5,300	240	42
8d8e	Babylon	Lindenhurst	9,000	362	16
52a	Brookhaven	Mastic Beach	10,500	355	234

1. Structures enclosed by raised road and high ground with ground elevations below the raised road crest.

BARRIER ISLANDS:

BREACH RESPONSE

- Proactive Breach Response plan is triggered when protection is compromised. This trigger would be an evaluation of the level of protection against breaching, and serve as a trigger when the beach and dune are lowered below a 25-year design level of risk reduction.
- Reactive breach closure is triggered when a breach has occurred. A breach is defined as the condition where a channel across the island permits the exchange of ocean and bay waters under normal tidal conditions.
- Conditional breach response requires action be taken to develop processes for conditional breach response within the large, Federally-owned tracts along Fire Island, considered the undeveloped areas within the purview of the Fire Island National Seashore. Within the national seashore boundary, the NPS needs to determine the likelihood of natural closure. All areas of the barrier island between Moriches Inlet and Shinnecock Inlet will either be a Pro-Active or Reactive Breach Response and therefore not addressed by the conditional breach management procedures.

FIRE ISLAND @ DEVELOPED LOCATIONS (communities, minor Federal Tracts)

- Beachfill (+15 ft dune with berm)
- Post-Sandy optimized beachfill alignment
- Minimized tapers into Federal tracts; with compensating overfill in communities

FIRE ISLAND @ UNDEVELOPED LOCATIONS (major Federal Tracts & Smith Point Park)

- Conditional Breach Response (+9.5 ft berm only), anticipated closure to be initiated within 45-60 days
- @ Lighthouse – Proactive and Reactive Breach Response (+13 ft dune and berm)
- @ Smith Point County Park East – sand bypassing, then Proactive and Reactive Breach Response
- @ Smith Point County Park West - short term beachfill in western, developed section to allow relocation of infrastructure, then Proactive Breach Response
- No maintenance fill for breach closure, action taken only when a breach occurs

WESTHAMPTON BARRIER ISLAND:

- Beachfill (+15ft dune with berm) fronting Moriches Bay
- Proactive and Reactive Breach Response (+13 ft dune, with berm), fronting Shinnecock Bay

DOWNTOWN MONTAUK AND POTATO ROAD

- Sediment management measure is recommended at both sites. A feeder beach will be created by placing sediment to offset erosion on a four year cycle over a 50 year span. Dune and berm construction and renourishment are not recommended.
- Potato Road feeder beach is contingent upon the implementation of a local pond opening management plan for Georgica Pond.

GROIN MODIFICATION

- Taper existing Westhampton Groins (13) and existing Ocean Beach Groins (2)
    - Shortening of groins 1 through 8 to 380 ft
    - Shortening of groins 9 through 13 to 386, 392, 398, 402, and 410 ft respectively
- Taper existing Ocean Beach Groins (2)

NATURAL/NATURE-BASED FEATURES (NNBF)

The selected NNBF plans are shown in the attached table. A second table presents that alternatives considered in making this selection.

INTEGRATION OF ADAPTIVE MANAGEMENT

- Period of renourishment for 30 years, subject to adaptive management considerations and local land use regulations, that will be adjusted to breach response, following 30 years.
- Provisions to continually adjust components of the project to improve effectiveness
- Applies to all plan features, developed to address climate change concerns (e.g., Sea Level Rise)

INTEGRATION OF LOCAL LAND USE REGULATIONS AND MANAGEMENT

- Local Land Management regulations to include enforcement of federal and state zoning requirements, as a necessary component for long-term risk reduction

Natural and Nature Based Features Summary of Alternative Evaluation

Transect	Site	Alt	CE / ICA Results	Priority Level	Rationale
2	Sunken Forest	1	Supported	u	Included as barrier NNBF
2	Sunken Forest	2	Supported	3	Included as a barrier NNBF
2	Sunken Forest	3	marginal	3	Included as a barrier NNBF
~~2~~	~~Sunken Forest~~	4	~~Excluded~~	~~u~~	~~Eliminated by CE/ICA~~
3	Reagan Property	1	Supported	u	Included as a barrier NNBF
3	Reagan Property	2	Supported	1	Included as a priority barrier NNBF
3	Reagan Property	3	Supported	u	Included as a barrier NNBF
5	Great Gunn	1	supported	1	Included as a priority barrier NNBF
~~5~~	~~Great Gunn~~	~~2~~	~~supported~~	~~1~~	~~Superseded by FIMI construction~~
~~5~~	~~Great Gunn~~	~~3~~	~~supported~~	~~1~~	~~Superseded by FIMI construction~~
~~5~~	~~Great Gunn~~	4	~~Excluded~~	~~u~~	~~Eliminated by CE/ICA~~
7	Tiana	1	supported	1	Included as a priority barrier NNBF
7	Tiana	2	supported	1	Included as a priority barrier NNBF
7	Tiana	3	supported	1	Included as a priority barrier NNBF
8	WOSI	1	supported	1	Included as a priority barrier NNBF
8	WOSI	2	supported	1	Included as a priority barrier NNBF
8	WOSI	3	supported	1	Included as a priority barrier NNBF
~~8~~	~~WOSI~~	4	~~supported~~	~~1~~	~~Eliminated based upon agency input~~
~~9~~	~~Georgica Pond~~	~~1~~	~~Excluded~~	~~3~~	~~Eliminated by CE/ICA~~
~~9~~	~~Georgica Pond~~	~~2~~	~~Supported~~	~~3~~	~~Eliminated on agency input, does not contributing to CSRM~~
~~9~~	~~Georgica Pond~~	~~3~~	~~Excluded~~	~~U~~	~~Eliminated by CE/ICA~~
10	East Inlet Island	1	Supported	1	Eliminated as NNBF, no CSRM, possible ESA offset
10	East Inlet Island	2	Supported	1	Eliminated as NNBF, no CSRM, possible ESA offset
~~10~~	~~East Inlet Island~~	~~3~~	~~Excluded~~	~~2~~	~~Eliminated by CE/ICA~~
11	John Boyle Island	1	supported	1	Eliminated as NNBF, no CSRM, possible ESA offset
~~11~~	~~John Boyle Island~~	~~2~~	~~Excluded~~	~~2~~	~~Eliminated by CE/ICA~~
11	John Boyle Island	3	supported	2	Eliminated as NNBF, no CSRM, possible ESA offset
~~14~~	~~Ocean Beach~~	~~1~~	~~Excluded~~	~~U~~	~~Eliminated by CE/ICA, superseded by FIMI~~

~~14~~	~~Ocean Beach~~	~~2~~	~~marginal~~	~~U~~	~~Eliminated by CE/ICA, superseded by FIMI~~
~~14~~	~~Ocean Beach~~	~~3~~	~~Excluded~~	~~U~~	~~Eliminated by CE/ICA, superseded by FIMI~~
15	New Made Island	1	marginal	1	Eliminated as NNBF (CSRM), but maintain for ESA consideration
~~15~~	~~New Made Island~~	~~2~~	~~Supported~~	~~2~~	~~Eliminated as NNBF, does not provide CSRM~~
~~15~~	~~New Made Island~~	~~3~~	~~supported~~	~~2~~	~~Eliminated as NNBF, does not provide CSRM~~
22	Islip Meadows	1	supported	1	Included as a priority mainland integrated non-structural NNBF
~~22~~	~~Islip Meadows~~	~~2~~	~~not supported~~	~~2~~	~~Eliminated by CE/ICA~~
22	Islip Meadows	3	supported	1	Included as a priority mainland integrated non-structural NNBF
23	Seatuck Refuge	1	supported	1	Included as a priority mainland integrated non-structural NNBF
23	Seatuck Refuge	2	marginal	1	Included as a priority mainland integrated non-structural NNBF
23	Seatuck Refuge	3	supported	1	Included as a priority mainland integrated non-structural NNBF
~~24~~	~~Davis Park~~	~~1~~	~~Excluded~~	~~U~~	~~Eliminated by CE/ICA, superseded by FIMI~~
~~24~~	~~Davis Park~~	~~2~~	~~Excluded~~	~~U~~	~~Eliminated by CE/ICA, superseded by FIMI~~
~~24~~	~~Davis Park~~	~~3~~	~~Excluded~~	~~u~~	~~Eliminated by CE/ICA, superseded by FIMI~~
~~25~~	~~Atlantique to Corneille~~	~~1~~	~~marginal~~	~~1~~	~~Eliminated, based upon agency input~~
25	Atlantique to Corneille	2	supported	1	Included as a priority barrier NNBF
~~25~~	~~Atlantique to Corneille~~	~~3~~	~~supported~~	~~1~~	~~Superseded by FIMI~~
~~26~~	~~Kismet~~	~~1~~	~~marginal~~	~~u~~	~~Superseded by FIMI~~
~~26~~	~~Kismet~~	~~2~~	~~Excluded~~	~~u~~	~~Eliminated by CE/ICA, superseded by FIMI~~
~~26~~	~~Kismet~~	~~3~~	~~Excluded~~	~~u~~	~~Eliminated by CE/ICA, superseded by FIMI~~
27	Warner Island East	1	Excluded	3	Eliminated as NNBF, but maintain for ESA consideration
~~27~~	~~Warner Island East~~	~~2~~	~~marginal~~	~~3~~	~~Eliminated, does not contribute to CSRM~~
~~27~~	~~Warner Island East~~	~~3~~	~~marginal~~	~~3~~	~~Eliminated, does not contribute to CSRM~~
~~28~~	~~Atlantique~~	~~1~~	~~marginal~~	~~1~~	~~Eliminated by CE/ICA, superseded by FIMI~~
~~28~~	~~Atlantique~~	~~2~~	~~Not supported~~	~~1~~	~~Eliminated by CE/ICA, superseded by FIMI~~
~~28~~	~~Atlantique~~	~~3~~	~~not supported~~	~~3~~	~~Eliminated by CE/ICA, superseded by FIMI~~
~~29~~	~~Fair Harbor~~	~~1~~	~~marginal~~	~~2~~	~~Eliminated by CE/ICA, superseded by FIMI~~
~~29~~	~~Fair Harbor~~	~~2~~	~~not supported~~	~~2~~	~~Eliminated by CE/ICA, superseded by FIMI~~
~~29~~	~~Fair Harbor~~	~~3~~	~~not supported~~	~~3~~	~~Eliminated by CE/ICA, superseded by FIMI~~

Tiana Cut	1	Supported	U	Included as a priority barrier NNBF
~~Tiana Cut~~	~~2~~	~~Not Supported~~	~~U~~	~~Superseded by changed conditions~~
~~Tiana Cut~~	~~3~~	~~Not Supported~~	~~U~~	~~Superseded by changed conditions~~
~~Smith Point Cut~~	1	Supported	~~U~~	~~Superseded by FIMI, changed conditions~~
~~Smith Point Cut~~	~~2~~	Supported	~~U~~	~~Superseded by FIMI, changed conditions~~
~~Smith Point Cut~~	~~3~~	Supported	~~U~~	~~Superseded by FIMI, changed conditions~~

Summary of NNBF Recommendations
Barrier Island Alternatives recommended for construction (All Alternatives shown for a site are recommended as a combined plan for that site)
Alternatives marked with * have been identified as top priority measures by the Corps and partner agencies

NNBF SITE	NNBF Alternative ID	Goal/Target	Description
T-2 Sunken Forest	**Combined 1,2,3**		
Alternative 1	T-2-1	eroding bayside shoreline	Remove bulkhead adjacent to marina, regrade shoreline and stabilize using bio-engineering, control Phragmites
Alternative 2	T-2-2	upper beach and dune	Enhance upper beach/dune width/slope/height, reduce disturbance by removing the boardwalk and installing a dune walkover, and restoring dune at cuts
Alternative 3	T-2-3	upland and interior dune areas	Restore interior upland and dune areas of the site to natural conditions by removing all hard structures, removing boardwalks and dune walkovers, closing off and regrading all disturbed areas/roads/trails (except one to provide access from marina)
T-3 Reagan Property	**Combined 1,2,3**		
Alternative 1	T-3-1	eroding bayside shoreline	Regrade eroding bayside shoreline and stabilize using bio-engineering (vegetated gabions)
* Alternative 2	T-3-2	upper beach and dune	Enhance upper beach/dune width/slope/height, reduce disturbance by closing off some access roads and trails, removing sand fence, raise boardwalks above dunes and restore dune
Alternative 3	T-3-3	bulkheaded areas of bayside shoreline	Bury bulkhead, regrade shoreline and create intertidal area, stabilize shoreline using bio-engineering
T-5 Great Gun	**1**		
*Alternative 1	T-5-1	existing salt marsh	Enhance salt marsh by restoring hydrologic connection via culvert beneath the road
T-7 Tiana	**Combined 1,2,3**		
*Alternative 1	T-7-1	bayside shoreline and upper beach and dune	Restore salt marsh by removing fill material, using herbicide to control *Phragmites*, regrading and replanting. Restore dune at access cut and provide access via a dune walkover.
*Alternative 2	T-7-2	upland and interior dune areas	Remove parking lot, regrade to natural contours, plant
*Alternative 3	T-7-3	bay submergent vegetation	Enhance existing SAV beds
T-8 WOSI	**Combined 1,2,3**		
*Alternative 1	T-8-1	*Phragmites* control throughout site	Enhance the existing salt marsh through the use of herbicides to control *Phragmites*.

*Alternative 2	T-8-2	Enhancement of bay shoreline and upper beach and dune	Reduce disturbance on site by raising the existing oceanside boardwalk and restoring the dune, regrading the bayside shoreline slope, and placing a walkover at the existing bayside shoreline access cut
*Alternative 3	T-8-3	Remove hard structures	Remove parking lot and walkway on oceanside, regrade site to natural contours, plant
T-25 Atlantique to Cornielle	**2**		
*Alternative 2	T-25-2	Create salt marsh bayside	Create new salt marsh by regrading upland areas and bay shoreline, plant native salt marsh species
Tiana (Channel Cut)			
Alternative 1	Tiana-1	Bayside Shoreline Improvements	Enhance bayside shoreline with soft bioengineering structures and intertidal zone plantings, increasing species diversity with invasive species control

Summary of NNBF Recommendations
Mainland Alternatives recommended for construction in combination with nonstructural improvements in the area.
(All Alternatives shown for a site are recommended as a combined plan)

T-22 Islip Meadows	**Combined 1,3**		
*Alternative 1	T-22-1	Improve and manage hydrology	Restore hydrologic connection by removing sediment, install flap gates to manage tidal flow
Alternative 3	T-22-3	Tidal pool creation, *Phragmites* control	Ditch plugging and pool creation, *Phragmites* control using herbicides
T-23 Seatuck Refuge	**Combined 1,2,3**		
*Alternative 1	T-23-1	Improve and manage hydrology	Restore hydrologic connection, install culverts, control Phragmites using hydrology, convert disturbed areas to salt marsh
*Alternative 2	T-23-2	Reconfigure tidal channels	Reconfigure existing tidal channels, control Phragmites with herbicides
*Alternative 3	T-23-3	Remove bulkhead, create salt marsh in footprint	Remove bulkhead, regrade shoreline, and restore marsh through plantings

Summary of NNBF Recommendations
Alternatives eliminated based upon CSRM evaluation, but considered for ESA offsets
(All Alternatives shown for a site are recommended as a combined plan)

T-11 John Boyle Island	**Combined 1,3**		
*Alternative 1	T-11-1	Create shorebird nesting habitat	Regrade portions of the dunegrass community to remove dense vegetation to create shorebird nesting habitat, control *Phragmites* throughout site
Alternative 3	T-11-3	Stabilize shoreline	Regrade and stabilize shoreline with vegetated gabion bio-engineering
T-15 New Made Island	**1**		
*Alternative 1	T-21-1	Create shorebird nesting habitat	Fill existing *Phragmites*-dominated baybeach to control *Phragmites* and create open dune habitat favorable for shorebird nesting
T-27 Warner Island East	**1**		
Alternative 1	T-27-1	Create shorebird nesting habitat	Fill BAYBEACH to create shorebird nesting habitat

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO
ATTENTION OF
Environmental Analysis Branch

December 17, 2015

Melissa D. Alvarez, PWS
Marine Habitat Resource Specialist
Habitat Conservation Division
National Marine Fisheries

Subject: Fire Island Inlet to Montauk Point Reformulation Study (FIMP)

Dear Ms. Alvarez:

This letter is in reference to the Fire Island Inlet to Montauk Point, New York Reformulation Study. This letter has been prepared to submit our official Essential Fish Habitat (EFH) coordination under the Magnuson-Stevens Fishery Conservation and Management Act in order to finalize the FIMP Reformulation Study and associated Environmental Impact Statement.

I look forward to working with you and your staff on finalizing this project. The District appreciates your continued cooperation in expediting this process. If you should have any questions, please contact Mr. Robert J. Smith of my staff at 917-790-8729.

Sincerely,

Peter Weppler
Chief, Environmental Branch

Attachments

MEMORANDUM OF UNDERSTANDING
between the
THE UNITED STATES ARMY
and
THE DEPARTMENT OF THE INTERIOR

I. PURPOSE

The purpose of this Memorandum of Understanding (MOU) is to provide a foundation for collaboration between the United States Army (Army), represented by the United States Army Corps of Engineers (Corps) and the Department of the Interior (DOI), for purposes of developing a plan that is mutually acceptable for hurricane and storm damage reduction, including identifying and evaluating natural and nature-based measures that contribute to coastal storm damage risk reduction, in the general reformulation study for the Fire Island to Montauk Point, New York project (FIMP).

II. BACKGROUND

The Corps and DOI stipulate that:

A. Congress authorized the FIMP for beach erosion control and hurricane protection in section 101 of the Rivers and Harbors Act of 1960, Public Law 86-645;

B. Section 8 of the Act establishing the Fire Island National Seashore, Public Law 88-587 directed that the authority of the Corps to undertake or contribute to shore erosion control or beach protection measures on lands within the Fire Island National Seashore lands shall be exercised in accordance with a plan that is mutually acceptable to the Secretary of the Army and the Secretary of the Interior;

C. The Corps initiated a reformulation study of the FIMP in 1980;

D. In 2004, the Corps, DOI, and other partners adopted a Vision Statement for the reformulation study that acknowledged a preference for measures that protect and enhance natural processes and minimize adverse environmental impacts;

E. In 2011, the Corps in consultation with the DOI developed a Tentatively Federally Selected Plan in the FIMP reformulation study that included a combination of soft structural, nonstructural, and nature based solutions as well as monitoring and adaptive management components to address uncertainties;

F. In 2012, Hurricane Sandy damaged portions of the FIMP project area, increasing risk and vulnerability of coastal developments in the project area to flooding; and,

G. Congress provided funding in the Disaster Relief Appropriations Act of 2013, Public Law 113-2 to reduce future flood risk in ways that will support the long-term sustainability of the coastal ecosystem and communities and reduce the economic costs and risks associated with large-scale flood and storm events.

III. MUTUAL AGREEMENTS

Building upon previous collaboration efforts such as the Vision Statement and the Tentatively Federally Selected Plan, and, subject to applicable federal laws, regulations, guidance, policy and the NEPA public review process, the Corps and DOI mutually agree to collaboratively:

- Identify natural and nature based measures that may contribute to hurricane and storm damage reduction in the FIMP study area;

- Investigate modeling tools to quantify the contribution of natural and nature-based measures to hurricane and storm damage reduction in the FIMP study area;

- To the extent possible, formulate all hurricane and storm damage reduction measures and alternatives in a manner that avoids or minimizes adverse environmental impacts;

- Develop project monitoring protocol with the goal of assessing, and adaptively managing, project impacts and performance;

- Take into account potential changing conditions, including sea level rise and the dynamic nature of the FIMP study area, over the period of analysis when formulating all hurricane and storm damage reduction measures and alternatives; and

- Formulate land use management measures and evaluate their contributions to long-term risk reduction.

IV. GENERAL PRINCIPLES

A. This MOU is intended only to outline areas of cooperation between the Corps and DOI necessary to allow for effective project implementation, and is not intended to create any right or benefit, substantive or procedural, enforceable at law by any party against the United States, its agencies, its officers, or any person.

B. This MOU is neither a fiscal nor funds obligation document. Any endeavor involving reimbursement or contribution of funds between the parties to the MOU will be handled in accordance with applicable laws, regulations, and procedures.

C. The Corps and the DOI intend to conduct the activities contemplated in this agreement in accordance with existing authorities. If any of the provisions of this MOU are determined to be inconsistent with existing laws, policies, regulations or directives governing the parties, then the provisions of this MOU not affected by a finding of inconsistency shall remain in full force and effect.

D. The parties to this MOU shall meet on a quarterly basis (in person or via conference call) to review the implementation of this MOU until the GRR/EIS for the FIMP project is completed.

E. This MOU may be modified as necessary, by mutual agreement of both parties, by a written amendment signed and dated by an authorized representative of each party.

F. Either party may terminate this MOU by providing 45 days written notice to the other. Otherwise this MOU will remain in force through completion of the GRR/EIS for the FIMP project and during the period of initial construction of the project.

V. <u>POINTS OF CONTACT</u>. The following individuals will be the points of contact for this MOU:

<u>CORPS</u>

Mr. Joe Vietri
Chief, Planning and Policy, North Atlantic Division
Building 301, General Lee Avenue
Fort Hamilton Military Community
Brooklyn, New York 11252
Joseph.R.Vietri@usace.army.mil
917-613-3873

<u>FISH AND WILDLIFE SERVICE</u>

Mr. David Stilwell
Field Supervisor, New York Field Office
U.S. Fish and Wildlife Service
3817 Luker Road
Cortland, NY 13045
607-753-9334

<u>NATIONAL PARK SERVICE</u>

K. Christopher Soller, Superintendent
Fire Island National Seashore
120 Laurel St.
Patchogue, NY 11772
631-687-4752

Mary Foley, Regional Chief Scientist
Northeast Region
National Park Service
15 State St.
Boston, MA 02109
617-223-5024

<u>USGS</u>

Walter Barnhardt
Center Director, Woods Hole Coastal and Marine Science Center
384 Woods Hole Road

Woods Hole, MA 02543
wbarnhardt@usgs.gov
508-457-2211

VI. **EFFECTIVE DATE.** The parties have executed this MOU as of the last date written below

U.S. ARMY

Jo-Ellen Darcy
JO-ELLEN DARCY
Assistant Secretary of the Army
(Civil Works)

Date: July 24, 2014

Department of the Interior

Rachel Jacobson
RACHEL JACOBSON
Acting Assistant Secretary for
Fish, Wildlife and Parks

Date: July 23, 2014

DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK NY 10278-0090

30 September 2013

REPLY TO
ATTENTION OF
Commander

Honorable Joseph J. Martens
Commissioner
New York State Department of Environmental Conservation
Albany, New York 12233-1010

Dear Commissioner Martens:

Thank you for your letter of September 5, 2013, expressing New York State support of the new dune alignment for the Fire Island to Montauk Point (FIMP) Reformulation project, and affirming Suffolk County's role in project implementation. We also appreciate the State's continued attention to the breach at Old Inlet.

In your letter, you also requested that the Corps take the lead to acquire the approximately 39 properties impacted by the new alignment and obtain the other perpetual easements required to construct and maintain the project. Although real estate acquisition remains the responsibility of the non-Federal sponsor under the Project Partnership Agreement, the Corps of Engineers is willing to provide technical assistance to the State and County. The real estate requirements for this project are complex, and timely completion of the real estate acquisition is critical to the success of the project.

