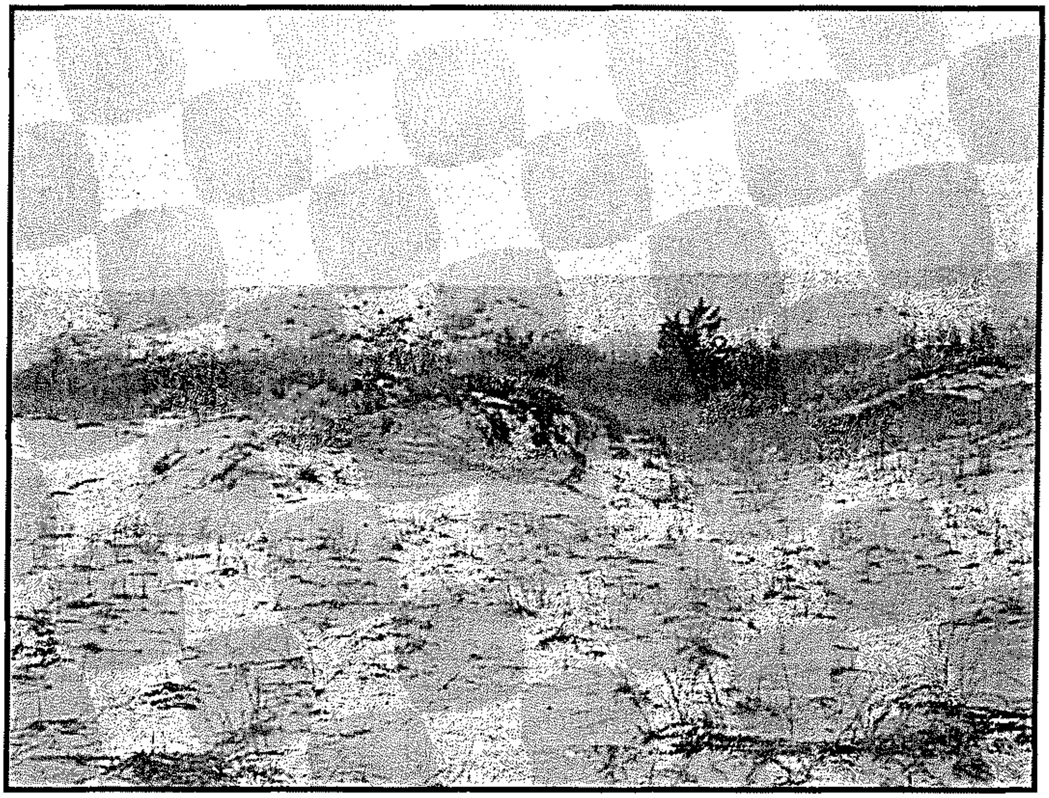
Atlantic Coast of New York, Jones Inlet to East Rockaway Inlet, Island of Long Beach, New York Storm Damage Reduction Project

DRAFT ENVIRONMENTAL ASSESSMENT APPENDICES



FEBRUARY 2006

Prepared by: U.S. Army Corps of Engineers
New York District, Planning Division (CENAN-PL-E)
26 Federal Plaza
New York, New York 10278-0090

DRAFT ENVIRONMENTAL ASSESSMENT
APPENDICES

FOR THE

ATLANTIC COAST OF NEW YORK, JONES INLET TO EAST ROCKAWAY INLET,

ISLAND OF LONG BEACH, NEW YORK

STORM DAMAGE REDUCTION PROJECT

FEBRUARY 2006

Prepared by:

U.S. Army Corps of Engineers
New York District, Planning Division (CENAN-PL-E)
26 Federal Plaza
New York, New York 10278-0090

APPENDIX A
PERTINENT CORRESPONDENCE

This Appendix will be compiled following comments from North Atlantic Division, the necessary agencies, and the public.

APPENDIX B
SECTION 404(B)(1) GUIDELINES EVALUATION

APPENDIX : SECTION 404(b)(1) GUIDELINES EVALUATION

Introduction

This appendix of the Atlantic Coast of New York, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York Storm Damage Reduction Project presents a Section 404(b)(1) Guideline evaluation for the comprehensive evaluation of improvements to the Long Beach Island (LBI) coastline. The evaluation is based on the regulations found at 40 CFR 230, Section 404(b)(1): Guidelines for Specification of Disposal Sites for Dredged or Fill Material. The regulations implement Sections 404(b) and 501(a) of the Clean Water Act, which govern the disposal of dredged and fill material inside the territorial sea baseline (§230.2(b)).

Generic 404 (b)(1) Evaluation

The following Section 404(b)(1) evaluation is presented in a format consistent with typical evaluations in the New York area and addresses all required elements of the evaluation.

Project Description

a. Location: The Atlantic Coast of New York, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York Storm Damage Reduction Project, covers approximately 6.7 miles (of which 6.4 miles represents protection provided by the selected plan) of oceanfront along Long Beach Island, including the Town of Hempstead (Point Lookout and Lido Beach), Nassau County (Nickerson Beach), and the City of Long Beach.

b. General Description: In 1965, the USACE evaluated various storm protection options for the area and presented findings in the Beach Erosion Control and Interim Hurricane Study for the Atlantic Coast of Long Island, New York: Jones Inlet to East Rockaway Inlet (USACE 1965). Local interests did not support the plan and the project was terminated in 1971. Since that time, beach erosion and storm damage have continued in the area. At the request of the local interests following Hurricane Gloria in 1985, the USACE conducted a Reconnaissance Study (completed in 1989), and subsequently a Feasibility Study (completed in February of 1995), to evaluate an array of structural and non-structural measures to provide flood and storm protection for the Long Beach Island area (USACE 1989, 1995, 1998, 1999).

   As a result of the Feasibility Study, several alternatives were evaluated and a final plan was selected. The plan, as presented in the Final Feasibility Study and Final Environmental Impact Statement (FEIS) for the Project, included widening of the existing beach with the hydraulic placement of beach fill material, rehabilitation of 16 groins at Long Beach, construction of six new groins west of Point Lookout at Lido Beach, and construction/rehabilitation of numerous dune walkovers and dune access points (USACE 1995, 1998). The December 1998 Record of Decision (ROD) (filed in the Federal Register, January 1999) granted approval of the plan as presented in the 1998 FEIS and was signed on December 23, 1998.

Subsequent to the 1998 release of the FEIS for the Project, the proposed alternative was re-evaluated. The re-evaluation was conducted to address changes to the shoreline since the 1998 evaluation and changes in the Project scope (i.e., a reduction in the size of the Project area), and to address environmental concerns expressed by agencies and/or interest groups (USACE 1998, 2002). Furthermore, this re-evaluation allowed incorporation of advancements in engineering evaluation methods. As a result of project re-evaluation, several modifications were made to the plan that was selected in 1998 and are presented in the 2005 Limited Reevaluation Report (LRR) and subsequent plan modifications for the Project (USACE 2005a). The proposed Project modification is intended to provide a long-term, cost-effective solution for reducing erosion and maintaining the protective dune and beach berm in this area.

When compared to the original Project that was presented in the 1998 FEIS and approved through a Record of Decision in 1999, the proposed Project modification includes several new structural features and activities that are in addition to those proposed in the original Project. These include placement of a sand barrier beneath the existing boardwalk in the City of Long Beach, extension and rehabilitation of the eastern terminal groin, dune cross-over structures, boardwalk surface replacement, construction of a lifeguard headquarters in Point Lookout, construction of timber walls around: five existing comfort stations, two comfort/lifeguard stations and one lifeguard headquarters in Long Beach the extension of existing dune cross-over structures in the Town of Hempstead. However, the overall Project area has been reduced in the proposed Project modification and several structural features and activities (vehicle access ramps, new groins, dune walkovers, impacts within a 136-acre shorebird nesting/foraging area) have been eliminated. As a result, the proposed modification has significantly reduced the area of fill placement and the amount of fill material required for the Project. Specifically, 170 fewer acres will be filled (i.e., approximately 104 acres in the upper beach zone, 35 fewer acres in the intertidal zone, and 31 fewer acres in the sub-tidal zone), the amount of fill material required for the Project has been reduced by 2,042,000 cubic yards (cy), and the amount of fill material needed for 5-yr renourishment activities has been decreased by 385,000 cy per yr. The Long Beach Limited Re-evaluation Report (LRR) and subsequent plan modifications provide specific details regarding proposed Project modification components (USACE 2005a).

c. Authority and Purpose: In October 1986, the Committee on Public Works and Transportation of the United States House of Representatives authorized the USACE to review the previous report on the Atlantic Coast of Long Island, New York, Jones Inlet to East Rockaway Inlet, to determine the feasibility of providing storm damage protection works for Long Beach Island. Subsequently, a reconnaissance study and report were completed in 1989, a Draft Feasibility Report and Draft Environmental Impact Statement (DEIS) report were circulated in 1994, and a Final Feasibility Report and Final

Environmental Impact Statement (FEIS) report, and circulated in 1998 (USACE 1998). A Record of Decision (ROD) was signed on December 23, 1998 and filed in the Federal Register in January 1999. The 1995 Feasibility Report Recommended Plan was authorized for construction by the 1996 Water Resources Development Act (WRDA).

As a result of the Feasibility Study, several alternatives were evaluated and a final plan was selected. The plan included widening of the existing beach with the hydraulic placement of beach fill material, rehabilitation of 16 groins at Long Beach, construction of six new groins west of Point Lookout at Lido Beach, and sand removal from an offshore borrow area. However, since the 1998 release of the FEIS for the Project the proposed alternative was re-evaluated. The re-evaluation was conducted to incorporate advancements in engineering evaluation methods, to address changes to the shoreline since the 1998 evaluation and changes in the Project scope (i.e., a reduction in the size of the Project area), and to address environmental concerns expressed by agencies and/or interest groups. As a result of project re-evaluation, several modifications were made to the plan that was selected in 1998 for this Project.

In 2002, the New York District USACE initiated a limited re-evaluation study to explore options to refine the proposed project modification. The limited re-evaluation study was conducted with the intent of identifying and evaluating various means of maintaining the beach that are longer-term and less expensive than the current plan and that incorporate concerns addressed by agencies and/or interest groups. As a result of project re-evaluation, several modifications were made to the plan that was selected in 1998 and are presented in the 2005 LRR for this Project and subsequent plan modifications (USACE 2005a).

d. General Description of Placement Material: Sand that is compatible to the existing beach that will be pumped in from offshore borrow area.

e. Proposed Discharge Site: The Atlantic Coast of New York, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York Storm Damage Reduction Project, covers approximately 6.7 miles (of which 6.4 miles represents protection provided by the selected plan) of oceanfront along Long Beach Island, including the Town of Hempstead (Point Lookout and Lido Beach), Nassau County (Nickerson Beach), and the City of Long Beach

f. Disposal Method: Use of hydraulic dredging equipment for the initial construction and renourishment efforts.

Factual Determinations

a. Physical Substrate Determinations

(1) 1) a dune with a top elevation of +15 ft above NGVD, a top width of 25 ft, and landward and seaward slopes of 1V:5H that will extend along the entire project area except where the City of Long Beach boardwalk is located; 2) a sand barrier with a top elevation of +15 ft above NGVD, a top width of 25 ft, a landward slope of 1V:3H and a seward slope of 1V:5H, that will be located directly beneath the existing boardwalk in the City of Long Beach; and, 3) a beach berm that will extend 110 ft from the seaward toe of the recommended dune or sand barrier at an elevation of +10 ft NGVD, then will gradually slope to match the existing bathymetry (slope will be between 1V:20H in Point Lookout and 1V:35H in Long beach and Lido Beach).

(2) Sediment Type: Sediments similar to those present in the placement area will be utilized. No impacts are anticipated.

(3) Dredged Material Movement: Minor short-term movement and existing shore processes will continue.

(4) Physical Effects on Benthos: Minor short-term disruption. No long-term impact.

(5) Other Effects: None identified

(6) Action to Minimize Impacts: See section (5.0)

b. Water Circulation, Fluctuations, and Salinity Determinations

(1) Water

(a) Salinity: Proposed project is not expected to affect salinity because beach fill does not govern the overall water mass movements (tidal flow and river discharge) that control salinity.

(b) Water Chemistry: No major impacts are expected.

(c) Clarity: Temporary increase in turbidity will occur from sediment resuspension during placement of the material.

(d) Color: Minor temporary changes possible but no major impacts are expected.

(e) Odor: No measurable impacts are expected.

(f) Taste: Not applicable

(g) Dissolved Gas Levels: Possible short-term variation may occur due to turbulence created by placement of the material on the beach.

(h) Nutrients: Temporary and localized nutrient increases may occur due to sediment resuspension during beach fill activities. No long-term increase in nutrients and eutrophication will result from the proposed project.

(i) Eutrophication: None identified

(j) Other: None identified

(2) Current Patterns and Circulation: No impacts identified

(3) Normal Water Level Fluctuations: No impacts identified

(4) Salinity Gradients: No impacts expected

(5) Actions to Minimize Impacts: Not applicable

c. Suspended Particulate/Turbidity Determination

(1) Change at Disposal Site: Short-term, localized increases in suspended particulates/turbidity as a result of placement of material, but no long-term changes.

(2) Effects on Chemical and Physical Properties of the Water Column: Impact should be minimal since particles will settle out fairly rapidly and no toxic metals or organic compounds are anticipated to be encountered.

(3) Effects on Biota: Short-term exposure due to localized sediment resuspension during placement of material. No long-term effects are projected.

(4) Action to Minimize Impacts: Placement of material will be completed as early as possible to allow for optimum recruitment of benthic organism within the placement area.

d. Contaminant Determination: No impacts identified.

e. Aquatic Ecosystems and Organisms Determination: Possible effects to the gills of nekton species that are in the immediate area of placement. No major impacts are expected.

f. Proposed Disposal Site Determination: Not applicable.

g. Determination of Cumulative Effects on the Aquatic Ecosystem: See section (4.0).

h. Determination of Secondary Effects on the Aquatic Ecosystem: None identified.

Findings of Compliance or Noncompliance

a. There are no practicable alternatives for the proposed action under the jurisdiction of Section 404(b)(1) Guidelines.

b. The proposed action does not appear to violate applicable state water quality standards or effluent standards.

c. The proposal will not have significant adverse impacts on endangered species or their critical habitats. Formal coordination with the USFWS under section 7 of the Endangered Species Act of 1973 is ongoing to insure the safety of any transient species that may be present during construction. Informal consultation with NMFS is ongoing at this time.

d. The proposed action will not result in significant adverse impacts on human health or welfare, including municipal and private water supplies, recreational and commercial fishing, plankton, fish, shellfish, wildlife and special aquatic sites.

e. All appropriate steps to minimize adverse environmental impacts have been taken.

f. No significant adaptations of the guidelines were made relative to this evaluation.

Conclusions

Based on all of the above, the proposed action is determined to be in compliance with the Section 404(b)(1) Guidelines, subject to appropriate and reasonable conditions, to be determined on a case-by-case basis, to protect the public interest.

APPENDIX C

U.S. FISH AND WILDLIFE (USFWS) COORDINATION ACT 2(b) REPORT

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 Branch

September 12, 2005

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

Subject: Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York, Storm Damage Reduction Project.

Dear Mr. Stilwell:

Thank you for providing the Draft Fish and Wildlife Coordination Act Report (DFWCAR) for the subject project. In response to the DFWCAR dated September 2004, please see attached modifications to the proposed project. We feel the modifications are not significant and would like your staff to review these modifications with my staff and resume the Section 7 consultation. We recognize your heavy workload and appreciate your speedy response to the project description. I look forward to working with you and your staff on this effort. If you should have any questions, please contact Mr. Robert J. Smith of my staff at 917-790-8729.

Sincerely,

Leonard Houston
Chief, Environmental Analysis Branch

Cc: USFWS, LI Field Office (Rosemarie Gnam)
Attachment

Construction of New Groins

The selected 1995 plan proposed eventual construction of seven new groins (all 765 ft long and 70 ft wide) at Point Lookout (USACE 1998). Currently only the first four groins are targeted for immediate construction, whereas the remaining three groins are proposed for deferred construction as needed based on the stability of the existing weldment area (USACE 2005a). However, based on subsequent re-evaluation of the area, some modifications to the original design of the four new groins have been proposed. The Project requires the immediate construction of a new groin field at Point Lookout that will contain four groins that begin 800 feet west of existing Groin 55 in Point Lookout. The four groins would be constructed with tapered lengths and spaced at an interval of 800 feet (USACE 2005a). Groin lengths vary and range from 380 ft to 800 ft. Groin widths will be 115 ft.

A determination to construct the three westernmost groins will be triggered at a later date within the 50-year Project life and be based on monitoring data (USACE 2005a). The criterion for construction includes a change from an accreting beach to an eroding beach in the area where the structures are to be located. The criteria will be evaluated based upon field measurements and analysis (USACE 2005a).

Point Lookout Terminal Groin Rehabilitation and Extension

During re-evaluation of the proposed Project, the USACE determined that Groin #58 (i.e., West Groin), the terminal groin in Point Lookout, required an extension along with the rehabilitation recommended by the Feasibility Study (USACE 2005). Accordingly, the District plans to rehabilitate the existing portion of the groin, extend the length an additional 100 feet (currently 200 ft), and extend the width to between 107 and 170 ft (currently widths range from 50 to 107 ft), in accordance with design specifications presented in the "1999 USACE Terminal Groin Rehabilitation and Extension at Jones Inlet, Long Beach Island, New York Report". Extending the terminal groin may decrease the amount of sediment lost toward the inlet after the beach fill component of the project is carried out (USACE 2005a). It will also possibly retain additional longshore sediment transport without causing large changes in inlet dynamics (USACE 2005a). The median armor weight for the rehabilitated and new portions of Groin #58 is approximately 10 to 10.75 tons (USACE 2005a).

Dune Walkovers and Vehicle Access structures, and Boardwalk Surface Replacement

Several dune walkovers and vehicle access points and are proposed for the City of Long Beach and the Town of Hempstead (USACE 2005a). Construction of these structures will allow the public to gain safe access to the beach without harming the existing and enhanced dune system.

A total of 12 timber dune walkovers (including 8 wheelchair accessible and 4 zig-zag), 12 gravel surface pedestrian walkovers, 8 extensions to existing walkovers, 11,000 lf of boardwalk repair, 8 gravel surface vehicle access ways two swing gate vehicle access

MODIFICATIONS TO THE PROPOSED ACTION

The recommended plan for this Project includes the preferred plan (identified in the 1995 Feasibility Report and subsequent 1998 FEIS filing) with post-Feasibility modifications as detailed in the LRR [USACE 2005a]. The recommended plan provides the most comprehensive, effective, and cost-effective solution to provide storm protection in the Project area.

The proposed action is a modification to the Atlantic Coast of New York, Jones Inlet to East Rockaway Inlet, Island of Long Beach, New York Storm Damage Reduction Project that received a favorable Record of Decision (ROD) in 1999. When compared to the original Project, the Project modification entails an overall reduction in the Project area, which results in a reduction of 7,000 linear feet (lf) of project area (12,000 lf of fill area), a reduction of 2,042,000 cy of fill material needed for initial beach fill and 385,000 cy per yr for 5-year renourishment activities, a reduction of 17 acres (ac) of dune plantings and a reduction of 43,000 lf of sand fence. Specifically, there will be a reduction of 104 ac of filling in the upper beach zone, 35 fewer acres of filling in the intertidal zone, and 31 fewer acres of filling in the sub-tidal zone.

Structural components of the Project modification include the construction of 12 timber dune walkovers, 12 gravel surface dune walkovers, eight extensions of existing dune walkovers, 8 gravel surface vehicle access ways, two swing gate vehicle access structures, one timber raised vehicle access way, construction of 1 lifeguard headquarters, construction of retaining walls around: five existing comfort stations, two comfort/lifeguard stations and one lifeguard headquarters, construction of four new groins (three of the seven groins proposed for the Project have been deferred indefinitely, and are not part of the current proposed Project modification), the rehabilitation of 17 groins, the rehabilitation and extension of the eastern terminal groin, and a modification to the sand placement location in the City of Long Beach such that a sand barrier (instead of a dune) is placed beneath the existing boardwalk instead of in front of the boardwalk. Supplemental NEPA documentation would be prepared to address construction of the three deferred groins as appropriate.

In addition to the decrease in the size of the Project Area and the amount of sand material required for the Project, when compared to the original Project, the Project modification would result in five fewer dune walkovers, one fewer vehicle access ramp, two fewer new groins, and the construction activities originally proposed within a 136-acre shorebird nesting/foraging area would be excluded from the Project (Table 2.1). The proposed Project modification would, however, result in an increase, eight walkover extensions, 11,000 lf of boardwalk repair, construction of one lifeguard headquarters, the construction of timber retaining walls around: five existing comfort stations, two comfort/lifeguard stations and one lifeguard headquarters, the rehabilitation of two groins, and the extension of the terminal groin. A comparison of components of the original selected plan and the proposed Project modification are shown in Table 2.1.

Table 2.1. Summary Comparison of the Original Proposed Project and the Currently Proposed Project Modifications.

Component	Original Project	Project Modification	Change
Beach fill material (for creation of beach berm, sand barrier and a dune)	41,000 lf, some within shorebird nesting area	29,000 lf, none within shorebird nesting area	-12,000 lf
Borrow area sand removal (i.e., total sandfill quantity, excluding 5-year renourishments)	8,642,000 cy	6,600,000 cy	-2,042,000 cy
Dune plantings	29 ac	12 ac	-17 ac
Sand fence	90,000 lf	47,000 lf	-48,500 lf
Boardwalk extensions	0	0	+15
Dune walkovers (timber and/or gravel surface)	29	24	-5
Walkover extensions	0	8	+8
Vehicle access ramps (timber and/or gravel surface)	12	11	-1
Repair of existing boardwalk surface	0	11,000 lf	+11,000 lf
Reconstruction of lifeguard headquarters	0	1	+1
Construction of timber retaining wall around: existing comfort stations, comfort/lifeguard stations, and lifeguard headquarters	8	8	0
5-yr renourishment	2,111,000 cy/yr	1,746,000 cy/yr	-385,000 cy/yr
Rehab and 100 ft Extension of groin 58	1 (rehab)	2 (rehab and extension)	+ 1
New groins	6	4 (7 proposed, but 3 have been deferred)	- 2
Rehabilitation of existing groins	15	17	÷ 2
Impacts to shorebird nesting/foraging area	136 ac	0 ac	No impacts

PROJECT ELEMENTS

Beachfill

This component of the Project includes the following: 1) a dune with a top elevation of +15 ft above NGVD, a top width of 25 ft, and landward and seaward slopes of 1V:5H that will extend along the entire project area except where the City of Long Beach boardwalk is located; 2) a sand barrier with a top elevation of +15 ft above NGVD, a top width of 25 ft, a landward slope of 1V:3H and a seward slope of 1V:5H, that will be located directly beneath the existing boardwalk in the City of Long Beach; and, 3) a beach berm that will extend 110 ft from the seaward toe of the recommended dune or sand barrier at an elevation of +10 ft NGVD, then will gradually slope to match the existing bathymetry (slope will be between 1V:20H in Point Lookout and 1V:35H in Long beach and Lido Beach).

Approximately 41,000 lf of beach fill and a total of 8,642,000 cy of fill material were proposed in the original selected plan (USACE 1998). However, the Project area has been re-defined and now excludes portions of Long Beach that were originally part of the Project area. The resulting beach fill plan includes approximately 29,000 lf of beach fill that extends from Point Lookout west to the western boundary of the City of Long Island Beach. This modification results in a reduction of 12,000 lf of project area and 2,042,000 cy of fill material.

The dune construction portion of beach fill actions includes implementation of dune stabilization methods. Specifically, 12 acres of beachgrass will be planted and 47,000 feet of sand fence will be installed (USACE 2005a).

Rehabilitation of Existing Groins

Sixteen groins were proposed for rehabilitation in the plan selected in 1998. However, the existing groins within the Project were re-evaluated in the LRR (USACE 2005a). The groins were evaluated for structural condition, sand trapping effectiveness, and planform holding effectiveness. As a result of this survey, a total of 17 groins were recommended for rehabilitation, including 15 groins in Long Beach and two groins in Point Lookout .