The New York District Real Estate leadership has already initiated contact with real estate representatives from both your office and Suffolk County for project requirements, staff capabilities and available resources. These discussions will assist in determining the best way to proceed, which may include Corps technical assistance with preliminary activities such as title, appraisal, and mapping. If necessary, it may also include assistance with property acquisition; however, at this time, the Corps of Engineers will not pursue acquisition of any properties required for the Fire Island to Montauk Point Project through eminent domain proceedings in Federal court. Once a plan is developed it will be memorialized in a Memorandum of Agreement, which must be executed prior to beginning the work.

In reference to the existing Old Inlet Breach, we are positioning ourselves to close this breach as was done last year for the other two Sandy breaches. However, we cannot complete any significant steps until after the property owner, the U.S. Department of the Interior, National Park Service, issues the required written permission to perform the actual work. We understand that they have concluded they will produce a National Environmental Policy Act Environmental Impact Statement and Record of Decision in order to issue that permission.

I look forward to working with your office on the Fire Island to Montauk Point Project, as well as the other projects in the Hurricane Sandy Recovery Program, which will provide critical protection to the citizens in the coastal regions of New York State. If you have any additional questions, please call me or contact Mr. Frank Verga, Project Manager at (917) 790-8212.

Sincerely,

Paul E. Owen
Colonel, U.S. Army
Commander

CF:
Fuchs (NYDEC)
Foley/Soller (DOI)
Anderson (Suffolk County)
Herter/Perales (NYSDOS)

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO
ATTENTION OF

DISTRICT COMMANDER

August 16, 2013

Honorable Joe Martens, Commissioner
New York State Department of Environmental Conservation
625 Broadway
Albany, New York 12233

Dear Mr. Martens:

Thank you for letter dated 14 June, 2013, that supports the implementation of the Fire Island to Montauk Point (FIMP) Project. In response, I am providing documentation to support the recommendation that the beachfill component of the plan for Fire Island be implemented along a more landward alignment than the original, more seaward alignment proposed prior to Hurricane Sandy.

The attached document compares the quantities of sediment required for initial construction and subsequent periodic maintenance over the fifty year study period for the more seaward, pre-Sandy minimum real estate alignment proposal and the more recent, post-Sandy, more landward alignment.

The analysis confirms that the sediment requirements for the more landward alignment are lower than those of the more seaward alignment. Further, the attachment demonstrates that even with the cost estimate for the necessary real estate acquisitions to allow construction of the more landward alignment combined with initial construction and maintenance costs, the new proposed alignment is considerably less expensive than the more seaward, original minimum real estate proposal.

This more landward alignment is more economical, resilient and sustainable over the 50 year project life. Accordingly, your concurrence with the Tentative Federal Selected Plan (TFSP) implementation in the revised alignment is expected, as the 14 June letter indicated concurrence once the revised alignment was proven to achieve these goals.

An accelerated schedule has been developed to provide emergency stabilization within the next construction window. Therefore, it is the District's intent to immediately proceed with analysis of the TFSP along this more landward alignment and seek higher authority approvals by each Federal Agency. Without immediate indication to the contrary, your support of the TFSP is assumed from the statements in the 14 June letter and the supporting analysis provided in this response. Please contact Mr. Anthony Ciorra, Chief of Coastal Restoration and Special Projects Branch at (917) 790-8208 or Mr. Frank Verga, Project Manager, at (917) 790-8212, should you have any questions.

Sincerely,

Paul E. Owen
Colonel, U.S. Army
Commander

Enclosure

United States Department of the Interior

FISH AND WILDLIFE SERVICE
3817 Luker Road
Cortland, NY 13045

July 29, 2013

Mr. Leonard Houston
Chief, Environmental Analysis Branch
U.S. Army Corps of Engineers
26 Federal Plaza
New York, NY 10278

Dear Mr. Houston:

This response to your letter dated July 15, 2013, requesting consultation with the U.S. Fish and Wildlife Service (Service) pursuant to the Fish and Wildlife Coordination Act (FWCA) of 1958 (48 Stat. 401, as amended; 661 *et seq.*) for the U.S. Army Corp of Engineers' (Corps) proposed emergency stabilization projects on Fire Island and Montauk Beach, Suffolk County, New York. These projects are being proposed to address shoreline erosion associated with Hurricane Sandy, and are part of the Corps' 83-mile Fire Island Inlet to Montauk Point Reformulation Study.

The Service requests that the Corps submit detailed project plans to our office as soon as possible so that we may begin to provide feedback on the draft scopes of work that your office submitted to us for review concerning preparation of Fish and Wildlife Coordination Act 2(b) Reports for each of these projects. In addition, please inform us as to whether the Corps will be requesting formal consultation with the Service pursuant to the Endangered Species Act (ESA) of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) and Coastal Barrier Resources Act (CBRA) of 1982, as amended (16 U.S.C. 3501 *et seq.*). Listed species that occur in the proposed project areas include the piping plover (*Charadrius melodus*; threatened), roseate tern (*Sterna dougallii dougallii*; endangered), sandplain gerardia (*Agalinus acuta*; endangered), and seabeach amaranth (*Amaranthus pumilus*; threatened). The red knot (*Calidris canutus rufa*), a candidate species for protection under the ESA, may also be present in the Fire Island project area.

If you have any questions or require further assistance, please have your staff contact Steve Papa of the Long Island Field Office at (631) 286-0485.

Sincerely,

David A. Stilwell

David A. Stilwell
Field Supervisor

ANDREW M. CUOMO
GOVERNOR

JOE MARTENS
COMMISSIONER

STATE OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
ALBANY, NEW YORK 12233-1010

June 14, 2013

Colonel Paul E. Owen
District Commander
United States Army Corps of Engineers
New York District
26 Federal Plaza
Room 2109
New York, NY 10278

Dear Colonel Owen:

I am pleased to inform you that New York State supports implementation of the fully federally funded Fire Island to Montauk Point (FIMP) project, including the United States Army Corps of Engineers' (Corps) proposal to expedite the implementation of elements of FIMP, such as the immediate restoration of dunes and beaches damaged by Hurricane Sandy on Fire Island and downtown Montauk. This support is based on the overall concepts of the FIMP project subject to the items further described in this letter.

On March 11, 2011, representatives of the Corps and the United States Department of Interior sent a letter to me outlining the potential plan of improvement for the Fire Island to Montauk Point ("FIMP") Reformulation Study. This "Tentative Federal Supported Plan" ("TFSP") was proposed as the basis to move forward with Reformulation Study efforts for the entire FIMP study area – encompassing approximately 83 miles of Atlantic Ocean coastal and bay areas of Suffolk County, New York. As noted in the federal letter, New York State must find the general plan of improvement acceptable before its attributes can be finalized through a collaborative process. New York's approval at this stage, I understand, would allow the Corps and State to move forward with a final analysis of the TFSP, including such matters as plan formulation, engineering, economics, environmental assessment, model certifications and formal agency policy-level approvals.

After a series of discussions, on December 29, 2011, DEC sent a letter to the Army Corps presenting information requests aimed at better understanding some of the basic elements of the TFSP so that DEC would be in a position to accurately explain project elements, costs, maintenance obligations and impacts of the TFSP to the required local community sponsor(s). While further discussions were taking place, Hurricane Sandy arrived – altering the physical and fiscal landscape in a variety of ways. On May 16, 2013 the Corps responded to the Department's letter which addressed a number of the concerns raised by the Department, but deferred a response on a few issues that are currently under review based on the impacts from Sandy.

I understand that alternative components of the TFSP are now being further refined, including: breach response measures along the barrier island, including "advanced" breach response methods or protocols; inlet management, beach and dune fill components and alignments with on-going beach nourishment; structural groin modifications; resiliency measures, including a significant number of coastal community building elevations; road elevations; land and development management to limit new development in certain flood hazard areas; protective natural infrastructure features (including wetland complexes, living shorelines, shellfish reefs, dunes, ecologically friendly in-bay breakwaters, and marsh islands) and environmental restoration, particularly in south shore bay areas.

All of the above elements would be sharpened in a process that fully involves local stakeholders. As you have emphasized, this massive project would need to be finalized in a manner that takes into account increased storm surge intensity associated with climate change and sea level rise. It is understood that the Corps will be performing an environmental impact review process under the National Environmental Policy Act (NEPA) for the entire FIMP project and that the National Park Service is evaluating the need for a NEPA review with respect to the existing breach in the Wilderness Area of the Fire Island National Seashore. It is through these processes that the elements of the project will be fully analyzed and a final FIMP project will be fully defined.

The State also supports the Corps' review of the post Sandy dune re-alignment along Fire Island that may be necessary based on the Corps' cost to benefit analysis that is still underway. If the cost to benefit analysis indicates that the alignment should be moved north in order to make the project more economical, resilient, and sustainable over the 50-year period of the project, then the State would support this realignment. If the realignment requires the purchase of properties, then the State would request that the Corps minimize the scope of this activity to the extent possible for unwilling sellers and to perform the procurement of these properties for the State at full federal expense. The State awaits the Corps' submittal of the elements of the project that you are currently working on, as delineated in your May 16, 2013 response. Thank you for all of your good and continuing efforts to help New York rebuild smarter and stronger in the face of the challenges presented by Hurricane Sandy.

Sincerely,

Joseph J. Martens

Joseph J. Martens

c: Mr. Joseph Vietri

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO
ATTENTION OF
Project Management Division

16 MAY 2013

Mr. Alan A. Fuchs, P.E.
Director, Bureau of Flood Protection and Dam Safety
New York State Department of Environmental Conservation
Division of Water
Bureau of Flood Protection and Dam Safety, 4th Floor
625 Broadway
Albany, New York, 12233-3504

Dear Mr. Fuchs:

Thank you for your letter dated December 29, 2011 regarding the Fire Island Inlet to Montauk Point (FIMP) Reformulation Study, which requested additional information on the Tentative Federal Supported Plan (TFSP). This was in response to the March 11, 2011 jointly signed letter from both the U.S. Army Corps of Engineers and the U.S. Department of Interior (DOI) which requested New York State's review and verification of acceptability of the TFSP.

We recognize there have been significant changes since the exchange of this correspondence, most notably Hurricane Sandy, the passage of PL 113-2 (The Disaster Relief Appropriations Act; 2013) which includes provisions that establish a framework for proceeding with Sandy affected authorized and unconstructed projects, and the increased support to bring the FIMP Reformulation Study to a conclusion.

Prior to Hurricane Sandy, the Corps was coordinating proposed responses with both your office and the DOI, as well as in the process of developing the requested information. As we are currently in the process of updating this information to account for necessary changes due to Hurricane Sandy, we have attached preliminary responses to your comments for your immediate review.

Since Hurricane Sandy, our offices have also been engaged in a number of discussions regarding appropriate revisions to the TFSP, and the evaluation of alternatives which properly reflect the post-Sandy condition. The revisions to the TFSP that are currently under consideration include the following:

- Beach fill alignment adjustments along Fire Island to account for post-Sandy changes
- Incorporation of a dune and beach feature in the Fire Island Lighthouse Tract
- Incorporation of a feeder beach in Smith Point County Park
- Updating of Breach Response protocols
- Updating of potential plan features in Downtown Montauk

The details requested by the State are necessary for identifying a FIMP mutually acceptable plan between the Corps, DOI and State of New York. Local sponsor concurrence with the features and scale set forth in the TFSP is an essential first step to formalizing the specific features of a recommendable plan. The Corps will continue to coordinate development of the updated TSFP implementation details with affected agencies to ensure the priorities communicated by NYS are incorporated.

We look forward to your timely review and continued discussion and coordination with your office. Please contact Mr. Frank Verga, Project Manager, at (917) 790-8212 if you have any questions.

Sincerely,

Paul E. Owen
Colonel, U.S. Army
Commander

CF w/Attachments:
NYSDEC, (P. Scully; S. McCormick)
NYSDOS, (F. Anders; B. Pendergrass)
NPS, (C. Soller)
USFWS, (D. Stilwell)

Joint Signed TFSP, dated March 11, 2011

NYS comments, dated December 29, 2011

NYS comments, dated June 28, 2012

US Army Corps of Engineers

March 11. 2011

Honorable Joe Martens, Commissioner
New York State Department of Environmental Conservation
625 Broadway
Albany, New York 12233

Dear Mr. Martens:

We write together to ask for your consideration of a newly developed potential plan of improvement for the Fire Island Inlet to Montauk Point, New York, Reformulation Study.

Any plan developed for this area that involves erosion control and beach nourishment must be mutually acceptable to the United States Secretary of the Army and Secretary of the Interior. Through a series of meetings spanning nearly 18 months, the U.S. Army Corps of Engineers and the U.S. Department of Interior now stand ready to move forward with Reformulation Study efforts by utilizing this potential plan of improvement for the entire project study area. This plan of improvement is the Tentative Federal Supported Plan (TFSP) and outlines a plan that appears to meet the Federal agency objectives and requirements necessary for mutual acceptability.

We have enclosed for your review a summary of the TFSP components. While this is a brief overview, supporting information for this plan is included in the May 2008 Draft Formulation Report, similar to Alternative 3G. The State of New York, the non-Federal sponsor, must find the general plan of improvement acceptable before any finalization can occur, including completion of the Reformulation Study Draft General Reevaluation Report and Draft Environmental Impact Statement.

If the State finds the components of the TFSP acceptable, we would immediately move forward with final analysis of the TFSP plan (plan formulation, engineering, economics, environmental assessment, model certifications. internal/external reviews), including higher authority approvals by each Federal agency.

If the State finds any components of the TFSP not acceptable, we request the State provide a locally preferred alternative (LPA). The LPA should include specific components that could be supported, in order to move forward with the required additional analysis. Both Federal agencies would still need to assess their ability to support the LPA.

We look forward to your timely review and are willing to arrange a meeting with your office in the March/April timeframe in order to further discuss the elements of the TFSP as necessary. Please do not hesitate to contact Mr. Anthony Ciorra, Chief of Civil Works at (917) 790-8208, or Mr. Frank Verga, Project Manager at (917) 790-8212, if you have any questions.

Sincerely,

John R. Boulé II
Colonel, Corps of Engineers
District Commander

K. Christopher Soller
Superintendent, Fire Island National Seashore
National Park Service

David A. Stilwell

David Stilwell
Field Supervisor, New York Field Office
U.S. Fish and Wildlife Service

Enclosure

CF:
Al Fuchs, NYS Department of Environmental Conservation
Fred Anders, NYS Department of State, Coastal Resources

FIRE ISLAND INLET TO MONTAUK POINT, NY
Tentative Federally-Supported Plan
Summary of Components

INLETS: FIRE ISLAND, MORICHES, SHINNECOCK

- Continuation of authorized projects, with increased sediment bypassing at each inlet

MAINLAND

- 10-year floodplain non-structural building retrofits, including road raisings
- Over 4,400 structures, and 4 road raising locations

BARRIER ISLANDS:

FIRE ISLAND @ DEVELOPED LOCATIONS (communities, minor Federal Tracts)

- Beachfill (+15 ft dune, with berm)
- minimum real estate impact alignment
- No tapers into Federal tracts; with overfill in communities

FIRE ISLAND @ UNDEVELOPED LOCATIONS (major Federal Tracts & Smith Point Park)

- Conditional Breach Response (+9.5 ft berm only), guidelines to be developed, anticipated closure to be initiated within 45-60 days
- @ Lighthouse - Reactive Breach Response (+9.5 ft berm only), closure initiated w/in 45 days
- @ Smith Point County Park - short term beachfill in western, developed section to allow relocation of infrastructure, then Conditional Breach Response
- Science Response Team to advise the decision makers for conditional closure
- No maintenance fill for breach closure, action taken only when a breach occurs

WESTHAMPTON BARRIER ISLAND:

- Beachfill (+15ft dune with berm) fronting Moriches Bay
- Breach Response (+13 ft dune, with berm), fronting Shinnecock Bay
- Breach Response to include action to be taken when vulnerable to breaching (specifics still to be defined)

DOWNTOWN MONTAUK AND POTATO ROAD

- Sediment management measures at both sites (feeder beach)
- Potato Road contingent upon a local pond opening management plan for Georgica Pond

GROIN MODIFICATION

- Taper existing Westhampton Groins (13) and existing Ocean Beach Groins (2)

RESTORATION

- Various alternatives at locations throughout study area

INTEGRATION OF ADAPTIVE MANAGEMENT

- Period of renourishment subject to adaptive management considerations and local land use regulations, or 50 year period of renourishment
- Provisions to continually adjust components of the project to improve effectiveness
- Applies to all plan features, developed to address climate change concerns (e.g., Sea Level Rise)

INTEGRATION OF LOCAL LAND USE REGULATIONS AND MANAGEMENT

- Local Land Management planning to include enforcement of federal and state zoning requirements, land acquisition or other measures is a necessary component for long-term risk reduction
- Improved land management can allow for adaptation to reduce costs for renourishment
- Important to ensure that the project does not induce development.

New York State Department of Environmental Conservation
Division of Water
Bureau of Flood Protection and Dam Safety, 4th Floor
625 Broadway, Albany, New York 12233-3504
Phone: (518) 402-8185 • **FAX:** (518) 402-9029
Website: www.dec.ny.gov

Joe Martens
Commissioner

December 29, 2011

Colonel John R. Boulé II
United States Army Corps of Engineers
New York District
26 Federal Plaza
Jacob K. Javits Federal Building
New York, New York 10278

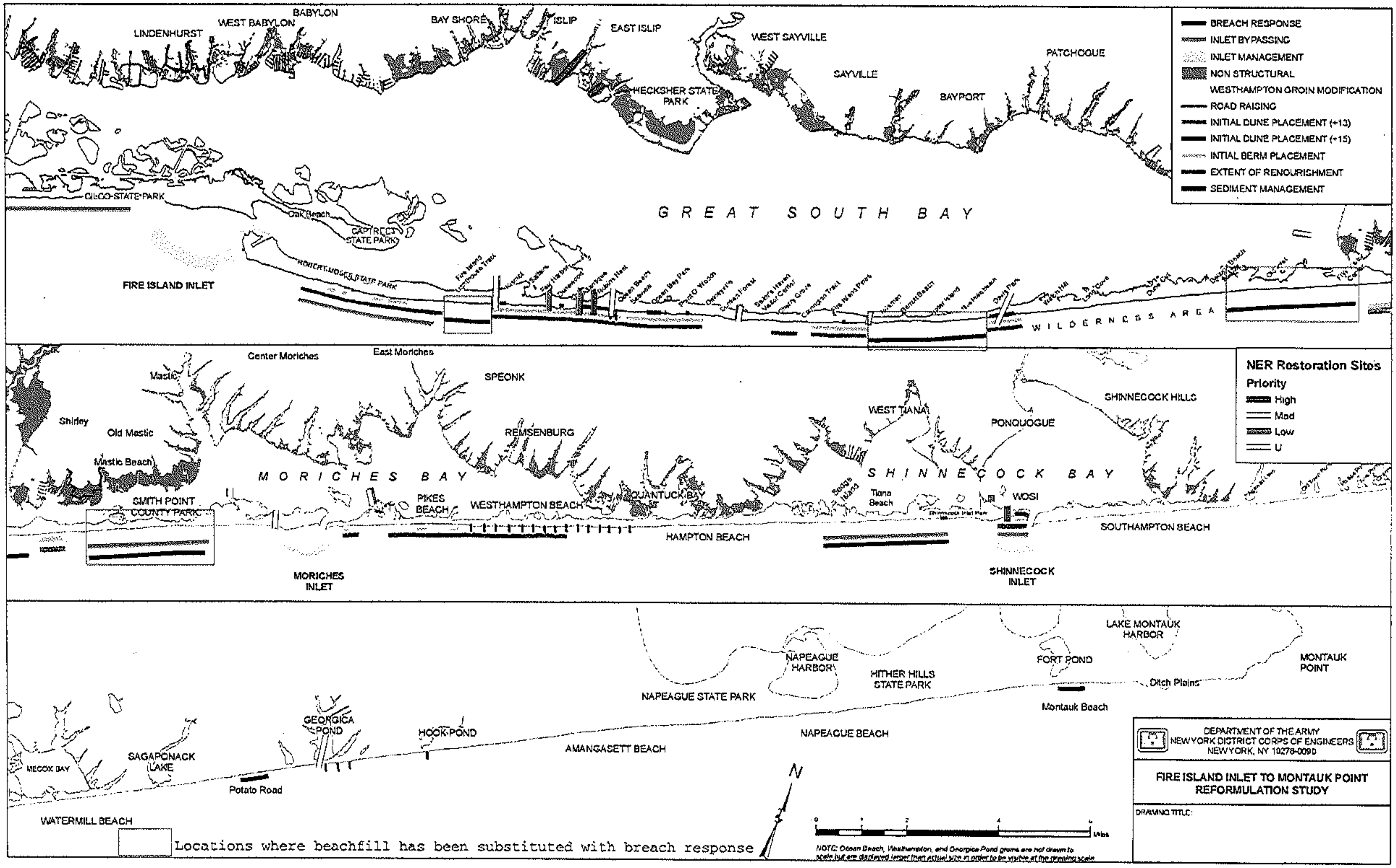
Re: Fire Island Inlet to Montauk Point (FIMP) Reformulation Study

Dear Colonel Boulé:

Thank you for the March 11, 2011, letter regarding the Federal Government's (New York District of the Army Corps of Engineers, National Park Service Fire Island National Seashore Office, and U.S. Fish and Wildlife Service New York Field Office) request for New York State to consider a potential plan of improvement for the Fire Island Inlet to Montauk Point area which is identified in the March 11th letter as the "Tentatively Federally Supported Plan" ("TFSP"). As the March 11th letter notes, the TFSP "appears to meet the Federal agency objectives and requirements," yet will need further approvals in the respective federal agencies before it would be fully approved.

The State has reviewed the TFSP and has had discussions with potential local sponsors. Unfortunately, we find that additional information is needed for the State and the potential local sponsors to respond to your request. As you understand, a positive response, or an adequately formulated request for a locally preferred alternative, will require the State to have support from its potential local partners. It is highly difficult for the State to fully understand, and to present the TFSP to potential local sponsors to seek their response or participation, when the TFSP is general in nature and does not contain the supporting information needed to justify its attributes. Therefore, the State respectfully requests the following information:

1. The March 11th letter provides a one page summary of the components of the TFSP. In May 2009 the Corps issued a Draft FIMP Reformulation Study ("Study"). Within this Study the Corps identified a number of options, including "Alternative 3G." The March 11th letter stated that Alternative 3G is "similar" to the TFSP. In the Study, we understand that alternative 3G was identified as being the National Economic Development/National Ecosystem Restoration ("NED/NER") plan, which was identified as the plan that best accomplishes the storm damage reduction objectives, based upon the integration of the alternatives. The NED/NER plan previously was discussed at a FIMP Executive Steering Committee meeting on November 10, 2009, and was presented by the Corps as the plan recommended for further development. Alternative 3G was also recommended for inclusion in the Draft General Re-evaluation Report and the



LINDENHURST
WEST BABYLON
BABYLON
BAY SHORE
ISLIP
EAST ISLIP
WEST SAYVILLE
SAYVILLE
BAYPORT
PATCHOGUE
HECKSHER STATE PARK
GILGO STATE PARK
Oak Beach
CAPTREE STATE PARK
ROBERT MOSES STATE PARK
FIRE ISLAND INLET
GREAT SOUTH BAY
WILDERNESS AREA
BREACH RESPONSE
INLET BYPASSING
INLET MANAGEMENT
NON STRUCTURAL
WESTHAMPTON GROIN MODIFICATION
ROAD RAISING
INITIAL DUNE PLACEMENT (+13)
INITIAL DUNE PLACEMENT (+15)
INTIAL BERM PLACEMENT
EXTENT OF RENOURISHMENT
SEDIMENT MANAGEMENT
Center Moriches
East Moriches
SPEONK
Mastic
Shirley
Old Mastic
Mastic Beach
REMSENBURG
WEST TIANA
PONQUOGUE
SHINNECOCK HILLS
MORICHES BAY
SHINNECOCK BAY
SMITH POINT COUNTY PARK
PIKES BEACH
WESTHAMPTON BEACH
QUANTUCK BAY
Tiana Beach
WOSI
HAMPTON BEACH
SOUTHAMPTON BEACH
MORICHES INLET
SHINNECOCK INLET
NER Restoration Sites
Priority
High
Med
Low
U
LAKE MONTAUK HARBOR
MONTAUK POINT
NAPEAGUE HARBOR
HITHER HILLS STATE PARK
FORT POND
Ditch Plains
NAPEAGUE STATE PARK
Montauk Beach
NAPEAGUE BEACH
AMANGASETT BEACH
GEORGICA POND
HOOK POND
SAGAPONACK LAKE
MECOX BAY
Potato Road
WATERMILL BEACH
N
Miles
Locations where beachfill has been substituted with breach response
DEPARTMENT OF THE ARMY
NEW YORK DISTRICT CORPS OF ENGINEERS
NEW YORK, NY 10278-0090
FIRE ISLAND INLET TO MONTAUK POINT
REFORMULATION STUDY
DRAWING TITLE:

Environmental Impact Statement for evaluation as a part of the public review process. Unfortunately, it is impossible to identify the significant differences between the newly developed TFSP and alternative 3G and we would appreciate receiving a detailed comparison of the two plans. We request that this comparison include a detailed description of the increased or decreased risks and impacts to the communities within in the study, as well as the level of storm damage reduction that would be provided by the TFSP.

2. For the State and potential local sponsors to determine the feasibility of agreeing to all or some of the TFSP, it is necessary to understand the costs involved with each phase. The State requests that the Corps provide the detailed cost-estimate/cost-breakdown for various elements of the TFSP and compare TFSP costs to those for Alternative 3G and the NED/NER plan. The Department is currently not clear on which plan is the NED/NER plan.

3. The March 11th letter indicates that the "plan *appears* to meet the Federal Agency objectives" (emphasis supplied). The State respectfully requests confirmation that the TFSP does, in fact, meet Federal Agency objectives and is the Corps "Recommended Plan". It is an extensive process for the State, in conjunction with potential local sponsors, to determine if the TFSP is fully acceptable or if a locally preferred alternative needs to be proposed for all or some of the project area. The State would strongly prefer to undertake this more extensive consultation with the knowledge that the TFSP will be acceptable to the Federal Government (subject to NEPA review and modifications, as well as appropriations) if endorsed by the State.

4. The TFSP calls for significant non-structural measures, such as elevation or relocation of structures. The State would appreciate detailed information on the Corps' proposed options for implementation of this portion of the TFSP. As one might expect, this is of great interest to potential local sponsors. The State would also be interested in the results of any consultations the Corps has undertaken with the Federal Emergency Management Agency on these proposed measures and their implementation. This non-structural effort has a direct relationship to FEMA's flood plain management and flood insurance programs, and they may be of great assistance in this implementation. Also, we request that the Corps provide a comparison of the levels of flood protection provided by the TFSP, Alternate 3G and the NED/NER plan versus the residual flood risks associated with maintaining the existing inlets.

5. Please provide more detailed information on the various barrier island breach and breach closure plans (current and proposed via the TFSP) including their locations, impacts, timeframes for closure, benefits, future estimated costs and how they relate to flood risk. It would be very useful to know how the level of storm damage reduction increases or decreases with the proposed breach plans in the TFSP in comparison to Alternative 3G and the NED/NER plan.

6. The State has discussed with the Federal Agencies its interest in evaluating the option of reducing or phasing out the re-nourishment portion of this project over the project's 50-year life span. This option might allow the beach configuration to eventually return to a more naturalized status or to possibly have beach

configuration addressed by property owners, local municipalities or local zoning entities. The State requests information on the manner in which this option would be addressed within the proposed TFSP. If these concepts are not addressed in the TFSP, the State requests that they be addressed.

7. The State has also previously raised concerns regarding the total cost of implementing any adopted plan for FIMP. One option in which there is strong potential interest is breaking the TFSP, or any plan, into a number of smaller geographical areas which could then be implemented in phases based on the availability of resources and the particular interest of non-federal sponsors. Please provide the Federal Agencies' views on whether such a phased approach would be acceptable and if there is any preferred or priority order recommended by the Federal Agencies for the implementation of a phased approach.

8. Please explain how sea level rise and climate change considerations and concerns were integrated in the TFSP, and how they will be integrated as we learn more in the future. Similarly, the summary of components associated with the TFSP also makes brief reference to beach re-nourishment being the subject of adaptive management measures; please provide information on the monitoring and assessment program associated with an adaptive management approach, as well as the entities potentially responsible for undertaking such an adaptive management approach. It is essential to understand the method by which elements of the TFSP could be adapted and modified to accommodate sea level rise and climate change.

The State very much appreciates the extensive efforts of the Federal Agencies and looks forward to working through the process with the local sponsor(s) to achieve a plan that best meets our mutual objectives. We look forward to your response to the above requests. If there are any questions pertaining to these requests, please contact me at the above number.

Sincerely,

Alan A. Fuchs, P.E.
Director
Bureau of Flood Protection and Dam Safety

cc.:

K. Christopher Soller, U.S. National Park Service
D. Stilwell, U.S. Fish and Wildlife Service
F. Santamora, Corps of Engineers
A. Ciorra, Corps of Engineers
F. Anders, NYSDOS
B. Culhane, Suffolk County
Commissioner Joe Martens
P. Scully, NYSDEC, Region 1
J. Tierney, NYSDEC
M. Klotz, NYSDEC
S. McCormick, NYSDEC

FIRE ISLAND INLET TO MONTAUK POINT (FIMP) REFORMULATION STUDY

Below are New York State comments to the "MODIFIED 2B" plan which the Corps has proposed as an alternative to be prepared to other alternatives in order to respond to the State letter dated December 29, 2011. The Corps has recommended that a comparison be made of alternatives 3A, TFSP, and MODIFIED 2B, and no action. These alternatives will be prepared in order to address the questions raised in the State's letter.

June 28, 2012

1. In "MODIFIED 2B" plan the non-structural measures need to stand alone and the benefits cost ratio of the overall plan cannot depend on them.

2. "MODIFIED 2B" proposes 13 ft dune under Proactive Breach Response at Fire Island Developed Locations. Why is the dune 2 ft lower than under Plans 3A and TFSP? How is the berm width affected?

3. What is the cross-section for 25-year plan Proactive Breach Response for "MODIFIED 2B" and what does subject to evaluation mean for all the project locations?

4. What will the real estate impact alignment be under "MODIFIED 2B"?

5. Under Integration of Adaptive Management in "MODIFIED 2B" nourishment is not included. Does that mean that it is not planned?

6. Will there be any maintenance fill for any of the breach closures under "MODIFIED 2B" and other remaining plans?

7. Is there an ability to taper off the State's involvement over time under any of the remaining plans?

8. Will FIMP prevent non-federal entities from constructing non-project activities within the project footprint such as building higher dunes, planting additional vegetation, installing snow fences, or privately funding beach replenishment?

9. Will FIMP allow non-federal entities (state, county, communities) take advantage of dredge mobilization to build a larger locally preferred alternative? Should they choose to provide additional funding to do so? Can they mobilize their own dredge in the event FIMP is providing less protection than they desire?

10. Will FIMP prevent non-federal entities from securing FEMA damage assistance or FEMA mitigation grant monies within the project footprint? (FEMA funded replenishment of non-federal engineered beaches, or FEMA funded home elevations through programs such as "project impact")?

11. If the FIMP plan becomes so big that it is unaffordable, will the lesser plan exist or there will be only no action plan left?

12. Natural processes value: The relative benefit/cost to natural processes of each alternative should be estimated, particularly with respect to flood protection and coastal barrier migration. For example, preventing breaches eliminates the primary method of barrier adjustment and retreat in response to sea level rise. See for example the recently prepared Ecosystem-based Management Plan for Great South Bay prepared by TNC. It would benefit all participants to know the environmental costs of such actions. A conceptual description of the effects of each alternative should be developed as a precursor to providing this information for the alternatives that will advanced for study in the EIS.

13. Environmental Restoration Alternatives and beach fill: The descriptions of alternatives provided by the Army Corps do not identify an opportunity to reduce the volume of fill along the ocean front in the event that bay side fill reduces the likelihood of a breach. This factor should be incorporated into the Breach Contingency and beachfill options.

14. Road raising/levees: We previously understood that this measure was not likely to be used because of state concerns over maintenance and long term effectiveness. If it is still under consideration, include evaluation of the potential costs if the levee is compromised, the maintenance work that can be anticipated over the project life, and cost shares among federal, state and local partners for both construction and long term maintenance.

15. Groins at Ocean Beach: The alternatives in the Army Corps spreadsheet cite "Taper Ocean Beach Groins" as a project measure. What exactly does "taper" mean with respect to two groins? Are they going to be shortened or rebuilt so the seaward end declines in elevation until it matches the bottom surface, or both?

16. Potato Road: The alternatives in the Army Corps spreadsheet all recommend "feeder beaches" contingent upon a management plan for opening Georgica Pond. What is being protected by these actions? Are the feeder beaches cost effective?

17. "MODIFIED 2B", beach/dune construction for all reaches: The Corps spreadsheet heading for this alternative says "Initial Beach Placement Will First Be Provided for All Reaches" Clarification is needed regarding which reaches are involved.

18. "MODIFIED 2B", Land Use Management: The clause that appears on the spreadsheet for TFSP "Improve land management can allow for adaptation to reduce nourishment cost" is missing from the description in "MODIFIED 2B". It should be included for all nourishment alternatives in any selected plan.

Responses to NYS Comments

Detailed NAN Responses to NYSDEC Comments, as dated December 29, 2011, and dated 28 June 2012

NYS Comment #1

The March 11th letter provides a one page summary of the components of the TFSP. In May 2009 the Corps issued a Draft FIMP Reformulation Study ("Study"). Within this Study the Corps identified a number of options, including "Alternative 3G". The March 11th letter stated that Alternative 3G is "similar" to the TFSP. In the Study, we understand that alternative 3G was identified as being the National Economic Development/National Ecosystem Restoration ("NED/NER") plan, which was identified as the plan that best accomplishes the storm damage reduction objectives, based upon the integration of the alternatives. The NED/NER plan previously was discussed at a FIMP Executive Steering Committee meeting on November 10, 2009, and was presented by the Corps as the plan recommended for further development. Alternative 3G was also recommended for inclusion in the Draft General Re-Evaluation Report and the Environmental Impact Statement for evaluation as a part of the public review process. Unfortunately, it is impossible to identify the significant differences between the newly developed TFSP and alternative 3G and we would appreciate receiving a detailed comparison of the two plans. We request that this comparison include a detailed description of the increased or decreased risks and impacts to the communities within in the study, as well as the level of storm damage reduction that would be provided by the TFSP.

➢ NAN Response #1

The May 2009 Draft Formulation Report (May 2009 Report) recommended two alternative plans for further consideration. The plans were described in Chapter 11 of the Report. Alternative 3A, which was identified as the plan that appears to maximize storm damage reduction benefits, and Alternative 3G, which was identified as the plan that appears to best balance the objectives of storm damage reduction, and achieving the objectives of the FIMP Vision Statement.

Following coordination with involved agencies, the TFSP evolved from 3G and was proposed in the March 2011 letter. The TFSP differs from 3G in two ways:
1) The TFSP includes beach fill in the portion of Smith Point County Park fronting the pavilion, where Plan 3G recommended only a breach response in this area, and:
2) The specific breach closure procedures in the TFSP acknowledges a delay of up to 60 days in closing a breach and possibility of natural closure. Plan 3G estimated 45 days to close breach.

As indicated in the cover letter, we are incorporating changes in the plan due to Sandy, in an Updated TFSP, which are not reflected in the following information. That information will be provided at a later date. The changes that are being incorporated include the following:

- Adjustments to beach fill alignment along Fire Island to account for post-Sandy changes
- Incorporation of a dune and beach feature in the Fire Island Lighthouse Tract
- Incorporation of a feeder beach in Smith Point County Park
- Updating of Breach Response Protocols
- Updating of potential plan features in Downtown Montauk

The comparisons of the alternative plans are documented in the May 2009 Report (Chapter 10). This information has also been summarized in the following sub-attachments:

- Attachment #1 – Table that provides a comparison of the remaining potential plans
- Attachment #2 – Text description of the TFSP
- Attachment #3 – A series of figures that compares the effectiveness of the TFSP

Please note: in coordinating the proposed responses to comments, the Corps suggested that the analysis consider the effectiveness of an additional alternative, identified as Plan 2B. Plan 2B is included in the table that compares alternatives. This table reflects the comments that were provided by NYS and DOI by email on 28 June 2012. Plan 2B is presently under evaluation.

NYS Comment #2

For the State and potential local sponsors to determine the feasibility of agreeing to all or some of the TFSP, it is necessary to understand the costs involved with each phase. The State requests that the Corps provide the detailed cost estimate/cost-breakdown for various elements of the TFSP and compare TFSP costs to those for Alternative 3G and the NED/NER plan. The Department is currently not clear on which plan is the NED/NER plan.

➢ NAN Response #2

Updated project costs are being developed to show costs associated with each remaining plan. Please note, all costs will change as the plan is updated to account for post-Sandy changes.

In general, costs include the upfront costs associated with construction, and recurring costs associated with renourishment, breach response, and sand bypassing.

- Attachment #4 shows costs associated with the following plans, based upon information contained in the May 2009 Report.
  - 1) Plan 3A, which appears to be the plan that maximizes net benefits
  - 2) TFSP, the plan supported by the Federal Agencies

NYS Comment #3

The March 11th letter indicates that the "plan appears to meet the Federal Agency objectives" (emphasis supplied). The State respectfully requests confirmation that the TFSP does, in fact, meet Federal Agency objectives and is the Corps "Recommended Plan". It is an extensive process for the State, in conjunction with potential local sponsors, to determine if the TFSP is fully acceptable or if a locally preferred alternative needs to be proposed for all or some of the project area. The State would strongly prefer to undertake this more extensive consultation with the knowledge that the TFSP will be acceptable to the Federal Government (subject to NEPA review and modifications, as well as appropriations) if endorsed by the State.

➢ NAN Response #3

The Corps anticipates further confirmation that the TFSP is acceptable to the Federal agencies, but can only document its understanding of agency priorities communicated in the most recent coordination. These plans were briefed at the Secretary-level and general support was expressed for them. It is expected that Secretary-level support will be reaffirmed to account for changes that are incorporated as a result of Hurricane Sandy. Even with this re-affirmation, until the necessary NEPA reviews are completed, it is appropriate to indicate that this support is tentative.

Vertical support is also conditional upon local sponsor concurrence. While confirming support from the State's sponsors can be challenging, it is necessary before the District seeks higher authority confirmation of the acceptability of these plans. Therefore, we request some indication from NYS that all components of the TFSP are found to be acceptable to the State. This would be a pre-requisite to engaging our HQ on the acceptability of any of these 3 remaining potential plans.

NYS Comment #4.
The TFSP calls for significant non-structural measures, such as elevation or relocation of structures. The State would appreciate detailed information on the Corps' proposed options for implementation of this portion of the TFSP. As one might expect, this is of great interest to potential local sponsors. The State would also be interested in the results of any consultations the Corps has undertaken with the Federal Emergency Management Agency on these proposed measures and their implementation. This non-structural effort has a direct relationship to FEMA's flood plain management and flood insurance programs, and they may be of great assistance in this implementation. Also, we request that the Corps provide a comparison of the levels of flood protection provided by the TFSP, Alternate 3G and the NED/NER plan versus the residual flood risks associated with maintaining the existing inlets.

➢ NAN Response #4:
The implementation of non-structural measures affords flexibility to accommodate local sponsor interests and leverage FEMA expertise. For evaluation of alternatives, the relative cost and anticipated benefits is sufficient for inclusion of measures in the TSFP.

The Corps has consulted FEMA and our USACE Center of Expertise for non-structural planning in the "National Flood Proofing Committee (NFPC)."

- Attachment #5 is a paper that was assembled for the Reformulation Study and communicates the options available for implementing non-structural solutions and some of the challenges that need to be addressed. At this point, our preference is to follow the model of implementation through the "homeowner-led approach". The Corps is willing to work with representatives of the State and local governments to further this discussion, and take advantage of State initiatives that are underway following Hurricane Sandy, as a model for how to proceed.

The Corps will coordinate a meeting to evaluate implementation options, and clarify preferred implementation approaches.

The Corps has been in contact with FEMA regarding the intersection of the non-Structural plan contained within FIMP, and how that relates to FEMA initiatives. As it relates to flood insurance, there is recent legislation that requires homeowners to pay actuarial rates, based upon the elevation of their house. As such, it is expected that the decision whether or not to participate in the non-structural program could have a bearing on the individual's financial responsibility for their individual flood insurance. In our discussions with FEMA, it also appears that the inclusion of the non-structural program will have a bearing on a homeowner's eligibility for participation in various FEMA programs. Similar to the funding of repair of engineered beaches, FEMA and the Corps need to consider the need to avoid augmentation. We are working to obtain a legal opinion on this, but at this point, it would be best to assume that the Corps program could limit the availability of FEMA funds, through certain programs.

NYS Comment #5.

Please provide more detailed information on the various barrier island breach and breach closure plans (current and proposed via the TFSP) including their locations, impacts, timeframes for closure, benefits, future estimated costs and how they relate to flood risk. It would be very useful to know how the level of storm damage reduction increases or decreases with the proposed breach plans in the TFSP in comparison to Alternative 3G and the NED/NER plan.

- NAN Response #5:

  Chapters 8 and 9 of the draft formulation report summarize the breach response plans to the extent they were developed at the time. The report identified the expected number of breaches for each plan alternative. Refinements to the breach closure measures which have been made since the compilation of the formulation report draft, as well as additional changes that have been requested will require that the team assess changes which may result if we allow for "natural closure" at a lower elevation than the breach closure design level. Further evaluation of the impacts will be sensitive to the assumptions in the trigger for action to be taken.

  The information provided in Attachment #2, in response to NYS Comment #1, provides a comparison as it presently exists of the comparison between the two plans.

NYS Comment #6.

The State has discussed with the Federal Agencies its interest in evaluating the option of reducing or phasing out the re-nourishment portion of this project over the project's 50-year life span. This option might allow the beach configuration to eventually return to a more naturalized status or to possibly have beach configuration addressed by property owners, local municipalities or local zoning entities. The State requests information on the manner in which this option would be addressed within the proposed TFSP. If these concepts are not addressed in the TFSP, the State requests that they be addressed.

- NAN Response #6:

  Presently the May 2009 draft Formulation Report includes text on three different alternatives for lifecycle management of these alternatives. These three scenarios are the ones jointly developed by the involved agencies, and are described in Chapter 11, Consideration of Lifecycle Management.

Presently, the report includes a brief summary of the options, without extensive quantitative analysis. The report presently concludes that of the three available options, the preferred approach is to address this through an adaptive management program.

An excerpt of the possible approaches and recommended approach is attached to this response (Attachment #6).

NYS Comment #7.

The State has also previously raised concerns regarding the total cost of implementing any adopted plan for FIMP. One option in which there is strong potential interest is breaking the TFSP, or any plan, into a number of smaller geographical areas which could then be implemented in phases based on the availability of resources and the particular interest of non-federal sponsors. Please provide the Federal Agencies' views on whether such a phased approach would be acceptable and if there is any preferred or priority order recommended by the Federal Agencies for the implementation of a phased approach.

- NAN Response #7:

Implementation of a Recommended Plan for the Reformulation Study would be a large effort which would be undertaken under multiple contracts. Incremental constructible elements may be achieved in several ways. The Corps considers identification of constructible elements to be a critical step undertaken in the final design phases of the project, following local sponsor concurrence with the elements and features within the recommended plan. At this point, the project is being formulated to prepare a Reformulation Report to address the entire Study Area with a project formulated on Separable Elements, which would allow for separate PPA's for one or more separable elements and multiple construction contracts for each PPA, as necessary.

The specifics of this are still subject to the final plan refinements and the updated final economic analyses.

NYS Comment #8.

Please explain how sea level rise and climate change considerations and concerns were integrated in the TFSP, and how they will be integrated as we learn more in the future. Similarly, the summary of components associated with the TFSP also makes brief reference to beach re-nourishment being the subject of adaptive management measures; please provide information on the monitoring and assessment program associated with an adaptive management approach, as well as the entities potentially responsible for undertaking such an adaptive management approach. It is essential to understand the method by which elements of the TFSP could be adapted and modified to accommodate sea level rise and climate change.

- NAN Response #8:

The Corps' Sea Level Change (SLC) guidance has been superseded twice since the May 2009 Draft Formulation Report. The current Corps Guidance is EC 1165-2-212 Sea-Level Change Considerations for Civil Works Programs, dated 1 October 2011. A 9 June 2010 workshop with the FIMP stakeholders considered the implementation and inclusion of prior guidance, EC 1165-2-211, dated July 2009, into the analysis of the alternatives and the selected plan and a scope of work for SLC analysis resulted from the meeting. Subsequent coordination with the Corps' leadership on the Corps guidance, which requires analysis of a three scenarios: "low" (historic), "intermediate" and "high" rates of sea level change further refined this scope of work. An AE is under contract to complete this analysis and to reflect the impact of SLC on the costs and benefits of the various alternatives.

In general, adaptive management of beach renourishment for sea level change considerations can be determined by sea level change and physical project features monitoring. Beach renourishment is highly adaptable due to its "soft" nature, and project features can be revised throughout the life of the projects. Monitoring will be specifically recommended as a feature of the plan, and as a cost-shared project requirement.

Similarly, based upon our discussions with HQUSACE, a similar course of action is recommended for non-structural solutions so that proposed plans can be adapted in the future based upon actual or realized SLC.