Rehabilitation will consist of repositioning existing armor stone and adding additional stone where required. The restored groins will have an average length of 144 ft and an average width of 53 ft. Existing groins are on average 144 ft long and 33 ft wide. A primary armor weight of 5 tons was selected for the new armor in order to match the existing armor (USACE 2005a).

structures, and one raised timber vehicle access way, are currently proposed. Originally, 29 dune walkovers (both timber and gravel) and 12 vehicle access ramps were included in the selected plan (USACE 1998). Extensions to existing walkovers and boardwalk surface replacement were not components of the 1995 Feasibility plan.

Comfort Stations and Lifeguard Headquarters

The currently proposed plan includes the construction of timber retaining walls around: five existing comfort stations, two comfort/lifeguard stations, and one lifeguard headquarters (including existing concession stands), and the construction of 1 lifeguard headquarters.

Bird Nesting and Foraging Area

The proposed Project modification has excluded Project activities from within a 93.4-acre ephemeral pool and a 42.3-acre tern/piping plover nesting area located in Point Lookout, near the Jones Inlet ebb shoal attachment point. Project activities were proposed within this area as part of the original plan that was selected in 1995. However, the USACE reevaluated proposed Project activities in direct response to concerns regarding shorebird habitat from Federal and State agencies and other interested parties (USACE 1998). As a result, construction of a beach berm and dune within the bird nesting/foraging area has been eliminated from the proposed Project to allow for the continued unimpeded use of the area as shorebird nesting and foraging habitat. Three new groins were originally proposed within the ephemeral pool and tern/piping plover nesting area. However, based on a re-evaluation of the Project, construction of these groins has been deferred indefinitely, and is not part of the proposed Project modification. Supplemental NEPA documentation would be prepared to address construction of the three deferred groins as appropriate. No beach fill activities will take place within the bird foraging and nesting area.

Sand Removal from Offshore Borrow Area

An offshore borrow area, located approximately 1.5 miles south of Long Beach Island between 25 feet mean low water and about 60 feet mean low water, has been identified as a potential source of sand material for beach fill and dune construction activities (USACE 2005a). Approximately 6,600,000 cy of material will be removed from this area. The original plan selected in 1995 proposed 8,642,000 cy of sand removal (USACE 1998).

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 Branch

November 12, 2004

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

Subject: Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York, Storm Damage Reduction Project.

Dear Mr. Stilwell:

Thank you for providing the Draft Fish and Wildlife Coordination Act Report (DFWCAR) for the subject project. In response to the DFWCAR dated September 2004, please see attached point-by-point response. We would like to meet with your staff to discuss future options with respect to project design and recommended best management activities. We recognize your heavy workload and appreciate your speedy response to the project description. I look forward to working with you and your staff on this effort. If you should have any questions, please contact Mr. Robert J. Smith of my staff at 212-264-0189.

Sincerely,

Leonard Houston
Chief, Environmental Analysis Branch

Cc: USFWS, LI Field Office (Rosemarie Gnam)

FAX ZCH 0961
R Smith

Steve Papa

United States Department of the Interior

FISH AND WILDLIFE SERVICE
3817 Luker Road
Cortland, NY 13045

RECEIVED
JUN 02 2004

May 27, 2004

Mr. Frank Santomauro
Chief, Planning Division
U.S. Army Corps of Engineers
26 Federal Plaza
New York, NY 10278

Attention: Robert Smith, Environmental Analysis Branch

Dear Mr. Santomauro:

Enclosed is the revised draft Scope of Work (SOW) for the U.S. Army Corps of Engineers' (Corps) Atlantic Coast of Long Island, New York from Jones Inlet Westerly to East Rockaway Inlet, Nassau County, New York Project (Long Beach Island Project). The proposed revisions reflect the U.S. Fish and Wildlife Service's (Service) consideration of staff time and cost estimates to undertake preparation of both the Draft and Final Fish and Wildlife Coordination Act 2(b) (FWCA) Reports for this large-scale, long-term project.

As you may be aware, because of the size and complexity of the project under review, the Service's cost estimates for completing the FWCA work were higher than the final figures in the Scope of Work. It will be helpful in the future to involve us as early as possible in the Project Delivery Team (PDT) planning process, so that mutually acceptable funding levels, reflective of the biological work needed, can be negotiated. We would appreciate your consideration of this. Our participation in the PDT process was discussed at some length in our problem-solving session at the December, 17 – 18, 2002, North Atlantic Division/Service Regional Office-sponsored NY District Corps/Service coordination meeting.

If you have any questions or require further assistance, please contact Steve Papa of the Long Island Field Office at (631) 581-2941.

Sincerely,

Fay A. [illegible]
fr
David A. Stilwell
Field Supervisor

Enclosure

cc: NYFO, Project & BR Files
LIFO, Project File
ES:LIFO:NYFO:SPapa:mvd
SPapa L. Zicari

Mr. Frank Santomauro
Chief, Planning Division
U.S. Army Corps of Engineers
26 Federal Plaza
New York, NY 10278

Attention: Robert Smith, Environmental Analysis Branch

Dear Mr. Santomauro:

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As you may be aware, because of the size and complexity of the project under review, the Service's cost estimates for completing the FWCA work were higher than the final figures in the Scope of Work. It will be helpful in the future to involve us as early as possible in the Project Delivery Team (PDT) planning process, so that mutually acceptable funding levels, reflective of the biological work needed, can be negotiated. We would appreciate your consideration of this. Our participation in the PDT process was discussed at some length in our problem-solving session at the December, 17 – 18, 2002, North Atlantic Division/Service Regional Office-sponsored NY District Corps/Service coordination meeting.

If you have any questions or require further assistance, please contact Steve Papa of the Long Island Field Office at (631) 581-2941.

Sincerely,

David A. Stilwell
Field Supervisor

Enclosure

REVISED SCOPE OF WORK
FISCAL YEAR 2004

Fish and Wildlife Coordination Act Report
Atlantic Coast of Long Island, New York from Jones Inlet Westerly to East Rockaway Inlet
Nassau County, New York

1. SUBJECT

This Scope of Work (SOW) is between the U.S. Fish and Wildlife Service (Service) and the U.S. Army Corps of Engineers, New York District (Corps) for the Service to prepare a Fish and Wildlife Coordination Act (FWCA) 2(b) Report for the proposed project. Report on the proposed project pursuant to the FWCA (16 U.S.C. 661 et seq.).

2. PROJECT NAME

Atlantic Coast of Long Island, New York from Jones Inlet Westerly to East Rockaway Inlet (Storm Damage Reduction Project)

3. CORPS DISTRICT AND CONTACTS

U.S. Army Corps of Engineers (CENAN-PL)
26 Federal Plaza, 21st Floor, New York, NY 10278-0090

Section Chief:	Roselle Henn	Tel:	(212) 264-2119
Project Biologist:	Robert J. Smith	Tel:	(212) 264-0189

4. SERVICE OFFICE AND CONTACTS

U.S. Fish and Wildlife Service, New York Field Office
3817 Luker Road, Cortland, NY 13045

Field Supervisor:	David A. Stilwell	Tel:	(607) 753-9334

U.S. Fish and Wildlife Service, Long Island Field Office
500 St. Marks Lane, Islip, NY 11751

Supervisor:	Rosemarie Gnam	Tel:	(631) 581-2941
		Fax:	(631) 581-2972

5. PROJECT DESCRIPTION

Long Beach Island

The study area for the Storm Damage Reduction Project is located on the Atlantic Coast of Long Island, New York, from Jones Inlet westerly to East Rockaway Inlet. The site lies within Nassau County, New York, and from east to west, encompasses the communities of Point Lookout, Lido Beach, City of Long Beach, and Atlantic Beach. The nine-mile-long barrier island varies in width from 1,500 to 4,000 feet (ft) and is bounded on the east by Jones Inlet, on the south by the Atlantic Ocean, on the west by

East Rockaway Inlet, and on the north by Reynolds Channel. Development is primarily residential with extensive recreational facilities. The storm damage reduction project requires the utilization of borrow area sediments and groin revitalization/construction to provide a measure of beach erosion control and hurricane protection to the Long Beach Island shoreline.

Project Description

Long Beach Island is a nine-mile-long barrier island located on the Atlantic Coast of Long Island, New York, between East Rockaway Inlet to the west and Jones Inlet to the east. The area has been subject to major flooding during storms, causing damage to structures along the barrier island. Over the years, continued erosion has resulted in a reduction of the height and width of the beachfront, which has increased the potential for storm damage.

The terrain of the island is low-lying and flat with elevations generally less than 10 ft above National Geodetic Vertical Datum (NGVD). Although some areas have dunes, the ocean shoreline of Long Beach typically consists of a continuous strip of generally low-lying beach with a series of groins along the oceanfront. Severe storms in recent years have not only caused a reduction in the overall beach height and width along the island, but also accelerated deterioration of the stone groins, increasing the susceptibility of the storm damage to local communities. Continuing erosion exposes this low-lying island to heightened risk of catastrophic damage from flooding and wave impact.

Problems also include the deterioration of existing coastal protective structures. In spite of continued storm damage, groins fronting the barrier island, including the eastern terminal groin, have not been maintained or repaired since construction in the 1950s. This deterioration decreases the protective capability of the beach and increases vulnerability of the coastal communities to storm damage.

The island is also subject to flooding, although at lower stages, and less frequently on the bay side of the island. Based on current Federal Emergency Management Administration (FEMA) delineation of the 100-year tidal inundation area, the Long Beach Island Regional Planning Board estimates that over 3,000 homes would be flooded, directly impacting over 8,000 homes. The threat of the resultant loss of life is a direct possibility in any coastal flooding situation.

The Long Beach Project is a storm damage reduction project which has been designed to provide protection against wave attack and inundation for homes and businesses along 6.4 miles of oceanfront including Point Lookout, Lido Beach, and the City of Long Beach. This area has been subject to major flooding during storms causing damage to structures along the barrier island. Over the years, continued erosion has resulted in a reduction in the height and width of the beachfront increasing the potential for storm damages.

The Recommended Plan is a beach fill plan developed to reduce storm damages to highly developed communities that are susceptible to wave attack and flooding during major storms and hurricanes and to provide protection against a 100-year storm event. The Plan, which includes approximately 34,000 linear feet of beachfill, is characterized by a

110-ft wide beach berm at an elevation of +10 ft above NGVD, and a dune system with a top elevation of +15 ft. NGVD.

Beachfill

The Recommended Plan includes the beach fill for Plan 5 in the February 1995 Feasibility Report. The components of the beach fill include:

a) *Dune and Berm Fill*: Dune and berm fill from Point Lookout west to the western boundary of the City of Long Beach where the selected plan tapers into the existing shoreline in Atlantic Beach (approximately 34,000 L.F.).

b) *Dune*: Crest elevation of +15 ft NGVD for a crest width of 25 ft with 1 on 5 side slopes on the landward and seaward sides.

c) *Berm*: Fronting the dune, a berm width of 110 ft to 400 ft at elevation +10 ft NGVD with a shore slope of 1 on 20 for the easternmost 5,500 L.F. of the project, a 1,500 L.F. transition, thence a 1 on 35 slope for the remaining 27,000 L.F.

d) *Sand Fill Quantity*: A total sand fill quantity of 6,670,200 cubic yards (cy) will add approximately 100 to 400 ft of design beach at 0.0 ft NGVD to the existing beach. These quantities of sand fill include the following:

+1.0 ft. tolerance
- Overfill factor of 2.5 percent
- Advanced nourishment width of 50 ft

e) The dune construction includes 24 acres of planted dune grass and 41,500 L.F. of sand fence for dune sand entrapment, as well as 15 boardwalk extensions/dune crossovers, 14 dune walkovers, and 4 vehicle access ramps over the dune in the City of Long Beach, and 26 dune walkovers and 8 vehicle access ramps over the dune in Lido Beach and Point Lookout.

f) Renourishment of approximately 1,681,300 cy of sand fill from the offshore borrow area every 5 years for the 50-year project life. Beachfill for the proposed project is available from an offshore borrow area containing approximately 36 million cy of suitable beachfill material. The borrow area is located approximately one mile offshore of the barrier island of Long Beach.

Changes To The Recommended Plan Since The Feasibility Report

Since the completion of the Feasibility Report in 1995, there have been refinements to design and changes in the existing conditions. Accordingly, a number of modifications have been incorporated into the Recommended Plan based on work completed to date since the completion of the Feasibility Report. These modifications are described in the following paragraphs.

Terminal Groin Rehabilitation and Extension

Based on the report entitled, "Terminal Groin Rehabilitation and Extension at Jones Inlet, Long Beach Island," February 1999, prepared by Michael Baker, Jr., Inc., the Recommended Plan has been modified to include rehabilitation and extension of Groin No. 58, the easternmost terminal groin in Point Lookout, in accordance with the typical design proposed in the referenced report.

New Groin Construction

Based on the report entitled, "Technical Reanalysis of the Shoreline Stabilization Measures for the Eastern Portion of the Long Beach Island, New York Project," March 2000, prepared by Offshore and Coastal Technologies, Inc. /Andrews, Miller & Assoc., Inc., the Recommended Plan has been modified to include the construction of seven new groins in the Point Lookout area. The first groin will be constructed 800 ft west of existing Groin No. 55 in Point Lookout and the second through fourth groins constructed with tapered lengths at intervals of 800 ft. The remaining three groins will be constructed at 1,200 ft. intervals with tapered lengths. In order to minimize potential impacts to the shoreline to the west, a tapered groin field is recommended with a 6-degree taper starting at the seaward tip of Groin No. 3. This taper results in a proposed length of 500 ft from the proposed seaward top of berm to the seaward tip of the first proposed groin to the west of Groin No. 3. The lengths of the remaining groins are reduced to meet the 6-degree taper for the groin field.

Initial construction of the four easternmost groins is recommended to provide the required erosion control and storm protection for the severely eroded shoreline area. The remaining three groins, which would be largely buried in the existing weldment area, are proposed for deferred construction as needed based on the stability of the weldment area. The deferred tapered groins are included to address the possibility that the weldment may migrate westward, creating erosional pressure to the east as it moves.

Existing Groin Rehabilitation

Based on a condition survey of the existing groins conducted in September 2003, the Recommended Plan has been modified to include rehabilitation of those groins that were found in poor or fair condition that would be beneficial to the beach stability. Based on this evaluation, 15 of the 23 groins in the City of Long Beach and 2 groins in Point Lookout are recommended for rehabilitation. The proposed rehabilitation consists of repositioning existing armor stone and adding additional armor stone along the seaward 100-200 ft of each of the groins. A minimum constructible crest width of approximately 13 ft was selected with side slopes of 1V on 2H. A primary armor weight of approximately 5 tons was selected in order to approximately match the existing armor stone.

Bird Nesting and Foraging Area

The Recommended Plan has been modified to accommodate an area of the beach which, due to existing width and berm height, is a prime area for ephemeral pool formation and, as such, is a prime shorebird nesting and foraging area. This plan will allow for the continued unimpeded use of this area as shorebird nesting and foraging areas. In order to avoid construction in this nesting/foraging area, evaluations were conducted to ensure that the existing condition has at least the same storm damage level of protection as the recommended design section. The level of protection against storm erosion and overtopping for the existing berm and dune width and height was compared to that required in the Feasibility Study and found to provide a comparable level of protection (less than 80 percent dune material displacement). A future trigger, a minimum berm width of 250 ft, has been determined and included in the LRR and OMRR&R Manual, such that if the berm width falls below that minimum width required storm protection, construction of deferred project elements will be initiated including placement of the full design section as per the Feasibility Study. Placement of the full feasibility cross-section (or equivalent protection) in the nesting/foraging area at a future date will be considered a part of major rehabilitation contingency for determining project costs.

Figures 3 to 5 from the original Scope of Work indicate the proposed ephemeral pool dimensions and positioning for the nesting/foraging area as provided by the NYD. The ephemeral pool encompasses a 93.4-acre area and the plover and least tern nesting area covers a 42.3-acre area.

Borrow Area

The borrow area is located south of Long Beach Island between 25 ft mean low water (MLW) to about 60 ft MLW. The sediments at the borrow site have been found characterized through a series of composite grain-size analyses and were determined to be predominantly fine sand with typically only a trace of silts (U.S. Army Corps of Engineers 1998). The offshore borrow area contains approximately 36 million cy of suitable beachfill material.

6. **PROJECT STATUS:**

Draft Environmental Analysis	Due May 2004
Final Environmental Analysis	Due October 2004

7. **SPECIFIC SERVICE WORK TO BE ACCOMPLISHED:**

A. Review project description and Draft/Final Scopes of Work;

B. Identify existing significant fish and wildlife resources (including threatened and endangered species and their habitats) within the project area and discuss project related resource concerns. Update information on fish and wildlife resources within the project's impact areas;

C. Coordinate with the New York State Department of Environmental Conservation (NYSDEC) and other agencies/organizations regarding project area resources, project-related impacts, and measures to minimize or mitigate project impacts on fish and wildlife resources;

D. Evaluate direct, indirect, and cumulative impacts of the preferred alternative on fish and wildlife resources;

E. Evaluate the preferred alternative to reduce or compensate for impacts to fish and wildlife resources. Recommend fish and wildlife enhancement opportunities in the project area and provide cost estimates for enhancement proposals;

F. Conduct site visits;

G. Provide an Interim Letter/Update one month prior to submission of Draft FWCA Report;

H. Provide Draft FWCA Report to Corps, NYSDEC, Environmental Protection Agency (EPA), and National Marine Fisheries Service (NMFS);

I. Review Corps and NYSDEC comments on Draft FWCA Report and provide Final FWCA Report;

J. Request written concurrence on Draft FWCA Report from NYSDEC;

K. Notify the Project Biologist in writing of any anticipated schedule delays as soon as they are identified or, minimally, one month prior to specified delivery date.

8. **REPORT BINDING:**

a.	Draft Report:	Four (4) copies bound
b.	Final Report:	Four (4) copies bound Digital (Compact Disk) version

9. **CORPS INPUT TO SERVICE:**

Corps to provide project description and all available information on project design and the benefit/cost analysis of the alternatives.	May 21, 2004
Corps to provide comments on Draft Report Receipt of the Draft Report	Within 30 days of

10. **SERVICE INPUT TO CORPS:**

Service submits Interim Letter/Update Update to the Corps	June 11, 2004 (or 22 days after receipt of the transfer of funds [TOF], whichever comes first
Service submits Draft FWCA Report to Corps, NYSDEC, EPA, and NMFS	July 11, 2004 (or 52 days from receipt of the TOF)
Service submits Final FWCA Report	August 20, 2004 (or 30 days after submission of the Draft Report – incorporates minimum 30-day interagency review period)

11. SERVICE EFFORTS AND COSTS:

Item	Staff-Days	Cost ($)
Review of project description/reports3	1,500	
Coordination with NYSDEP, Service specialists, and other resource agencies	2	1,000
Site Visits	2	1,000
Preparation of Draft FWCA Report	12	6,000
Preparation of Final FWCA Report	5	2,500
SUBTOTAL:	24	12,000
Overhead (38 percent)		4,560
Report Reproduction, Equipment, Materials, and miscellaneous expenses		500
TOTAL:		**$17,060.00**
Interim Payment MIPR W16ROE41128165		**$15,000.00**
Approximate overhead (38 percent)		4,130.00
Site Visits and Report Preparation	21	10,869.00
Anticipated Additional Payment/per anticipated revision to MIPR		**$2,060.00**
Approximate overhead (38 percent)		568.00
Report Preparation	3	1,492.00

Kcb

Faxed 6/16/04

United States Department of the Interior

FISH AND WILDLIFE SERVICE
3817 Luker Road
Cortland, NY 13045

June 15, 2004

Mr. Leonard Houston
Chief, Environmental Analysis Branch
U.S. Army Corps of Engineers
26 Federal Plaza, Rm. 2119
New York, NY 10278

Dear Mr. Houston:

In accordance with the Scope-of-Work (SOW) dated May 27, 2004, this Interim Letter provides the U.S. Fish and Wildlife Service's (Service) preliminary review and comments on the U.S. Army Corps of Engineers' (Corps) project entitled, "Atlantic Coast of Long Island, New York, from Jones Inlet Westerly to East Rockaway Inlet, Nassau County, New York" (referred to as Long Beach Island Project), and is intended to assist in subsequent project planning. This letter does not constitute the final report of the Department of the Interior on the project as described under Section 2(b) of the Fish and Wildlife Coordination Act (FWCA) (48 Stat. 401, as amended; 16 U.S.C. 661 *et seq.*). The Service has also used this opportunity to provide some comments on the proposed project pursuant to the Endangered Species Act (ESA) of 1973, as amended, (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) regarding the Federally-listed piping plover and seabeach amaranth which occur in the study area.

Description of Project and Study Area

The following project description, which was developed by the Corps, is excerpted from the May 27, 2004, SOW (Figures are not included).

> **Long Beach Island**
>
> The study area for the Storm Damage Reduction Project is located on the Atlantic Coast of Long Island, New York, from Jones Inlet westerly to East Rockaway Inlet. The site lies within Nassau County, New York, and, from east to west, encompasses the communities of Point Lookout, Lido Beach, City of Long Beach, and Atlantic Beach. The 9-mile long barrier island varies in width from 1,500 to 4,000 feet (ft) and is bounded on the east by Jones Inlet, on the south by the Atlantic Ocean, on the west by East Rockaway Inlet, and on the north by Reynolds Channel. Development is primarily residential with extensive recreational facilities. The storm damage reduction project requires the utilization of borrow area sediments and groin revitalization/construction to provide a measure of beach erosion control and hurricane protection to the Long Beach Island shoreline.

Project Description

Long Beach Island is a 9-mile long barrier island located on the Atlantic Coast of Long Island, New York, between East Rockaway Inlet to the west and Jones Inlet to the east (See Figure 1). The area has been subject to major flooding during storms, causing damage to structures along the barrier island. Over the years, continued erosion has resulted in a reduction of the height and width of the beachfront, which has increased the potential for storm damage.

The terrain of the island is low-lying and flat with elevations generally less than 10 ft above National Geodetic Vertical Datum (NGVD). Although some areas have dunes, the ocean shoreline of Long Beach typically consists of a continuous strip of generally low-lying beach with a series of groins along the oceanfront. Severe storms in recent years have not only caused a reduction in the overall beach height and width along the island, but also accelerated deterioration of the stone groins, increasing the susceptibility of the storm damage to local communities. Continuing erosion exposes this low-lying island to a heightened risk of catastrophic damage from flooding and wave impact.

Problems also include the deterioration of existing coastal protective structures. In spite of continued storm damage, groins fronting the barrier island, including the eastern terminal groin, have not been maintained or repaired since construction in the 1950s. This deterioration decreases the protective capability of the beach and increases vulnerability of the coastal communities to storm damage.

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Preliminary and Outstanding Service Comments on the Project Description and Supporting Documents

Via electronic correspondence dated April 14, 2004, the Service requested clarification of the project description and forwarded the table provided below to illustrate the differences between the 1995 Proposed Plan, which was to serve as the basis for the proposed project, and the project description contained in the May 27, 2004, SOW. While our office awaits clarification and confirmation on these aspects of the final project design, we will continue to move forward in the preparation of the Draft FWCA Report, as we believe we have a understanding of the gross aspects of the proposed project.

In addition, on April 13, 2004, the Service requested the reports entitled, "Terminal Groin Rehabilitation and Extension at Jones Inlet, Long Beach Island," dated February 1999, and "Technical Reanalysis of the Shoreline Stabilization Measures for the Eastern Portion of the Long Beach Island, New York Project," dated March 2000. The Service awaits these reports for review.

Comparison of Beach Nourishment Plan from 1995 Recommended Plan 5 and Project Description in Draft 2004 SOW

	1995 Recommended Plan	Plan in Draft 2004 SOW
Beach Fill Length	41,000 ft	34,000 ft
15 to 25 ft maintenance corridor	Yes	No
Berm width	110 ft	110 to 400 ft
Fill volume	6,670,200 cy	8,642,000 cy
Beach grass area	29 acres	24 acres
Linear ft snow fence	90,000 ft	41,500 ft
Renourishment volumes	2,111,000 cy	1,681,200 cy
Dune walkovers	16	15
Vehicle access ramps	12	4
Timber ramps	13	15?