ATTACHMENT #1

FIMP - COMPARISON OF REMAINING PLANS OF IMPROVEMENT ---- AS OF MAY 2, 2013

*** Final comparison will also include the *NO ACTION PLAN* ***

Plan 3A *NOTE; THIS PLAN IS NOT ACCEPTABLE TO ALL PARTNERS	Updated TFSP Tentative Federally Supported Plan (dated March 11, 2013) *This contains updates to reflect post-Sandy considerations	Plan 2B * Full Analysis of this plan still to be undertaken *This contains updates to reflect post-Sandy considerations
INLETS: FIRE ISLAND + MORICHES + SHINNECOCK Continuation of authorized projects, with increased sediment bypassing	INLETS: FIRE ISLAND + MORICHES + SHINNECOCK Continuation of authorized projects, with increased sediment bypassing	INLETS: FIRE ISLAND + MORICHES + SHINNECOCK Continuation of authorized projects, with increased sediment bypassing
MAINLAND 6-year floodplain Non-structural building retrofits, including road raisings Over 3,200 structures	MAINLAND 10-year floodplain Non-structural building retrofits, including road raisings Over 4,400 structures + 4 road raising locations	MAINLAND 10-year floodplain Non-structural building retrofits, including road raisings Over 4,400 structures + 4 road raising locations
BARRIER ISLANDS: FIRE ISLAND @ DEVELOPED LOCATIONS Communities + minor Federal Tracts Beachfill (+15 ft dune, with berm) Minimum real estate impact alignment Groin Modifications; Taper existing Ocean Beach Groins (2)	BARRIER ISLANDS: FIRE ISLAND @ DEVELOPED LOCATIONS Communities + minor Federal Tracts Beachfill (+15 ft dune, with berm) Post-Sandy Adjusted Beachfill Alignment Tapers into Federal tracts; alternately overfill in communities @ Lighthouse; Beachfill (+15 ft dune, with berm) Groin Modifications; Taper existing Ocean Beach Groins (2)	BARRIER ISLANDS: FIRE ISLAND @ DEVELOPED LOCATIONS Communities + minor Federal Tracts Beachfill (+13 ft dune, with berm) Post-Sandy Adjusted Beachfill Alignment Tapers into Federal tracts; alternately overfill in communities @ Lighthouse; Beachfill (+13 ft dune, with berm) No set renourishments; renourish when cross-section falls below design level (25-year) Groin Modifications; Taper existing Ocean Beach Groins (2)
FIRE ISLAND @ UNDEVELOPED LOCATIONS Major Federal Tracts + Smith Point County Park Beachfill (+13 ft dune, with berm) Minimum real estate impact alignment	FIRE ISLAND @ UNDEVELOPED LOCATIONS Major Federal Tracts + Smith Point County Park Conditional Breach Response (details TBD) - guidelines TBD; anticipated closure to be initiated within 45-60 days @ Smith Point County Park (East + West) Feeder Beach - beachfill to offset inlet effects, details TBD Long-term relocation of park facilities to *minimize* renourishment Science Response Team to advise decision makers for conditional closure No maintenance fill for breach closure; action taken only when breach occurs	FIRE ISLAND @ UNDEVELOPED LOCATIONS Major Federal Tracts + Smith Point County Park Conditional Breach Response (details TBD) - guidelines TBD; anticipated closure to be initiated within 45-60 days @ Smith Point County Park (East + West) Feeder Beach - beachfill to offset inlet effects, details TBD Long-term relocation of park facilities to minimize renourishment Science Response Team to advise decision makers for conditional closure No set renourishments; renourish when cross-section falls below design level (25-year)
WESTHAMPTON (fronting Moriches Bay) Beachfill (+15 ft dune, with berm) Groin Modifications; Taper existing Westhampton Groins (13)	WESTHAMPTON (fronting Moriches Bay) Beachfill (+15 ft dune, with berm) Groin Modifications; Taper existing Westhampton Groins (13)	WESTHAMPTON (fronting Moriches Bay) Beachfill (+13 ft dune, with berm) No set renourishments; renourish when cross-section falls below design level (25-year) Groin Modifications; Taper existing Westhampton Groins (13)
SHINNECOCK (fronting Shinnecock Bay) Proactive Breach Response (+13 ft dune, with berm)	SHINNECOCK (fronting Shinnecock Bay) Beachfill / Proactive Breach Response (+13 ft dune, with berm) No set renourishments; renourish when cross-section falls below design level (25-year)	SHINNECOCK (fronting Shinnecock Bay) Beachfill (+13 ft dune, with berm) No set renourishments; renourish when cross-section falls below design level (25-year)

FIMP - COMPARISON OF REMAINING PLANS OF IMPROVEMENT ---- AS OF MAY 2, 2013

*** Final comparison will also include the *NO ACTION PLAN* ***

Plan 3A *NOTE; THIS PLAN IS NOT ACCEPTABLE TO ALL PARTNERS	Updated TFSP Tentative Federally Supported Plan (dated March 11, 2011) *This contains updates to reflect post-Sandy considerations	Plan 2B * Full Analysis of this plan still to be undertaken *This contains updates to reflect post-Sandy considerations
DOWNTOWN MONTAUK + POTATO ROAD Sediment management measures at both sites (feeder beaches) Potato Road contingent upon pond opening mgt plan for Georgica Pond Structural Solution at Downtown Montauk under consideration *	DOWNTOWN MONTAUK + POTATO ROAD Sediment management measures at both sites (feeder beaches) Potato Road contingent upon pond opening mgt plan for Georgica Pond Structural Solution at Downtown Montauk under consideration *	DOWNTOWN MONTAUK + POTATO ROAD Sediment management measures at both sites (feeder beaches) Potato Road contingent upon pond opening mgt plan for Georgica Pond Structural Solution at Downtown Montauk under consideration *
ENV RESTORATION Various alternatives throughout the study area (TBD)	ENV RESTORATION Various alternatives throughout the study area (TBD)	ENV RESTORATION Various alternatives throughout the study area (TBD)
INTEGRATION OF ADAPTIVE MANAGEMENT N/A	INTEGRATION OF ADAPTIVE MANAGEMENT Period of nourishment subject to adaptive management considerations and local land use regulations or, 50-year period of nourishment Provisions to continually adjust components of project to improve effectiveness Applies to all plan features, developed to address climate change concerns (Sea level rise)	INTEGRATION OF ADAPTIVE MANAGEMENT No structured renourishment; renourish upon breach vulnerability planned for 50 years, or, can be adapted Provisions to continually adjust components of project to improve effectiveness Applies to all plan features, developed to address climate change concerns (Sea level rise)
INTEGRATION OF LAND USE REGULATIONS AND MANAGEMENT N/A	INTEGRATION OF LAND USE REGULATIONS AND MANAGEMENT Local land management planning to include enforcement of Federal and State zoning requirements, land acquisition or other measures as necessary component for long-term risk reduction Improved land management can allow for adaptation to reduce nourishment costs Important to ensure project does not induce development	INTEGRATION OF LAND USE REGULATIONS AND MANAGEMENT Local land management planning to include enforcement of Federal and State zoning requirements, land acquisition or other measures as necessary component for long-term risk reduction Improved land management can allow for adaptation to allow for less frequent nourishment Important to ensure project does not induce development

ATTACHMENT #2

SUMMARY OF TENTATIVE FEDERAL SELECTED PLAN (TFSP)

The Tentative Federal Selected Plan (TFSP) has been identified as the plan that reasonably balances the policies of the US Army Corps of Engineers and the Department of the Interior.

The full analysis of how this plan was identified is included in the Draft GRR. This paper provides a summary of the TFSP. The following alternative has been developed and considered as a comprehensive plan, but each component is described separately below. In simplified terms, the TFSP is:

- Continuation of authorized projects at the inlets, with sand bypassing
- +15 ft dune, 90 ft berm beachfill plan at the post Sandy adjusted alignment along developed locations spanning Great South Bay and Moriches Bay, maintained for 50 years
- +13 ft dune, Proactive Breach Response Plan along Shinnecock Bay
- Conditional Breach Response in Fire Island undeveloped areas
- Restoration measures in conjunction with breach response
- Sediment management measures for Downtown Montauk, and Potato Road (contingent upon an improved management plan for Georgica Pond)
- Modification of the Westhampton and Ocean Beach groinfields
- Non-structural building retrofit plan for structures in the 10-year floodplain, in conjunction with road raising where cost-effective
- Approximately 38 restoration alternatives at various locations throughout the study area

A. Beach and Dune Fill Component.

Based upon the engineering and economic evaluation of the beach fill alternatives, and coordination with the Federal Partners, the TFSP includes beach fill with the following characteristics:

- Continuous beach and dune fill along the developed shorefront areas fronting Great South Bay and Moriches Bay, where necessary, to meet this design threshold; and
- Alignment: Beachfill configured along a post Sandy alignment;
- +15 ft NGVD dune, 90 ft berm at +9.5 ft NGVD in developed areas & minor federal tracts
- +15 ft NGVD dune, berm at Lighthouse Tract
- Renourishment: 50 years, approximate 4-year cycle, along same length of shoreline

B. Non-Structural Plan

Based upon the engineering and economic evaluation of the non-structural plans, the non-structural plan that optimizes the net excess benefits is a combined building retrofit plan and road-raising plan along the mainland floodplain, which is generally described as follows:

- 100-year level of protection for structures inside 10-year flood plain
- Building retrofit measures are proposed, include limited relocation or buyouts, based upon structure type and condition
- 4 locations of road raising, totaling 5.91 miles in length, directly protects 1,020 houses
- Over 4,400 structures are included for non-structural treatment
- Estimated construction period is 20 years

C. Inlet Modification Plan

Based upon the engineering and economic evaluation of the inlet modification and management measures, including the multiple criteria screening matrix, the recommended plan for inlet management is continuation of the authorized project at each inlet with increased sediment bypassing from the ebb shoal to offset the downdrift deficit. A long-term, monitoring and adaptive management plan is included to allow for future changes or improvements in the inlet management, over time. The inlet management measures are generally described as follows:

Shinnecock Inlet: Continuation of authorized project + Ebb shoal dredging; -16' deposition basin
- 2 year cycle; additional 100,000 CY/yr

Moriches Inlet: Continuation of authorized project + Ebb shoal dredging
- 1 year cycle; additional 100,000 CY/yr;

Fire Island Inlet: Continuation of authorized project + Ebb shoal dredging; deposition basin expansion, with additional updrift disposal
- 2 year interval; additional 100,000 CY/yr; and

D. Groin Modification Plan

Based upon engineering and economic analysis of groin modifications, recommendation is shortening (or tapering) of Westhampton groin field (15 existing), which will increase the amount of sediment transported to the west, and will reduce renourishment requirements for the shoreline downdrift of the groins. This plan includes:
- Shortening of groins, varying between 70 – 100 ft;
- Releases 0.5M to 2M CY of sand to west

E. Breach Response Plan (BRP)

Based upon engineering and economic analysis of the alternatives, recommendation is:

- Conditional Breach Response Plan in Fire Island undeveloped areas, with threshold details currently under development
- Proactive Breach Response Plan for areas along Shinnecock Bay, where a beachfill plan is not recommended:
    - Breach Closure Template: +13' NGVD dune, berm height +9.5 ft NGVD, berm width generally 90 ft wide, but vary depending on conditions prior to the breach and within adjacent areas
    - Proactive Response Plans include restoring the template to the design condition when the shoreline is degraded to an effective width of 50 ft.

F. Sediment Management Plans

The engineering and economic analyses identified two areas of high damages where a conventional beach nourishment project was not economically viable (Downtown Montauk, and Potato Road). In these areas, Sediment Management Alternatives were evaluated to offset the long-term erosion trend, to maintain the current protection, and prevent conditions from getting worse; these features would also serve as feeder beaches. In the area of Potato Road, the implementation of this plan would be contingent upon the development of a local management plan for Georgica Pond to address the effects of the pond opening and measures to minimize the consequences of this. The plans generally include:

- Sediment placement to offset long-term erosion trend; 120,000 CY at each location; includes placement every 4 years with material to be placed as advance fill on front face of existing berm

G. Restoration Measures

Collaborative planning with an interagency team drawn from the Study's Environmental Technical Management Group and supported by the Interagency Reformulation Group established specific objectives through the development of a Restoration Framework.

This framework called for the restoration of five coastal processes that are critical to the development and sustainability of the various coastal features (such as beaches, dunes, barrier islands and bluffs), which together form the natural system. In a natural ecosystem, features such as barrier islands and dunes protect coastal lands and property, and reduce danger to human life, stemming from flooding and erosion, while establishing habitats important to coastal species. The five Coastal Processes identified by the Restoration Framework (reference as *"Processes Targeted"* within the attached Table titled "Summary of Restoration Ranks and Scores") as vital to maintain the natural coastal features are: Longshore Sediment Transport; Cross Island Sediment Transport; Dune Development and Evolution; Estuarine Circulation; and Bayside Shoreline Processes.

The Design of restoration alternatives focused on measures that contribute to the restoration of these coastal processes that are consistent with the Reformulation objectives. Such alternatives have been developed into specific and sustainable National Ecosystem Restoration (NER) alternatives.

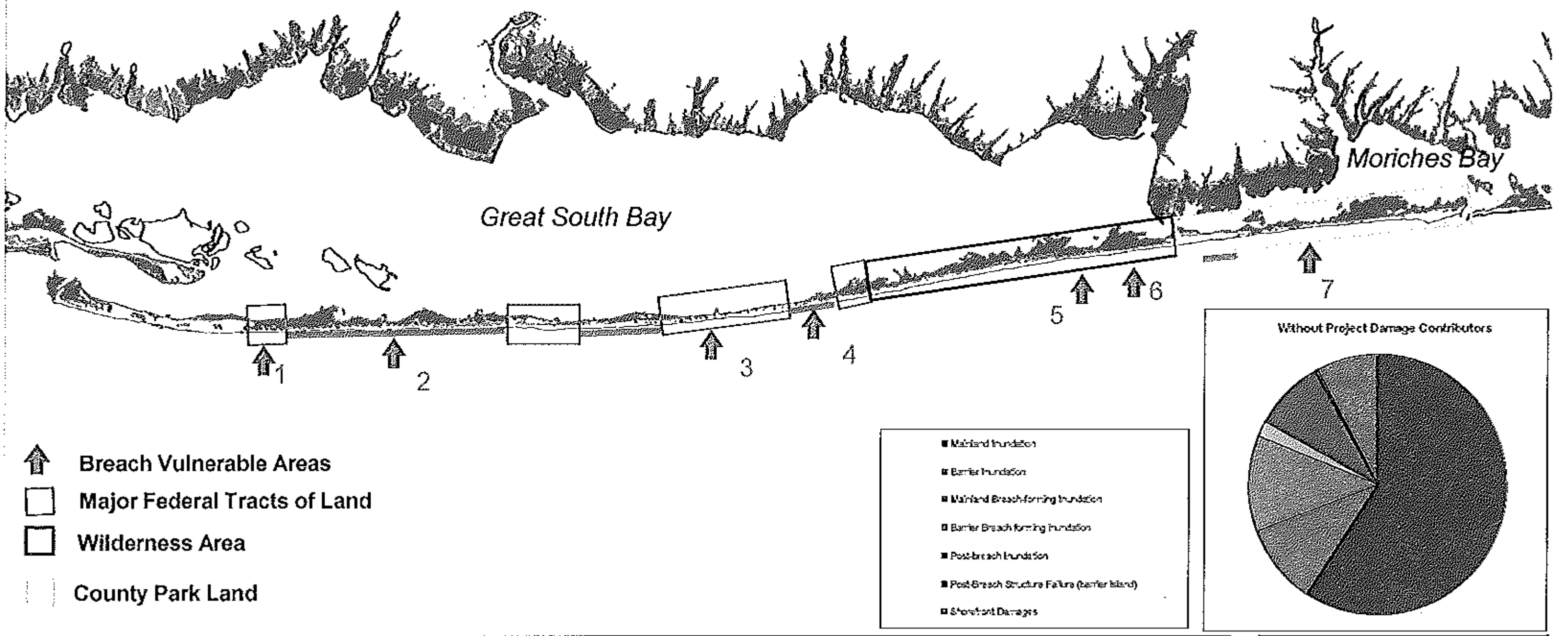
H. Adaptive Management

Adaptive Management has been identified as a component of TFSP. There is significant uncertainty associated with this plan, therefore the implementation requires an incremental adaptive management approach. This approach will be defined in the next phase of planning and will include 1) data collection to improve the understanding of the physical, social and environmental setting, 2) modeling efforts (engineering and formulation) to analyze the data, and 3) an adaptive management framework that would establish the overall objectives, decision rules, and identify the adaptations to the plan that could be accomplished with the project. This adaptation strategy will require a periodic review of the project execution (10-yr basis) and recommendations for the adaptation of the project, based upon the findings.

The adaptive management plan will formalize mechanisms for reviewing and revising the lifecycle management of elements of the project, relating to the following elements: Inlet Management, Breach Response, Beach fill, Borrow Area, Non-Structural, Restoration, Land Management Policies and Climate Change. Climate change will be accounted for with the monitoring of climate change parameters, identification of the effect of climate change on the project design, and identification of adaptation measures that are necessary to accommodate climate changes, as it relates to all the project elements.

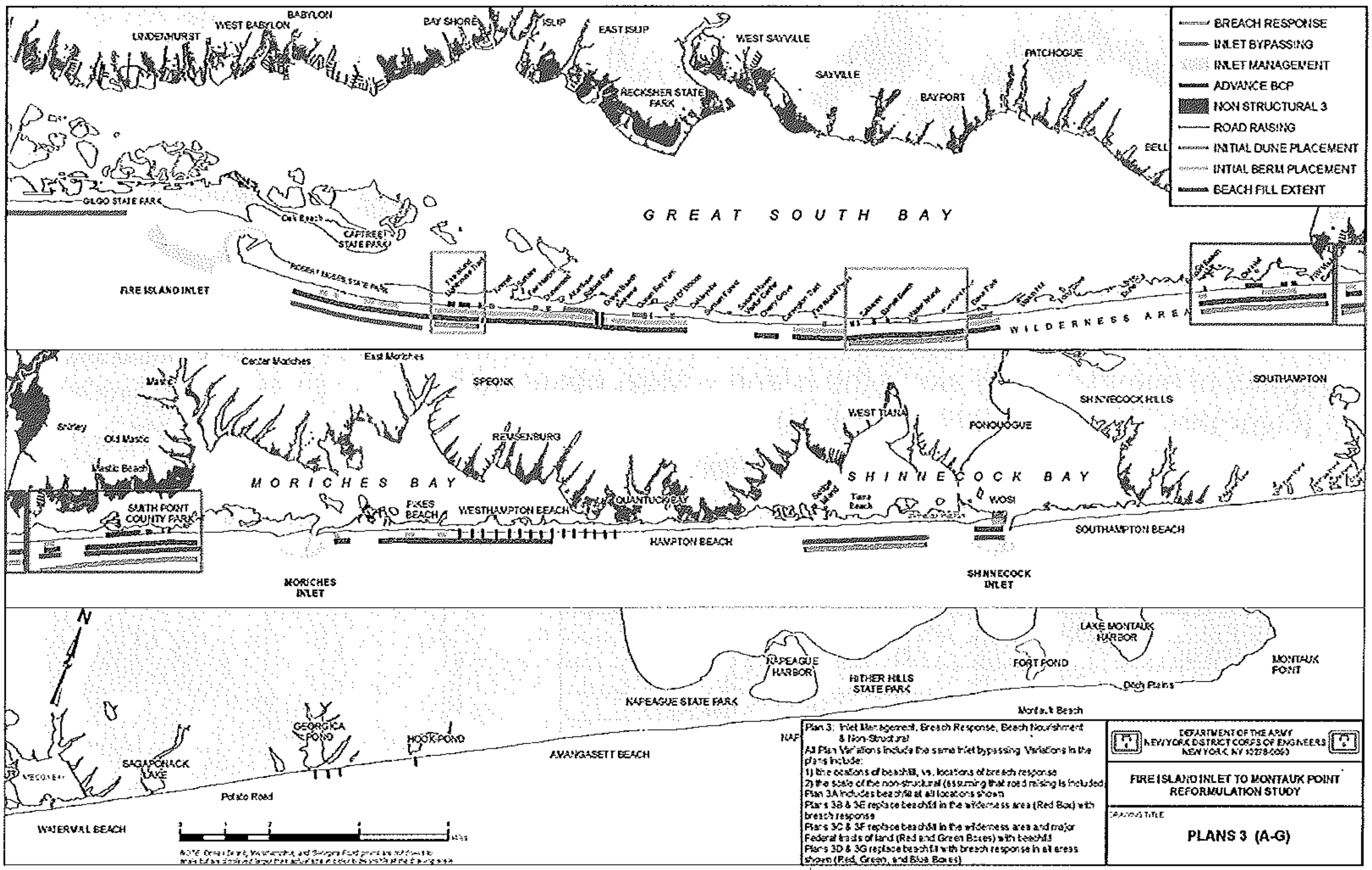
ATTACHMENT #3

FIMP - Problem Summary (Based upon May 2009 Report, being updated)

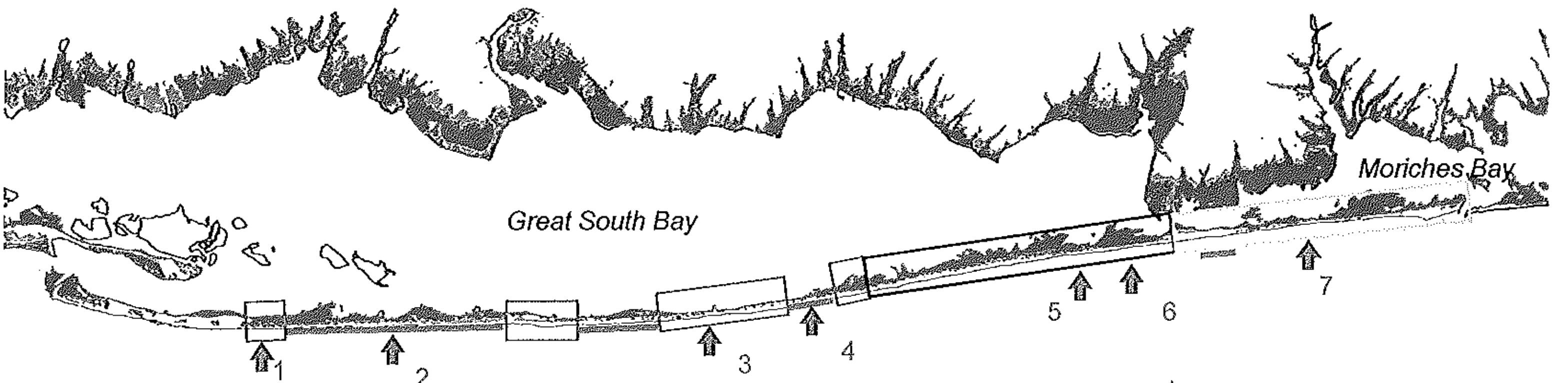


Damage Category	Without Project Annual Damages	Great South Bay	Moriches Bay	Shinnecock Bay	Alternatives
Total Project					
Tidal Inundation occurring due to inlet conditions, and wave setup in back bay					
Mainland	55,834,500	32,403,700	14,379,500	9,051,300	Non-Structural & Road Raising
Barrier	9,423,300	9,414,300	2,400	6,600	
Tidal Inundation occurring due to the event resulting in breaching, and overwash					
Mainland	$11,035,500	6,483,500	3,618,700	933,300	Beachfill
Barrier	$1,946,900	1,939,600	1,600	5,700	
Total Inundation	**$78,240,200**	**50,241,100**	**18,002,200**	**9,996,900**	
Damages (Inundation and Structure Failure) due to a breach remaining open					
Inundation	**$8,292,700**	**6,660,500**	**1,469,600**	**162,600**	**Beachfill Breach Response**
Structure Failure (barrier island)	**$358,900**	**304,600**	**-**	**54,300**	
Total Breach-Open	**$8,651,600**				
Shorefront Damages	$7,305,200	3,900,000	355,000	1,150,000	Beachfill
Total Storm Damage	**$94,197,000**	**61,106,200**	**19,826,800**	**11,363,800**	

FIMP – Alternative 3 Summary



FIMP – Impact of Alternatives



Breach Vulnerable Areas
Major Federal Tracts of Land
Wilderness Area
County Park Land

Effect of eliminating fill along the island – Most observable:
(Over the 50-year life of the project)