Ecological Uniqueness of Project Area and Surrounding Habitats

There are 116 species of special emphasis in the Hempstead Bays - South Oyster Bay oceanic, barrier island, and estuarine complex, incorporating 42 species of fish and 49 species of birds, and including the following Federally and State-listed species. (Living resources and their habitats are dynamic, therefore, the ecological significance and species information presented here may not be complete or up-to-date [U.S. Fish and Wildlife Service 1997]. Federal and State environmental agencies should be consulted for additional information.)

Federally-listed Endangered
- Atlantic ridley (=Kemp's) sea turtle (*Lepidochelys kempi*)

Federally-listed Threatened
- loggerhead sea turtle (*Caretta caretta*)
- piping plover (*Charadrius melodus*)
- seabeach amaranth (*Amaranthus pumilus*)

Federal Species of Concern
- northern diamondback terrapin (*Malaclemys t. terrapin*)

State-listed Endangered
- Carolina clubmoss (*Lycopodiella caroliniana*)
- Barratt's sedge (*Carex barrattii*)
- false china-root (*Smilax pseudochina*)
- St. Andrew's cross (*Hypericum hypericoides* spp. *multicaule*)

State-listed Threatened
- least tern (*Sterna antillarum*)
- northern harrier (*Circus cyaneus*)
- osprey (*Pandion haliaetus*)
- common tern (*Sterna hirundo*)
- button sedge (*Carex bullata*)
- golden dock (*Rumex maritimus* var. *fueginus*)

State-listed Special Concern Animals
- short-eared owl (*Asio flammeus*)

State-listed Rare Plants
- whip nutrush (*Scleria triglomerata*)
- pinweed (*Lechea racemulosa*)

Preliminary Endangered Species Act Comments

The project area, which includes the beach nourishment and dune construction zones as well as the offshore sand borrow areas, contains habitat critical to a number of fish and wildlife species, including the Federally-listed piping plover and seabeach amaranth. Currently, the Service awaits the Corps' submission of a Biological Assessment (BA), as per 50 CFR Part 402, that would identify the potential impacts of the project to these listed species and measures to avoid or minimize impacts due to direct and indirect effects of the project. On April 13, 2004, the Service provided guidance related to the preparation of the BA and offered technical assistance as needed in developing a framework for the BA.

The Service recommends that the Corps include the following measures into the project description in order to avoid or minimize impacts to the piping plover and seabeach amaranth:

1) The Corps should consult with the Service in order to identify, delineate, and symbolically fence piping plover territorial, courtship, nesting, and brood rearing areas. By July 1, if plovers have not utilized any previously designated piping plover territorial, courtship, nesting, or brood-rearing area, the Corps, after consultation with the Service, may be authorized to initiate construction activities within these areas. Any on-going construction work within the plover territorial, courtship, nesting, and brood-rearing areas and designated buffer areas shall cease by April 1 of any given year.

2) Qualified endangered species bird monitor(s), from a list pre-approved by the Service, should be retained.

3) Beginning on April 1, and prior to commencement of <u>both the initial construction project and subsequent renourishment activities</u>, and continuing through September 1, or the date of last fledging (marking the conclusion of the piping plover breeding season), the following survey/monitor activities shall be established:

Seabeach amaranth surveying activities within the project area shall be conducted both mid-season (June/July) and late season (September/October). Upon the identification of any seabeach amaranth within the project area, the Corps shall reinitiate Section 7 consultation with the Service and shall protect seabeach amaranth habitat with symbolic fencing. Symbolic fencing shall be erected in a 3 meter (approximately 10 feet) radius around individual plants, or erected in a 3 meter zone in any direction around groups of plants. No fill shall be placed on seabeach amaranth between May 1 and November 1 in any given year. Consultation with the Service will be necessary to determine if this time-of-year work restriction is appropriate.

4) The beach disposal area(s) in front of the dunes shall be finished to a natural grade and contour to maintain suitable nesting habitat for piping plovers.

5) The dredged material to be disposed of in the beach nourishment area shall conform with the already existing substrate on the beach or consist of material that is capable of maintaining suitable piping plover habitat.

6) In order to assess the need for additional protective measures for piping plover and seabeach amaranth, the Corps should ensure, via cooperation and coordination with local landowners or through direct involvement by Corps biologists, that the project area is surveyed for three seasons following the initial project completion. The objectives of these surveys should be to estimate the number of breeding pairs of plovers, to estimate overall productivity, and to estimate the number of seabeach amaranth plants. Yearly survey reports should be sent to the Service by December 1 during each of the 3 years following initial project completion.

7) A stated secondary benefit of the proposed project will be the significant improvement of opportunities for recreational beach use. Increases in recreational use of beaches can also result in increased adverse impacts to piping plovers and seabeach amaranth that occur on these beaches. To avoid such impacts, the protection of piping plover and seabeach amaranth habitats should be assured prior to project implementation. This should occur by educating residents, landowners, or beach managers on the management requirements discussed below and, prior to project commencement, by seeking a written agreement from residents, landowners, or beach managers for full cooperation with the

Corps and the Service, or mutually agreed-upon designated representatives (the New York State Department of Environmental Conservation, The Nature Conservancy, etc.).

a) Provide access to the project beaches to the Service, the Corps, or their mutually agreed-upon designated representatives, to survey, monitor, post, and/or symbolically-fence seabeach amaranth habitat and piping plover courtship, nesting, and brood-rearing areas, and erect predator exclosures (as needed) for nests during the plover breeding season (April 1 to September 1). Access should be given during daylight hours on any day(s) of any given year at the required frequency to accomplish the purposes stated above.

   The symbolic fencing may be placed in a 50 meter radius (approximately 163 ft) around plover nest sites, and in a 3 meter radius or zone around seabeach amaranth plant(s) where pedestrians, joggers, picnickers, fisherman, boaters, horseback riders, or other recreational users are present in numbers that could harm or disturb incubating plovers and their eggs, and seabeach amaranth.

b) Prohibit off-road vehicular (ORV) traffic, including all terrain vehicles, on the beach in accordance with the Service's guidelines entitled, "*Guidelines for Managing Recreational Activities in Piping Plover Breeding Habitat on the U.S. Atlantic Coast to Avoid Take Under Section 9 of the Endangered Species Act.*" Prohibit ORVs from entering symbolically-fenced seabeach amaranth areas during the growing season between May 1 and November 1.

c) Prohibit the removal of natural organic material deposited on the beach by the tides (wrack) during brood-rearing in the areas used by plovers in order to preserve plover feeding habitat. Prohibit mechanical beach cleaning of any kind; however, trash and litter may be manually removed from the wrackline.

d) Prohibit fireworks on beaches where piping plovers nest from April 1 to September 1, or the date of last fledging.

e) Prohibit kite-flying within 200 meters (approximately 656 ft) of territorial or nesting adults or unfledged juvenile piping plovers from April 1 to September 1.

f) Leash pets at all times from April 1 to September 1 on beaches where piping plovers are present, because dogs and cats are common predators of piping plover eggs and chicks.

g) Prohibit feeding of raccoons, gulls, or other wildlife to minimize predation on plovers.

The proposed project area may contain the Federally-listed Kemp's Ridley (*Lepidochelys kempi*) and loggerhead (*Caretta caretta*) sea turtles. Principal responsibility for these species is vested with the National Oceanic and Atmospheric Administration/Fisheries (NOAA/F) and it is recommended that the Corps consult with the NOAA/F in accordance with Section 7 of the ESA regarding the potential for project impacts on these marine species.

Finally, there is no habitat within the project impact area designated or proposed "critical habitat" in accordance with provisions of the ESA.

Analysis of Adverse and Beneficial Project Impacts

In terms of report format, the Service will follow report formats used in previously prepared reports. With that in mind, the following provides a preliminary list of direct and indirect impacts to fish and wildlife resources that will be addressed in the FWCA Report. This list is not intended to be exhaustive.

Direct Impacts

- large-scale habitat modification of the dune and beach areas and ocean intertidal and subtidal zones
- impacts to fish and wildlife from construction, turbidity, and noise

Indirect Impacts

- interference with natural processes of habitat formation
- long-term, extended habitat modification
- Impacts of potential increases in recreation

Cumulative Impacts

- Impacts from related south shore beach erosion and hurricane protection and navigation projects
- Burial of benthic organisms

Recommended Approach to Mitigation and Enhancement

Under the FWCA and the National Environmental Policy Act regulations, the Service has responsibilities to ensure that project-related losses to fish and wildlife resources are identified and mitigated. As part of our participation in the project planning, a mitigation plan will be developed and will be included in the draft FWCA Report.

Alternative approaches to minimize or avoid impacts may include, but not be limited to: establishing time of year construction windows for initial and renourishment activities; establishing a species-community monitoring plan over the life of the project; and, ensuring that the grain size of the fill matches that existing at the project site.

Potential Opportunities for Additional Fish and Wildlife Conservation Measures

The Service intends to use this phase of project planning to coordinate with local and State agencies, as well as the Corps, on potential habitat enhancement features that could be incorporated into the project description that would provide an overall net benefit to fish and wildlife species. These measures could include, but not be limited to, the development of outreach and public education through the design and placement of kiosks along the project boardwalk or access points, and habitat enhancement or creation to benefit migratory waterfowl, shorebirds, and marine mammals.

Thank you for the opportunity to provide your agency with these interim comments. If you have any questions or require further assistance, please have your staff contact Steve Papa of the Long Island Field Office at 631-581-2941.

Sincerely,

David A. Stilwell

David A. Stilwell
Field Supervisor

United States Department of the Interior

FISH AND WILDLIFE SERVICE
3817 Luker Road
Cortland, NY 13045

September 22, 2004

Mr. Walter Mudgan
Division of Environmental Planning and Protection
U.S. Environmental Protection Agency
Region 2
290 Broadway
New York, NY 10007-1866

Dear Mr. Mudgan:

Please find enclosed the U.S. Fish and Wildlife Service's (Service) Draft Fish and Wildlife Coordination Act Report for the U.S. Army Corps of Engineers' (Corps) proposed project entitled, "Atlantic Coast of New York, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York, Storm Damage Reduction Project."

The Service looks forward to receiving your comments on this draft report within 45 days of receipt of this letter. If additional time is needed, please have your staff coordinate with Robert Smith, of the Corps' New York District Office, at 212-264-0189. If you have any questions related specifically to this report, please contact Steve Papa of the Long Island Field Office at 631-581-2941.

Sincerely,

David A. Stilwell
Field Supervisor

Enclosure

cc: USACE, New York, NY (R. Smith, Planning Division)

United States Department of the Interior

FISH AND WILDLIFE SERVICE
3817 Luker Road
Cortland, NY 13045

September 22, 2004

Charles T. Hamilton
Supervisor, Natural Resources
New York State Department of Environmental Conservation
Building 40, SUNY at Stony Brook
Stony Brook, NY 11794

Dear Mr. Hamilton:

Please find enclosed the U.S. Fish and Wildlife Service's (Service) Draft Fish and Wildlife Coordination Act Report for the U.S. Army Corps of Engineers' (Corps) proposed project entitled, "Atlantic Coast of New York, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York, Storm Damage Reduction Project."

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Sincerely,

David A. Stilwell
Field Supervisor

Enclosure

cc: USACE, New York, NY (R. Smith, Planning Division)

United States Department of the Interior

FISH AND WILDLIFE SERVICE
3817 Luker Road
Cortland, NY 13045

September 22, 2004

Stan Gorski, Field Office Supervisor
Habitat Conservation Division
National Oceanic and Atmospheric Administration
James J. Howard Marine Sciences Laboratory
74 Magruder Road
Highlands, NJ 07732

Dear Mr. Gorski:

Please find enclosed the U.S. Fish and Wildlife Service's (Service) Draft Fish and Wildlife Coordination Act Report for the U.S. Army Corps of Engineers' (Corps) proposed project entitled, "Atlantic Coast of New York, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York, Storm Damage Reduction Project."

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Sincerely,

David A. Stilwell
Field Supervisor

Enclosure

cc: USACE, New York, NY (R. Smith, Planning Division)

Draft Fish and Wildlife Coordination Act Report

Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York, Storm Damage Reduction Project

September 2004

Prepared For:

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

Prepared By:

Department of the Interior
U.S. Fish and Wildlife Service
Long Island Field Office
Islip, New York

Preparer: Steven T. Papa

Long Island Field Office Supervisor: Rosemarie Gnam

EXECUTIVE SUMMARY

This is the U.S. Fish and Wildlife Service's (Service) Draft Fish and Wildlife Coordination Act (FWCA) Report for the U.S. Army Corps of Engineers' (Corps) proposed project entitled, "Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York, Storm Damage Reduction Project." Pursuant to the FWCA of 1958, as amended (87 Stat. 401, as amended; 16 U.S.C. 661 *et seq.*), the Corps consulted with the Service to ensure that there was equal consideration for fish and wildlife resources during the planning of the Corps' proposed water resources development project.

The Service identified major ecological communities and significant habitats in the Corps' study area, the species that use those habitats, and the potential impacts to those species and habitats resulting from implementation of the Corps' proposed project (also referred to as Recommended Plan). The Recommended Plan involves a massive construction project which would rehabilitate, remove, and replace numerous groins and provide initial beach and dune construction and maintenance over a 50-year project life. In addition, vehicle access ramps and dune walkovers would be constructed. The Corps also identified in the Recommended Plan important shorebird breeding areas within the study area and contingency plans for these specific areas. The beach nourishment and periodic maintenance will involve the dredging of offshore sand reserves with upland and intertidal placement in the proposed project area.

The Service recommended a number of measures the Corps should incorporate in the project design, local cost-sharing agreement, plans and specifications, as well as the operations and maintenance agreements to avoid, minimize, or compensate for impacts to Service trust resources including migratory birds and wetland habitats. Some of the species impacted by this project are included in various local, State, and Federal conservation plans. In this urban setting, the proposed project area supports many locally, regionally, and nationally important avifauna, fish, and shellfish species. The Service indicated that the environmental studies which the Corps has used as the basis of its justification and support for the project are out dated and non-site specific. The Service has recommended that the Corps undertake a number of resource studies to develop an environmental framework which would assist in its decision-making process for this project. In addition, the Service has pointed to the need for these additional studies to assist the Service in developing adequate mitigation measures.

The Service has concluded that the proposed project will result in unacceptable adverse impacts to Service trust resources. The Service also concludes that the proposed mitigation measures should be implemented immediately to address some of the informational and data gaps which exist for these resources in order to proceed with project planning. In addition, the mitigation measures include coordination that should be undertaken by the Corps with the local cost-share sponsors to minimize predicted long-term adverse impacts to waterbirds and shorebirds due to human recreational activities in the project area. The Service recognizes the importance of the project and is committed to assisting the Corps on meeting its project objectives. Along this line, the Service has indicated that additional consultation under the FWCA would be needed, and that the Service is available to facilitate the consultation process.

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AUTHORITY, PURPOSE, AND SCOPE

This is the Fish and Wildlife Service's (Service) Draft Fish and Wildlife Coordination Act (FWCA) Report for the U.S. Army Corps of Engineers' (Corps) feasibility study for the proposed project entitled, "Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York, Storm Damage Reduction Project." This report is submitted in accordance with the FWCA of 1958, as amended (48 Stat. 401, as amended; 16 U.S.C. 661 *et seq.*), which mandates Federal agencies to consult with the Service and the state wildlife agency, in this case, the New York State Department of Environmental Conservation (NYSDEC), for any projects that may impact the waters of the United States. As a draft report, it does not constitute the final report of the Secretary of the Interior as required by Section 2(b) of the FWCA.

The Corps' feasibility study is being conducted under the authority of a resolution by the Committee on Public Works and Transportation of the U.S. House of Representatives adopted on October 1, 1986, which stated:

> *"Resolved by the Committee on Public Works and Transportation of the United States House of Representatives, that the Board of Engineers for Rivers and Harbors is hereby requested to review the previous report on the Atlantic Coast of Long Island, New York, Jones Inlet to East Rockaway Inlet, authorized by the resolution of the Committee on Public Works and Transportation, adopted March 20, 1963, and June 19, 1963, respectively, and also in response to Public Law 71, 84th Congress, First Session,*

approved June 15, 1955, with a view to determining the feasibility of providing storm damage protection works for Long Beach Island."

In accordance with the Scope of Work (SOW) between the Service and the Corps dated May 27, 2004, copies of this report were submitted to the Corps and the NYSDEC for their review and written concurrence. This report was also sent to the U.S. Environmental Protection Agency (EPA) - Region I and the National Oceanic and Atmospheric Administration/Fisheries (NOAA/F) for comments. A statement from the NYSDEC as to whether that agency concurs with the findings and recommendations of the Service is expected within 45 days after receipt of this report. Throughout the preparation of this report, the Service coordinated with the Corps to obtain pertinent engineering and biological reports.

The Service and the Corps are currently engaged in informal consultation under the Endangered Species Act (ESA) of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) for the purpose of ensuring that the proposed project would not be likely to adversely affect the Federally-listed threatened piping plover (*Charadrius melodus*) and seabeach amaranth (*Amaranthus pumilus*). In correspondence dated March 16, 2004, the Corps informed the Service that a biological assessment was being prepared which would evaluate whether the proposed project would be likely to adversely affect Federally-listed species.

The purpose of the Corps' proposed project is to identify and evaluate a possible solution to beach erosion and storm damage problems experienced on Long Beach Island. The purpose of the FWCA consultation is to document the potential impacts upon fish and wildlife resources expected from the implementation of the proposed project and recommend measures to conserve and protect fish and wildlife resources.

The scope of analysis for this report is defined, in large measure, by the SOW between the Corps and the Service, which established the specific work to be accomplished by the Service in this phase of the planning process. The Corps requested that the Service identify the significant fish and wildlife resources, including threatened and endangered species within the project area, and discuss project-related resource concerns. In addition, the Corps requested the Service to update information on fish and wildlife resources, evaluate project impacts (direct, indirect, and cumulative) of the preferred alternative, develop mitigation measures for the preferred alternative, and recommend fish and wildlife enhancement opportunities.

To achieve the above, the Service identified the geographic area and temporal scope of the FWCA analysis. The geographic area generally includes Long Beach Island from Jones Inlet to East Rockaway Inlet, Nassau County, New York (U.S. Army Corps of Engineers 1998), including all areas found there that would be directly or indirectly impacted by the proposed project. The eastern and western boundaries of the FWCA analysis area are Jones Inlet and Beach 40th Street on the Rockaway peninsula, respectively. (Beach 40th Street represents the

The FWCA analysis area includes the areas described above as well as the previously defined portion of the Rockaway peninsula and associated ocean beach, intertidal, and subtidal habitats. In addition, the Hempstead Bays and South Oyster Bay complex to the north of Long Beach Island are also included in the FWCA analysis area to evaluate potential fish and wildlife enhancement opportunities in the study area. These are relatively shallow water bays which include wetland and dredge disposal islands connected by a network of natural and man-made channels. These bays have an interconnection with the Atlantic Ocean through the Jones and East Rockaway Inlets.

The Hempstead Bays - South Oyster Bay complex has a drainage area, including groundwater drainage areas, and surface area of 578 square km (223 square mi) and 7,331 ha (18,100 ac), respectively. Water depths in the bays vary from less than 2 m (6 ft) in the natural creeks and small bays to 9 m (30 ft) in portions of some of the dredged navigation channels and in the larger open water areas. Tidal fluctuations in the bays average 1 to 1.2 m (3.6 to 4.2 ft). Salinity ranges from 25 to 30 parts per thousand, depending on location and time of year; water temperature ranges from -2.0 to 29.4°C (28 to 85°F). The water column is well-mixed, with relatively high dissolved oxygen levels. The bay complex is in the Outer Coastal Plain physiographic province. Sediments are composed predominantly of water-sorted sands and gravels derived from glacial outwash and marine sources, with extensive peat deposits in East Hempstead Bay (U.S. Fish and Wildlife Service 1997).

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The temporal scope of the FWCA analysis extends from the short-term impacts due to the construction of the proposed project to the long-term impacts that may occur over the 50-year life of the project.

PRIOR CORPS OR FISH AND WILDLIFE SERVICE STUDIES AND REPORTS RELEVANT TO THE FEASIBILITY STUDY

Federal funds were allocated to the Corps in 1988 to conduct a Reconnaissance Study entitled, *"Long Beach Island, New York."* Subsequently, the Corps prepared a Reconnaissance Report entitled, "*Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York,*" dated March 1989, which was approved by the Office of the Chief of Engineers in July 1989. In support of the Reconnaissance Study, the Service submitted a Planning Aid

Report (PAR) in January 1989 which identified the fish and wildlife resources and potential project impacts related to general beach nourishment storm protection alternative plans along Long Beach Island. Thereafter, Draft and Final FWCA Reports were submitted to the Corps in April 1994 and December 1995, respectively. The Final FWCA Report documented the potential impacts upon fish and wildlife resources due to implementation of the 1995 Recommended Plan and recommended measures that should be taken to conserve fish and wildlife resources.

A partial listing of documents prepared by the Corps and the Service to provide technical input and analysis during earlier phases of project planning, is provided below:

United States Army Corps of Engineers. 1998. *Atlantic Coast of Long Island, New York, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York, Final Feasibility Report with Final Environmental Impact Statement.* U.S. Army Corps of Engineers, New York District, Manhattan, NY. 89 pp.

United States Army Corps of Engineers. 1989. *Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York.* New York: New York District. Reconnaissance Report.

United States Fish and Wildlife Service. 1995a. *Fish and Wildlife Coordination Act 2(b) Report, Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York, Storm Damage Reduction Project.* U.S. Fish and Wildlife Service, Long Island Field Office, Islip, NY. 32 pp.

United States Fish and Wildlife Service. 1989. *Planning Aid Report for the Corps' Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York, Storm Damage Reduction Project.* U.S. Fish and Wildlife Service, New York Field Office, Cortland, NY.

DESCRIPTION OF STUDY AND FWCA ANALYSIS AREAS

The Corps' feasibility study area consists of Long Beach Island between Jones Inlet and East Rockaway Inlet, Nassau County, New York (Figure 1), and the designated offshore dredging areas illustrated in Figure 2. Long Beach Island is a developed barrier island, which is approximately 14.5 kilometers (km) (9 miles [mi]) in length, and between 457 and 1,220 m (1,500 to 4,000 ft) in width. It includes the hamlets of Point Lookout and Lido Beach, the Village of Atlantic Beach, and the Incorporated City of Long Beach. Unincorporated areas are under the jurisdiction of the Town of Hempstead. Long Beach Island is primarily residential with apartment houses, condominium complexes, beach clubs, hotels, and single family residences along the ocean shore, central areas, and bay side. The ocean beach serves year-round residents as well as a substantial influx of summer visitors and vacationers. Long Beach Island is easily accessible and has an annual beach attendance of approximately 1.5 million visitors (U.S. Army Corps of Engineers 1989). Park areas located on the ocean beach which are managed by the Town of Hempstead and Nassau County include Nickerson Beach Park, Nassau Beach, Lido Beach, and Silver Point.

The offshore dredging area is located approximately 2.4 km (1.5 mi) south of Long Beach Island and covers approximately 223 hectares (ha) (550 acres [ac]) of marine subtidal habitat. Tides along the south shore of Long Island are semi-diurnal. The mean tidal level for Long Beach Island is 0.61 m (2.0 ft) above mean low water (MLW). The mean tidal range is approximately 1 m (3.6 ft) and the spring tidal range reaches 1.3 m (4.3 ft) above MLW (U.S. Army Corps of Engineers 1998).

Long Beach Island has elevations generally less than 3 m (10 ft) above National Geodetic Vertical Datum (NGVD) (U.S. Army Corps of Engineers 1998). The island provides some measure of protection against wave attack to the Long Island mainland shore (U.S. Army Corps of Engineers 1989). The ocean shoreline consists of a continuous strip of low-lying beach with a series of approximately 60 stone and timber groins which extend offshore into the ocean from 60 to 183 m (200 to 600 ft) (U.S. Fish and Wildlife Service 1989).