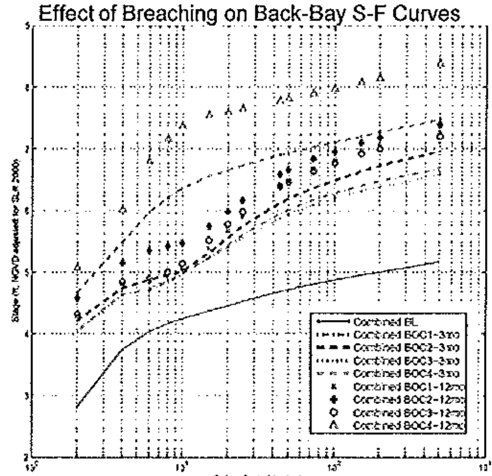
1. <u>Increase in number of expected breaches</u>
2. Increase in back-bay stage frequency curves
3. Increase in number of houses flooded
4. Increase in Residual Risk

Average likelihood of beaching

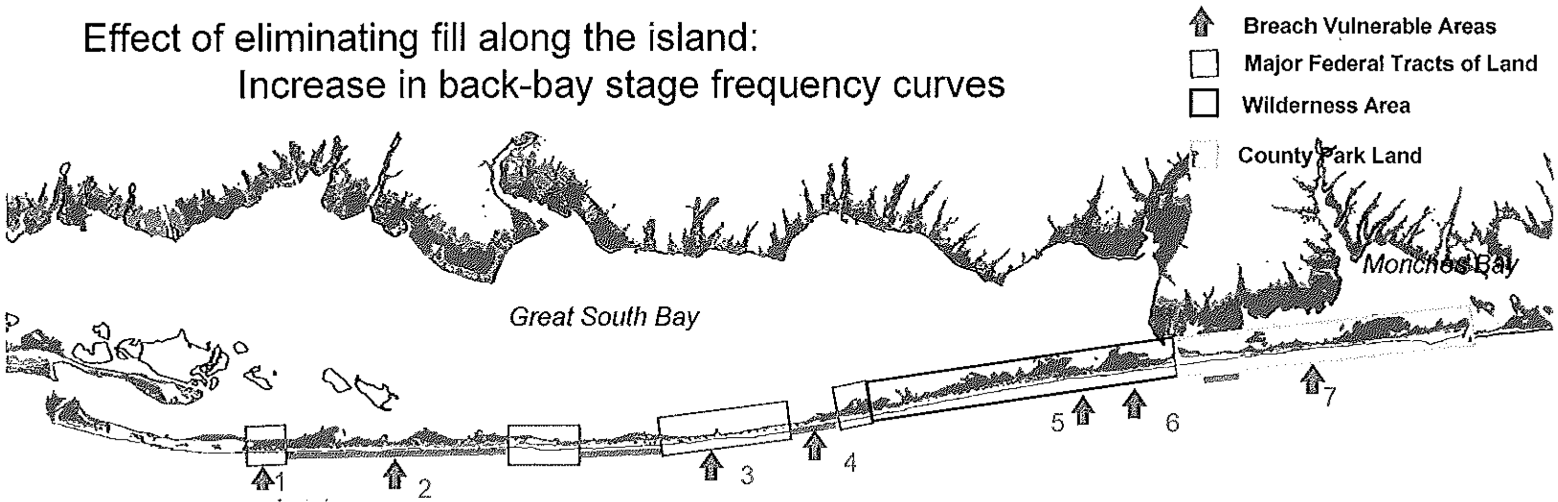
Location		Without	3A	3B/E	3C/F	3D/G	Location
1	WGSB	1	0	0	1	1	MFTL
2	WGSB	2.1	0	0	0	0	
3	CGSB	1.8	0	0	1.7	1.7	MFTL
4	CGSB	0.1	0	0	0	0	
5	EGSB	1.7	0	1.7	1.7	1.7	Wilderness
6	EGSB	1.5	0	1.5	1.5	1.5	Wilderness
7	MOR	1.8	0	0	0	1.8	County Park
8	WSHN	0.2	0.1	0.1	0.1	0.1	
9	WSHN	0.5	0.4	0.4	0.4	0.4	
10	SHN	0.3	0.2	0.2	0.2	0.2	
Total		11	0.7	3.9	6.6	8.4	

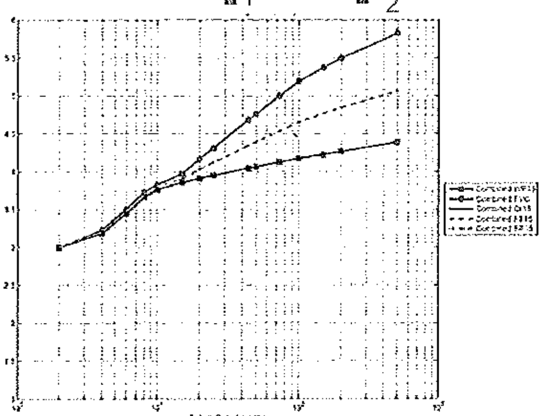
Mean Values based upon 50 years of analysis

Effect of Breaching on Back-Bay S-F Curves

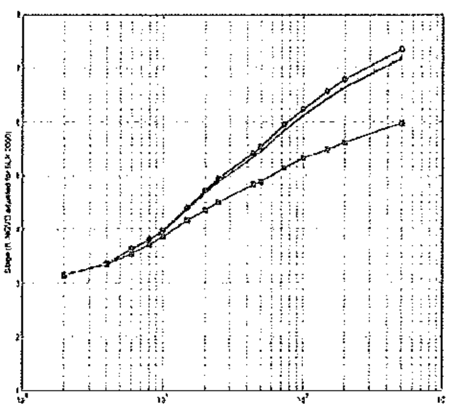


Effect of eliminating fill along the island: Increase in back-bay stage frequency curves

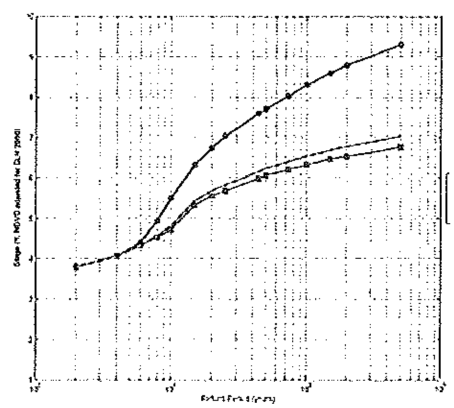




Station 3 Western Great South Bay



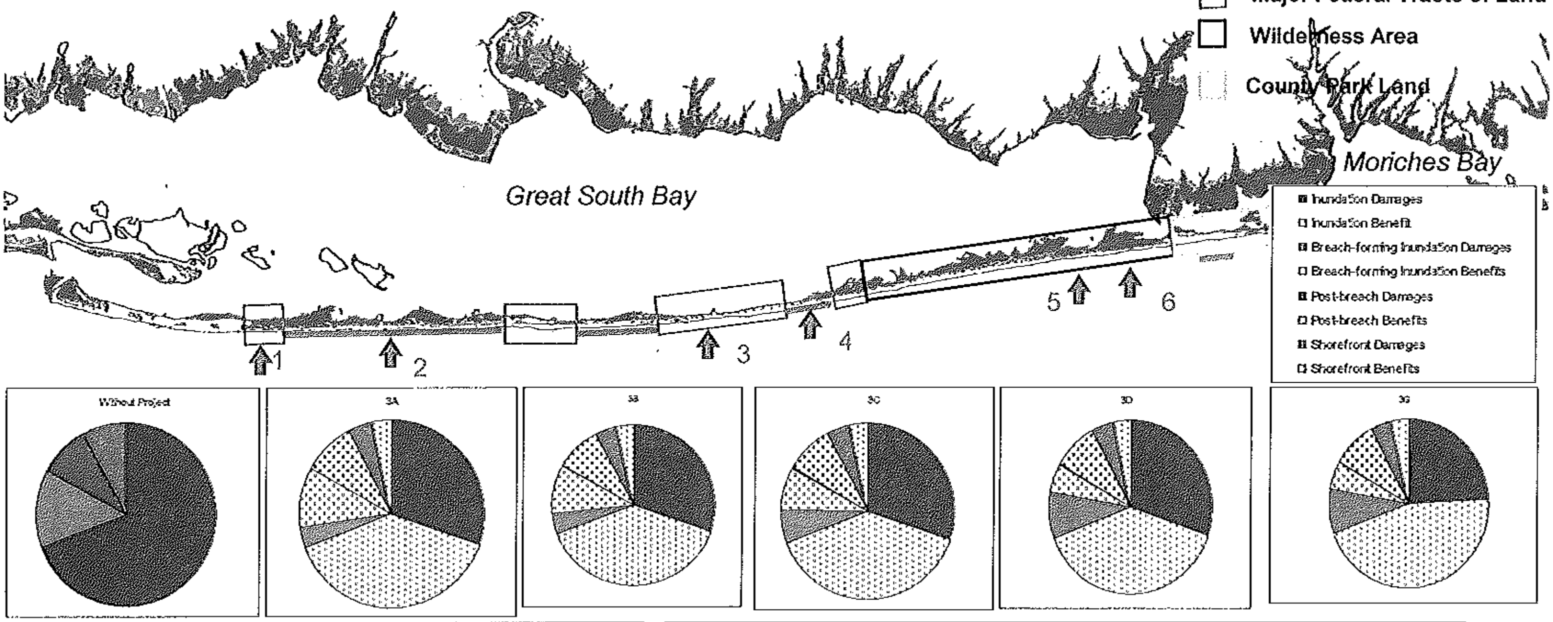
Station 8 Eastern Great South Bay



Station 10 Moriches Bay

The figures above show the engineering modeling used as input into the lifecycle damages model. The upper and Lower (red) curves represent the variability in the back-bay stages that are likely in the future without project condition based upon projected changes in the barrier Island condition, considering storm activity, and local actions that may be implemented. Plan 3A is represented by the lower red curve, which is comparable to the baseline condition. The intermediate curves show the effect of eliminating beachfill in various locations. Western GSB is most influenced by eliminating fill in the MFTL. Eastern GSB is most influenced by eliminating fill In the wilderness area. Moriches Bay is relatively insensitive to the effects of fill removal.

Effect of eliminating fill along the island: Increase in Residual Risk



Damage Category	Without
Total Project	
Tidal Inundation occurring due to inlet conditions, and wave setup in back bay	
Mainland	$55,834,500
Barrier	9,423,300
Tidal Inundation occurring due to the event resulting in breaching, and overwash	
Mainland	$11,035,500
Barrier	$1,946,900
Total Inundation	**$78,240,200**
Damages (Inundation and Structure Failure) due to a breach remaining open	
Inundation	**$8,292,700**
Structure Failure (barrier island)	**$358,900**
Total Breach-Open	**$8,651,600**
Shorefront Damages	$7,305,200
Total Storm Damage	**$94,197,000**

Alternative Damages	**3A**	**3B**	**3C**	**3D**	**3G***
Non-Structural & Road Raising	19,081,400	19,081,400	19,081,400	19,081,400	13,270,200
	9,423,300	9,423,300	9,423,300	9,423,300	9,423,300
Beachfill	3,298,500	3,890,000	5,618,500	7,929,300	7,929,300
	10,000	20,000	60,000	70,000	70,000
	31,790,800	**32,430,500**	**34,611,900**	**36,980,000**	**30,692,800**
Beachfill Breach Response	**0**	**200,000**	**300,000**	**380,000**	**380,000**
	0	**0**	**0**	**0**	**0**
Beachfill	4,045,200	4,045,200	4,045,200	4,045,200	4,045,200
	35,836,000	**36,675,700**	**38,957,100**	**41,405,200**	**35,118,000**
Storm Damage Reduction Benefits	**58,361,000**	**57,521,300**	**55,239,900**	**52,791,800**	**59,079,000**
Total Benefits**	**61,970,000**	**60,751,000**	**58,396,000**	**55,189,000**	**60,877,000**
Alternative First Cost	**328,850,000**	**322,686,000**	**320,911,000**	**320,911,000**	**386,285,000**
Alternative Annual Cost	**39,656,000**	**39,562,000**	**38,909,000**	**38,962,000**	**45,598,000**
Net Benefits	**22,314,000**	**21,189,000**	**19,487,000**	**16,227,000**	**15,279,000**

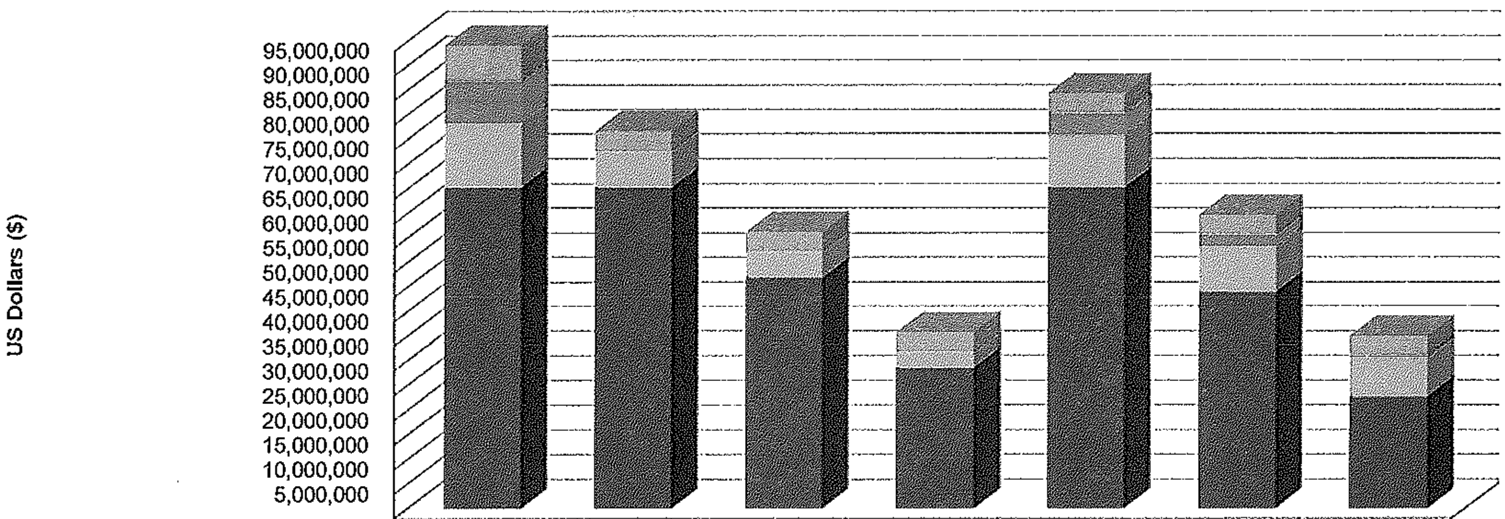
* Plan 3g includes the same barrier island features as Plan 3D, but includes a larger non-structural plan along the mainland.

** Total benefits are larger than the sum of the storm damage reduction benefits. These benefits include the costs avoided benefits associated with breach closure and local beachfill operations.

Differences Between Plans 3A and 3G/TFSP:
Plan 3A Reduces Breaching in all locations in Great South and Moriches Bay
Plan 3G/TFSP Allows Breaching in Multiple Locations, but includes a larger N-S Plan

Success of Both Plans (but greater for 3G/TFSP) depends upon participation in N-S Plan
Reduction in "breach reduction benefits" between 3A and 3G/TFSP is: $140M
Increase in "non-structural benefits" between 3A and 3G/TFSP is: $110M
3G/TFSP relies more upon N-S, and is also significantly more expensive than 3A, $105M more

FIMP Damage Contributions by Alternatives



	Without Project	3A - 0% NS	3A - 50% NS	3A - 100% NS	3G - 0% NS	3G - 50% NS	3G - 100% NS
Shorefront Damages	7,305,200	4,045,200	4,045,200	4,045,200	4,045,200	4,045,200	4,045,200
Post-breach Damages	8,651,600	0	0	0	4,547,100	2,463,600	380,000
Breach-forming Inundation Damages	12,982,400	7,419,000	5,372,400	3,308,500	10,509,700	9,254,500	7,999,300
Inundation Damages	65,257,800	65,257,800	46,881,250	28,504,700	65,257,800	43,975,600	22,693,500

ATTACHMENT #4

<u>FIMP Cost Overview by Plan Feature</u>

* ***<u>Please note costs are presently being updated to account for changed conditions, and current price levels</u>***

* ***<u>Costs below reflect those contained in the May 2009 Draft Report</u>***

- **<u>Plan 3A</u>**

<u>Beach fill</u> = $160,000,000
<u>Building Retrofits</u> = $407,000,000
<u>Road Raising</u> = $14,900,000
<u>Groin Modification</u> = $10,000,000
<u>Inlet Management</u> (additional cost of bypassing)
    Shinnecock Inlet = $756,000 per cycle
    Moriches Inlet = $600,000 per cycle
    Fire Island Inlet = $4,100,000 per cycle
<u>Breach Response</u> ($6-$12M per closure)
<u>Restoration Alternatives</u> = up to $60,000,000

- **<u>Plan TFSP</u>**

<u>Beach fill</u> = $140,000,000
<u>Building Retrofits</u> = $550,000,000
<u>Road Raising</u> = $14,900,000
<u>Groin Modification</u> = $10,000,000
<u>Inlet Management</u> (additional cost of bypassing)
    Shinnecock Inlet = $756,000 per cycle
    Moriches Inlet = $600,000 per cycle
    Fire Island Inlet = $4,100,000 per cycle
<u>Breach Response</u> ($6-$12M per closure)
<u>Restoration Alternatives</u> = up to $60,000,000

Table 10.10 – Annual Cost

Plan 3 – Management, Non-Structural and Beach Nourishment Plans

	Plan 3.a	Plan 3.g / (TFSP)
Cost Category	Inlet Mgmt, BCP 13 @SB, NS2R, 15ft Dune @ GSB & MB	Inlet Mgmt, BCP 13 @ SB, BCP 9.5 @ OPWA, MFT, & SPCP, NS3R, 15 ft Dune @ GSB & MB
Beach Fill	$160,200,000	$139,200,000
Nonstructural	$407,200,000	$550,800,000
Road Raising	$14,900,000	$14,900,000
Total First Cost	*$582,400,000*	*$705,000,000*
Total IDC	$26,600,000	$29,400,000
Total Investment Cost	*$609,000,000*	*$734,400,000*
Interest and Amortization	$34,000,000	$41,000,000
Operation & Maintenance	*$9,300,000*	*$8,900,000*
Renourishment	*$12,900,000*	*$11,000,000*
Subtotal	*$56,200,000*	*$60,900,000*
Annual Breach Closure Cost	*$0*	*$1,000,,000*
Major Rehabilitation	*$0*	*$0*
Total Annual Cost	*$56,200,000*	*$61,900,000*

Interest Rate 5.125%, Project Life 50 years

ATTACHMENT #5

US Army Corps of Engineers, New York District

Implementation of Non-Structural Measures

Fire Island Inlet to Montauk Point

As a member of your local municipal government, you may know that you must play a key role in the implementation of non-structural measures that are recommended for your community as a result of the FIMP study. However, what does this really mean? To what degree would you be involved? At what phase of the process would your involvement begin? How would your role in a project with US Army Corps participation differ from what you may be used to through your community's participation in other Federal programs? This fact sheet provides answers to questions you may have regarding the implementation of building retrofit measures, such as elevating and/or floodproofing.

THREE BASIC OPTIONS

There are three basic options available for the implementation of non-structural measures. The options differ in their level of municipal, homeowner, and federal involvement. Let's call these options 1) municipally-managed 2) Federal government-managed 3) homeowner and Federal-government managed.

Under option 1, a participating municipality would enter into an agreement that outlines the local responsibilities for issuing requests-for-proposal (RFPs), selecting a contractor to perform the work, providing oversight during the construction phase of the project, distributing Federal funds to the contractor upon successful completion, and post-project monitoring to ensure that the effectiveness of the project is not compromised; e.g., to prevent residents from converting areas below the base flood elevation to living space.

This approach would likely require the dedication of municipal resources, such as a full-time staff person(s) for the project duration. The Village of Freeport in Nassau County provides an example of a Long Island community using a similar approach. (see sidebar)

Under option 2, the Corps would handle the design specifications, RFP, contracting, construction monitoring and inspection tasks. This options reduces the work required by both the municipality and the homeowner; however, since the Corps would conduct contract arrangements, detailed plans and specifications would need to be developed for each building to be retrofit. This requirement increases the project cost per building.

FREEPORT'S STORY

Since 1997, Freeport's Superintendent of Buildings, Joseph Madigan, has worked to achieve the elevation of 24 flood-prone residential structures through participation in FEMA's Hazard Mitigation Grant Program and Flood Mitigation Assistance Program.

After their project applications were approved by FEMA, the Village issued RFPs and hired contractors on a case-by-case basis. FEMA paid 75% of the project costs, and the individual homeowners paid the remaining 25%. The average cost to raise each flood-prone structure in Freeport was roughly $75,000.

In general, there was significant public support of the elevation projects. The most prominent concerns identified by homeowners were the 25% matching share, and the need to vacate their homes for the roughly 3-week construction phase.

Option 3, in which participating homeowners take a lead role, is a technique that the Corps has used successfully on a number of large non-structural projects. The homeowner enters into a real estate agreement with the Corps under which the homeowner, using Corps-prepared guide specifications, contracts directly with area contractors. Project funds are provided at an agreed-upon level of funding to the homeowner. Experience within the agency has shown that this method can achieve significant cost savings, and also gives the homeowner a greater degree of control over the work and the flexibility to incorporate additional home improvements (at their cost) as part of the retrofit project. The use of real estate agreements establishes a legal requirement that the homeowner maintain the structure in a manner to minimize future flood damages.

For these reasons, this third option would appear to be the optimal approach for implementing non-structural protection for typical structures in Long Island. (The Corps may choose to develop plans and specifications for more complex retrofit designs.) This proposed approach is broken down into the following four phases:

REFORMULATION/PLANNING PHASE:

This first phase is now being undertaken by the FIMP Study Team, and will identify building retrofit plans for alternative levels of protection, using input from the municipalities. Next, the benefits, costs, and impacts of the different plans will be evaluated to determine which measures are best suited for the different portions of the study area. Based upon these results, the Reformulation Study will recommend plans for Congressional authorization and funding.

DESIGN PHASE

If Congress authorizes a plan that includes non-structural measures, the Corps then coordinates with participating homeowners to discuss and select retrofit options. After considering homeowner preferences, the Corps prepares design alternatives and evaluates the cost-effectiveness of each option. The Corps would then meet with homeowners to refine the details of the plan. After the final alternative is selected, final cost estimates are developed. Please note that all retrofit work will be done in compliance with FEMA/National Flood Insurance Program (NFIP) regulations, and may provide some reduction in flood insurance premiums.

IMPLEMENTATION PHASE

At the start of this phase, individual municipalities enter into Project Cooperation Agreements with New York State and the Corps, and sponsor funding is obtained. Real Estate Agreements are then executed with participating homeowners. (Participation in the program is strictly voluntary, and at the discretion of the individual homeowner.) Next, each homeowner issues a Corps-provided RFP and guide specifications to contractors, and evaluates submitted bids (designs, cost estimates, and qualifications). Based upon this evaluation, the homeowner decides which firm they would like to hire to retrofit their home.

Nationally, non-structural projects typically have a 65/35 federal/non-federal cost-sharing arrangement. The State of New York as non-federal sponsor would pay between 50% and 70% of the non-federal share, while the remainder would be borne by local municipalities, who can in turn pass the cost onto participating homeowners. A homeowner would be responsible for up to 50% of the 25% non-federal share, or 12.5% of the total project cost. Temporary relocation during construction would be included in the cost-sharing arrangement as a project component.

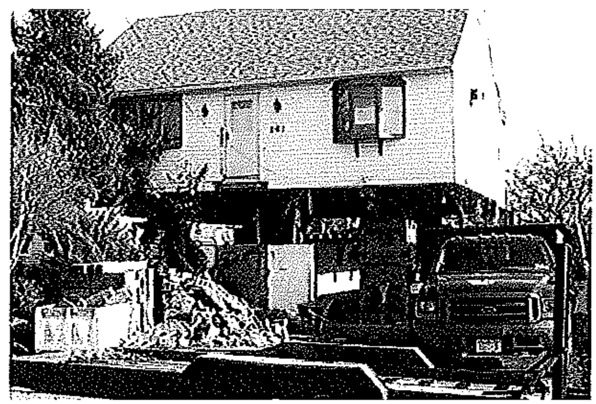
Each participating homeowner is then required to submit a proposal to the Corps, stating their selection. Upon approval, the Corps meets with the homeowner and their selected contractor to sign a Contractor/Homeowner Agreement (CHA).

Construction activities then begin. The Corps will periodically provide construction inspectors as necessary to review the work. The homeowner is responsible for ensuring that their selected contractor complies with the CHA, and adheres to the approved scope of work and required safety measures.

In the event of unforeseen conditions requiring changes to selected project plans, an appeals process would be established whereby homeowners can submit requests for change orders. The Corps deems the construction phase complete upon a Final Inspection of the building.

MONITORING PHASE

Upon completion of the construction phase, the homeowner is responsible for adhering to the requirements set forth in the Real Estate Agreement regarding acceptable uses. Periodic inspections to ensure continued compliance are conducted by State, County, or local officials.



Above: Residential structure elevation project underway in the Village of Freeport

Some **key points** to keep in mind during project implementation:

- Local height restrictions may be exceeded by elevated buildings, requiring the issuance of variances.
- Legislation in your municipality may require that homes be reassessed after elevation *(in Freeport, this requirement was waived for participating homeowners).*
- Traffic slowdowns during construction due to driver curiosity are common.
- Your local utility company likely has height restrictions for electrical panels, meters, etc. This equipment may need to placed at acceptable heights after the building is elevated.
- During the winter months, ensure that contractors insulate pipes to prevent freezing.
- For small lots with limited workspace, helical piles are a space-saving alternative for building elevation, if substantial wave action is not anticipated.

ATTACHMENT #6

D. Consideration of the life cycle management of these plans.

Alternative Plans 3A and 3G, were developed with a 50-year project life, and 50 years of renourishment. These plans do not meet the Vision objectives that "the plan addresses long-term demands for public resources". These plans do not include provisions that would change the need for continued renourishment within the project life, or alter the conditions so that a different solution could be expected following the 50-year project life.

In order to achieve a reduction in the long-term commitment for renourishment, alternatives would need to be implemented that would reduce the infrastructure that is at risk, or remove infrastructure to allow for a more efficient use of resources. The integration of land and development management regulations identifies improvements in the application of land use regulations, acquisition planning, and post-storm response planning that could help to reduce the infrastructure at risk along the shorefront.

With this as a component of the overall plan, there are several approaches which could be undertaken in the life-cycle management of the project to achieve this. The options that have been identified include:

1 – A scheduled reduction in the scale of protection for the beachfill in a timeframe that coincides with the acquisition planning. Under this scenario a beachfill plan would be maintained for a shorter period of time, over which purchase of property would be offered to shorefront structures at risk. After this period of time, the scale of protection would be reduced, thus reducing the commitment of resources for continued renourishment. The benefit of this approach is that the reduction in protection is not dependent upon the acquisition occurring.

2 – A scheduled relocation of the proposed line of protection that coincides with the acquisition planning. Under this scenario, the beachfill plan would be linked with the proposed acquisition plan. After a period of time, the footprint of the project would be maintained in a more landward location on a scheduled timeframe. The difficulty with this initiative is that the movement of the dune on a prescribed timeframe would require guaranteed acquisition, and could not be guaranteed with a willing-seller program.

3 – Adaptive Management. Under this scenario, the beachfill plan and the acquisition plan could proceed independently. On a periodic basis, coinciding with the scheduled renourishment, the constructed project would be revisited to identify if opportunities exist for adjustment of the maintained profile based upon the relative success in implementing the acquisition plan.

Under any of these scenarios, it is important to 1) identify the time scale that would be necessary for the implementation of alternatives, and 2) identifying the effect that these changes would have on project economics.

It is recognized that the acquisition of shorefront property through a willing-seller program is not an instantaneous action, particularly with consideration for acquisition strategies that could allow for a homeowner to sell their property but be allowed to continuously use the property.

The timeframes necessary for implementation of these measures suggests a timeframe measured in decades, not in years. Along the shorefront, consideration must be given for: the funding availability for acquisition, the timing of interest in selling, and the staffing to process these acquisitions.

When consideration was given for the time necessary to implement the non-structural alternatives along the mainland, accounting for staffing this effort, and funding these programs, it is expected that implementation of the mainland non-structural program would require 25 to 30 years. Discussions have also been held with agencies responsible for the relocation of public infrastructure along the shorefront. Input from these agencies indicates that major public works improvements, whether relocation or otherwise typically require 10 to 20 years, from conception to execution.

These timeframes suggest that if there is interest in reducing the long-term commitment for public investment in renourishment, a beachfill with a duration of 20 to 30 years could be considered in conjunction with an acquisition plan. As the project duration is shortened, it impacts the project economics. A sensitivity analysis was conducted which established that Alternative 3, built and maintained for 30 years, and subsequently replaced with a breach response plan, would have little effect on the project economics, and the economic viability. Achieving this objective, however, would require a larger investment in Real Estate to provide an alternative form of risk reduction for houses along the shorefront.

The challenge with developing a plan that integrates the land management, acquisition, and scheduled renourishment of the project is the uncertainty that exists. These elements introduce uncertainty to a situation that is already uncertain due to the complexities of projecting renourishment, projecting the functioning of the inlets, and the unknowns regarding future climate change. With all these uncertainties it is suggested that the implementation of the project adopt an incremental adaptive management approach. This approach would establish 1) data collection that would be implemented, 2) modeling efforts to analyze the data, and 3) an adaptive management framework that would establish the overall objectives, and the adaptations to the plan that could be accomplished with the project. This adaptation strategy is based upon the concept that with the passage of time the trends become established and more appropriate strategies can be executed. It is expected that this adaptation strategy would require a periodic review of the project execution (10-yr basis) and recommendations for the adaptation of the project, based upon the findings.

S Date: 15 October 20

United States Department of the Interior

FISH AND WILDLIFE SERVICE
3817 Luker Road
Cortland, NY 13045

September 11, 2013

Colonel Paul E. Owen
District Engineer
U.S. Army Corps of Engineers
26 Federal Plaza
New York, NY 10278

Dear Colonel Owen:

The U.S. Fish and Wildlife Service is requesting clarification from the U.S. Army Corps of Engineers (Corps) on the planning and integration of several overlapping storm damage protection projects that are currently being planned, permitted or have already been constructed within the U.S. Army Corps of Engineers' (Corps) Fire Island Inlet to Montauk Point Storm Damage Reduction Reformulation Study Area (FIMP) on Fire Island. We are particularly interested in the Smith Point County Park area where the following projects have been recently proposed or constructed: beach nourishment and dune construction at Smith Point County Park, Fire Island, New York (Corps' Public Notice [PN] NAN-2013-00873-EBO; applicant, Suffolk County Department of Public Works dated August 1, 2013); the Corps' proposed Fire Island Interim Project (emergency stabilization project); the Corps' proposed FIMP; and the Corps' constructed Breach Contingency Plan (BCP; Smith Point Breach Fill Project, November 2012).

In terms of planning and integration of projects, the Service has worked with the Corps and the National Park Service to develop a Tentatively Supported Federal Plan (TSFP) for the Fire Island Reach of the FIMP, calling for a feeder beach along portions of Smith Point County Park. However, the PN describes a large-scale beach nourishment and dune construction project which is much greater in scale than the concept of a feeder beach envisioned in the TSFP. In addition, the PN also appears to address areas where the Corps' BCP was implemented to close a small partial breach in Smith Point County Park in November of 2012. If the Smith Point PN were approved it would seem to run counter to the Corps' BCP, which is supposed to be in effect until the FIMP is constructed, providing a period where overwash habitat could be maintained for the benefit of the federally-listed piping plover (*Charadrius melodus;* threatened) as discussed in the Corps' BCP biological assessment, environmental assessment, and Service biological opinion (U.S. Army Corps of Engineers 1996, U.S. Fish and Wildlife Service 1995).

Overall, the Service requests clarification on how these projects will be implemented in the context of a comprehensive and coordinated approach to shoreline and ecosystem resiliency, as much planning still needs to be undertaken to develop a final plan which achieves these goals. We also suggest that once the planning and integration of these projects is finalized the Corps prioritize these projects for the purposes of conducting consultations with the Service under the Endangered Species Act of 1973, as amended (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) and the Fish and Wildlife Coordination Act (FWCA) of 1958, as amended (48 Stat. 401, as amended; 16 U.S.C. 661 *et seq.*).

We will reserve comments on the Corps' PN for Smith Point until we receive your response. Thank you for your immediate attention to this request. If you have any questions or require further assistance, please have your staff contact Steve Papa of the Long Island Field Office at (631) 286-0485.

Sincerely,

for Patricia Cole
David A. Stilwell
Field Supervisor

References

U.S. Army Corps of Engineers. 1996. Fire Island to Montauk Point, Long Island, New York, Breach Contingency Plan Executive Summary and Environmental Assessment. New York District, New York, NY. 45 pp plus appendices.

U.S. Fish and Wildlife Service. 1995. Biological Opinion for the Fire Island to Montauk Point Breach Contingency Plan (1995). 90 pp.

ANDREW M. CUOMO
GOVERNOR

JOE MARTENS
COMMISSIONER

STATE OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
ALBANY, NEW YORK 12233-1010

September 5, 2013

Colonel Paul E. Owen
Commander and District Engineer
United States Army Corps of Engineers
New York District
26 Federal Plaza
New York, NY 10278-0090

Dear Colonel Owen:

Thank you for your letters of July 29, 2013 and August 16, 2013. As you are aware, the State has taken some major steps to move the Fire Island to Montauk Point (FIMP) project forward. In addition, the State continues to work with the Breach Contingency Plan (BCP) Coordination Team to track the movement of the breach. The purpose of this letter is to update the Corps on a few items and clarify other issues.

The State has obtained a local sponsor for the FIMP project. Suffolk County has volunteered to take on this role, based largely on the 100 percent fully federally-funded project, which has brought the possibility of the full implementation of FIMP one step closer. Suffolk County has had a representative on the FIMP Executive Steering Committee throughout the project. This is to formally notify you that Gil Anderson, Commissioner of Suffolk County Department of Public Works, will represent the County on the Committee. In addition, the New York State Department of State (DOS) has also had a representative on the Executive Steering Committee, Fred Anders, who has retired. Therefore, Jeff Herter will take over this role and represent DOS on the Committee.

The Corps' August 16, 2013 letter indicates that the Corps has completed its assessment of the re-alignment of the Fire Island dune, which will require the acquisition or relocation of approximately 39 properties, and resulted in a positive cost benefit analysis. This is to confirm the State's support of the Corps moving forward quickly to implement the Fire Island Emergency Interim project along this new dune alignment. As stated in my June 14, 2013 letter, I want to reiterate the State's request to have the Corps take the lead on the acquisition of these properties, both from willing and unwilling sellers, in order to expedite the implementation of this emergency interim project. In addition, the State requests the Corps to also obtain the perpetual beach easements necessary to construct and maintain this project. Since this is a 100 percent federally-funded project and the acquired property will most likely be retained by the Federal Government (these properties are located within the Fire Island National Seashore and managed by the National Park Service), it is logical that the Federal Government (Corps) would take the lead in these acquisitions. Please let me know how the State can assist you in obtaining these properties and easements in the most expeditious manner.

Thank you also for your letter dated July 13, 2013 regarding Old Inlet Breach. I would appreciate receiving confirmation of the steps necessary to execute the breach closure in the event that the Breach Contingency Plan Coordination team determines that the Inlet is not closing through natural processes. As noted in my June 20, 2013 correspondence, the State fully supports the Corps' implementation of all the necessary steps to prepare for breach closure in the event that this determination is made.

Thank you and your staff for your extraordinary effort in moving the FIMP as well as other critical coastal projects forward. I look forward to talking with you soon.

Sincerely,

Joseph J. Martens

c: C. Perales, NYSDOS
G. Anderson, Suffolk County
J. Herter, NYSDOS
C. Soller, USNPS
J. Vietri, Corps
F. Verga, Corps
A. Fuchs, NYSDEC

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO
ATTENTION OF
Environmental Analysis Branch

May 6, 2011

Mr. David A. Stilwell
Field Supervisor
Fish and Wildlife Service
3817 Luker Road
Cortland, New York 13045

Dear Mr. Stilwell:

The letter is in response to your letter dated March 16, 2011 regarding mitigation and Endangered Species Act (ESA) consultation as they relate to the Fire Island to Montauk Point (FIMP) Reformulation Study. The Service expresses concerns regarding the Proactive Breach Response component of the Tentatively Supported Federal Plan (TSFP), as well as concerns regarding progress in advancing mitigation the overall TSFP. The letter also referred to reinitiating Section 7 Consultation under the ESA regarding the FIMP Interim Breach Contingency Plan (Interim BCP).

In short, the U.S. Army Corps of Engineers, New York District (District) believes that in the absence of a fully coordinated recommended plan, development of site-specific mitigation plans for the TSFP is premature, and may be unwarranted with respect to the breach response component. With respect to reopening Section 7 Consultation under the Endangered Species Act regarding the FIMP Interim Breach Contingency Plan (Interim BCP), the District's position has not changed since the latest discussion of this topic. Please find the District's response to specific comments in the attached enclosure. The District does acknowledge an importance in discussing impacts and related mitigation measures in general, and suggests that this may best be accomplished in conjunction with the detailed development of a restoration component to the TSFP, as described in our April 4, 2011 letter. The District strongly recommends that our two agencies meet soon to work out a task list and schedule to address these related items in depth at your earliest convenience. To resolve these concerns, I request that you contact my Environmental Analysis Branch chief, Len Houston, by phone (917-790-8702) or Email (leonard.houston@usace.army.mil) to arrange a meeting.

Sincerely,

Mr. Frank Santomauro, P.E.
Chief, Planning Division

Enclosure
cc: USFWS – LIFO
NYSDEC, Region 1, Stony Brook, NY (P. Scully)
NYSDOS, Albany, NY (F. Anders; B. Pendergrass)
USGS, Woods Hole, MA (W. Schwab)
NPS-FIIS, Patchogue, NY (C. Soller)
NPS, Boston, MA (M. Foley)

ENCLOSURE 1 - DETAILED RESPONSE TO 16 MARCH 2011 FWS LETTER

This District would like to take this opportunity to respond to the points highlighted in the letter.

1. *Request for minutes from Breach Response Plan (BRP) meeting in December 2010.* Please find a copy of the Memorandum for the Record attached.

2. *Breach closure dialogue did not include a discussion on bayside habitat creation.* The meeting on December 1, 2010 did include discussions regarding bayside habitat creation through sediment placement as part of breach closure, but did not come to a firm conclusion as to the size and location for bayside sediment placement. Since 2008, the District and Department of Interior have been coordinating the inclusion strategies for strengthening barrier island resiliency as part of breach response procedures and restoration opportunities which involve bayside sediment placement. These measures include a) restoration plans, b) storm damage reduction plans that include sediment placement on the bayside, c) sand placement as part of a breach closure plan. The District has proposed a number of "initial projects" that in a phased implementation strategy would utilize monitoring and adaptive management to expand the number of locations at which these strategies could be constructed over the life of the project. These "initial projects" include plans to replicate the natural overwash topography and overwash fans that can provide a habitat response that could be quantified to evaluate the biological effects of replicating/restoring the geomorphic processes and help guide decisions on whether additional management actions are necessary

3. *Proactive Breach Response Plan*
The Service has indicated that they do not support the Proactive Breach Closure Plan (PBCP) along the Westhampton Barrier Island. While the District recognizes the Service's concern, please note that this location is outside of the FIIS jurisdiction, where "mutual acceptability" is required. The District feels that Proactive BCP is an appropriate alternative for this area that includes measures to take action to prevent breaches from occurring at locations vulnerable to breaching, when a breach is imminent. This alternative provides a beach cross-section area that is comparable to the breach closure alternatives, as such, smaller than a traditional beachfill alternative. These Proactive plans are not specifically designed with the intent of protecting ocean shorefront development from overwash, wave attack or storm induced erosion losses, and allow for a greater level of overwash and dune lowering during a storm, so long as the overwash extent is below the threshold that would result in breaching. It should also be noted that this portion of the shoreline also includes a number of restoration features, and a recommendation for sediment placement in the bay for purposes of storm damage reduction. It is important to note that the breach response protocols include consideration of: 1) the closure cross-section, 2) "maintenance efforts" that would be undertaken following breach closure, and 3) the triggers for taking action. All of these actions can be included in the broader discussion of generic mitigation measures that must precede development of site-specific mitigation plans.

4. *Mitigation Planning*
Consistent with existing CEQ guidelines, the Department of Army's NEPA implementing regulations place significant emphasis on the planning and implementation of mitigation throughout NEPA's environmental analysis process. For this analysis to advance, a recommended alternative needs to be identified. For an alternative to be considered a recommended plan, two conditions must be realized: (1) it is supported by the non-federal sponsor, in this case, NYSDEC; and (2) a waiver of the requirement that the

recommended plan also be the NED/NER plan must be obtained from ASA(CW). Unless and until those conditions are met, there cannot be a recommended plan that will analyze potential environmental impacts as part of the NEPA process. Any analysis of the TSFP as the "recommended plan" prior to achieving the state support or receipt of waiver would appear to be premature. Also, please note that some alternatives discussed in the Draft Formulation Report contain design elements whose purpose is to minimize the impacts.

Some examples of mitigative measures are as follows:

(a) Avoid: Adjust the time of construction activities to avoid periods of fish migration, shorebird nesting;
(b) Minimize: Adding to the traditional storm damage reduction design a component to increase back-bay habitat,
(c) Rectify: Restore water flow to the back-bay; increase or develop new wetlands
(d) Reduce: replacement of beachfill alternatives with breach response, and smaller beach cross-section templates that are comparable to the breach closure alternatives

5. *Section 7 Consultation - Endangered Species Act*
The Service has noted on several occasions their opinion that the Storm Damage Reduction (SDR) measures developed as part of FIMP will reduce optimal habitat for Threatened and Endangered (T&E) shore species such as the Piping Plover, by reducing the frequency and severity of overwash and breaching. The Service has noted that by inhibiting the formation of early successional habitat, SDR measures may lower productivity of these species. The District has worked with the Service to develop a Draft T&E Management Plan to increase T&E species productivity at locations where SDR measures might be implemented. The Service has indicated in the past that the Management Plan should be implemented at all locations managed by FIMP Partners, where T&E species are present. In addition, the Service has identified a series of locations within the FIMP study area, where there are opportunities to enhance habitat for T&E Species. Many of these are within the FIIS and there may be opportunities to address bayside erosion and T&E concerns at some locations under the TSFP. The District agrees that efforts should resume in establishing the long-term management plan, and would welcome the Service's feedback on the report that was submitted to the USFWS for input.

6. *Section 7 Consultation Breach Contingency Plan*
The Interim BCP was established via coordination among all involved local, state, and Federal agencies and reflects interagency recognition of the benefits of coordinated, rapid response to a barrier island breach. The proposed methods discussed as well as project area conditions have not been changed, thereby making re-initiating consultation unnecessary. It is noted that District staff has been working with Service staff and other resource agencies throughout the duration of the FIMP Study to incorporate management measures for threatened and endangered species into both the BCP and TSFP. If in place, these would address impacts through implementation of specific monitoring and protection measures during and post construction. To date, these discussions have not yielded an agreement, but the District remains hopeful that an agreement can be reached.

CENAN-EN

14 January 2011

MEMORANDUM FOR RECORD

SUBJECT: FIMP Reformulation Study Conditional Breach Response Protocols

1. On 1 December 2010, a meeting was held at the New York District with the objective of identifying the conditional breach response protocols that would be acceptable to the National Park Service, as part of the Fire Island Inlet to Montauk Point Reformulation Study.

2. U.S. Army Corps of Engineers, National Park Service, NYS DEC, NYS DOS, USGS, US FWS staff participated in the meeting. The attendance is listed at the end of the MFR.

3. Prior breach response protocols were described and discussed, including the Corps' original Breach Closure Plan (1997), the present Corps' Breach Closure Plan which received a NYS Permit in June 2010, the 1994 National Park Service (NPS) report pertaining to breaching on Fire Island, and the 2007 NPS report titled "Recommendations for a Barrier Island Breach Management Plan for Fire Island National Sea Shore, including the Otis Pike High Dune Wilderness Area, Long Island, New York."

4. It was discussed that the breach response protocols for the area of Smith Point County Park (SPCP) will need to be coordinated with Suffolk County, and there needs to be concurrence with the County on the protocols in that project location. The specific actions and FIMP plan development at Smith Point County Park was also discussed. Mary Foley of NPS indicated that beachfill in the undeveloped portion of SPCP would be consistent with NPS policy if done to compensate for the erosion that has been caused by Moriches inlet, as an initial action, to be subsequently followed by inlet by-passing during the project lifetime.

5. Regarding the threshold width of any breach closure sections, bayside erosion was brought up, primarily at those locations that are adjacent to revetments. It was asked if erosion at those locations should be addressed from the bayside first. Restoration of the bayside shoreline is being considered at a number of locations with the proposed environmental restoration features for the project.

6. The locations of the Large, Publically Owned Tracks of Land on Fire Island were discussed and are listed below:

- East of Point of Woods to west of Cherry Grove
- East of Cherry Grove to Fire Island Pines (Carrington)
- East of FI Pines to west of Water Island (Talisman/Barrett Beach)
- East of Water Island to Davis Park
- East of Davis Park to Smith Point County Park (Wilderness Area)
- Smith Point County Park to RV Campground.

7. The Allowable Conditional Breach Closure Characteristics within the Large, Publically Owned Tracts where then described. Breach closure could be accomplished, if the breach was not naturally closing, within 45 to 60 days of the breach opening. Contracting procedures can be started at the occurrence of the breach, but may need to be cancelled if the breach closes naturally. Under any scenario, the breach would be closed at Day 60. The cross-section of the breach closure would be at +9.5 ft NGVD height at a minimum, the breach cross-section would match the 0.0 ft NGVD shorelines on both the ocean and bay sides making smooth shorelines without indentations, and the cross-section slope would match adjacent bayside and ocean-side slopes. No cross-sectional sand maintenance of the breach closure template would be allowed after the breach closure.

If a breach closed naturally, no additional fill material would be allowed in that location to bring the section to the above cross-section characteristics. Only on the occurrence of a new breach, that did not close naturally in that location, would additional material be allowed to be placed to bring the cross-section to the +9.5 ft NGVD height and shoreline to shoreline width. It was discussed that there would be increasing likelihood of re-breaching and subsequent vulnerability in those locations that did not close naturally with the increased berm height.