The FWCA analysis area includes the areas described above as well as the previously defined portion of the Rockaway peninsula and associated ocean beach, intertidal, and subtidal habitats. In addition, the Hempstead Bays and South Oyster Bay complex to the north of Long Beach Island are also included in the FWCA analysis area to evaluate potential fish and wildlife enhancement opportunities in the study area. These are relatively shallow water bays which include wetland and dredge disposal islands connected by a network of natural and man-made channels. These bays have an interconnection with the Atlantic Ocean through the Jones and East Rockaway Inlets.

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DESCRIPTION OF ECOLOGICAL UNIQUENESS

The purpose of this section is to establish and identify the significant fish and wildlife resources in the proposed project and FWCA analysis areas. This information provides the basis for the more detailed discussion of ecological communities and significant habitats upon which the impacts of the selected plan and the fish and wildlife enhancement opportunities are evaluated later in this report.

Earlier Service reports (i.e., U.S. Fish and Wildlife Service 1989 and 1995a) for the proposed project provide a description of fish and wildlife resources and sensitive habitats and are incorporated by reference into this report. In addition, the Service's FWCA Reports for the Corps' Westhampton Interim Storm Damage Protection Project (U.S. Fish and Wildlife Service 1994), Breach Contingency Plan (U.S. Fish and Wildlife Service 1995b), Fire Island Inlet to Moriches Inlet Storm Damage Protection Project (U.S. Fish and Wildlife Service 1998a), and West of Shinnecock Inlet Interim Storm Damage Protection Project (U.S. Fish and Wildlife Service 1999) summarized the characteristics of barrier island communities for the Fire Island and Westhampton Barrier Islands, and the Southampton Barrier Spit, and are incorporated by reference into this report as they dealt with a similar subject matter regarding species' use and impacts of shoreline protection alternatives on marine, barrier island, and back-bay habitats. The Service's PAR for the Corps' State Boat Channel and Reynolds Channel Project (U.S. Fish and Wildlife Service 1995c) is also incorporated by reference into this report, as it described fish and wildlife resources for the Reynolds Boat Channel, which is in this FWCA analysis area. While the information contained in those reports is relevant and useful for this FWCA analysis, the Service recognizes that they are somewhat dated. Therefore, updates are provided here when necessary.

Long Beach Island is included in the Service's designated "Hempstead Bays – South Oyster Bay Significant Fish and Wildlife Habitat Complex," comprised of significant land habitat and water habitat complexes (U.S. Fish and Wildlife Service 1997; Figure 3). Within the proposed project area, limited but high ecological value maritime beach and dune communities at Nassau Beach and Silver Point have also been identified by the New York State Department of State (NYSDOS) Division of Coastal Resources as "New York State Designated Coastal Fish and Wildlife Habitats" (New York State Department of State 2004). These areas plus the ocean beaches from Point Lookout to Beach 40th Street on the Rockaway peninsula make up the Significant Land Habitat Complex in the FWCA analysis area. The uniqueness of these areas has been recognized by the Service's Hudson River/New York Bight Ecosystem Team, which considers beach strand species and habitats to be an Ecosystem Team priority resource concern along the Atlantic Coast. Working with other Federal agencies, coastal states, and private partners, the Service is identifying important remaining beach strand habitat and working to eliminate or reduce threats to coastal habitats and species through education, conservation, protection, and restoration.

Long Island's Atlantic Coast Beaches, including, but not limited to, Long Beach Island, are also recognized as "Important Bird Areas" by the National Audubon Society. The proposed project area supports a number of migratory shorebirds which are listed as highly imperiled or of high conservation concern by the U.S. Shorebird Conservation Plan (2004). The proposed project area also provides foraging and overwintering habitat for seabirds (U.S. Fish and Wildlife Service 1997).

In addition, the marine and estuarine subtidal habitats support a number of regionally significant shellfish and finfish resources, some of which are protected through various rules and regulations promulgated by the NOAA/F and the NYSDEC. For example, the proposed project area is included in the American Lobster Management Area for the south shore of Long Island. Also, the project area is Essential Fish Habitat for 36 species of finfish and shellfish species. Most of the fish species identified in the Corps' FEIS (U.S. Army Corps of Engineers,1998) as using the proposed project area would require essential fish habitat assessments.

The nearshore waters of Long Island, including the proposed project area, may contain both Federally-listed endangered and threatened species of sea turtles during summer and early fall months. Endangered species of sea turtles which may be present in the area of the proposed operations include Kemp's Ridley (*Lepidochelys kempi*), leatherback (*Dermochelys coriacea*), and green (*Chelonia mydas*). A threatened species known to occur in the vicinity is the loggerhead sea turtle (*Caretta caretta*). Principal responsibility for these species is vested with the NOAA/F who must be notified about the proposed project under the Section 7 consultation requirement of the ESA.

Based on U.S. Fish and Wildlife Service (1997), there are 116 species of special emphasis in the Hempstead Bays - South Oyster Bay oceanic, barrier island, and estuarine complex, incorporating 42 species of fish and 49 species of birds (see U.S. Fish and Wildlife Service [1997] for a complete listing of those species.) Federally- and New York State-listed species and species of special concern are provided in the list below.

Federally-listed endangered

Atlantic ridley (=Kemp's) sea turtle (*Lepidochelys kempi*)

Federally-listed threatened

loggerhead sea turtle (*Caretta caretta*)

piping plover (*Charadrius melodus*)

seabeach amaranth (*Amaranthus pumilus*)

Federal species of concern

northern diamondback terrapin (*Malaclemys t. terrapin*)

State-listed endangered

Carolina clubmoss (*Lycopodiella caroliniana*)

Barratt's sedge (*Carex barrattii*)

false china-root (*Smilax pseudochina*)

St. Andrew's cross (*Hypericum hypericoides* ssp. *multicaule*)

State-listed threatened and special concern species

least tern (*Sterna antillarum*)

northern harrier (*Circus cyaneus*)

osprey (*Pandion haliaetus*)

common tern (*Sterna hirundo*)

button sedge (*Carex bullata*)

golden dock (*Rumex maritimus* var. *fueginus*)

State-listed special concern animals

short-eared owl (*Asio flammeus*)

State-listed rare plants

whip nutrush (*Scleria triglomerata*)

pinweed (Lechea racemulosa)

EXPLANATION OF FISH AND WILDLIFE RESOURCE CONCERNS AND PLANNING OBJECTIVES

The purpose of consultation under the FWCA is to ensure equal consideration of fish and wildlife resources in the planning of water resource development projects. The Service's emphasis in this regard is to identify means and measures to mitigate the potential adverse impacts of the proposed project and to make positive contributions to fish and wildlife resource problems and opportunities.

This report is intended to be released along with the Corps' Feasibility Report to the public, as it will serve as the basis of the Service's public meeting statement and the comments on the Corps' Feasibility Report and Environmental Impact Statement (EIS).

From the Service's perspective, a desired output of the feasibility study is to ensure the protection of healthy marine, estuarine, and terrestrial ecological communities. Specifically, the Service recommends that conservation of fish and wildlife resources be accomplished by: (1) ensuring that the feasibility study evaluate alternatives which achieve and maintain high biological diversity; (2) ensuring natural areas are protected and monitored throughout the life of the project; (3) ensuring construction designs promote high value habitats for Service trust species; (4) establishing conservation easements over the life of the project; and (5) incorporating education and outreach activities to the project to inform the public about the uniqueness and fragility of the coastal ecosystem.

Ultimately, the Service's Mitigation Policy (January 23, 1981, Federal Register v. 46 n. 15 pp. 7644-7663) establishes a number of criteria which, if met, would allow the Service to support a water resource development project. These criteria are:

1) The projects are ecologically sound.

2) The least environmentally damaging alternative is selected.

3) Every reasonable effort has been made to avoid or minimize damage or loss of fish and wildlife resources and uses.

4) All mitigation recommendations have been adopted with guaranteed implementation to satisfactorily compensate for unavoidable damage or loss consistent with the appropriate mitigation goal.

5) For wetlands and shallow water habitats, the proposed activity is clearly water dependent and there is a demonstrated public need.

DESCRIPTION OF EVALUATION METHODS

The Corps' planning schedule and funding limitations precluded the Service from conducting field surveys and investigations for significant wildlife resources, such as migratory birds, in the study and FWCA analysis areas. As a result, descriptions of natural resources are based on previous studies (some of which are very outdated and not site-specific) for similar projects, relevant grey and peer-reviewed literature, local, State, and Federal fish and wildlife reports and plans, and personal communications with knowledgeable biologists, planners, coastal geologists, and engineers. As expressed in earlier correspondence, it is critical for the Service to participate early in the planning process, particularly via participation on the Project Delivery Team, in order to be able to provide input to fish and wildlife surveys and investigations that are required under the FWCA. Such surveys are critical, for instance, to meet the objectives of Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds, the intent and requirements of the FWCA and Migratory Bird Treaty Act (16 U.S.C. 703 *et seq.*). In addition, up-to-date surveys would reduce the risks of uncertainty in projecting the future without project conditions, which the Corps has expressed to the Service, during an interagency meeting, that it is critical to obtain an accurate assessment of future fish and wildlife resource conditions. Finally, early coordination will prevent delay in project planning, in that appropriate studies will be conducted so that they are available for synthesis, analysis, and incorporation into planning documents.

The Corps' request for an updated FWCA Report in 2004 did not include any new information regarding fish and wildlife species in the proposed project area beyond the information provided in the Corps' FEIS (1998). That report contained, in part, data on finfish and benthic communities obtained from studies within the project area or the lower reaches of the Hudson River Estuary. Specifically, these included benthic sampling conducted in the offshore dredging area in June 1993, for which results are found in WCH Industries (1994), and finfish studies conducted in the Lower Bay of New York Harbor between 1985 and 1986, as reported by the New York State Office of General Services (1992). In addition, the Corps' FEIS (1998) included a listing of bird species associated with beach environments on the south shore of Long Island, as given in Howe et al. (1978), and applied that information, as well as least tern and piping plover nesting site data from 1983 to 1993, to the Final EIS analysis. As mentioned above, this information will be used and updated, if possible, in this report. But the time constraints of the FWCA consultation and the limited funds budgeted by the Corps for FWCA consultation, prevented, in most cases, updated, site-specific information for Federal trust resources to be gathered and analyzed.

In this report, the Service provides a discussion of Federal trust resources (i.e., migratory birds, wetlands, endangered species, and anadromous fish), as well as shellfish, for the project area. However, of these resources, our analysis focuses on migratory birds and wetlands due to the fact that the Corps will likely have to complete an Essential Fish Habitat Assessment for a number of marine shellfish and finfish species during consultation with NOAA/F, and consultation under the ESA will be required for Federally-listed species in the proposed project area.
A description of coastal wetland habitats of Long Beach Island and the Rockaway peninsula from East Rockaway Inlet to Beach 40th Street, as well as the back-bay habitats in the FWCA analysis areas, is provided in Figure 4. Seamless digital data for wetland habitats was obtained from the Service's National Wetlands Mapper found on the Service's National Wetlands Inventory website, www.nwi.fws.gov. No ground truthing was conducted by the Service relative to the wetland map presented in this report.

In developing mitigation recommendations, the Service relied on experience, literature searches, and local, State, and Federal conservation plans (e.g., bird conservation plans and local, State, and Federal land and water conservation plans), and special designations (e.g., Federally- and

State-identified Significant Fish and Wildlife Habitat Complexes) to derive appropriate recommendations for mitigation and fish and wildlife enhancement opportunities.

Fish and wildlife enhancement opportunities are presented which represent actions that are recommended as part of existing conservation plans, which would benefit migratory birds and the habitats in the study area that support them.

As discussed in more detail in the following section, this report discusses fish and wildlife resources which use the three major ecological systems (marine, estuarine, and terrestrial) found in the significant land and water complexes of the proposed project area. The ecosystem classifications follow Edinger et al. (2002).

DESCRIPTION OF FISH AND WILDILFE RESOURCE CONDITIONS

The purpose of this section is to describe and define the fish and wildlife resources within the FWCA analysis area. The fish and wildlife resources are defined based on their quantity, quality, and significance. In addition, this section describes the future without project conditions. This section is organized to present the definitions of each of the ecological communities in the FWCA analysis area, followed by a discussion of the bird, fish, shellfish, and plant species in each community beginning with the back-bay estuarine community and ending with the offshore marine community. Lastly, the future without project conditions are presented using information from the Corps' FEIS (1998) and the Service's best prediction of future fish and wildlife resource conditions, recognizing that there is a degree of uncertainty due to the lack of up-to-date site specific information on many significant resources and the ephemeral nature of many of the habitats in the proposed project area.

Ecological Communities

As established in the Description of Study and FWCA Analysis Areas above, the FWCA analysis area contains Significant Land and Water Habitat Complexes designated by the Service and NYSDOS, Important Bird Areas, and certain fisheries which require consultation with NOAA/F. Within these specially designated areas, three major ecological systems, each with their respective subsystems and communities, can be identified using the classification system in Edinger et al. (2002), which aids in the description and delineation of specific habitat and community types in the FWCA analysis area. They are marine, terrestrial, and estuarine. The marine system consists of three subsystems including marine subtidal, marine intertidal, and marine cultural. The marine subtidal habitat consists of the marine deepwater community, the marine intertidal subsystem includes the marine intertidal gravel/sand beach community, and the marine cultural subsystem includes marine riprap and artificial shore communities. The terrestrial system includes the open habitat which is comprised of the open upland subsystem and maritime beach and dune communities. The estuarine system includes numerous subsystems and communities including, estuarine intertidal/salt shrub/high saltmarsh/low saltmarsh/salt panne, and estuarine cultural/estuarine ditch/estuarine dredge spoil shore/estuarine riprap/artificial shore.

The importance of these habitats is based in large part by their recognition as significant fish and wildlife habitats by the Service and the NYSDOS. In addition, the proposed project area and back-bay habitats comprise the western component of the South Shore Estuary Reserve (SSER). As a whole, the SSER, a NYSDOS-designated marine and estuarine reserve, stretches from West Hempstead Bay to Shinnecock Bay, including the mainland watershed, wetlands, and barrier islands.

Estuarine Community

Overall, the complex serves as a part of a larger network of migratory bird stopovers on the south shore of Long Island. The avian species range from those with no significant concern to those with extremely high management concern for the nation or the region. Shorebirds which use this area include black-bellied plover (*Pluvialis squatarola*), semipalmated plover (*Charadrius semipalmatus*), greater yellowlegs (*Tringa melanoleuca*), ruddy turnstone (*Arenaria interpres*), sanderling (*Calidris alba*), semipalmated sandpiper (*Calidris pusilla*), least sandpiper (*Calidris minutilla*), dunlin (*Calidris alpina*), red knot (*Calidris canutus*), and short-billed dowitcher (*Limnodromus griseus*). Between 50,000 to 100,000 birds are estimated to use the estuary annually. Foraging habitats may include the interconnected marine and estuarine beaches, mud and sand flats, salt marshes, and grasslands (U.S. Fish and Wildlife Service 1998b).

Along with the Great South Bay, this estuarine community is an important breeding site for waders (heron, egrets, and ibises), with over 900 pairs nesting in 1995, and represents an important component of the Atlantic Flyway for migrating and wintering waterfowl, with an average of nearly 25,000 waterfowl counted on mid-winter aerial surveys (U.S. Fish and Wildlife Service 1997). Species of waders breeding in the estuarine community are snowy egret (*Egretta thula*), glossy ibis (*Plegadis falcinellus*), black-crowned night-heron (*Nycticorax nycticorax*), great egret (*Casmerodius albus*), little blue heron (*Egretta caerulea*), green-backed heron (*Butorides striatus*), tri-colored heron (*Egretta tricolor*), yellow-crowned night-heron (*Nyctanassa violacea*), and cattle egret (*Bubulcus ibis*). The Hempstead Bays heronries contain most of the known Long Island nesting sites for yellow-crowned night-herons (U.S. Fish and Wildlife Service 1997).

The wetland complex is a priority habitat of the Bird Conservation Area for the Southern New England/Mid Atlantic Coast (U.S. Fish and Wildlife Service 2000). Priority habitats are either in need of critical conservation measures or are critical for long-term planning to conserve regionally important bird populations. Salt marsh species identified in the proposed project include saltmarsh sharp-tailed sparrow (*Ammospiza caudacuta*), seaside sparrow (*Ammospiza maritima*), glossy ibis, tricolored heron, yellow-crowned night heron, cattle egret, osprey (*Pandion haliaetus*), and northern harrier (*Circus cyaneus*) (U.S. Fish and Wildlife Service 2000).

Thousands of brant (*Branta bernicla*) and American black duck (*Anas rubripes*) congregate to feed and rest in the shallow waters around salt marsh islands and tidal flats in the estuarine community. Grassy areas attract Canada geese (*Branta canadensis*), while scaup (*Aythya* spp.) and red-breasted mergansers (*Mergus serrator*) concentrate in the deeper waters of the numerous channels and inlets, such as Reynolds Channel and Jones Inlet (U.S. Fish and Wildlife Service 1998b). Other waterfowl found in lesser numbers include mallard (*Anas platyrhynchos*), American widgeon (*Anas americana*), canvasback (*Aythya valisneria*), bufflehead (*Bucephala albeola*), and ruddy duck (*Oxyura jamaicensis*). Nesting waterfowl include Canada goose, mallard, American black duck, and gadwall (*Anas strepera*). Finally, the harlequin duck (*Histrionicus histrionicus*) overwinters in Jones Inlet and the Point Lookout area (U.S. Fish and Wildlife Service 1998b).

All of the open bay waters of this complex are important habitat for a high diversity of marine and estuarine-dependent species of finfish that are found here during at least one stage in their life histories. Menhaden (*Brevoortia tyrannus*), weakfish (*Cynoscion regalis*), and winter flounder (*Pleuronectes americanus*) spawn in the sandy shallows, while American sandlance (*Ammodytes americanus*), killifish (*Fundulus* spp.), pipefish (*Synganthidae* spp.), sticklebacks (*Gasterosteidae* spp.), and Atlantic silversides (*Menidia menidia*) spawn in edge habitat provided by the mosaic of salt marsh islands. Young bluefish (*Pomatomus saltatrix*), striped bass (*Morone saxatilis*), summer flounder (*Paralichthys dentatus*), and tautog (*Tautoga onitis*) are dependent upon the bays as nurseries. Finfish harvested from Hempstead and South Oyster Bays include winter and summer flounder (*Paralichthys dentatus*) or fluke, weakfish, tautog, grey snapper (*Lutjanus griseus*), and kingfish (*Menticirrhus saxatilis*). Shellfish in the bay include soft clam (*Mya arenaria*), hard clam (*Mercenaria mercenaria*), bay scallop (*Argopecten irradians*), and ribbed mussel (*Geukensia demissa*). Horseshoe crab (*Limulus polyphemus*) and blue crab (*Callinectes sapidus*) are residents of the area, the latter is represented by all life stages. The diamondback terrapin (*Malaclemys t. terrapin*) nests among the salt marsh and dredged material islands in the complex.

Terrestrial Communities

The barrier beach is comprised of maritime beach and dune communities. Especially important are the beaches on both sides of Jones Inlet, as well as the beaches at Silver Point, Lido Beach, and Nassau Beach. The fish and wildlife habitat of Silver Point consists of approximately 12 ha

(30 ac) of sparsely vegetated dunes at the western end of Long Beach Island, and bare shell and pebble beach in the center of the public recreation facilities. Nassau Beach consists of about 6.1 ha (15 ac) of sparsely vegetated dunes and the adjoining shell and pebble area inland and north of the dunes (New York State Department of State 2004).

The maritime beach and dune communities have also been identified as the highest priority habitat in the Bird Conservation Plan for the Southern New England/Mid Atlantic Coast Region (U.S. Fish and Wildlife Service 2000). Species which inhabit these habitats include piping plover, American oystercatcher (*Haematopus palliatus*), short-eared owl (*Asio flammeus*), common tern, least tern, and horned lark (*Eremophila alpestris*) (U.S. Fish and Wildlife Service 2000). Ephemeral pools and interdunal swales behind the dunes at specific sites on Long Beach Island provide optimal foraging areas for piping plover. Peak shorebird use of the barrier island is summer and fall, especially for the semipalmated plover, black-bellied plover, willet (*Catoptrophorus semipalmatus*), semipalmated sandpiper, least sandpiper, and short-billed dowitcher. Reports from birders obtained from web posting of the New York Rare Bird Alert website indicate that the proposed project and adjacent habitats provide habitat for various avifauna, including rough-legged hawk (*Buteo lagopus*), little gull (*Larus minutus*), Bonaparte gull (*Larus philadelphia*), lesser black-backed gull (*Larus fuscus*), horned grebe (*Podiceps auritus*), great cormorant (*Phalocrocorax carbo*), and purple sandpiper (*Calidris maritima*).

The beaches on the north shore of East Rockaway Inlet on the Rockaway Peninsula also support occurrences of seabeach amaranth. The hyssopleaf thoroughwort (*Eupatorium hyssopifolium* var. *laciniatum*) occurs in a scrubby thicket adjacent to a salt marsh on one of the salt marsh islands in South Oyster Bay (New York State Department of State 2004).

Overall, characteristic plant species of the maritime beach community include beach grass (*Ammophila breviligulata*), sea rocket (*Cakile edentula*), seaside spurge (*Chamaesyce polygonifolia*), seabeach amaranth, and seabeach knotweed (*Polygonum glaucum*). The maritime dune community is dominated by grasses and shrubs which occur in patches or dense assemblages which reflect the level of disturbance this community experiences in the coastal zone. Characteristic species of naturally active dunes include beach grass, dusty miller (*Artemisi stelleriana*), beach pea (*Lathyrus japonicus*), sedge (*Carex silicea*), seaside goldenrod (*Solidago sempervirens*), and sand rose (*Rosa rugosa*). Over time, as dunes become stabilized, the vegetation experiences various levels of succession. In more stabilized settings, beach heather (*Hudsonia tomentosa*), bearberry (*Arcotostaphylos uva-ursi*), beach plum (*Prunus maritima*), pitch pine (*Pinus rigida*), or post oak (*Quercus stellata*) may be found in the dunes (Edinger et al. 2002).

Marine Communities

The marine intertidal zone is alternately exposed and submerged throughout tidal fluctuations, and is subject to the turbulence of waves, currents, and the shifting nature of the substrate. Although few species can withstand the stresses caused by being exposed and submerged, those species that do tolerate such conditions are often abundant (Naqvi and Pullen 1982). Generally, molecrab (*Emerita talpoida*), tellin clam (*Tellina agilis*), coquina clam (*Donax variabilis*), amphipod species (*Acathohaustorius* spp.), and polychaete species (*e.g., Scolelpis squamata*) are found in the marine ocean intertidal zone, providing a source of food for migrating and resident shorebirds (U.S. Fish and Wildlife Service 1997).

The U.S. Shorebird Plan indicates that shorebird breeding, foraging, and roosting areas are found throughout the North Atlantic region (U.S. Shorebird Plan 2000a). High energy beach fronts are used for foraging and breeding; sandy flats (including inlet interfaces at low tide) are used for foraging; and rock jetties and groins are used for foraging and loafing. The high beach and dunes are used for foraging, breeding, and roosting. Significant areas for shorebirds in New York include the following areas, Long Island Atlantic Coast (and Jamaica Bay), Atlantic Coastal Salt Marshes, and Atlantic Coastal Beaches (U.S. Shorebird Plan 2000a).

The marine subtidal zone extends from the low tide mark to the lower limit of ocean bottom, 500 m (1,640 ft) south of the proposed offshore dredging area. Shellfish and crustaceans that may inhabit this general area include the mud clam (*Mulinia lateralis*), razor clam (*Ensis directus*), surf clam (*Spisula solidissima*), blue mussel (*Mytilus edulis*), soft shell clam (*Mya arenaria*), blue crab, and American lobster (*Homarus americanus*) (U.S. Fish and Wildlife Service 1997). Other marine subtidal benthic macrofauna include tellin clam, sand dollar (*Echinarachnius parma*), amphipod species (*e.g., Protohaustarius deichmaae, Unicola irrorata*), and polychaete species (*e.g., Sthenelais limicola, Lumbrineris fragilis, Spiophanes bombyx*), all of which are found in habitats described as a medium, coarse-grain sand community (Steimle and Stone 1973).