8. Discussed, but not resolved, was the issue of placement of additional sand material in the bay during the hydraulic construction closure of the breach, to emulate flood shoal volumes of breaches allowed to remain open. It was acknowledged that the proposed volume and dimensions of any additional bay material placed during breach closure operations would need to be resolved at future technical meetings within the plan identification process, although it was recognized that it could be reasonable to target placement of sand consistent with the volume of material that would be expected to be deposited over a period of 9-12 months.

9. Also discussed but not resolved was the make-up of the Science Advisor Panel and its relationship to the institutional and governmental decision makers. It was hoped that a technical panel could be formed, with academics and consultants, which could make recommendations to the decision makers on the likelihood of breaches within the large, publically-owned tracts closing naturally prior to 45 to 60 days from the time of the breach. These advisors would need to meet right after the breach and frequently thereafter, and considerable monitoring data would need to be collected to aid the Science Panel in its recommendations.

10. Considerable time was spent outlining modeling and monitoring needs for the conditional breach response protocol. Below is the listing on modeling and monitoring needs. This list may be more fully detailed and amended with future FIMP technical team discussions.

<u>Physical Monitoring Outline Requirements:</u>

A. Develop a Model to predict likelihood of natural closing of breaches in the large, publically owned tracts on Fire Island, using a Bayesian approach, based on empirical physical, climatological and hydraulic data, time of year considerations, etc.

B. Conduct a Tabletop exercises to run through breaching and closing scenarios after development of the Bayesian model.

C. Pre-Storm/Ongoing Physical Monitoring:
- Ocean Water Levels
- Bay Water Levels –some measurements already in Great South Bay, will need to add more recording stations
- Continue Bouy 44025, add more nearshore wave bouys
- Back Bay Bathymetry – 1500 ft north of barrier island
- Yearly LiDAR of the whole barrier island: More vulnerable areas/more frequent, specifically for those locations, especially pre-storm
- August: Annual assessment of vulnerable locations, topography: island height, width, slopes

D. Immediately Pre-Storm Actions:
- Assistance from NPS rangers regarding barrier island physical conditions, identification of potentially breach-vulnerable locations.
- Photography of potential vulnerable locations
- Examine wave and water level conditions, and wave and water level predictions
- Exercise Bayesian Model, alert Science Team
- Based on vulnerability assessment and wave conditions, should pre-storm beach measurements be taken? If conditions appear stable, no measurements taken. If conditions are bad, take island cross-section measurements to obtain conditions prior to the possible breaching (one day of RTKS in the field).

E. Post-Storm, with significant changes to topography such as a Full Breach/Partial Breach:
- Weekly: Topography/Bathymetry through the throat of the breach area
- Aerial Photography: including flood tide delta
- Ground Level Photography
- ADCP: weekly current flow in the channels (new breach, Moriches and Fire Island Inlets)
- Bathymetry at Fire Island and Moriches Inlets
- Mainland Water Levels while breach is open
- Mainland Flood Marks immediately post-breach and in the event of a subsequent storm while breach is open
- Ocean Waves just outside the breaches area
- Shallow cores within the breach area
- Water Quality: Temp/Salinity/Clarity after breaching

F. Upon Natural or Constructed Breach Closure: Continuation of Pre-Storm/Ongoing monitoring items above.

11. The meeting adjourned with the following issues not fully resolved: the makeup of the science advisory panel, the relationship between the science panel and the decision makers, the protocols of the meetings of the science advisory panel, and the protocols of action by all parties under the condition of a partial breach (water only flowing ocean to bayside during times of high water). It is expected that an additional technical meeting will need to be held to resolve these issues, but that meeting is not scheduled at this time.

12. Respectfully submitted by Lynn M. Bocamazo, P.E., CENAN-EN, (917) 790-8396

Attendees:
Lynn Bocamazo, CENAN-EN
Steve Couch, CENAN-PL-F
Robert Smith, CENAN-PL-E
Mary Foley – NPS Regional Scientist
Chris Soller - NPS, FIIS Superintendent
Charley Roman – NPS
Cheryl Hapke – USGS
Steve Pappa – USFWS
Al Fuchs – NYS DEC
Eric Star – NYS DEC
Santiago Alfageme – Moffat Nichol
By teleconference (partial time):
Fred Anders – NYS DOS
Barry Pendergrass – NYS DOS
Sue McCormick – NYS DEC
Kevin Kispert – NYS DEC

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO
ATTENTION OF
Environmental Analysis Branch

April 4, 2011

Mr. David A. Stilwell
Field Supervisor
United States Department of the Interior
Fish and Wildlife Service
3817 Luker Road
Cortland, New York 13045

RE: Fire Island to Montauk Point (FIMP) Reformulation Study

Dear Mr. Stilwell:

An action item coming out of the January 28, 2011 regional-level meeting with Congressman Bishop on the progress and path forward on FIMP's Tentatively Federal Selected Plan (TFSP) was to continue a dialogue with respect to natural resources. At this time we fully expect that the TFSP will also include strategies for both large-scale restoration of coastal processes and site specific habitat restorations.

To aid in those strategies, the U.S. Army Corps of Engineers, New York District (District) prepared a community Habitat Evaluations Procedures Model (HEP) (in which your agency participated) to identify and assist in the evaluation of benefits of potential restoration alternatives under consideration. The HEP model assessment resulted in a large array of Restoration Designs in the FIMP project area. The restoration framework identified five key physical processes to be targeted for restoration, including 1) longshore transport, 2) cross-island transport, 3) dune growth and evolution, 4) bay shoreline processes, and 5) estuarine circulation and water quality. In the consideration of restoration alternatives, two main categories of process restoration present themselves:

- Restoration of processes with the primary objective of storm damage reduction. These are restoration alternatives that were designed for the purpose of using habitat features for protection purposes. These include measures such as sand bypassing, and some bayside habitat restoration in breach vulnerable areas
- Restoration of processes with the primary objective of habitat restoration. These are measures developed by an HEP interagency team to identify optimal locations for restoration to primarily achieve ecological objectives, with a secondary objective of reducing storm damages.

Over 80 sites across the 83-mile Project area were evaluated by the District and interagency HEP Team for restoration potential. Eighteen (18) sites were selected as having real opportunities for restoration and a total of 57 restoration design alternatives (three to four per restoration site) were developed and evaluated. The information acquired through this restoration evaluation process will facilitate future selection of alternatives based on ecological need at the time of construction, the location of the storm damage reduction activity and availability of funding and support.

As part of the ongoing FIMP collaborative planning process, District staff met on June 25, 2010 with the Fire Island National Seashore (FIIS) to define National Park Service (NPS) restoration goals for (FIIS). Although the U.S. Fish and Wildlife Service (USFWS) was not present at the meeting, it was noted that "goals set forth during this meeting were to meet their (UFWS) request as it pertains to FIIS as well." The particular focus for FIIS was the need to address bayside erosion with the purpose of restoring natural processes and reducing storm damages.

It is our understanding that NPS seeks to accomplish habitat improvements through long-term, adaptive management; with "processes" being monitored instead of a site-by-site specific location determination. NPS' first preference is that the land manager (NPS) allow for natural processes to occur. If this is not a viable approach, then the next preference would be to adopt measures that replicate these natural processes in a sustainable manner. The least-preferred approach would be in restoring a particular landform, or habitat that is not directly linked with a process restoration. NPS also highlighted that they will allow the monitoring of breaches and their closure if there is an imminent threat to human life and harm.

Using materials from the above referenced HEP Model Report, the outcome of the meeting highlighted restoration opportunities (see Attachment 1) at the following sites within FIIS citing those needing highest priority first:

- **T-2 Sunken Forest**
- **T-3 Reagan Property**
- **Other areas** within this "stretch" that NPS would like (bayside) restoration measures to include those in the "Water Island" and "Talisman Beach" area(s).
    - **T-5 Great Gun.** While this is technically not within NPS boundaries, NPS supports Alternatives 1 and 2 at this site. A selection and discussion of these sites demonstrates that NPS would like other areas, not just those within current Park boundaries and/or those previously studied under FIMP (HEP), to be considered. This serves to further reiterate NPS' goal of a multi-dimensional, multi-location, multi-year and multi-phased (restoration) project design(s) throughout the FIMP area. For further consideration, the property owner (the Town of Brookhaven) will have to be contacted.
    - **T-25 Atlantique to Corneille**. This site is supported by NPS, as it simulates a breach/overwash event and creates a feeder beach.

In order to ensure that restoration goals are included within the TSFP, it is important that the partner agencies begin to identify specific sites and an overall process by which they can be incrementally implemented without delay. Only in this manner can they achieve an equal footing with the storm damage risk reduction options in terms of design and funding. The District's initial goal would be to set forth an agreement with respect to inclusion of the above four sites in the TSFP. This would include developing a monitoring program, including success criteria, by which to evaluate the above alternatives and make reasonable decisions with regard to bringing additional sites per the restoration at other locations over the out years.

The District recognizes that the impact analysis of potential adverse environmental effects of implementing the TSFP still needs to occur before any decisions on the type and quantity of mitigation if any, is addressed. This restoration effort is separate and distinct from that exercise, and would seek to put the selected restoration opportunities in place regardless of any subsequent analysis of mitigation needs. During the upcoming environmental analysis of the TSFP, adaptive management, monitoring and mitigation measures, if applicable, would be added to the TSFP, possibly utilizing some of the restoration sites identified during the effort highlighted in this letter. Your participation in this restoration planning process is critical. It is our desire to reinitiate this effort in the near future with a working meeting of the resource agencies to formulate the appropriate design option for each of the four sites at FIIS, and then prioritize the 18 priority HEP sites and formulate an implementation schedule to advance future efforts. Toward that end I am requesting that you identify a POC for this effort. I will then have Mr. Leonard Houston, Chief of our Environmental Analysis Branch contact the designated individual to plan the date and agenda for the meeting, which may conceivably be a multiday effort.

If you have any additional questions/concerns please contact Mr. Houston, at (917)790-8702 or leonard.houston@usace.army.mil for further information.

Sincerely,

Frank Santomauro, P.E.
Chief, Planning Division

cc: USFWS-LIFO (Papa)
NPSIFIIS, Patchogue, NY (C. Soller)
NPS, Boston, MA (M. Foley)

Faxed 3/16/11

United States Department of the Interior

FISH AND WILDLIFE SERVICE
3817 Luker Road
Cortland, NY 13045

March 16, 2011

Colonel John R. Boulé
Commander, New York District
U.S. Army Corps of Engineers
26 Federal Plaza, Rm. 2109
New York, NY 10278

Dear ~~Colonel Boulé~~ John:

This letter is a follow up to the U.S. Army Corps of Engineers (Corps) December 15, 2010, Breach Response Plan (BRP) meeting for the Fire Island Inlet to Montauk Point Storm Damage Protection (FIMP) Study area, and to a discussion you and I had during a briefing for Congressman Bishop. The BRP meeting was held at the New York District Office in New York and included representatives from the National Park Service (NPS), New York State Department of State (NYSDOS), New York State Department of Environmental Conservation (NYSDEC), and U.S. Geological Survey (USGS). We very much appreciated the opportunity to participate in the meeting. We request a copy of the minutes for our review due to the significance of the discussions related to development and implementation of the BRP on Fire Island National Seashore. We note that the meeting did not include any substantive discussions on environmental mitigation for breach closure activities, which can result in the disruption of natural processes and habitat formation, or regulatory compliance with Federal laws. In addition, from the U.S. Fish and Wildlife Service's (Service) perspective, there was no definitive agreement between the agencies regarding alternatives for a Proactive Breach Closure Plan (Proactive BCP) for the Westhampton barrier island.

During the course of coordinating with the Corps and other agencies on the FIMP and BRP, the Service has continued to stress and recommend that planning efforts should address mitigation and focus on consultations pursuant to Section 7 of the Endangered Species Act (ESA) of 1973, as amended (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*), and Fish and Wildlife Coordination Act (FWCA) of 1958, as amended (48 Stat. 401, as amended; 16 U.S.C. 661 *et seq.*). These recommendations were provided at the December 15 meeting and reiterated in comments we provided via electronic correspondence dated January 21, 2011, on the Tentatively Supported Federal Plan (TSFP) for the FIMP. Our concerns and recommendations relative to these areas are discussed in more detail below.

ESA Section 7," we anticipate that the Corps will be contacting us in the near future to ensure compliance with the ESA and FWCA. The Service encourages the Corps to resume coordination with the Service and Federal, State, and local landowners on a comprehensive long-term management plan for listed species in the study area.

The Service recommends that the Corps finalize consultation prior to implementing any breach response plan. We are aware that the Corps was recently issued a Water Quality Certification (Permit Number 1-4799-00023/00007) by the NYSDEC-Region 1 to conduct breach fill activities, and recommend the Corps obtain and complete all other necessary permits and consultations prior to proceeding with undertaking any breach fill activities. We understand that the Corps may undertake breach fill projects in compliance with provisions of the National Environmental Policy Act and the ESA that permit emergency consultations, but we hope that the fact that the Corps has worked to obtain a NYSDEC permit prior to any breach event illustrates the Corps intent to fulfill ESA compliance earlier rather than later as a necessary component of breach response planning.

I welcome the opportunity to further discuss these concerns and recommendations with you, or for your staff to contact Steve Papa or Steve Sinkevich, of the Long Island Field Office, to further explore these issues.

Sincerely,

David

David A. Stilwell
Field Supervisor

cc: NYSDEC, Region 1, Stony Brook, NY (P. Scully)
NYSDOS, Albany, NY (F. Anders; B. Pendergrass)
USGS, Woods Hole, MA (W. Schwab)
NPS/FIIS, Patchogue, NY (C. Soller)
NPS, Boston, MA (M. Foley)

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO
ATTENTION OF

June 28, 2006

Environmental Assessment Branch

Chief Harry Wallace
Poospatuck-Unkechaug Native American Nation
207 Poospatuck Lane
Mastic, New York 11950

Dear Mr. Wallace:

On behalf of the United States Army Corps of Engineers – New York District (Corps) I am writing to you and the Poospatuck-Unkechaug Nation as a prelude to establishing formal contact and an introduction from our Commanding Officer.

The Corps is currently undertaking a major Storm Damage Reduction Project along the southern coast of Long Island, the Fire Island to Montauk Point (FIMP) Reformulation Study. As the project area also includes the lands of your Nation, we would like to formally meet with you and others from the Nation to: a) establish formalized contact b) have a discussion on the FIMP Project and c) to introduce to you what the mission of the Corps is and how we may be able to provide assistance, if you require or wish.

The initial formalized contact would be with our Commanding Officer, followed by future meetings with various technical staff.

I hope that you will consider our request for contact and future meetings. If this is something that interests you, please contact the Project Archaeologist, Dr. Christopher Ricciardi by phone (917-790-8630), email (christopher.g.ricciardi@usace.army.mil) or by mail: U.S. Army Corps of Engineers – New York District – 26 Federal Plaza – Environmental Branch – Room 2151, New York, New York 10278-0090 so that formal arrangements can begin.

Thank you very much for your time and consideration.

Sincerely,

L. Houston

Leonard Houston,
Chief, Environmental Branch

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO
ATTENTION OF

April 27, 2006

Environmental Assessment Branch

Ruth L. Pierpont, Director
Historic Preservation Field Services Bureau
New York State Office of Parks, Recreation and Historic Preservation
Peebles Island - P.O. Box 189
Waterford, New York 12188-0189

Re: CORPS
Fire Island to Montauk Point (FIMP) Reformulation Project
Historic Structures Study (03PR04748)
Suffolk County, New York

Dear Ms. Pierpont:

The U.S. Army Corps of Engineers, New York District is pleased to furnish you with the final report, *The Built Environment along Long Island's South Shore – Historic Structure Study* and a set of DVDs containing the various data sets referenced in the report.

I would also like to thank Dr. Virginia Bartos for her efforts in working with our Project Archaeologist, Dr. Christopher Ricciardi, throughout this process. Together, they had to wrestle with a complex situation that went beyond the more traditional ways of completing a project such as this.

The Corps is now moving forward with the overall project. As per the recommendations of the coordinated efforts between our offices (see attached MFR from the more recent meeting), we will now begin the process of outlining a Memorandum of Agreement for the next phase of the overall Fire Island to Montauk Point (FIMP) Reformulation Project.

If you have any questions please do not hesitate to contact our Project Archaeologist, Dr. Christopher Ricciardi at (917) 790-8630 or christopher.g.ricciardi@usace.army.mil(.)

Thank you.

Sincerely,

L. Houston

Leonard Houston
Chief, Environmental Analysis Branch

Enclosures

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO
ATTENTION OF

2 June 2005

Environmental Analysis Branch

Ms. Ruth L. Pierpont, Director –
Bureau of Field Services
NYS Office of Parks, Recreation & Historic Preservation
Peebles Island – P. O. Box 189
Waterford, New York 12188-0189

Re: CORPS
Fire Island to Montauk Point (FIMP) Reformulation Project
Historic Structures Study (03PR04748)
Suffolk County, New York

Dear Ms. Pierpont:

This letter is with regard to comments the U.S. Army Corps of Engineers – New York District (Corps) received from your staff in a letter dated January 25, 2005. The letter, a response to the Draft Report, *The Built Environment Along Long Island's South Shore – Historic Structure Study*, was signed by Ms. Virginia Bartos, and included sections by Mr. Douglas Mackey and Mr. Mark Peckham.

On Friday, May 20, 2005, Dr. Christopher Ricciardi, the Project Archaeologist, met with Mr. Douglas Mackey and Dr. Virginia Bartos to discuss the New York State Office of Parks, Recreation and Historic Preservation (NYSOPRHP)'s response to the draft report and the letter from earlier this year.

I am pleased to hear that the meeting between our staff members went well, as outlined in the attached Memorandum for the Record (MFR) to this letter. The continued coordination between our two agencies will be key to advancing specifically the Fire Island to Montauk Point (FIMP) Project, as well as all of the Corps ongoing Projects.

As discussed in the MFR, the Corps will work on specific sections of the draft report to include your staff's issues and concerns. Dr. Bartos now has a greater appreciation for all of the coordination between the Corps and Mr. Warren during the two years prior to the draft arriving for review.

If you have any questions please do not hesitate to contact our Project Archaeologist, Dr. Christopher Ricciardi at (917) 790-8630 or christopher.g.ricciardi@usace.army.mil.

Thank you very much for your understanding.

Sincerely,

L. Houston

Leonard Houston, Chief
Environmental Analysis Branch

cc: Dr. Virginia Bartos
Mr. Douglas Mackey
Mr. Mark Peckham

CENAN-PL-E 1 June 2005

MEMORANDUM FOR THE RECORD

SUBJECT: Report on meeting between Virginia Bartos from the New York State Office of Parks, Recreation and Historic Preservation (NYSOPRHP) and the U.S. Army Corps of Engineers, New York District on Friday, 20 May 2005.

1. On Friday, May 20, 2005, Christopher Ricciardi, Ph.D., Project Archaeologist, met with Virginia Bartos, Ph.D., at the New York State Office of Parks, Recreation and Historic Preservation (NYSOPRHP) to discuss the Fire Island to Montauk Point (FIMP) Reformulation Project and the draft Historic Structures Survey Report, previously submitted to the NYSOPRHP for comments/review.

2. Dr. Ricciardi began by providing Dr. Bartos with information relating to the previous coordination efforts between the two agencies. This information helped Dr. Bartos to gain a better understanding of the level of effort that went into the planning phase of the Historic Structures Survey Project.

3. Dr. Ricciardi provided an overall view of the FIMP Project (see Appendix A for listing of previously submitted/completed reports) as well as the specific Historic Structures Survey. He detailed where the Project is and is going. He provided Dr. Bartos with the five (5) DVDs that constituted the "technical" sections of the Historic Structures Survey Report including the maps, recording forms, images, etc.

4. Dr. Ricciardi then discussed the specifics of the Historic Structure Survey. He outlined how the report was never intended to serve, as a comprehensive Cultural Resource Report and that terrestrial and underwater archaeology were not considered for this phase of the report. Those phases have been and will continue to be undertaken as separate components and reports as the overall FIMP Project progresses.

5. Dr. Ricciardi agreed with Dr. Bartos on some of the specific issues she raised with draft report including that of the references to Hefner's work, the need for a stronger linkage between the Project on Long Island and the references to the author of the Delaware Project and the general historical background to some specific details on structure's title and identification. He would also insure that the previous history, relating to the coordination efforts, be included in the report as well.

6. Dr. Bartos discussed the issue of "50 Years". According to Section 106 Guidelines, any structure that is of 50 years or older must be evaluated. Dr. Bartos, understanding, that a majority of the structures within the project area fall into this category, stated that both organizations should work together to developed guidelines/a specific time period for dealing with structures that are post 1950. Both agencies will work together to develop a Memorandum of Agreement/Understanding (MOA/U) on this specific issue.

7. Both Dr. Ricciardi and Bartos were happy to have clear up the issues raised in Dr. Bartos' letter from the end of January 2005. Both agreed that the report will be updated and completed in the fashion that it was intended as, an introductory study to the overall Project area. Both agreed that the best way to complete this portion of the Section 106 process for the Project will be through a MOA/Us between the two agencies. Perhaps an over-arching MOA/U can be developed to deal with the issue of the date of structures, as referenced in Issue 6, as well as the overall Cultural Resource process for the rest of the project?

8. Dr. Ricciardi thanked Dr. Bartos for her understanding of the FIMP situation as well as her comments. Dr. Bartos was happy to have restored the open lines of communication as well. Both agreed to keep the lines of communication open.

Christopher Ricciardi, Ph.D., Project Archaeologist
Environmental Analysis Branch

Appendix 1: FIMP Cultural Resource Reports

COMPLETED:

Barber, Russell J., Michael E. Roberts and C.C. Lamberg-Karlovsky.

1980 A Survey of Archaeological and Historical Resources, Fire Island Beach Erosion and Hurricane Protection Project, Westhampton Beach, New York. Report on file with the U.S. Army Corps of Engineers - New York District. New York, New York.

Greeley-Polhemus Group, Incorporated and Dolan Research, Incorporated.

1997a Interim Report #2: Cultural Resource Study - Fire Island to Montauk Point, Suffolk County, New York Reformulation Study: Phase 1 Archaeological Survey. Report on file with the U.S. Army Corps of Engineers - New York District. New York, New York.

1997b Remote Sensing Survey: Cultural Resource Study - Fire Island to Montauk Point, Suffolk County, New York Reformulation Study: Reach 2: Interim Project West of Shinnecock Inlet. Report on file with the U.S. Army Corps of Engineers - New York District. New York, New York.

1998 Research on Shipwrecks in the Near Shore Area - Fire Island to Montauk Point, Long Island, Suffolk County, New York – Reach 1: Interim Project - Fire Island to Moriches Inlet. Report on file with the U.S. Army Corps of Engineers - New York District. New York, New York.

John Milner and Associates.

2000 Cultural Resource Baseline Study - Fire Island Inlet to Montauk Point, Suffolk County, New York - Reformulation Study Report on file with the U.S. Army Corps of Engineers - New York District. New York, New York.

Panamerican Consultants, Inc.

2003 Remote Sensing Survey, Tidal Zone and Near Shore Project Area, Atlantic Coast of Long Island, Fire Island Inlet to Moriches Inlet, Fire Island, Suffolk County, New York – Interim Project. Report on file with the U.S. Army Corps of Engineers - New York District. New York, New York.

Reiss, Warren, WCH Industries, Inc. and Boston Affiliates, Inc.