The Corps' FEIS (1998) includes a listing of finfish species sampled from the offshore waters of Lower New York Harbor during the mid 1980s which are suspected to utilize the proposed project area. Overall, the waters of the New York Bight, which includes, in part, Lower New York Harbor, support seasonally abundant populations of many commercially and recreationally important fish (U.S. Fish and Wildlife Service 1997). Primary species include striped bass, weakfish, bluefish, fluke, winter flounder, scup (*Stenotomus chrysops*), black sea bass, and Atlantic mackerel (*Scomber scombrus*) (U.S. Fish and Wildlife Service 1997). The nearshore subtidal zone is used for feeding by many species, including tautog, northern puffer (*Sphoeroides maculatus*), black sea bass (*Centropristis striata*), striped bass (*Morone saxatilis*), bluefish, and weakfish (U.S. Army Corps of Engineers 1998; U.S. Fish and Wildlife Service 1995a). Adult bluefish and striped bass congregate in the deeper waters of Jones Inlet, as does the American sandlance, which is the major food item of the Federally-listed endangered roseate tern (*Sterna dougallii*) (U.S. Fish and Wildlife Service 1997).

The marine subtidal community includes the proposed offshore dredging area, which is located approximately 2.4 km (1.5 mi) off of the southeast coast of Long Beach Island between 7.6 and 18.3 m (25 to 60 ft) below MLW. Moving from east to west in the proposed dredging area, the substrate varies from patches of sand to silty sand (WCH Industries 1994). This area is within the migratory path of numerous fish species and provides spawning, feeding, and nursery habitat for many other species (U.S. Army Corps of Engineers 1993). Seabird surveys during the 1980s also showed this area to contain concentrations of seabirds of between 5 km^2 and 50 km^2 (3.1 mi and 31 mi, respectively) during the spring and fall surveys (U.S. Fish and Wildlife Service 1997).

In June of 1993, benthic invertebrate sampling was conducted in the proposed offshore dredging area by WCH Industries under contract with the Corps (U.S. Fish and Wildlife Service 1995a). WCH Industries (1994) reported benthic assemblages in the proposed dredging area similar to the assemblages found in Steimle and Stone (1973), who reported a medium sand assemblage dominated by tellin clam, amphipod spp. (*Protohaustarius deichmannae; Unciola irrorata)*, sand dollar, and Atlantic surf clam in waters off of the southwest coast of Long Island.

Also of note is that the marine subtidal community within the offshore dredging area supports a productive Atlantic surf clam fishery. This area contains high densities of surf clam from the shoreline to approximately 3.2 km (2 mi) offshore (New York State Department of Environmental Conservation 2002). Overall, the New York State waters of the Atlantic Ocean support a major surf clam fishery. In 2001, 444,053 bushels of surf clams, with a value of $4.5 million were harvested (New York State Department of Environmental Conservation 2002). Surf clam surveys conducted immediately west of this location along the Rockaway Beach Peninsula have been shown to produce a harvest valued at approximately $100,000 per 40.7 ha (100 ac) or more (New York State Department of Environmental Conservation 1994).

The marine subtidal areas within the proposed project area contain hard bottom substrate due to submerged barges or shipwrecks. The importance of these structures to benthic invertebrates and demersal/reef fish has not been evaluated in the Corps' FEIS (1998). The Corps' FEIS stated that additional studies on these features, which also have cultural significance, would be required. As of this time, the Service has not been informed by the Corps if the additional studies to address those potential habitats have been undertaken.

Finally, the proposed project area does provide habitat for a number of seabirds. In summer, shearwaters and storm-petrels are the most abundant pelagic birds in the New York Bight. The greater shearwater (*Puffinus gravis*), sooty shearwater (*Puffinus griseus*), and Wilson's storm-petrel (*Oceanites oceanicus*) breed in the southern hemisphere and spend much of their non-breeding period in the North Atlantic, including the New York Bight. Cory's shearwater (*Calonectris diomedea*) breeds in the eastern North Atlantic and Mediterranean and ranges west to the Atlantic Coast of North America during the summer and fall. The Manx shearwater (*Puffinus puffinus*) and Leach's storm-petrel (*Oceanodrama leucorhoa*) breed in the North Atlantic and migrate through the New York Bight in the summer and fall. Gulls and terns that are nesting on the beaches and islands in the New York Bight feed on fish and marine invertebrates in the nearshore waters of the New York Bight and its bays and estuaries.

In the fall, the highest densities of seabirds are observed south and east of Montauk Point, along the south coast of Long Island, in the Apex of the Bight, and off the mouth of Delaware Bay. As in the summer, this distribution may be related to the food base provided by these productive bays and estuaries. The most common pelagic birds migrating through the New York Bight in the fall and spring include shearwaters, petrels, gannets, phalaropes, and jaegers. Substantial numbers of waterfowl, especially sea ducks, and waterbirds also move into and migrate through the Bight in the fall. Two species of jaegers, pomarine (*Stercorararius pomarinus*) and parasitic (*Stercorararius parasiticus*), breed in the North Atlantic and are present in low numbers in the New York Bight in the spring and fall. The northern fulmar (*Fulmaris glacialis*) breeds in the Arctic and occurs in the Bight during its non-breeding period, including the fall and winter, although it is most common in the Bight in the spring. Two species of phalarope, red phalarope (*Phalaropus fulicaria*) and red-necked phalarope (*Phalaropus lobatus*), breed in the Arctic, winter in the tropics, and migrate through the offshore waters of the New York Bight in the spring and fall, feeding on crustaceans and other marine invertebrates. The northern gannet (*Sula* *bassanus*) breeds north of the New York Bight and migrates through the Bight in substantial numbers. The migration of seabirds along the coastline of the New York Bight in the fall appears to be quite significant. A seabird survey in Avalon, New Jersey, (Avalon Sea Watch) counted almost 900,000 birds migrating past one point on the New Jersey shoreline in 1995 during the late summer and fall, including nearly 50,000 red-throated loons (*Gavia stellata*), over 46,000 gannets, over 200,000 double-crested cormorants (*Phalacrocorax auritus*), and over 440,000 scoters (*Melanitta* spp.).

In the winter, moderate densities of birds are observed dispersed over the entire continental shelf. During the winter, kittiwakes, skuas, gannets, and auks occur in the offshore waters of the New York Bight, while coastal waters are dominated by gulls, sea ducks, loons, and grebes. The black-legged kittiwake (*Rissa tridactyla*) breeds in the Arctic and is one of the more common pelagic birds in the open waters of the New York Bight during the fall, winter, and spring. Three species of alcids (auks) are regularly observed at low densities in the Bight during the winter, razorbill (*Alca torda*), dovekie (*Alle alle*), and thick-billed murre (*Uria lomvia*). These small, duck-like birds are found primarily in offshore waters where they feed on fish and crustaceans. Two species of loons, common loon (*Gavia immer*) and red-throated loon, migrate through and winter in the New York Bight. These birds winter in both the pelagic and coastal zones of the Bight and also occur in coastal bays. Loons feed primarily on fish, but also feed on crustaceans, insects, and mollusks. Two species of grebes, horned grebe (*Podiceps auritus*), and red-necked grebe (*Podiceps grisegena*), also frequent the nearshore waters and coastal bays. Sea ducks, including black, white-winged, and surf scoters (*Melanitta nigra, M. fusca,* and *M. perspicillata*), and long-tailed duck (*Clangula hyemalis*), are widely distributed in low numbers in the coastal waters of the New York Bight. Common eider (*Somateria mollissima*), king eider (*Somateria spectabilis*), and harlequin duck primarily winter off rocky coasts to the north of the New York Bight, but the common eider appears to be expanding its wintering range to the south into the Bight, and harlequins and king eiders regularly occur off of Montauk Point. Harlequin ducks are also regularly reported near the groins in Point Lookout, NY. Two species of gulls that breed in the New York Bight watershed, the herring gull (*Larus argentatus*) and greater black-backed gull (*Larus marinus*), are abundant in winter in the bays, coastal waters, and offshore waters of the New York Bight.

Pelagic birds migrating through and moving into the New York Bight in the spring include many of the same species that migrate through in the fall, including shearwaters and petrels, fulmars, skuas, gannets, phalaropes, and jaegers.

It is important to note that published survey data to date are not extensive, regular, or systematic enough to fully describe the use of the New York Bight by pelagic birds. Only species composition, range, and selected high-use areas are known. Surveys of the Bight do indicate the importance of this area for a variety of pelagic and coastal birds, however.

Man-made structures such as seawalls, jetties, groins, and bulkheads provide rocky habitat for both aquatic and avian species, and represent the marine riprap/artificial shore community. However, species diversity is low compared to a natural marine rocky intertidal community (Edinger et al. 2002). Characteristic organisms are algae, barnacles, and mussels (Edinger et al. 2002; Burlas et al. 2001). The Corps' FEIS (1998) suggests that the blue mussel is the dominant species of this community in the proposed project area.

Future Resource Conditions Without the Project

Based on the Corps' FEIS (1998) and the Service's experience with shoreline protection activities in the study area, this report assumes that several on-going and future projects are likely to occur on Long Beach Island without the project. These projects include maintenance dredging of the Federal Jones Inlet Navigation Channel on a triannual schedule; periodic maintenance of the U.S. Coast Guard (USCG) Station boat basin at Jones Island, which provides a sand source to a small segment of Long Beach Island; and seasonal shoreline management efforts by the Town of Hempstead, whereby sand fencing is placed on the ocean beach in an effort to build the beach elevation by trapping windblown sand. The Town of Hempstead also conducts beach scraping where sand from the beach berm is graded to supply sand to areas with lower elevations. In addition, the Service is providing technical assistance and review of wind power proposals by the Long Island Power Authority off of the south shore of Long Island, including the proposed project area. These proposals will require Clean Water Act, Section 404 and/or Rivers and Harbors Act of 1899, Section 10 permits from the Corps.

In the without-project condition, the local interests would allow erosion to continue until the water line reached the seaward toe of the dunes or boardwalk before taking remedial action to restore the beach (U.S. Army Corps of Engineers 1998). This erosion would reduce the storm damage protection capability of the existing beach and dune. Thus, it is anticipated that without shoreline protection improvements, existing protective mechanisms would deteriorate, exposing the coastal communities to extensive property damage and loss (U.S. Army Corps of Corps 1998).

In the absence of the Long Beach Island Project, it is also likely that State and local governments would request beach placement material, dredged from the Federal Jones Inlet Navigation Channel at a frequency of once every 3 years (U.S. Army Corps of Engineer 1998). The Corps' FEIS (1998) also states that retreat from the barrier island is inconceivable, and most structures which are already participating in the National Flood Insurance Program (NFIP) would, if destroyed, be rebuilt to the NFIP base elevation. As the Service noted in the previous section, dredged material from the USCG Station would also be deposited on small segments of the

Town of Hempstead beaches, and the Town of Hempstead would continue its program of beach scraping and sand entrapment.

In terms of fish and wildlife resources in the without-project condition, physical and human activities would continue to greatly influence the ecological communities. Physically, the maritime beach and dunes would continue to erode due to natural processes in some areas, perhaps eventually being eliminated entirely in certain areas since large-scale, high density residential and commercial developments and infrastructure limit the northward movement of the maritime beach and dune communities. In the present situation of extensive development, loss of the maritime beach and dunes would likely create undesirable conditions for certain avifauna which rely on these habitats for breeding, foraging, loafing, and roosting. In other areas, the maritime beach may naturally accrete and increase in elevation, improving and potentially increasing the area available for breeding, foraging, roosting, and loafing. The marine intertidal system would remain stable in terms of its relative location, only shifting offshore or onshore depending on erosion and accretion rates of the various areas on Long Beach Island.

The future of the proposed offshore dredging area in the without-project scenario would likely be the continued existence of this community in its present condition, which includes commercial shellfish harvesting, and commercial and recreation fin fishing.

In the without-project condition, the estuarine habitat would continue to experience human-induced and natural impacts. Dredging of back-bay channels would continue, with the possibility of upland disposal of dredged material on existing dredge spoil-created islands. Back-bay recreational activities would continue and lead to disturbance of breeding and non-breeding waterbirds and shorebirds.

IDENTIFICATION OF ALTERNATIVE PLANS CONSIDERED, OUTCOME OF PLANS SELECTION PROCESS, AND ALTERNATIVES EVALUATED AND ADDRESSED BY THE SERVICE IN THIS REPORT

To date, the outcome of the Corps' feasibility study is the selection of the 1995 Recommended Plan, with several modifications and select contingencies which are described in the following section. As per the SOW, the FWCA analysis was to address this alternative only.

DESCRIPTION OF SELECTED PLAN AND OTHER PLANS EVALUATED BY THE SERVICE

As part of the on-going feasibility study, the Corps evaluated eight options to address the objectives of the feasibility study. These included No Action, Beach Restoration, Beach Restoration with Groins, Seawall, Seawall with Beach Restoration, Bulkhead with Beach Restoration, Breakwater with Beach Restoration, and Perched Beach with Beach Restoration.

Based on an evaluation of technical, economic, environmental, regional, social, and institutional constraints, the Corps determined that the Recommended Plan is a beachfill plan which is characterized by a 33.5 m (110 ft) wide beach berm at an elevation of 3 m (10 ft) NGVD, and a dune system with a top elevation of 4.6 m (15 ft) NGVD. The plan includes approximately 10.4 km (34,000 linear ft) of beachfill. The components of the beachfill include:

(a) Dune and berm fill from Point Lookout west to the western boundary of the City of Long Beach where the selected plan tapers into the existing shoreline in Atlantic Beach (approximately 10.4 km or 34,000 ft).

(b) Dune Design: Crest elevation of 4.6 m (15 ft) NGVD for a crest width of 7.6 m (25 ft) with 1 on 5 side slopes on the landward and seaward sides.

(c) Berm Design: Fronting the dune, a berm width from 33.5 m to 122 m (110 ft to 400 ft) at elevation 3 m (10 ft) NGVD with a shore slope of 1 on 20 for the easternmost 1.7 km (5,500 ft) of the project, a 457.2 m (1,500 ft) transition, thence a 1 on 35 slope for the remaining 27,000 ft (8.2 km).

(d) A total sand fill quantity of 5.1 million cubic meters (m^3) (6,670,200 cubic yards [yd^3]) will add approximately 30.5 to 122 m (100 to 400 ft) of design beach at 0 m

(0 ft) NGVD to the existing beach. These quantities of sand fill include the following:

- +0.3 m (1.0 ft) tolerance;
- overfill factor of 2.5 percent; and
- advanced beach nourishment width of 15.2 m (50 ft).

(e) The dune construction includes 9.7 ha (24 ac) of planting dune grass and 12.6 km (41,500 ft) of sand fence for dune sand entrapment, as well as 15 boardwalk extensions/dune crossovers, 14 dune walkovers, 4 vehicle access ramps over the dune in the City of Long Beach, 26 dune walkovers, and 8 vehicle access ramps over the dune in Lido Beach and Point Lookout.

(f) Renourishment of approximately 1,285,446 m^3 (1,681,300 yd^3) of sand fill from the offshore dredging area every 5 years for the 50-year project life. Beachfill for the proposed project is available from an offshore borrow area containing approximately 27.5 million m^3 (36 million yd^3) of suitable beachfill material. The borrow area is located approximately 1.6 km (1 mi) south of Long Beach Island.

Since the completion of the Corps' Feasibility Report in 1998, there have been refinements to the project design and changes in the existing conditions which have been incorporated into the

Recommended Plan. These modifications are described in the following paragraphs (U.S. Army Corps of Engineers, *in litt.*).

Terminal Groin Rehabilitation and Extension. Based on the report entitled *"Terminal Groin Rehabilitation and Extension At Jones Inlet, Long Beach Island,"* dated 1999, which was prepared by Michael Baker, Jr., Inc., the Recommended Plan has been modified to include the rehabilitation and extension of Groin No. 58, the easternmost terminal groin in Point Lookout, in accordance with the typical design proposed in the referenced report.

New Groin Construction. Based on the report entitled *"Technical Reanalysis of the Shoreline Stabilization Measures for the Eastern Portion of the Long Beach Island, New York Project,"* dated March 2000, which was prepared by Offshore and Coastal Technologies, Inc./Andrews, Miller & Assoc., Inc., the Recommended Plan has been modified to include the construction of seven new groins in the Point Lookout area. The first groin will be constructed 244 m (800 ft) west of existing Groin 55 in Point Lookout, and the second through fourth groins constructed with tapered lengths at intervals of 244 m (800 ft). The remaining three groins will be constructed at 366 m (1,200 ft) intervals with tapered lengths. In order to minimize the potential impacts to the shoreline to the west, a tapered groin field is recommended with a recommended 6 degree taper starting at the seaward tip of Groin 3. This taper results in a proposed length of 152 m

(500 ft) from the proposed seaward top of the berm to the seaward tip of the first proposed groin to the west of Groin 3. The lengths of the remaining groins are reduced to meet the 6 degree taper for the groin field.

Initial construction of the four easternmost groins is recommended to provide the required erosion control and storm protection for the severely eroded shoreline area. The remaining three groins, which would be largely buried in the existing weldment area, are proposed for deferred construction as needed based on the stability of the weldment area. The deferred tapered groins are included to address the possibility that the weldment may migrate westward, creating erosional pressure to the east as it moves.

Existing Groin Rehabilitation. Based on a condition survey of the existing groins conducted in September 2003, the Recommended Plan has been modified to include rehabilitation of those groins that were found in poor or fair condition that would be beneficial to the beach stability. Based on this evaluation, 15 of the 23 groins in the City of Long Beach and 2 groins in Point Lookout are recommended for rehabilitation. The proposed rehabilitation consists of repositioning existing armor stone and adding additional armor stone along the seaward side of each of the groins, 30.5 to 61 m (100 to 200 ft). A minimum groin crest width of approximately 4 m (13 ft) was selected with side slopes of 1V on 2H. A primary armor weight of approximately 4.5 metric tons (5 tons) was selected in order to approximately match the existing armor stone.

Bird Nesting and Foraging Area. The Recommended Plan has also been modified to accommodate an area of the beach which, due to existing width and berm height, is a prime area for ephemeral pool formation and as such, is a prime shorebird nesting and foraging area. The ephemeral pool encompasses a 38 ha (93.4 ac) area and the plover and least tern nesting area encompasses 17.1 ha (42.3 ac). This plan will allow for the continued unimpeded use of this area as shorebird nesting and foraging areas. In order to avoid construction in this nesting/foraging area, evaluations were conducted to ensure that the existing condition has at least the same storm damage level of protection as the recommended design section. The level of protection against storm erosion and overtopping for the existing berm and dune width and height was compared to that required in the Feasibility Study and found to provide a comparable level of protection (less than 80 percent dune material displacement). A future trigger, a minimum berm width of 76.2 m (250 ft), has been determined and included in the LRR and OMRR&R Manual, such that if the berm width falls below that minimum width required for storm protection, construction of deferred project elements will be initiated, including placement of the full design section as per the Feasibility Study. Placement of the full cross-section (or equivalent protection) in the nesting/foraging area at a future date will be considered a part of a major rehabilitation contingency for determining project costs.

Borrow Area (Offshore Dredging Area). The offshore dredging area is located south of Long Beach Island between 7.6 and 18.2 m (25 to 60 ft) below MLW. The sediments at the borrow site were determined to be predominantly fine sand with typically only a small percentage of silts (U.S. Army Corps of Engineers 1998).

The design beach fill will be placed on top of the existing beach. Existing groins may be partially or completely covered. The extent of groin covering does not include the effect of periodic nourishment. For the remaining groins which remain exposed, those that are in fair to poor condition will be rehabilitated only within their exposed portions. This includes approximately 15 existing groins which will be extended approximately 10 m (30 ft). The remaining groins will remain the same length or shortened.

DESCRIPTION OF IMPACTS OF SELECTED PLAN AND OTHER EVALUATED ALTERNATIVES

As per the SOW, this section only provides a description of the proposed project; no other plans were evaluated as part of the FWCA analysis.

Non-Ecological Impacts

Implementation of the Recommended Plan will provide storm damage reduction benefits to Long Beach Island, with minimal benefits to the mainland of Long Island (U.S. Army Corps of Engineers 1998). Recreational benefits will be realized on Long Beach Island, and they can be defined as enhanced recreation potential provided by increased beach area (U.S. Army Corps of Engineers 1989). Without advanced beach fill (initial overfill) and periodic nourishment, long- and cross-shore coastal processes would erode the design beach profile, reducing the storm damage protection ability of the project design (U.S. Army Corps of Engineers 1993). Overall, the Corps anticipates that the project will result in positive impacts in terms of added protection to the shoreline, buildings and infrastructure, and human life.

Impacts to Ecological Communities

Potential Impacts to Marine Intertidal, Maritime Beach, and Maritime Dune Communities

Recent studies present varied evidence as to both short- and long-term impacts of beach nourishment along the western coast of the Atlantic Coast, and focus principally on beach and benthic/pelagic invertebrate and finfish communities of the western Atlantic Coast (e.g., Mineral and Management Service 2001; Peterson et al. 2000; Peterson and Manning 2001; Lindquist 2001; U.S. Army Corps of Engineers 2004; Burlas et al. 2001; and Byrnes et al. 2004). On the other hand, relatively little information on the effects of beach nourishment on shorebirds and waterbirds is present in the literature (CZR, Inc. 2003).

Based on the review of the literature, the proposed project has the potential to result in a number of direct and indirect physical and biological impacts in terms of scale and duration in the marine intertidal, maritime beach, and maritime dune communities in the proposed project area. Direct adverse impacts to these communities include, but are not limited to, impacts to breeding and non-breeding avian species through habitat modification, burial of prey resources at the disposal sites, removal of prey resources in the offshore dredging areas, and disturbance of breeding, loafing, roosting, and foraging activities of avifauna. These impacts are expected to occur during construction, post-construction, and renourishment phases of the proposed project extending 50 years into the future.

Changes in the beach morphology and sedimentologic characteristics (slope, height, grain size, sorting coefficient, etc.) may affect colonization of marine invertebrates, a major forage resource for shorebirds, to the intertidal zone. The Corps' FEIS (1998) indicated that sediments in the offshore dredging area do not exactly match beach substrates in the proposed project area. A shift to finer or coarser sediments can affect the abundance of macrofauna prey resources (Peterson and Manning 2001) in the proposed project area, which can have consequences for higher trophic levels (Peterson and Manning 2001). Morphological and sedimentologic changes to the maritime beach and dunes can also impact breeding habitat, either adversely or beneficially. For example, the Corps' Long Island Intracoastal Waterway Channel Maintenance Dredging Project resulted in the deposition of highly fine sand and mud dredge spoils on East Inlet, Moriches Bay, Brookhaven, NY, that was deemed unsuitable substrate for colonial waterbirds (U.S. Fish and Wildlife Service – Long Island Field Office project file). A corrective plan of action was initiated by the Corps to mitigate for this condition; however, the short- and long-term effects of this project have not been evaluated as of this time. Potentially beneficial impacts of beach nourishment have been observed at other Corps sites existing on Long Island; however, these are not well studied and remain anecdotal as to their long-term contribution to resource conservation.

In addition to the above, direct impacts also include destruction of benthic resources due to the covering of these existing habitats with massive amounts of sand (U.S. Army Corps of Engineers 1998). Peterson and Manning (2001) stated that long-term adverse impacts to benthic fauna at North Topsail Beach, NC, occurred following beach nourishment. Lindquist and Manning (2001) reported that periodic nourishment of these beaches appeared to prevent the full recovery of benthic species.

The timing of dredging and placement of sand, as well as the rehabilitation of groins, during the initial and the periodic nourishment activities will also be a major factor regarding short- and long-term impacts for non-endangered shorebird and waterbird species. The direct effects include disruption of breeding, foraging, and roosting activities. Beach construction activities are usually very intensive environmentally disruptive operations, which involve the mobilization and use of heavy equipment and vehicles on the ocean beaches. The operation of dredging equipment immediately adjacent to a shoreline that is used as a courtship, nesting, and brood rearing area has the potential to disturb shorebirds to the point where they may not successfully nest and fledge young. Dredging equipment that is operated immediately adjacent to shorebird breeding habitat may preclude shorebirds from using the habitat entirely, forcing them to seek appropriate habitat elsewhere. Operation of machinery used to move dredge pipeline and to grade the nourished beach can greatly disturb shorebirds, their nests, and can endanger the lives of chicks (U.S. Fish and Wildlife Service 1995a). However, even low levels of human activity have been shown to result in disturbance and displacement of shorebirds at migrational staging and roosting areas (Pfister et al. 1992). Migratory shorebirds are particularly vulnerable to disturbance at roosting sites at high tides where the habitat available for roosting is diminished (U.S. Fish and Wildlife Service 1998b). Long-term impacts are likely, as recreational activities would increase as a result of the proposed project. Human activities may adversely affect productivity of shorebirds (Ruhlen et al. 2002) and influence foraging activity of some shorebird species (Burger and Gochfeld 1991).

The proposed project will also result in changes to the existing dune structure, burial of dune vegetation, and vegetation succession. The proposed project will create a monotypic stand of American beach grass through artificial planting at densities which may or may not be beneficial to avifauna. If vegetation succession and increased human disturbance is encouraged, shorebirds will most likely be discouraged from occupying these habitats.

Finally, grooming of the beaches to remove detritus and garbage can remove vital foraging resources for shorebirds and impact the trophic transfer of energy in the coastal setting (Dugan et al. 2003).

However, the Corps' FEIS (1998) concludes that that the biological community of the beach nourishment area will not be significantly affected over the long-term. Mobile organisms, such as fish, appear to be the least affected by beach nourishment activities as they are able to move to avoid disturbances (Hurme and Pullen 1988). Such motile species are able to return to the area when conditions are suitable again.

The recovery of benthic macrofauna (those animals 0.5 millimeters [mm] or larger in size) after beach nourishment varies from one site to another. Studies completed in the 1970s indicate that when nourishment ceases, the recovery of benthic macrofauna is rapid, and complete recovery might occur within one or two seasons (Reilly and Bellis 1978; Parr et al. 1978). The ability of macrofauna to recover is due to: (a) their short life cycles, (b) their fast reproductive potential, and (c) the recruitment of plankton larvae and motile macrofauna from nearby unaffected areas (Naqvi and Pullen 1982).

Meiofauna (animals smaller than 0.5 mm [0.02 inches] and equal to or larger than 0.062 mm [0.002 inches]) tend to recover very slowly from a <u>major</u> disturbance, perhaps due to their slow reproduction, limited ability to migrate, and their highly specialized adaptations to a restricted environment (Naqvi and Pullen 1982). However, meiofaunal recovery can be rapid following minor disturbances (Naqvi and Pullen 1982).

Potential Impacts to Marine Subtidal Habitats

This section addresses the impacts to the marine subtidal habitats in the offshore dredging area which covers approximately 223 ha (550 ac). The impact area is increased when the sedimentation plume footprint, which can extend from 300 m to 500 m (328.1 yd to 546.8 yd, respectively) from the dredge site, is considered. A description of the potential physical and biological changes and their associated impacts is given in Minerals and Management Service (2001). Some notable potential biological effects to fish and invertebrates include, but are not limited to, (1) removal or loss of infauna and epifauna at the borrow site for one to five years to a community with comparable pre-disturbance abundance and diversity and biomass but different species composition and structure; (2) altered energy transfer on the food chain and altered composition of fish prey base; (3) loss of spawning habitat, (4) loss of overwintering habitat; and (5) changes in community structure (species present, diversity, abundance, and biomass in surrounding areas (Minerals Management Service 2001).

The primary adverse impact on the environment due to dredging operations at a borrow area involves the disturbance and destruction of benthic resources and their habitats, which would result in a loss of benthic organisms from the immediate area (an additional impact from 300 to

500 m [0.2 mi to 0.3 mi, respectively] of the removal activity). Woodward-Clyde Consultants (1975) concluded that dredging may lower the productivity of a borrow area, and thus, the usefulness of the site for the production of fish and shellfish may decrease until a typical community is re-established in the borrow area. Hard bottoms, such as artificial or man-made reef structures which provide habitat for demersal and reef fish, can also be extremely vulnerable to the impacts of offshore dredging (Minerals Management Service 2001).

Dredging also directly effects fish by displacing fish populations from the dredging operation site (Woodhead 1992). Fish utilizing borrow pits may potentially be exposed to elevated contaminant levels due to the siltation of contaminated fine material into the borrow pit. Small deep pits are the poorest habitat due to reduced water circulation and high sedimentation rates which could lead to anoxic conditions lethal to species using the pits. However, as indicated in studies by Woodhead and McCafferty (1986), borrow areas and channels often contain higher levels of fish than adjacent shoals, indicating that borrow areas do not demonstrate adverse impacts to resources once the construction period is over.

Decreased water quality and increased turbidity in the marine nearshore subtidal zone could result from the actual beach nourishment activity (Mineral Management Service 2001). Sand particles suspended by dredging are dense and fall quickly back to the bottom while the fine sediments stay in suspension longer than sand, only sinking slowly (Woodhead 1992). The Corps' FEIS (U.S. Army Corps of Engineers, 1998) states that some invertebrate species would be unable to leave, and, therefore, subject to increased turbidity; but they are generally adapted to a highly turbid nearshore environment. U.S. Army Corps of Engineers (1998) provided no comparison of the background turbidity levels to the turbidity levels resulting from the proposed dredging operations. Fish tolerance to suspended solids varies from species to species and by age. Beach nourishment can affect fish populations by delaying hatching time of fish eggs, by killing the fish by coating their gills, and by reducing dissolved oxygen concentrations to stressful levels (Naqvi and Pullen 1982).

Localized turbidity plumes can have lethal and sublethal effects on benthos and fish, including hematological compensation for reduced gas exchange across gill surfaces, abrasion of epithelial tissue, packing of the gut with large quantities of ingested solids which may have little nutritive value, disruption of gill tissues (abrasion, clogging, increased activity of mucosa), and increased activity with a reduction of stored metabolic reserves (Profiles Research and Consulting Groups, Inc., 1980). Other effects of increases in turbidity include a decrease in light penetration, mechanical abrasion of the filter feeding and respiratory structures of animals, possible resuspension of contaminants and nutrients, burial of non-motile eggs, larvae, and adults, and absorption of essential nutrients from the water column (Stern and Stickle 1978).

The potential for oxygen deprivation problems in borrow areas is a very real concern. Reduced water circulation and high siltation/sedimentation of fine material can lead to anoxic conditions lethal to organisms which may be utilizing a borrow pit. These adverse impacts have been found to be minimal in areas with strong currents where oxygen can be quickly replenished (Tuberville and Marsh 1982). Elimination of small deep pit designs can alleviate potential oxygen deprivation problems..

In general, species which are found on well sorted, clean, rippled sand are adapted for a dynamic environment. These species may be more sensitive to silt deposited from dredging and slower to recolonize than less specialized and more opportunistic species found on high silt/clay sediment (WCH Industries 1994).

Based on the previous sediment surveys, the silty patches in the proposed borrow area have high standing crops of benthic species, with the amphipods and juvenile rock crabs having high value to fluke, winter flounder, black sea bass, and striped bass. Scup and winter flounder consume a great variety of benthos, including polychaetes. The sub-areas within the borrow area which have higher levels of silt are populated by opportunistic and rapid growing species and could recover rapidly from dredging. In contrast, the organisms in sandy patches may be slower to recover (WCH Industries 1994).

The surf clam is of special interest because it is harvested commercially in the proposed borrow area which is within one of the most productive surf clam areas on the east coast. Again, this area is responsible for the majority of New York's surf clam harvesting, where surf clam surveys conducted immediately west of the borrow area location along the Rockaway Beach Peninsula have been shown to produce a harvest valued at approximately $100,000 per 40.4 ha (100 ac) or more (New York State Department of Environmental Conservation 1994).

In addition, dredging activities may also impact migratory or overwintering seabirds (Minerals Management Service 2004). Seabirds also use these habitats and can experience loss of foraging resources due to dredging, which can result in shifts in foraging patterns (U.S. Fish and Wildlife Service, Chesapeake Bay Field Office, pers. comm. 2004). The Minerals Management Service which oversees exploration of offshore areas for mining, and oil and gas reserves, has recognized the potential impacts of their programs to seabirds and has undertaken, in certain areas of the country, surveys to understand seabird distribution and abundance in their project areas.

Potential Impacts to Marine Riprap and Artificial Shores

The effects of beach nourishment and the burial of groins would result in a loss of rocky intertidal habitat. However, sand placement over groins will re-establish sandy bottomed intertidal habitat. Impacts associated with the placement of rock substrate into the intertidal zone to rehabilitate existing groins could include the mortality of clams, mussels, and other invertebrates that would be eliminated during groin construction, as well as short-term effects of increased turbidity in the immediate area. However, groins which are left uncovered will be colonized by species associated with a rocky substrate which may provide a food source for fishes, invertebrates, and avifauna.

The effects of new groin construction at the eastern end of the proposed project area include those noted above. In addition, the proposed new groins may stabilize the nourished beach, providing additional habitat for shorebirds and waterbirds. The effect of new groins on down drift beaches to the west and nearshore currents needs to be assessed in order to avoid the transference of beach erosion westward.

Cumulative Effects

The cumulative effects analysis contained in the Corps' FEIS (1998), provides an estimate of the hectares of marine subtidal habitat within the offshore dredging areas (generally between 5.4 and 18.2 m [18 and 60 ft] below MLW) for Corps' shoreline protection projects along the south shore of Long Island, including the Long Beach Island Project. The Corps calculates that the total area affected by those projects would only affect 4 percent of the total habitat within these depth contours. The Corps cumulative impacts analysis should also include the effects of the maintenance dredging projects, as well as the area of intertidal and maritime beach and dune habitat that would be impacted. In addition to quantifying the area of habitat which would be affected, the Corps should also evaluate the cumulative impacts of its coastal program on migratory birds and wetlands, particularly those species and habitats of priority concern as established in various conservation plans that have been developed by local, State, and Federal agencies.

As discussed above, various physical and biological data collection efforts would need to be undertaken across the south shore of Long Island in order to address the cumulative impacts of the Corps beach nourishment program. The lack of site-specific data for the proposed project area and other project areas currently prevents the Service from making an accurate assessment of the cumulative impacts of this project in the context of other on-going projects. However, the Service believes that there is enough information to strongly support that cumulative impacts are, in many respects, likely adverse.

Effects on Federally-listed Endangered/Threatened Species

Due to the potential for the proposed project to affect listed species, the Corps has informed the Service that they will prepare a biological assessment pursuant to Section 7 of the ESA. In consultation with the Service, the Corps shall utilize its authority to further the purposes of the ESA in the conservation and recovery of listed species and the ecosystems on which they depend. Further, 50 CFR 402.02 states that the "effects of an action" to be considered during consultation include "direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action...."

The piping plover is a Federally-listed threatened species along the Atlantic Coast which nests on Long Island beaches. Dredging and beach disposal activities have potential to exert direct adverse effects on the piping plover as a result of disruption of courtship, nesting, and feeding activities during the breeding season, and alteration of their habitat. The operation of dredging equipment immediately adjacent to a shoreline that is used by piping plovers as a courtship, nesting, and feeding area has the potential to disturb plovers to the point where they do not successfully nest and fledge young. In addition, dredging equipment that is operated immediately adjacent to piping plover habitat may preclude plovers from using the habitat entirely, forcing them to seek appropriate habitat elsewhere.

Operation of machinery used to move dredge pipeline and to grade the nourished beach can greatly disturb plovers, their nests, and can endanger the lives of chicks. The placement of dredge pipeline can form a barrier prohibiting plover chicks from reaching foraging habitats including beach wrack and American beach grass. Beach slope is also a critical factor for habitat selection. In order to maintain piping plover habitat during a beach nourishment project, the material to be deposited on the beach must be consistent with the existing substrate already on the beach, or consist of material that is suitable for maintenance of piping plover habitat.

The proposed project may also maintain or enhance habitat for plovers. If the project beaches are occupied by plovers, these birds may experience indirect effects from human activity as a result of the increased attractiveness of these areas for human recreation. One of the project purposes of beach nourishment is to maintain and enhance recreational opportunities on Long Beach Island. Human activities that may potentially adversely affect plovers include off-road vehicle use, unleashing of pets, fireworks, kite-flying, and removal of wrack near plover nesting and feeding areas.

Seabeach amaranth may also be adversely affected by the proposed project. Proposed activities which may affect seabeach amaranth include beach nourishment, which would result in the burial of plants and seeds, disruption of seed production and dispersal, and degradation of habitat by promoting vegetative stabilization, perennial succession, and competition. Indirect effects may include trampling of plants and seeds by recreational activities, and removal of plants via mechanical beach grooming.

EVALUATION AND COMPARISON OF THE SELECTED PLAN AND OTHER EVALUATED ALTERNATIVES

An evaluation and comparison of the selected plan to other plans was not requested by the Corps. Therefore, such an analysis was not undertaken.

DISCUSSION AND JUSTIFICATION OF FISH AND WILDLIFE CONSERVATION MEASURES

Coastal shoreline erosion has resulted in a reduction in beach height and width along the barrier island and accelerated deterioration of the locally constructed stone groins. Sand erosion calculations indicate that the entire study area has experienced a net loss of sand, except Atlantic Beach which continually accretes sand (U.S. Army Corps of Engineers 1998). The groins and jetties within the study area have deteriorated since their construction and are becoming less effective and increasingly susceptible to storm damage. From a shoreline protection perspective, the continued erosion of the barrier island combined with the low elevations of the protective beach berm exposes Long Beach Island to a high risk of catastrophic damage from ocean flooding and wave attack (U.S. Army Corps of Engineers 1998).

The potential damages incurred as a result of storms include structural damages to residential and commercial properties, inability to effectively evacuate the island due to flooding of major roads, and the threat to human life. The Corps' proposed project concentrates primarily on the benefits obtained by reducing damages to structures from flooding occurring on the ocean beaches. However, the Corps recognizes that the island also experiences a lesser degree of flooding from the bay to the north, but is not addressing that problem via the proposed project.

Through the feasibility study, the Corps seeks to develop an effective shoreline protection plan to address long-term erosion and provide acceptable levels of protection from the impacts of inundation and wave attack. In recognition that the regional economy relies heavily on recreational beach usage, the Corps' study will seek to establish that a need exists for protecting and enhancing the Long Beach Island shorefront.

As established in the preceding sections of this report, the proposed project is likely to result in adverse impacts to Federal trust species. This report has focused on the migratory birds and their habitats, primarily maritime beach and dune communities, and marine intertidal and subtidal habitats, which support species which are highly imperiled or of high conservation concern, as well as priority habitats for conservation. The use of the proposed project area and adjacent habitats by these species and the potential impacts resulting from the proposed project are clear justifications to include conservation measures in these plans, and to further evaluate fish and wildlife enhancement opportunities in the study area. Further, habitats in the proposed project area have also received special protection and status as critical conservation areas through the NYSDOS designation as Significant Fish and Wildlife Habitats and inclusion in the SSER, warranting careful consideration of potential impacts, mitigation measures, and fish and wildlife enhancement opportunities.

LIST OF MITIGATION RECOMMENDATIONS

Mitigation Recommendations

The views and recommendations of the Service on this project are guided by its Mitigation Policy. This policy seeks to mitigate losses of fish, wildlife, and their habitats, and uses thereof, from land and water developments. The Service's mitigation policy does not apply to the ESA. The term "mitigation" is defined as: (a) avoiding the impact altogether by not taking a certain action or parts of an action; (b) minimizing impacts by limiting the degree or magnitude of the action and its implementation; (c) rectifying the impact by repairing, rehabilitating, or restoring the affected environment; (d) reducing or eliminating impacts over time; and, (e) compensating for impacts by replacing or providing substitute resources or habitats. The Service has developed mitigation measures for the proposed project impact area defined for the Recommended Plan and the FWCA analysis area which are discussed below. Some of these measures involve the collection of data that was identified in this report as lacking or out-dated for the proposed project area. Further consultation with the Service under the FWCA will be required following the implementation of these measures.

This particular project is only one of many dredging and beach nourishment projects undertaken by the Corps (and others) along the south shore of Long Island. Consequently, an assessment of long-term cumulative impacts of beach nourishment on local resources should be initiated in order to develop an adaptive long-term shoreline protection plan. Overall, more information is needed on the impacts on beach resources of various existing and proposed erosion control options, including groin fields, dune stabilization and berm elevation projects, and inlet management. Consideration must be given to the beach resources, especially the Federally-listed endangered seabeach amaranth and the Federally-listed threatened piping plover, and associated bay resources before these projects proceed. For this particular project, the Service recommends the following in each of the ecological communities impacted by the proposed project.

Maritime Beach and Dune Communities

The proposed project may have direct adverse effects on waterbird and shorebird species of regional concern in the short-term and over the 50-year life of the project. Protection measures for the State-listed least tern are provided in U.S. Fish and Wildlife Service (1995a) and should be incorporated into the proposed project description. The following provide additional strategies for avoiding, minimizing, or compensating impacts to avifauna and their habitats in the proposed project area.

(a) Activities associated with beach nourishment, berm and dune construction, and groin rehabilitation should be accomplished outside the breeding season for Federally- and State-listed species.

(b) Due to the lack of site-specific information on waterbirds, seabirds, shorebirds, and land birds, the Corps should fund a survey of these species in the proposed project area, and Service identified impact areas. A survey program will be developed in collaboration with the Service as a component of the feasibility study for the proposed project. Under the Transfer of Funding Agreement, the Service has the first right of refusal related to studies needed to fulfill the requirements of the FWCA. The Corps' Wilmington District has developed post-construction surveys for shorebirds in some of their project areas (*e.g.*, CZR, Inc. 2003); however, pre-construction surveys should also be conducted to develop pre- and post-construction data sets for statistical comparison. Until such studies are devised and information collected and analyzed, final mitigation measures for these species cannot be provided.

(c) An indirect benefit of the proposed project will be the significant improvement of opportunities for recreational beach use. As discussed in this report, increases in recreational use of beaches can also result in increased adverse impacts to shorebirds and waterbirds that utilize these beaches and nearshore waters. To avoid or minimize recreational impacts, the protection of these species should be demonstrated prior to project implementation. This should occur by developing and completing plans for educating residents, landowners, or beach managers of the management requirements discussed below, and, prior to project commencement, by obtaining a written agreement from residents, landowners, or beach managers for full cooperation with the Corps and the Service, or mutually agreed upon designated representatives (*e.g.*, the NYSDEC).

(d) Access to the project beaches should be provided to the Service, the Corps, or their mutually agreed upon designated representatives, to survey and monitor waterbird and shorebird use areas. Access should be given during daylight hours on any day(s) of any given year at the required frequency to accomplish the purposes stated above.

(e) Protection measures should be provided for that include the placement of symbolic fencing around breeding areas to avoid or minimize the impacts associated with recreational users.

(f) Fireworks should be prohibited on beaches used by shorebirds or colonial waterbirds as breeding, foraging, loafing, or roosting areas.

(g) The Corps should work with the landowners to implement leash laws and develop laws and regulations to control cats during the migratory bird use periods.

(h) Feeding of raccoons, gulls, or other wildlife should be prohibited to minimize mortality of migratory birds.

(i) The Corps should ensure that the mined beach nourishment sand is compatible with the sand that is now on the beach with respect to grain size, clay content, and organic matter.

(j) If the dunes are to be planted with vegetation, American beach grass should be planted 18 inches on center from the southern toe of the dune to the dune crest to the northern toe of the dune. The Corps should also consult with the Service on other plant species that can be incorporated into the planting scheme in order to increase plant diversity and heterogeneity in the proposed project area.

(k) Public access on dunes should be limited to wooden walkways over the dune in order to maintain beach grass beneath the walkway, and on the dunes.

(l) Sand grain size distribution should be monitored at the beach nourishment site before the project and immediately after project completion.

(m) Benthic resources should be monitored in the maritime beach and dune habitats. The monitoring plan should be coordinated with the Service.

Nearshore and Offshore Marine Subtidal Habitats/Marine Intertidal Habitats

(a) All offshore dredging activities should be coordinated with the NYSDEC – Region 1 in regard to the protection of resources under their jurisdiction. A primary goal should be to avoid dredging in areas which contain significant concentrations of the commercially important Atlantic surf clam beds.

(b) Exposing and impacting various sediment types during dredging should be avoided. Maintaining the same sediment type at the borrow area will increase the probability that the same pre-dredging benthic assemblage will re-establish after dredging.

(c) Producing deep, steep-sided pits with little to no water circulation that may lead to silt and organic matter accumulation and hypoxic or anoxic conditions, should be avoided. Broad, shallow pits with gently sloping sides are less likely to exhibit these effects.

(d) In recognition of the seabird monitoring activities being undertaken by the Minerals Management Service on potential offshore sand reserves in other parts of the country, the Corps should adopt a similar sampling program for this Federal trust resource. These surveys will be necessary to develop appropriate mitigation measures. Until these surveys are completed, the Service is unable to provide adequate mitigation measures to protect these species.

(e) The Service recommends that the Corps develop a pre- and post-monitoring program based on the guidance protocols developed by the U.S. Department of the Interior's Minerals Management Service (see Minerals Management Service

2001) for finfish and benthic assemblages within the offshore dredging areas. The justification for their approach is the observation that while benthic species abundance has been shown to return to pre-dredging levels, in some cases from 1 to 2 years after dredging, species composition may be different and the ability of fishes to use such altered assemblages for prey is uncertain. Therefore, the purpose is centered more towards trophic transfer relationships under modified conditions as opposed to changes in the resident fish community (Minerals Management Service 2001).

(f) The Corps should consult with the NYSDEC as to whether additional quantitative baseline surveys on the density and age distribution of surf clams should be collected to determine the surf clam resources within the offshore dredging area. This information can be used to determine areas, within the dredging zone, that should be excluded from dredging operations, and will also enable the Corps to better determine the value of surf clam resources that may be impacted by dredging.

Marine Cultural (Marine Riprap and Artificial Shores)

(a) The construction of new groins at the eastern end of the project area should avoid adversely affecting sand accretion on down drift beaches west of the new groin field.

(b) If the Corps determines that new groin construction is the best alternative for alleviating sand erosion at the eastern portion of Long Beach Island, the area should be monitored in order to determine the effects of these structures on the beaches west of the new groin field, especially at Lido Beach and Long Beach.

(c) The Corps should develop remedial action plans should the new groins be proven to negatively impact the beaches west of the new groin field.

ENDANGERED AND THREATENED SPECIES RECOMMENDATIONS

Section 7(a)(2) of the ESA, requires all Federal agencies, in consultation with the Secretary of the Interior, to ensure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any <u>listed</u> species. In consultation with the Service, the Corps shall utilize its authority to further the purposes of the ESA in the conservation and recovery of listed species and the ecosystems on which they depend. Further, 50 CFR 402.02 states that the "effects of an action" to be considered during consultation include "direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action...."

Based on our review of the proposed project, beach nourishment activities along the shoreline of Long Beach Island have the potential for direct and indirect adverse effects on piping plovers and seabeach amaranth. Consequently, further Section 7 consultation will be required, as noted by the Corps in correspondence dated. The Service submitted recommendations in correspondence dated June 15, 2004, to the Corps for conservation measures which should be incorporated into the project plans to avoid and minimize potential adverse effects to these species.

SUMMARY OF FINDINGS AND SERVICE POSITION

Potential Impacts on Maritime Beach and Dune Communities

The Service finds that implementation of the proposed project will cause adverse impacts to the ecological communities of the maritime beach and dune communities. If implemented in accordance with the mitigation recommendations provided in this report, these impacts can be avoided, minimized, or compensated.

The proposed project will impact marine and terrestrial communities, resulting in the elimination and disturbance of invertebrate and vertebrate inhabitants of the maritime beach and dune communities, which in some cases, support species or habitats which have been identified in U.S. Shorebird Plan (2004) as highly imperiled or a high priority concern in the region. With periodic nourishment scheduled over the 50-year project life this may have some serious implications for the species using the proposed project area. However, the implementation of the avian and benthic resource monitoring programs and mitigation measures provided in this report, will assist the Corps in offsetting the potential adverse impacts presented in this report, by using the monitoring information to guide appropriate design and construction approaches.