1994 Atlantic Coast of Long Island, Fire Island to Montauk Point – Westhamtpon Beach Interim Protection – Plan Remote Sensing Survey of Two Borrow Areas. Report on file with the U.S. Army Corps of Engineers - New York District. New York, New York.

Tidewater Atlantic Research, Incorporated.
2001 Remote Sensing Archaeological Survey of Borrow Areas 2A, 2B, 2C, 3A, 4A, 4B, 5A, 5B, 6A, 7A, and 8A - Atlantic Coast of Long Island, Fire Island Inlet to Moriches Inlet, Suffolk County, New York - Reformulation Study. Report on file with the U.S. Army Corps of Engineers - New York District. New York, New York.

Vetter, John F. and Bert Salwen.
1974 Report on an Archaeological Reconnaissance of Fire Island, Suffolk County, New York. Report on file with the U.S. Army Corps of Engineers - New York District. New York, New York.

IN PROGRESS:

URS Corporation.
2004 The Built Environment along Long Island's South Shore: Historic Resource Study Report on file with the U.S. Army Corps of Engineers - New York District. New York, New York.
DRAFT only.

OFFICE OF PARKS · RECREATION · HISTORIC PRESERVATION
NEW YORK STATE
Bernadette Castro
Commissioner

New York State Office of Parks, Recreation and Historic Preservation
Historic Preservation Field Services Bureau
Peebles Island, PO Box 189, Waterford, New York 12188-0189 518-237-8643

January 24, 2005

Dr. Christopher Ricciardi
Project Archaeologist
U.S. Army Corps of Engineers
New York District
Planning Division - Environmental Analysis Branch
26 Federal Plaza - Room 2151
New York, New York 10278-0090

RE: FIMP HSR (03PR04748)

Dear Chris:

First of all, let me thank you for forwarding a copy of the *Fire Island to Montauk Point (FIMP) Reformulation Project* report. The area and resources included within the study area are overwhelming at best and URS should be congratulated for submitting a coherent report. I've shared the report with Field Services Bureau (FSB) archeologist Douglas Mackey and with Mark Peckham, the FSB National Register and Survey Unit Supervisor, who also handles historic maritime properties. This letter includes their responses, along with my observations regarding the historic resource study for Long Island's south shore.

My immediate response to the report is that the State Historic Preservation Office (SHPO) is left out of any decision making process. I suspect (as does my supervisor) that the consultant failed to realize that the New York State Office of Parks, Recreation and Historic Preservation (OPRHP) has a larger role than just a caretaker of historic sites. There are two distinct bureaus within OPRHP, one being the FSB that functions as the SHPO and the other being the Bureau of Historic Sites (BHS) that oversees parks and state owned historic resources. Whenever OPRHP is mentioned in the report, it seems that consultation is an option rather than a requirement. In order to comply with Section 106, the SHPO must review any federal undertaking for potential effects to historic resources. In his letter of 17 March 2003, Jim Warren of the FSB anticipated such confusion and recommended that the term SHPO be used rather than OPRHP, advice that was ignored. The role of the SHPO in the decision-making process should be at the beginning of any undertaking and I suggest that a box be added to the chart on page 8.1 between the first and second boxes that states "Consult with SHPO on project scope/potential effects."

In the section on interagency cooperation, the SHPO should again be added to the list of agencies. The consultants mention developing a programmatic agreement to streamline the evaluation process. The FSB has done this in the past with various types of undertakings (wind farms, cell towers, etc.) and it only seems logical to do the same with the FIMP, given the vast area and large number of identified and potential resources. Mark Peckham indicated that the SHPO is unable to comment on the districts and properties in the report due to the lack of necessary information (photographs, adequate maps, addresses of properties). The property typology in the report fails to indicate which resources if any meet eligibility criteria, making it unusable for our purposes. More definitive data will be required for our review and we can certainly come to some agreement about when and what information is required as FIMP projects are planned by the Army Corps of Engineers. We can certainly streamline the review process and further refine the eligibility criteria. (From some of the sample photos supplied, it is clear that the consultants have a more liberal application of National Register eligibility criteria than the SHPO.) From a cultural resource perspective, the SHPO can certainly help refine or re-define the area of potential effect (APE).

With the general comments out of the way, it is time to turn attention to specifics:

Archeology

Overall, the report has little to say about archeology. URS stated that that this was on purpose, but then included statements about areas where no archeology would be found. FSB archeologist Douglas Mackey offers the following comments:

- The Section describing prehistoric contexts is extremely short and addresses the various stages of prehistoric cultures that have occupied the area and attempts to discuss the different types of sites that may be associated with each. The discussion jumps from a very quick introduction to the Paleo-Indian period and how Long Island may have originally been populated to the major language and cultural groups encountered at the time of European settlement. It almost appears as if the authors believe that the seventeenth century Native American occupants were directly related to the Paleo-Indians that first occupied the area. While this is one theory, there is a 10,000-12,000 year interval of dynamic cultural adaptation and change which is glossed over with no discussion.

- On pages 5.1-5.3 several previous studies are discussed which conclude that large portions of the study area have no potential for archeological resources due to natural and manmade disturbances. Recent studies contradict this information by reporting that a number of sites have been identified in these areas since the initial evaluation was conducted, and it is likely that our knowledge of the geological factors involved has increased since 1980. Therefore it is recommended that this review be updated and that information gathered over the last twenty-five years be included in a re-evaluation of the area's potential.

- On a related topic, although several previous reports have developed models indicating that archaeological sites are unlikely in portions of the project, it is not clear if these models have ever been tested. Given the potential extent of the current project, it will be prudent to test any models proposed to determine if they are valid. Failure to test such far reaching models could potentially result in the failure to identify numerous archaeological sites if the model is wrong.

Maritime Resources

These sections were reviewed by the FSB's Mark Peckham who stated that the report is quite correct in pointing to a large number of marine accidents. Although the report indicated that at least four are eligible, it is highly likely that the number should be much higher. There is extensive literature on the subject, including a report commissioned by the Corps in 1997 by Greeley, Polhemus & Dolan. In addition to submerged sites, there is the potential of encountering historic shipwrecks and sites buried beneath shifting beaches and dunes.

Property Types (reviewed by Virginia Bartos)

- Many of the URS definitions are too simplistic for Long Island resources. With European occupation from as early as ±1640, there is more variety in the property types than they indicate. For example, in the discussion of late-nineteenth century property types, the report states that the Queen Anne style dominates the landscape. This period had a rich diversity of styles and the photograph identified on page 4.1 is of a Colonial Revival style house, not Queen Anne.

- The report makes generalizations about suburban development based on a Delaware study that begs the question if the same holds true for Long Island.

- The report should give a little more emphasis to commercial property types since the area became part of the late-nineteenth century vacation industry that developed more as part of a trend, and less about tuberculosis that was much more of an issue in Staten Island (Seaview Hospital). With the current return of heritage tourism, it is important to examine the modern vacation industry along with the serious development pressures many of the communities in the study area are facing.

- The list on page 5.3 should be expanded to include a more current list of properties recently added to the National Register of Historic Places. Historic resource studies done by Robert Hefner are missing from the bibliography. These are useful documents that mostly cover the Town of East Hampton and its surroundings.

I presume that this report is part of a proactive approach that the Corps is developing for the Long Island south shore. The real value of the document is that it is a good beginning point for consultants who may be involved with historic resource evaluation as part of future projects since it includes a brief historic overview and a handy encapsulation of the National Register Criteria. The consultants correctly recommend that the Corp work with other agencies, especially when it comes to streamlining the review process. The SHPO looks forward to working with the Corp on this and with any other historic property related issues that are part of the FIMP. If you have any questions about this letter, please contact me at (518) 237-8634 Ext. 3256 or at virginia.bartos@oprhp.state.ny.us.

Sincerely,

Virginia

Virginia L. Bartos, Ph.D.
Historic Preservation Program Analyst

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO
ATTENTION OF

10 January 2005

Environmental Analysis Branch

Ms. Ruth Pierpont, Director
Historic Preservation Field Service Bureau
NYS Office of Parks, Recreation and Historic Preservation
Peebles Island – P. O. Box 189
Waterford, New York 12188-0189

Re: CORPS
Fire Island to Montauk Point (FIMP) Reformulation Project
Suffolk County, New York

Dear Ms. Pierpont:

The U.S. Army Corps of Engineers, New York District (Corps), is pleased to furnish you with a copy of the draft report, *The Built Environment Along Long Island's South Shore – Historic Structure Study*. This report will be included in the overall Fire Island to Montauk Point (FIMP) Reformulation Study and Environmental Impact Statement that the Corps is currently undertaking.

Ms. Virginia Bartos, and her predecessor, Mr. James Warren, have worked closely with the Corps to insure that the best possible project scope was created for this phase of the project. This report outlines work undertaken to begin the initial process of identifying what, if any structures and historical districts, may be eligible for inclusion on the National Register of Historic Places within the Area of Potential Effect (APE) within the FIMP study area. It is part of a larger phased approached to the overall Section 106 Process.

The Corps concurs with the conclusions and recommendations of the draft report. This baseline study will serve as a guide for helping the Corps, and all involved parties, to devise the best possible protection for historic properties and areas within the APE. The Corps will continue to work closely with your office as well as all interested parties to insure that cultural resource issues are considered as more definitive plans are created for the overall FIMP Project.

In keeping with Section 106 compliance of the Historic Preservation Act of 1966, as amended, the Corps requests a review of the enclosed draft report and your assessment of our determinations by 18 February 2005. We hope that your office will concur with all of the conclusions and determinations made in the report. If you have any questions, please contact the Project Archaeologist, Dr. Christopher Ricciardi, at (212) 264-0204.

Sincerely,

for

Leonard Houston
Chief, Environmental Analysis Branch

Enclosure

OFFICE OF PARKS · RECREATION · HISTORIC PRESERVATION
NEW YORK STATE

Bernadette Castro
Commissioner

New York State Office of Parks, Recreation and Historic Preservation
Historic Preservation Field Services Bureau
Peebles Island, PO Box 189, Waterford, New York 12188-0189 518-237-8643

March 23, 2000

Frank Santomauro, P.E.
Chief, Planning Division
U.S. Army Corps of Engineers
New York District
Jacob K. Javits Federal Building
New York, New York 10278-0090

Dear Mr. Santomauro:

Re: <u>CORPS</u>
Storm Damage Protection/Fire Island
Inlet-Moriches Inlet
Brookhaven/Islip, Suffolk County
96PR1724

The State Historic Preservation Office (SHPO) has reviewed the information submitted for this project. Our review has been in accordance with Section 106 of the National Historic Preservation Act and relevant implementing regulations.

The SHPO has reviewed the Remote Sensing Survey prepared for the project. While we do not have concerns with the filling over the anomalies which are entirely beneath the sea bed, we are concerned with placing fill on the four having a side scan signature. We recommend diver verification of the four anomalies (#2, 13, 63, and 78) so we can determine whether filling is appropriate for these potentially significant resources.

If you have any questions, please contact Cynthia Blakemore at (518) 237-8643, extension 3288.

Sincerely,

Ruth L. Pierpont

Ruth L. Pierpont
Director

RLP:bsd

United States Department of the Interior

NATIONAL PARK SERVICE
Fire Island National Seashore
120 Laurel Street
Patchogue, New York 11772

IN REPLY REFER TO:

February 10, 2000

L7617 (FIIS)

Mr. Frank Santomauro
Chief, Planning Division
Department of the Army
New York District, Corps of Engineers
Jacob K. Javits Federal Building
New York, NY 10278-0090

Dear Mr. Santomauro:

Thank you for the opportunity to review the U.S. Army Corps of Engineers' draft report, Remote-Sensing Survey, Tidal Zone and Near-Shore Project Area, Atlantic Coast of Long Island, Fire Island Inlet to Moriches Inlet, Fire Island, Suffolk County, New York Interim Project. We found the study to be adequate but had a number of concerns that are outlined below.

#1
- The remote sensing study is adequate, but the model used, 50 gammas in an area of 80 feet (Pearson 1991), is an untested model. One effect of this is that anomalies that do not appear on more than one lane have been eliminated. Please justify the use of this model.

How [illegible] can be [illegible] justified

#2
- Site formation processes have been ignored in the remote sensing survey. Pieces of wrecks, such as hull fragments, are not captured by the survey methods. While in many cases these may not be National Register eligible, but, those located within NPS boundaries may be significant to Fire Island National Seashore (FIIS). This needs to be clarified in the report.

#3
- Of the four anomalies congruent with sidescan sonar targets and tentatively identified as shipwrecks, those located within NPS boundaries should be evaluated by a diver for significance. We disagree that burial under sand constitutes

[illegible] burial is done -

a no-adverse effect. Rather, the effect of burial is presently unknown and the response of submerged organic structures to compaction under sand requires further study. Burial also impedes access to and identification of these potentially significant anomalies. An effort should be made to identify them before they are either buried or impacted by dredging, anchoring, or other beach fill activities.

- The report should include a section addressing "accidental discoveries" and the appropriate protocol.

- Several years ago, FIIS' dive team used an underwater video to document remnants of a wooden shipwreck in the surf zone in the vicinity of Watch Hill. The NPS regional archeologist also documented this shipwreck, which is buried in the beach and dune but extends south into the ocean. This documentation may be difficult to locate at the present time, but should be part of the survey report. If there is an interest in pursuing this further, please contact FIIS Environmental Compliance Specialist Danette Woo at (631) 289-1711.

- After a major northeaster (c. 1988?) a wooden copper plated hull was exposed on the beach west of Watch Hill. Eventually the hull was buried again by natural dynamics. The park has photo-documentation of the hull in its archives. Shouldn't this information be part of the report? For more information, please contact FIIS Curator Steve Czarniecki at (631) 395-9693.

- This draft report deals entirely with shipwrecks and refers to the McCormick study on page 12 paragraph 2 with regards to archeological expectations. Nonetheless, page 64 paragraph 2 of the same study also states that the shoreline of Fire Island extended 100 miles SE of present shoreline 18,000 years ago. Therefore, there continues to be a possibility of "resources" other than cultural that could be transported via sand transfer to the beach or disturbed by other support activities taking place offshore. These issues should be documented in the report.

- On page 39, a no-work zone is designated from Sunken Forest to Cherry Grove. The only NPS restriction was the beach area in front of Sailors Haven. This was so designated for reasons of endangered species habitat protection. This should not have precluded use of other survey techniques to survey this small area of beach. And should not have precluded other beach areas to be surveyed. It is not clear to us why this stretch was omitted from the survey.

- Ocean Beach is not mapped consistently with the other communities, as the maps do not reflect the houses at Ocean Beach even though anomalies 31 and 32 indicate the Ocean Beach groins.

If you have any questions, please feel free to contact Danette Woo, Environmental Compliance Specialist at (631) 289-1711 or danette_woo@nps.gov.

Sincerely,

Constantine J. Dillon
Superintendent

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

December 20, 1999

REPLY TO
ATTENTION OF

Environmental Analysis Branch
Environmental Assessment Section

Cynthia Blakemore
Historic Preservation Program Analyst
Historic Preservation Field Services Bureau
New York State Office of Parks, Recreation and
Historic Preservation
Peebles Island
P.O. Box 189
Waterford, New York 12188-0189

RE: CORPS
Storm Damage Protection/Fire Island Inlet
Moriches Inlet
Islip/Brookhaven, Suffolk County
96 PR1724

Dear Ms. Blakemore,

As you are aware the U.S. Army Corps of Engineers, New York District (New York District), is currently undertaking a number of studies to identify potentially significant cultural resources within the above referenced project area to determine if the proposed project would have an effect on any identified resources. As part of these studies, the New York District has conducted a remote sensing survey of the near shore sand placement area. Enclosed is a copy of the draft report entitled "Remote Sensing Survey, Tidal Zone and Near Shore Project Area, Atlantic Coast of Long Island, Fire Island Inlet to Moriches Inlet, Fire Island, Suffolk County, New York, Interim Project" (Enclosure 1).

The survey consisted of a near-shore survey utilizing a side scan sonar and magnetometer and a low-water survey using a magnetometer to identify targets and anomalies that may represent potentially significant submerged cultural resources. The total survey effort identified 78 anomalies within the entire project area. The analysis of the data suggests that 52 anomalies are non-significant and require no further work. The remaining 26 anomalies fit the criteria for potentially significant submerged cultural resources. Of these anomalies, four have a side scan signature associated with a magnetic anomaly indicating a portion of the target lies above the sea bed. It is not anticipated that covering the potentially significant resources with sand will constitute an adverse effect. Potentially harmful activities associated with beach fill operations, such as anchoring, anchor dragging or dredging, will not occur in locations where potentially significant resources have been identified and no further work is recommended. If, however, project plans change to include any activities that may disturb these resources, then additional work, including underwater investigations, may be required.

Please review and provide comments on the enclosed draft report in accordance with Section 106 of the National Historic Preservation Act and 36 CFR 800.4. Please note this report contains sensitive information regarding the location of potentially significant cultural resources that should not be released to the public. Two versions of the final remote sensing report, one with locational data and one without, will be provided to your office once all comments are received and incorporated into the report. If you have any questions or require additional information, please call Nancy Brighton, Project Archaeologist, at (212) 264-2198. Thank you for your assistance.

Sincerely,

Frank Santomauro, P.E.
Chief, Planning Division

Enclosure

cf. Mark Peckham, New York State Office of Parks, Recreation and Historic Preservation
Larry Murphy, Submerged Cultural Resources Unit, National Park Service
Steve Pendry, Northeast, Cultural Resources Center, National Park Service
Constantine Dillon, Fire Island National Seashore, National Park Service

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

December 20, 1999

REPLY TO
ATTENTION OF

Environmental Analysis Branch
Environmental Assessment Section

Constantine J. Dillon
Superintendant
Fire Island National Seashore
National Park Service
120 Laurel Street
Patchogue, New York 11772-3596

RE: Remote Sensing Survey
Tidal Zone and Near Shore Area
Fire Island, Suffolk County
New York

Dear Superintendent Dillon,

As you are aware the U.S. Army Corps of Engineers, New York District (New York District) has recently completed a remote sensing survey along twelve miles of the Fire Island coastline, including a portion of the Fire Island National Seashore. The remote sensing survey consisted of a survey of the near shore area using a side scan sonar and magnetometer and a low water survey using a magnetometer. Enclosed is a copy of the report entitled "Remote Sensing Survey, Tidal Zone and Near Shore Project Area, Atlantic Coast of Long Island, Fire Island Inlet to Moriches Inlet, Fire Island, Suffolk County, New York, Interim Project" (Enclosure1). The comments assembled by my staff are provided for your review (Enclosure 2).

The total survey effort identified 78 anomalies within the entire project area. The analysis of the data suggested that 52 anomalies are non-significant and require no further work. The remaining 26 anomalies fit the criteria for potentially significant submerged cultural resources. Of these anomalies, four have a side scan signature associated with a magnetic anomaly indicating a portion of the target lies above the sea bed. It is not anticipated that covering the potentially significant resources with sand will constitute an adverse effect. Potentially harmful activities associated with beach fill operations, such as anchoring, anchor dragging or dredging, will not occur in locations where potentially significant resources have been identified and no further is work is recommended. If, however, project plans change to include any activities that may disturb these resources, then additional work, such as an underwater investigation, may be required.

Please review and provide comments on the enclosed report by January 31, 2000. Please note this report contains sensitive information regarding the location of potentially significant cultural resources, which should not be released to the public. Two versions of the final remote sensing report, one with locational data, and one without, will be provided to your office once all comments are received and incorporated into the report. If you have any questions or require additional information, please call Nancy Brighton, Project Archaeologist, at (212) 264-2198. Thank you for your assistance.

Sincerely,

Frank Santomauro, P.E.
Chief, Planning Division

Enclosures

cf. Larry Murphy, Submerged Cultural Resources Unit, National Park Service
Steve Pendry, Northeast Cultural Resources Center, National Park Service
Mark Peckham, New York State Office of Parks, Recreation and Historic Preservation
Cynthia Blakemore, New York State Office of Parks, Recreation and Historic Preservation

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278–0090

December 20, 1999

REPLY TO
ATTENTION OF

Environmental Analysis Branch
Environmental Assessment Section

Larry Murphy
Submerged Cultural Resources Unit
National Park Service
P.O. Box 728
Santa Fe, New Mexico 87504-0728

RE: Remote Sensing Survey
Tidal Zone and Near Shore Area
Fire Island, Suffolk County
New York

Dear Mr. Murphy,

As you are aware the U.S. Army Corps of Engineers, New York District (New York District) has recently completed a remote sensing survey along twelve miles of the Fire Island coastline, including a portion of the Fire Island National Seashore. The remote sensing survey consisted of a survey of the near shore area using a side scan sonar and magnetometer and a low water survey using a magnetometer. Enclosed is a copy of the draft report entitled "Remote Sensing Survey, Tidal Zone and Near Shore Project Area, Atlantic Coast of Long Island, Fire Island Inlet to Moriches Inlet, Fire Island, Suffolk County, New York, Interim Project" (Enclosure1). The comments on the draft report from my staff are provided for your review (Enclosure 2).

The total survey effort identified 78 anomalies within the entire project area. The analysis of the data suggested that 52 anomalies are non-significant and require no further work. The remaining 26 anomalies fit the criteria for potentially significant submerged cultural resources. Of these anomalies, only four have a side scan signature associated with a magnetic anomaly indicating a portion of the target lies above the sea bed. It is not anticipated that covering the potentially significant resources with sand will constitute an adverse effect. Potentially harmful activities associated with beach fill operations, such as anchoring, anchor dragging or dredging, will not occur in locations where potentially significant resources have been identified and no further work is recommended. If, however, project plans change to include any activities that may disturb these resources, then additional work, such as underwater investigations, may be required.

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Sincerely,

Frank Santomauro, P.E.
Chief, Planning Division

Enclosures

cf. Mark Peckham, New York State Office of Parks, Recreation and Historic Preservation
Cynthia Blakemore, New York State Office of Parks, Recreation and Historic Preservation
Steve Pendry, Northeast Cultural Resources Center, National Park Service
Constantine Dillon, Fire Island National Seashore, National Park Service

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

December 20, 1999

REPLY TO
ATTENTION OF

Environmental Analysis Branch
Environmental Assessment Section

Steve Pendry
Archaeology Branch
Northeast Cultural Resources Center
National Park Service
400 Foot of John Street
Lowell, Massachusetts 01852

RE: Remote Sensing Survey
Tidal Zone and Near Shore Area
Fire Island, Suffolk County
New York

Dear Mr. Pendry,

As you are aware the U.S. Army Corps of Engineers, New York District (New York District) has recently completed a remote sensing survey along twelve miles of the Fire Island coastline, including a portion of the Fire Island National Seashore. The remote sensing survey consisted of a survey of the near shore area using a side scan sonar and magnetometer and a low water survey using a magnetometer. Enclosed is a copy of the report entitled "Remote Sensing Survey, Tidal Zone and Near Shore Project Area, Atlantic Coast of Long Island, Fire Island Inlet to Moriches Inlet, Fire Island, Suffolk County, New York, Interim Project" (Enclosure1). The comments on the draft report assembled by my staff are provided for your review (Enclosure 2).

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Sincerely,

Frank Santomauro, P.E.
Chief, Planning Division

Enclosures

cf. Mark Peckham, New York State Office of Parks, Recreation and Historic Preservation
Cynthia Blakemore, New York State Office of Parks, Recreation and Historic Preservation
Larry Murphy, Submerged Cultural Resources Unit, National Park Service
Constantine Dillon, Fire Island National Seashore, National Park Service