Potential Impacts to Marine Subtidal Communities (Offshore Dredging Area)

Dredging sand from the borrow area will result in the elimination of benthic invertebrate species and habitats, and commercial clam beds. Dredging will result in a sedimentation plume footprint that could extend up to 500 m (547 yd) from the actual dredge site, causing turbidity and sedimentation both in and around the dredged area. A decrease in dissolved oxygen may result from the resuspension of organically enriched sediments, as well as with changes in the currents and water circulation within the borrow area itself. Recovery time periods are dependent on a number of physical and biological factors and vary up and down the Atlantic Coast. While species abundance may return to conditions (which are also unknown) prior to dredging, community changes may take place which could have implications to energy transfers up the food chain. Major concerns include the impacts of dredging on the surf clam fishery, impacts to seabirds, and disturbance to food chain dynamics.

Potential Impacts to Marine Riprap and Artificial Shore Communities

The purpose of new groin construction is to stabilize the beach at the eastern end of Long Beach Island, which may potentially enhance habitat for shorebird species which use rocky habitats and wide beaches for breeding, foraging, loafing, and roosting. However, new groin construction can also transfer beach erosion problems to the west of the proposed new groin field. The Corps needs to assure the Service that this will not happen.

Potential Impacts to Endangered and Threatened Species

The proposed project has the potential to exert both direct and indirect adverse effects on the piping plover and seabeach amaranth. Dredging and beach disposal activities during the plover breeding season have the potential to exert direct adverse effects on the piping plover as a result of disruption of courtship, nesting, and feeding activities, and alteration of their habitat. Seabeach amaranth may also be adversely affected by the proposed project, which may result in the burial of adult plants and seeds, disruption of seed production and dispersal, and degradation of habitat by promoting vegetative stabilization, perennial succession, and competition.

The proposed beach nourishment may also maintain or enhance habitat for plovers. If the project beaches are occupied by plovers, these birds may suffer indirect effects from human activity as a result of the increased attractiveness of these areas for human recreation. Indirect effects of the project upon seabeach amaranth may include trampling of plants and seeds by recreational activities.

Overall, the Service finds that implementation of the proposed project has the potential to result in adverse effects to fish and wildlife resources, as well as the Federally- and State-listed piping plover and seabeach amaranth and their supporting ecosystems. In the case of non-endangered species, these impacts can be avoided or minimized by incorporating the mitigation measures contained in this report. The Service recognizes the need for the proposed project and acknowledges that beach nourishment can potentially maintain and enhance habitat for breeding and non-breeding migratory birds.

The Service has recommended mitigation measures which will avoid and minimize adverse environmental impacts of the proposal. Some of these measures involve physical and biological monitoring during various stages of project planning and construction, and over the life of the project. The Service has also recommended sand grain size monitoring of the beach nourishment and new groin construction areas in order to assess the impacts of beach nourishment on fish and wildlife habitat substrate. The monitoring plan will enable the Service and the Corps to effectively evaluate potential impacts for similar projects which may be proposed in the same or similar areas in the future, and to assist in assessing long term cumulative impacts of beach nourishment and dredging on local resources.

The Service, as stated in our June 15, 2004, letter, has presented several recommendations which should be considered for incorporation into the project description in order to avoid and minimize impacts to the piping plover and seabeach amaranth. The biological assessment should evaluate these and other measures further.

FISH AND WILDLIFE ENHANCEMENT OPPORTUNTIES

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

In addition, the Service recommends that the Corps participate throughout this project in the protection and restoration of wetland habitats which support breeding and non-breeding birds, as well as fish and shellfish, in the back-bay complexes. Many recommendations related to accomplishing this task are found in the SSER Comprehensive Management Plan. The Service is interested in pursuing these and other fish and wildlife enhancement opportunities in the proposed study area, and is willing to extend the FWCA consultation under a separate SOW to address these ideas in more detail.

REFERENCES

Burger, J., and M. Gochfeld. 1991. Human Activity Influence and Diurnal and Nocturnal Foraging of Sanderlings (*Calidris alba*). *The Condor* 93: 259-265.

Burlas, M. G.L. Ray, and D. Clarke. 2001. The New York Districts 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.

Byrnes, M.R., R.M. Hammer, T.D. Thibaut, and D.B. Synder. 2004. Effects of Sand Mining on Physical Processes and Biological Communities Offshore New Jersey, U.S.A. *Journal of Coastal Research* 20: 25-43.

CZR, Inc. 2003. Waterbird and Shorebird Use at Ocean Island Beach in Brunswick County, North Carolina – December 2001-November 2002. Prepared for U.S. Army Corps of Engineers, Wilmington District, Wilmington, North Carolina. Contract Number DACW 54-97-D-0028.

Cowardin, L.M., V. Carter, F. Golet, and E. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Fish and Wildlife Service. 103 pp.

Dugan, J.E., D.M. Hubbard, M.D. McCrary, and M.O. Pierson. 2003. The Response of Macrofauna Communities to Macrophyte Wrack Subsidies on Exposed Sandy Beaches of Southern California. *Estuarine Coastal and Shelf Science* 58S: 133-148.

Edinger, G.T., D.J. Evans, S. Gebauer, T.G. Howard, D.M. Hunt, and A.M. Olivero (editors). Ecological Communities of New York State – Second Edition. A revised and expanded revision of Carol Reschke's Ecological Communities of New York State. Draft for Review. New York Natural Heritage Program, New York State Department of Environmental Conservation, Albany, NY. 136 pp.

Federal Register. 1981. U.S. Fish and Wildlife Service Mitigation Policy. Washington, DC. U.S. Department of the Interior.

Howe, M.A., R.B. Clapp, and J.S. Weske. 1978. Marine and Coastal Birds. MESA New York Bight Atlas, Monograph 31. New York Sea Grant Institute, Albany, NY. 87 pp.

Hurme, A.K., and E.J. Pullen. 1988. Biological Effects of Marine Sand Mining and Fill Placement for Beach Replenishment. *Marine Mining* (7): 123-136.

Lindquist, N. 2001. Impacts of Beach Nourishment and Beach Scraping on Critical Habitat and Productivity of Surf Fishes. SeaGrant North Carolina Research Projects. Website: www.ncseagrant.org.

Lindquist, N., and L. Manning. 2001. Impacts of Beach Nourishment and Beach Scraping on Critical Habitat and Productivity of Surf Fishes. Final Report to the North Carolina Fisheries Resource Grant Program. 41 pp. plus appendices.

Minerals Management Service. 2001. Final Report Development and Design if Biological and Physical Monitoring Protocols to Evaluate the Long-Term Impacts of Offshore Dredging Operations on the Marine Environment. Prepared for the U.S. Department of the Interior, Minerals Management Service, International Activities and Marine Minerals Division Under Contract No. 14-35-0001-31051. 166 pp. plus Appendix.

Naqvi, S.M., and E.J. Pullen. 1982. Effects of Beach Nourishment and Borrowing on Marine Organisms. Fort Belvior: U.S. Army Corps of Engineers, Coastal Engineering Research Center. MR 82-14.

New York State Department of Environmental Conservation. 2002. 2002 Atlantic Ocean Surfclam Population Assessment. Prepared by Bureau of Marine Fisheries – Division of Fish, Wildlife, and Marine Resources, East Setauket, NY. 29 pp.

-------------------------. 1994. Concerns Regarding the Long Beach Storm Damage Project. Stony Brook: New York State Department of Environmental Conservation letter to U.S. Fish and Wildlife Service.

New York State Department of State. 2004. Significant Fish and Wildlife Habitats Website - http://nyswaterfronts.com.

New York State Office of General Services. 1992. Subaqueous Sand Mining. Albany: Draft Environmental Impact Statement.

Parr, T., E. Diener, and S. Lacy. 1978. Effects of Beach Replenishment on Nearshore Sand Fauna at Imperial Beach, California. Fort Belvior: U.S. Army Corps of Engineers, Coastal Engineering Research Center. MR-74.

Peterson, C.H., D.H.M. Hickerson, and G.G. Johnson. 2000. Short-term Consequences of Nourishment and Bulldozing on the Dominant Large Invertebrates of a Sandy Beach. *Journal of Coastal Research* (16)(2): 368-378.

Peterson, C.H., and L. Manning. 2001. How Beach Nourishment Affect the Habitat Value of Intertidal Beach Prey for Surf Fish and Shorebirds and Why Uncertainty Still Exists.

Proceedings of the Coastal Ecosystems and Federal Activities Technical Training Symposium, August 20-22, 2001. 2 pp.

Pfister, C., B.A. Harrington, and M. Lavine. 1992. The Impact of Human Disturbance on Shorebirds at a Migration Staging Area. *Biological Conservation* (60): 115-126.

Profiles and Research Consulting Groups, Inc. 1980. Seasonal Restrictions on Dredging Projects by NMFS in the Northeast. Volume 1. Prepared for the National Marine Fisheries Service under Contract SB 1408(a) -79-C-169.

Reilly, F., and V.J. Bellis. 1978. A Study of the Ecological Impact of Beach Nourishment with Dredged Materials on the Intertidal Zone. Inst. For Coastal and Marine Resources, East Carolina University Technical Report No. 4. East Carolina University, Greenville, NC.

Ruhlen, T.D., S. Abbott, L.E. Stenzel, and G.W. Page. 2002. Evidence that Human Disturbance Reduces Snowy Plover Chick Survival. *Journal of Field Ornithology* 74(3): 300-304.

Steimle, F. and R. Stone. 1973. Abundance and Distribution of Inshore Benthic Fauna of Southwestern Long Island. NOAA Technical Report, NMFS SSRF-673.

Stern. E.M., and W.B. Stickle. 1978. Effects of Turbidity and Suspended Material in Aquatic Environments. Vicksburg: U.S. Army Corps of Engineers, Waterways Experiment Station. Technical Report D-78-21.

Tuberville, D.B. and G.A. Marsh. 1982. Benthic Fauna of an Offshore Borrow Area in Broward County, Florida. MR 82-1, U.S. Army Corps of Engineers, Coastal Engineering Research Center, Fort Belvior, VA. 26 pp.

United States Army Corps of Engineers. 2004. Year 2 Recovery from impacts of Beach Nourishment and Surf Zone Fish and Benthic Resources on Bald Head Island, Caswell Beach, Oak Island, and Holden Beach, North Carolina – Final Study Findings. Prepared for U.S. Army Corps of Engineers, Wilmington District, Wilmington, NC. Contract No. DACW54-00-D-0001.

-------------------------. 1998. *Atlantic Coast of Long Island New York, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York, Final Feasibility Report with Final Environmental Impact Statement.* U.S. Army Corps of Engineers, New York District, New York, NY. 89 pp.

-------------------------. 1994. Comments to the Service's April 1994, Draft Fish and Wildlife Coordination Act Report. U.S. Army Corps of Engineers, New York District, New York, NY.

-------------------------. 1989. *Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York.* Reconnaissance Report. U.S. Army Corps of Engineers, New York District, New York, NY.

United States Fish and Wildlife Service. 2000. U.S. Shorebird Conservation Plan, North Atlantic Regional Shorebird Plan, Version 1. New Jersey Division of Fish and Wildlife and North Atlantic Shorebird Habitat Working Group. 17 pp.

---------------------------. 2000b. LandBird Conservation Plan Physiographic Area 9 Southern New England U.S. Fish and Wildlife Service, Northeast Region, Hadley, MA. 51 pp.

-------------------------. 1998a. South Shore Estuary Reserve Shorebird Draft Technical Report. U.S. Fish and Wildlife Service Southern New England – New York Bight Coastal Ecosystems Program, Charleston, RI. 13 pp.

-------------------------. 1998b. *Fire Island Inlet to Montauk Point Beach Erosion Control and Hurricane Protection Project Reach I Fire Island Inlet to Moriches Inlet Interim Storm*

Damage Protection Plan Draft Fish and Wildlife Coordination Act Section 2(b) Report. U.S. Fish and Wildlife Service, Long Island Field Office, Islip, NY. 59 pp.

------------------------. 1997. *Significant Habitats and Habitat Complexes of the New York Bight Watershed.* U.S. Fish and Wildlife Service, Charlestown, RI. 1, 024 pp.

------------------------. 1995a. *Fish and Wildlife Coordination Act Section 2(b) Report, Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York, Storm Damage Reduction Project.* U.S. Fish and Wildlife Service, Long Island Field Office. 32 pp.

------------------------.. 1995c. Fish and Wildlife Coordination Act Section 2(b) Report, Fire Island Inlet to Montauk Point, Long Island, New York, Breach Contingency Plan. U.S. Fish and Wildlife Service, Long Island Field Office. 51 pp.

------------------------. 1995a. *Reynolds Channel and State Boat Channel Project Planning Aid Report.* U.S. Fish and Wildlife Service, Long Island Field Office, Islip, NY.

------------------------. 1994. *Fish and Wildlife Coordination Act 2(b) Report, Atlantic Coast of Long Island, New York Moriches Inlet to Shinnecock Inlet Interim Storm Damage Reduction Project.* U.S. Fish and Wildlife Service, Long Island Field Office, Islip, NY.

-------------------------. 1989. *Planning Aid Report for the Corps' Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York, Storm Damage Reduction Project.* U.S. Fish and Wildlife Service, New York Field Office, Cortland, NY.

U.S. Shorebird Conservation Plan. 2004. High Priority Shorebirds – 2004. Unpublished Report. U.S. Fish and Wildlife Service, 4401 Arlington, VA. 5 pp.

WCH Industries, Inc. 1994. Benthic Community Profiles, Beach Restoration Project, Jones Inlet to Long Beach Island, Long Beach, New York. Waltham, MA.

Woodhead, P.M.J. 1992. *Assessments of the Fish Community and Fishery Resources of the Lower New York Bay Area in relation to a Program of Sand Mining Proposed by New York State.* Stony Brook: Marine Sciences Research Center, SUNY at Stony Brook.

Woodhead, P.M.J. and SS. McCafferty. 1986. Report of the Fish Community of Lower New York Harbor in Relation to Borrow Pit Sites. In *"Draft Supplemental Environmental Impact Statement: Use of Subaqueous Borrow Pits in the Disposal of Dredged Material from the Port of New York – New Jersey,"* 1988, by U.S. Army Corps of Engineers, New York District, New York, NY. 1988.

Woodward-Clyde Consultants. 1975. Rockaway Beach Erosion Control Project Dredge Material Research Program Offshore Borrow Area. San Francisco: Woodward-Clyde Consulting Engineers, Geologists, and Environmental Scientists.

FIGURES

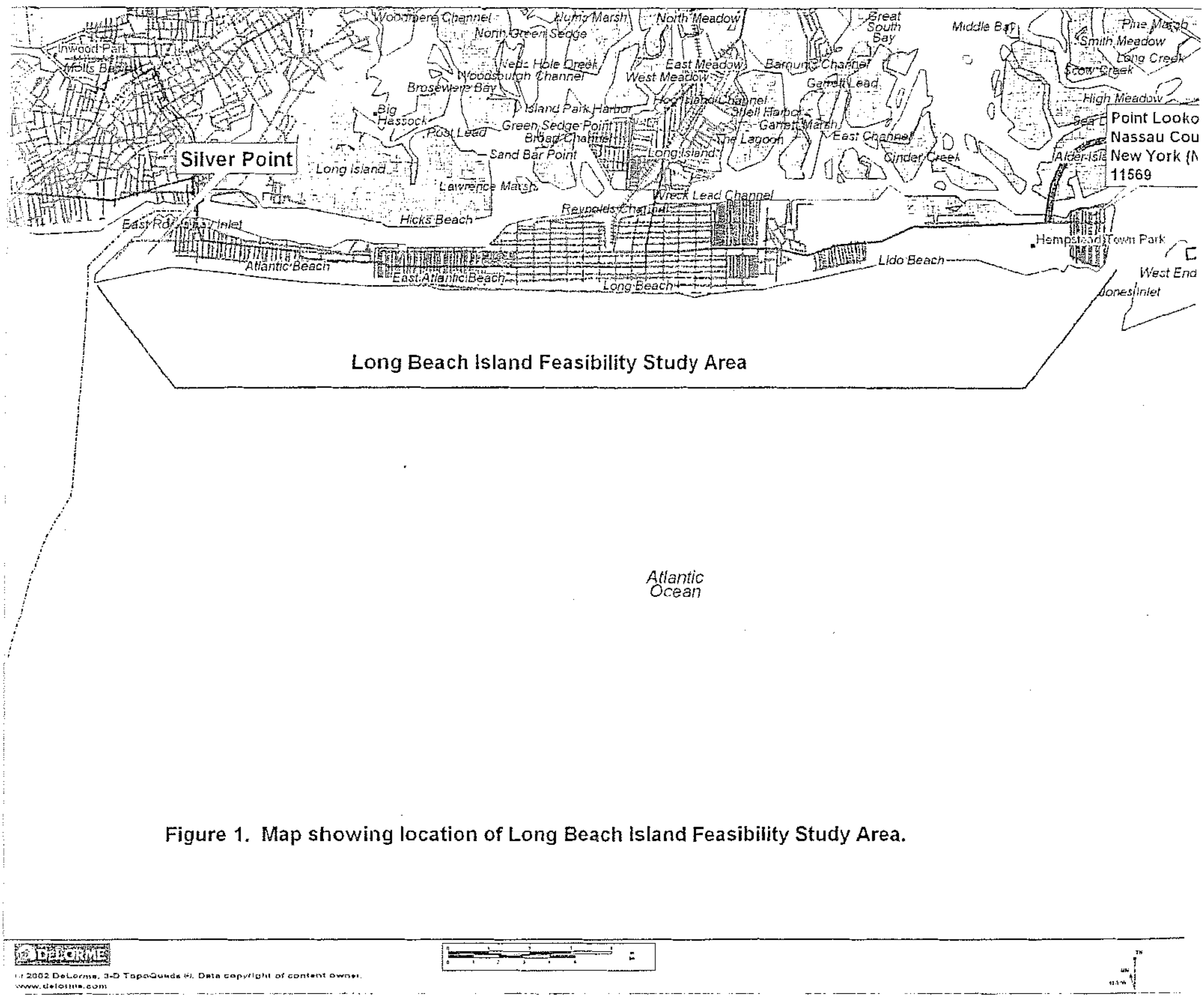

Figure 1. Map showing location of Long Beach Island Feasibility Study Area.

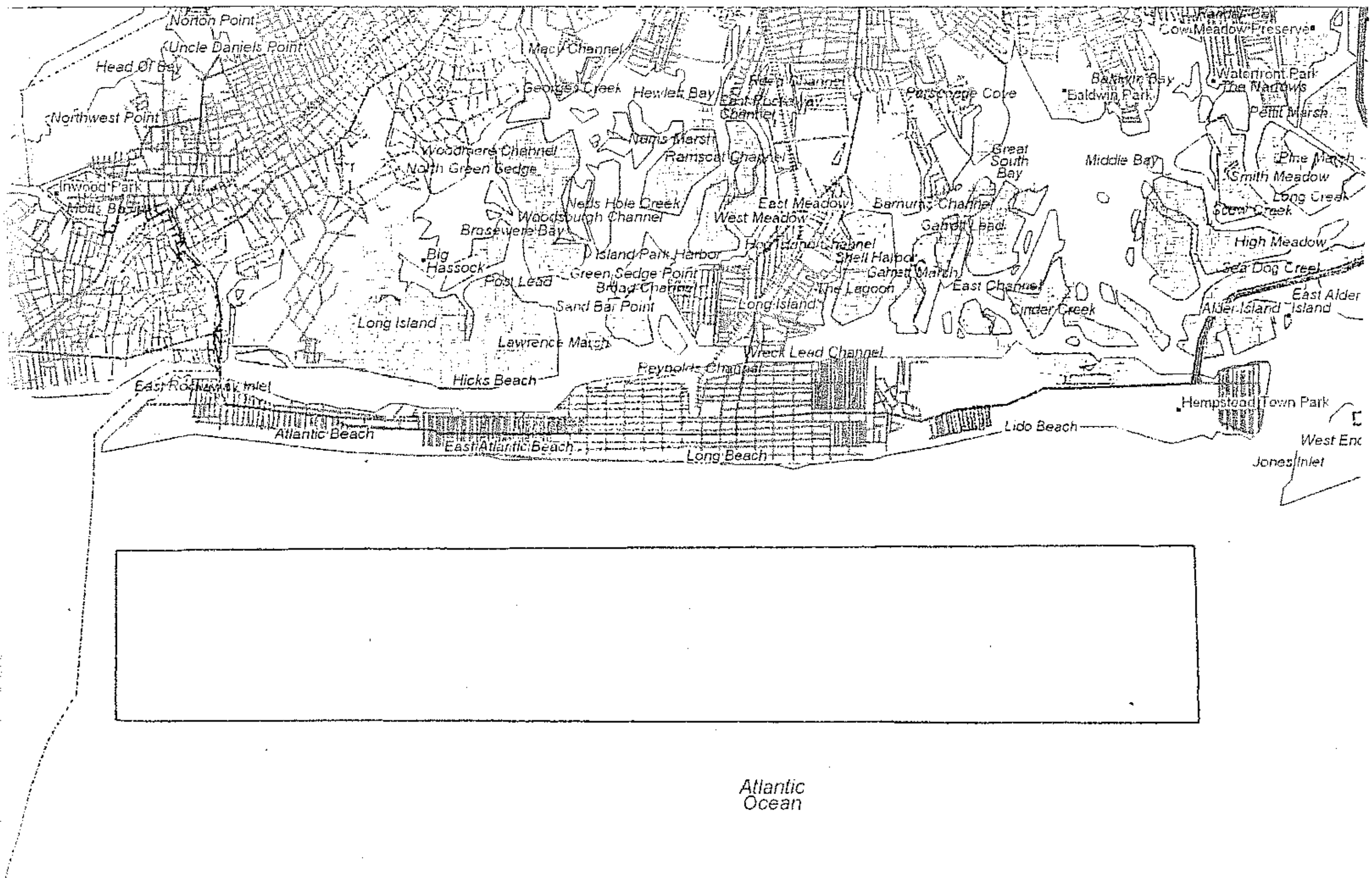

Figure 2. General Area of Proposed Offshore Dredging Area between 25 and 60 ft depths shown in red outlined box.

Hempstead Bays - South Oyster Bay - Map 1 of 2

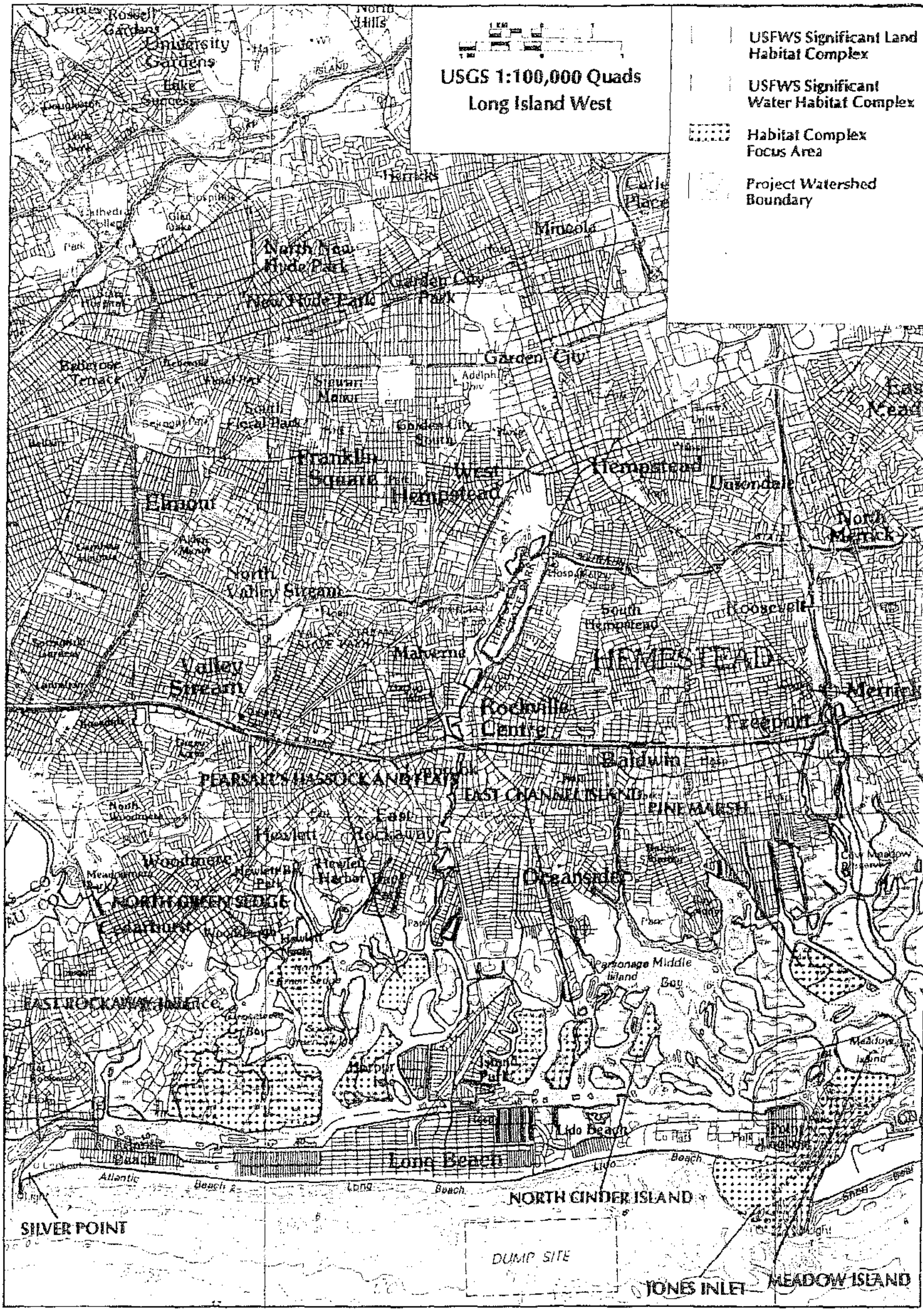

Figure 7. Map showing Hempstead Bays Significant Fish and Wildlife Habitat Complex in the SWCA analysis area. From U.S. Fish and Wildlife Service (1997).

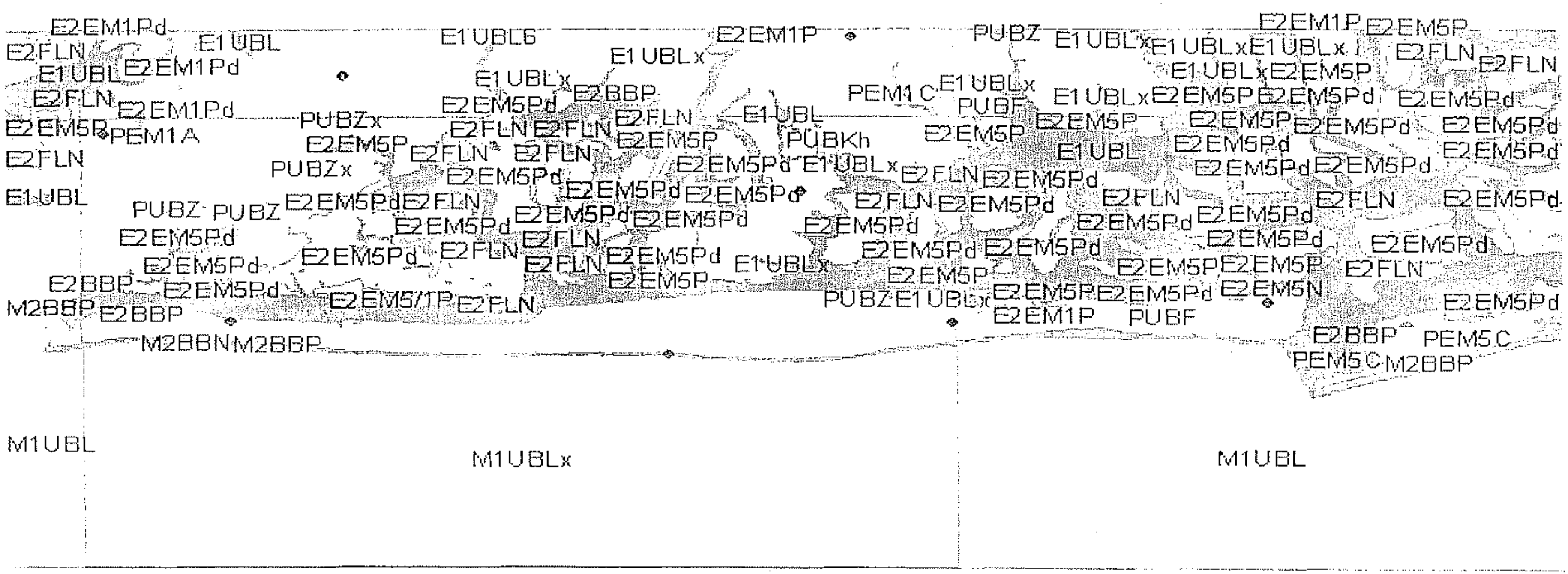

Figure 4. Wetland designations in the feasibility study area following Cowardin et al (1979).

APPENDIX D
NEW YORK STATE COASTAL ZONE MANAGEMENT PROGRAM CONSISTENCY DETERMINATION

Your coast, your future

NYS*Waterfronts*

George E. Pataki
Governor
Alexander F. Treadwell
Secretary of State

July 17, 1998

Mr. Frank Santomauro, P.E.
Chief, Planning Division
Environmental Assessment Division
U.S. Army Corps of Engineers
New York District
Jacob K. Javits Federal Building
New York, New York 10278-0090

Re: F-98-415(DA)
U.S. Army Corps of Engineers/NY District - Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York Storm Damage Reduction Project

Dear Mr. Santomauro:

The Department of State has completed its review of the Corps of Engineers/New York District's consistency determination with respect to the New York State Coastal Management Program, together with supporting documentation, for the proposed Jones Inlet to East Rockaway Inlet, Long Beach Island Storm Damage Reduction Project.

Based upon the project information submitted, the Department of State agrees with the Corps' consistency determination for this activity. This agreement is based on an understanding between the Corps, this Department, and the New York State Department of Environmental Conservation that new modeling tools are available, that those modeling tools will be used in monitoring studies of the area, and that if those studies indicate additional groins are necessary, appropriate supplemental National Environmental Policy Act documentation and interagency consultation will be conducted in order to modify the project accordingly.

Thank you for your cooperation regarding this matter. If you or your staff have any questions regarding this decision, please call William F. Barton at (518) 473-2469 or Steven C. Resler at (518) 473-2470.

Sincerely,

William F. Barton
George R. Stafford/ for
Director

GRS/SCR

NYS Department of State
Division of Coastal Resources and Waterfront Revitalization
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APPENDIX E
AIR CONFORMITY ANALYSIS

LIMITED RE-EVALUATION OF AIR QUALITY EMISSIONS FROM STORM DAMAGE REDUCTION PROJECT FOR ISLAND OF LONG BEACH, NEW YORK

Contract Number: DACW51-01-D-0018-1
Delivery Order Number: 0037

Prepared for:

U.S. Army Corp of Engineers
New York District
26 Federal Plaza
New York, New York 10278-0090

Prepared by:

Weston Solutions, Inc.
Northern Ecological Associates, Inc.

July 2005

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1.0 INTRODUCTION

1.1 Background

This Air Quality Analysis involved the limited re-evaluation of air quality emissions as part of the Storm Damage Reduction Project for the Island of Long Beach, New York (Long Beach Project). The Air Quality Analysis is based on expected schedule and equipment needs of the project as projected by the U.S. Army Corp of Engineers (USACE), New York District and is conducted in accordance with U.S. Environmental Protection Agency (EPA) standards, and USACE requirements and methodology coordinated with the New York State Department of Environmental Conservation (NYSDEC), Bureau of Air Quality Planning. This analysis will be included in a Supplemental Environmental Assessment (SEA) of potential project impacts to be prepared by the District.

The Long Beach Project was the subject of a Feasibility Study, which was completed in February of 1995. Subsequent to that Feasibility Study, three design efforts were accomplished, including (1) design of an extension for the easternmost terminal groin at Jones Inlet, (2) a technical reanalysis of the eastern half of the project, and (3) a quantity update for the western portion of the project. In addition, there has been physical construction where the Town of Hempstead has upgraded the stone revetment along the western side of Jones Inlet, and has also constructed new dunes in the vicinity of the western terminus of the project.

A Limited Re-evaluation Report (LRR) is being prepared by the District, which will summarize all Feasibility Study efforts and present details of the post-Feasibility design refinements. The LRR will include 1) preparation of a supplemental Environmental Assessment (SEA), which summarizes the results and potential environmental impacts of post-Feasibility Study design refinements and Feasibility Study efforts, 2) perform limited NEPA requirements that reflect any new refinements of the final plan, which will be included as a companion document to the LRR. The air quality analysis provided in this report is being completed as part of the SEA for incorporation into the LRR.

1.2 Proposed Action

The proposed project area is located on the south shore of Long Island from Jones Inlet to East Rockaway Inlet and consists of approximately 9 miles of oceanfront. The area has been subject to major flooding during storms, causing damage to structures located along the barrier island. Continued erosion over the years has resulted in a reduction of the height and width of the beach, which has increased the potential for storm damage.

The project would provide storm damage protection to the highly developed communities that are subject to direct wave attack and flooding during major storms and hurricanes. The recommended plan in the Feasibility Report, dated February 1995, provides protection against a 100-year storm event for 7 of the 9 miles of public shoreline between Jones Inlet and East Rockaway Inlet, including the communities of Point Lookout, Lido Beach, and the City of Long Beach.

The Long Beach project construction activities associated with the project includes beachfill, new groin construction, rehabilitation of existing groins and rehabilitation/extension of the terminal groin in Point Lookout. These activities along with construction of various dune walkovers, vehicle accesses, boardwalk extensions and dune planting/sand fence installation are expected to be completed in either a 4-year or a 5-year construction schedule which are currently under consideration.

Specific construction items for each of the sub-reaches are summarized below.

City of Long Beach, New York

- Groin Rehabilitation. 15 groins in Long Beach are recommended for rehabilitation. The proposed rehabilitation consists of repositioning existing armor stone and adding additional armor stone along the seaward 100-200 feet of each of the groins.
- Beachfill Placement. 5,741,300 cubic yards of beachfill will be placed using a hydraulic cutterhead dredge.

- Boardwalk Extensions and Walkovers Construction. 15 boardwalk extensions/dune crossovers and 14 dune walkovers will be constructed.
- Comfort Station/Life Guard Station Construction. 5 comfort stations, 2 comfort/lifeguard stations and 1 lifeguard headquarters will be constructed.
- Vehicle Access Construction. 4 vehicle access ramps over the dune will be constructed.
- Sand Fence Installation. 29,800 linear feet of sand fence will be installed.

Point Lookout, New York

- New Groin Construction. 7 new groins are proposed for construction in the Point Lookout area. Stone required for the groin construction will be transported by barging from the quarry at Poughkeepsie, N.Y on the Hudson River to a project constructed docking area along Reynold's Channel on the bay side opposite the project. The stone will be rehandled from the barges and trucked to the project site. Groin work is based on utilization of land based equipment with construction proceeding from the landward end of the groin crest out to the seaward crest. The inshore end of the groin will require open cut excavation in order to construct the design section.
- Terminal Groin Rehabilitation/Extension. Groin No. 58, the easternmost terminal groin in Pt. Lookout, will be rehabilitated and extended.
- Groin Rehabilitation. 2 groins will be rehabilitated. The proposed rehabilitation consists of repositioning existing armor stone and adding additional armor stone along the seaward 100-200 feet of each of the groins.
- Beachfill Placement. 1,379,600 cubic yards of beachfill will be placed using a hydraulic cutterhead dredge.
- Dune Walkover Construction. 27 dune walkovers will be constructed.
- Life Guard Station Relocation. 1 lifeguard station will be relocated. Relocation should be phased early in the project construction schedule.
- Vehicle Access Construction. 8 vehicle accesses will be constructed.
- Sand Fence Installation. 11,700 linear feet of sand fence will be installed.
- Dune Grass Planting. 6.8 acres of dune grass will be planted.

The project is expected to commence during the first quarter of calendar year 2006 and will be completed in either a 4-year or a 5-year construction schedule. The two construction schedule options were both considered as part of the air quality analysis evaluation.

2.0 EXISTING CONDITIONS

Air quality is measured by the concentration of pollutants in the atmosphere. Under the federal Clean Air Act (CAA) and its amendments, the U.S. Environmental Protection Agency (USEPA) developed criteria which represent the maximum allowable atmospheric concentrations of pollutants that may occur while ensuring protection of public health and welfare, with a reasonable margin of safety. These National Ambient Air Quality standards (NAAQS) were established for six "criteria" pollutants: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter, and lead (Pb). Particulate matter standards incorporate two particulate classes: 1) particulate matter with an aerodynamic diameter less than or equal to 10 micrometers (PM10), and 2) particulate matter with an aerodynamic diameter less than or equal to 2.5 micrometers (PM2.5). Currently, only PM10 is regulated by the NAAQS.

Areas that meet the NAAQS standard for a criteria pollutant are designated as being in "attainment"; areas where the criteria pollutant level exceeds the NAAQS are designated as being in "nonattainment". Ozone nonattainment areas are subcategorized based on the severity of their pollution problem (marginal, moderate, serious, severe, and extreme). Particulate matter and carbon monoxide nonattainment areas are classified into two categories (moderate and serious). Areas previously designated as nonattainment and subsequently designated as attainment are considered to be "maintenance" areas. When insufficient data exists to determine an area's attainment status, it is designated unclassifiable (for attainment).

The proposed Long Beach Project is located in the New York-Northern New Jersey-Long Island Consolidated Metropolitan Statistical Area (CMSA). The New York-Northern New Jersey-Long Island CMSA is designated as a severe nonattainment area for ozone (O_3). The area was previously designated as a nonattainment area for carbon monoxide (CO), but now is designated as attainment for CO and therefore, the area is considered to be a maintenance area for CO. The area is designated as attainment for nitrogen dioxide, sulfur dioxide, particulate matter, and lead.

3.0 CLEAN AIR ACT CONFORMITY REQUIREMENTS

Section 176(c) of the federal Clean Air Act prohibits Federal entities from taking actions in nonattainment or maintenance areas that would jeopardize the attainment of NAAQS or otherwise do not conform to the State Implementation Plan (SIP) for the attainment and maintenance of the NAAQS. The CAA delegates responsibility to each state to achieve and maintain the NAAQS.

Each state is required to develop a SIP, which is its primary mechanism for ensuring that the NAAQS are achieved and maintained within that state. The SIP is a plan which provides for implementation, maintenance and enforcement of the NAAQS, and includes emission limitations and control measures to attain and maintain the NAAQS. Within the state of New York, the authority to regulate sources of air emissions resides with the NYSDEC. The NYSDEC has developed regulations that incorporate Federal air quality regulations in addition to state pollution control rules promulgated to achieve emission standards and control measures outlined in the SIP.

Conformity to a SIP, as defined in the CAA, means conformity to the SIPs purpose of reducing the severity and number of violations of the NAAQS to achieve attainment of such standards. Each Federal agency department planning to undertake an action is required to determine if its action conforms to the applicable SIP. The U.S.EPA has promulgated two regulations to instruct federal agencies and departments on how and when conformity must be demonstrated, The General Conformity regulations (40 CFR Part 93 Subpart B) and the Transportation Conformity regulations (40 CFR 93 Subpart A). The General Conformity requirements apply to Federal actions except Federal highway and transit actions, which are subject to the Transportation Conformity regulations.

The Long Beach Project is a non-transportation project and is governed by the General Conformity regulations (40 CFR Parts 6, 51, and 93) described in *Determining Conformity General Federal Actions to State or Federal Implementation Plans* (40 CFR Part 93).

To focus general conformity requirements on those Federal actions with the potential to have significant air quality impacts, U.S. EPA established threshold de minimis emission rates in the final rule. A conformity demonstration is required for each pollutant when the total direct and indirect emissions from the Federal action exceed the corresponding de minimis level. With the exception of lead, the de minimis levels are based on the CAA's major stationary source definitions for criteria pollutants (and precursors of criteria pollutants) and vary by the severity of the nonattainment area. A conformity determination is required when the annual total of direct and indirect emissions from a Federal action, occurring in a nonattainment or maintenance area, equals or exceeds an annual de minimis level. Table 1 lists the de minimis levels by pollutant.

Table 1. De Minimis Levels for General Conformity.

Pollutant		General Conformity De Minimis Levels (tons per year)
Ozone*	Serious	50
	Severe	25
	Extreme	10
	Other nonattainment areas outside ozone transport region	100
	Marginal and moderate non-attainment areas inside ozone transport region	50/100
Carbon Monoxide	All	100
Sulfur Dioxide	All	100
Lead	All	25
Nitrogen Dioxide	All	100
Particulate Matter	Moderate	100
	Serious	70

* Applies to volatile organic compounds (VOCs) and nitrogen oxides (NOx), which react in the presence of sunlight to form ozone. Thus, these ozone precursors (VOC and NOx) are regulated to maintain the ozone NAAQS.

Since the proposed Long Beach Project is located in a severe ozone nonattainment area and a carbon monoxide maintenance area, the following de minimis criteria would apply:

- 25 tons per year of volatile organic compounds (VOCs) or,
- 25 tons per year of nitrogen oxides (NOx) or,
- 100 tons per year of carbon monoxide (CO).

A Federal action that does not exceed the threshold emission rates (de minimis levels) of criteria pollutants may still be subject to a general conformity determination if the total of direct and indirect emissions from the action exceeds ten percent of the total emissions inventory for a particular criteria pollutant in a nonattainment or maintenance area. If the emissions exceed this 10 percent threshold, the Federal action is considered to be a "regionally significant" activity, and thus, the general conformity rules would apply.

Regional inventories for the applicable nonattainment/maintenance areas for the project are summarized in Table 2, along with the "regionally significant" 10 percent threshold.

Table 2. Regional Emission Inventories and Regional Significance Threshold Levels.

Pollutant	New York Metro Area SIP Emissions (TPD)	10% Regional Significance Criteria (TPD)
VOC[1]	722.8	72.8
NOx[1]	619	61.9
CO[2]	2672	267.2

Note: TPD– tons per day
1) Inventories for 2007, 66 FR 42479 – 42487, August 13, 2001.
2) Inventory for 2007, New York State Department of Environmental Conservation, August 1999.

Federal actions in which the projected direct and indirect emissions exceed either the de minimis emission threshold or are considered to be regionally significant must demonstrate conformity with the SIP. Conformity is demonstrated by meeting any of the following:

- The action is specifically identified in the approved SIP;
- The emissions from the action along with all other emissions in the area would not exceed the emission budget specified in the SIP;

- For ozone (VOC or NOx), the total emissions are fully offset through a revision of the SIP or a similarly enforceable measure (such as use of emission reduction credits) that effects emission reductions equal to the emissions from the action; or
- For CO, air quality modeling demonstrates that the action will not cause or contribute to a violation of any existing NAAQS.

4.0 AIR QUALITY ANALYSIS METHODOLOGY

The following sections identify the emission sources associated with the Long Beach Project and outline the emission estimate methodology for all the direct and indirect sources associated with the project. Detailed emission estimation calculations are presented in Attachment 1.

4.1 Direct Emissions (During Project)

Direct emissions are the emissions of a criteria pollutant or its precursors that are caused or initiated by a Federal action and occur at the same time or place as the action. In this case, direct emissions are those associated with gaseous exhaust of construction equipment operated at the site and both highway and off-highway trucks specified by USACE as part of the construction activities. Information on the types of construction equipment operated and hours of operation were determined using the USACE Tri-Service Automated Cost Engineering System (TRACES) software for construction costing and scheduling. Estimates utilized for this analysis were based on the latest November 2004 estimates for the project (Attachment 2).

The emissions estimates were based on the total project. There are two construction options being considered for the project. Under Option 1, construction for the project would commence in the fourth quarter of 2006 and continue for four years, ending in the third quarter of 2010. Since specific information was not available on construction phasing and schedule, it was assumed that the elements of the storm damage protection project would be constructed in a piece-wise nature and the land-side equipment usage could be assumed to be equal on an average basis over the four year period. Marine equipment usage would commence with the second quarter 2007 and continue for 20 months, through the third quarter 2008.

Under Option 2, construction would occur over a five year period, with construction activities be conducted outside the "ozone season" (May 1 - September 30). Thus, all construction activities would be conducted in the fourth quarter of each year and continue through the first quarter of the following calendar year. Construction activities would commence in the fourth quarter of 2006 and continue intermittently in six-month increments through the first quarter of 2011. Since specific information was not available on construction phasing and schedule, it was assumed that the elements of the storm damage protection project would be constructed in a piece-wise nature and the land-side equipment usage could be assumed to be equal on an average basis over the duration of the project.

Emissions were estimated using USEPA methodologies and emission factors. Emissions from off-road construction equipment and off-highway trucks were obtained from the USEPA Nonroad Engine and Vehicle Emission Study, 1991. Emissions for internal combustion engines utilized in air compressor pumps were determined from emission factors from the USEPA Compilation of Air Pollution Emission Factors, AP-42. Load factors for construction equipment were taken from the USEPA Nonroad vehicle study and load factors for the compressors were determined from estimates provided by USACE (1999). Emissions were estimated using the following general equation:

Off-Road Emissions (lbs) = Power Rating (hp) x LF x EF (g/hp-hr) x hrs/ 453.59

Where,

LF = Average Load Factor
EF = Emission Factor (gram/horsepower-hour)
hrs = hours of operation
453.59 = conversion factor from grams to pounds (453.59 gram/pound)

Emissions from marine vessels were calculated using US EPA emission factors for both propulsion and auxiliary engines from the Final Regulatory Impact Analysis Document for marine vessels (US EPA 1999) using appropriate load factors.

Marine Vessel Emissions (lbs) =

Propulsion Power Rating (hp) x LF x EF (g/kw-hr) x hrs/ 1.341/ 453.59 +
Auxiliary Power Rating (hp)x LF x EF (g/kw-hr) x hrs/ 1.341 / 453.59

Where,

LF = Average Load Factor
EF = Emission Factor (gram/horsepower-hour)
hrs = Hours of operation
1.341 = Conversion factor from horsepower to kilowatts (1.341 hp/kw)
453.59 = Conversion factor from grams to pounds (453.59 gram/pound)

Direct emissions associated with USACE vehicles identified by the TRACES construction equipment list were not considered. On road vehicle emissions (i.e. trucks, cars) are regulated under the Transportation Conformity Rule and therefore are not included in this analysis.

Detailed calculations showing the annual emission factors are provided for all pollutants in Attachment 1.

4.2 Indirect Emissions (During Project)

Indirect emissions are those not directly generated by the action at the project site, but occur later in time and/or are further removed from the action itself. These may include emissions from vehicles used for the commuting of construction workers or the emissions from highway vehicles used for the delivery of material and equipment to and from the site. Emissions from these sources were not considered. On road vehicle emissions (i.e. trucks, cars) are regulated under the mobile source provisions of the CAA and are therefore, are not include in this analysis. There are no other potential sources of indirect emissions associated with this project.

4.3 Post-Construction Emissions

The conformity analysis should consider emissions that are reasonably definable and related to the project but occurring subsequent to the completion of the construction activities. The continued operation of the storm damage control project does not entail any significant post-project emissions. The anticipated post-construction emissions associated with routine maintenance operations and checks on the project, would be negligible. Any repair operations to the storm damage system would also be minimal and would be considered to be a separate project to be defined when necessary in the future.

5.0 CONCLUSIONS/DEMONSTRATION OF CONFORMITY

The conformity analysis for the Federal action considers the direct and indirect emissions of the general action. Conclusions of the air quality analysis for the reevaluation are determined by comparing annualized emissions to general conformity de minimis thresholds and to regional significance thresholds.

Table 3 and Figure 1 summarize the maximum annual project emissions, direct and indirect, for the five calendar years which encompass construction schedule Option 1 for the project. Table 4 and Figure 2 summarize the maximum annual project emissions, direct and indirect, for the six calendar years which encompass construction schedule Option 2 for the project.

Table 3. Construction Schedule Option 1 Maximum Annual Emissions.

	Annual Emissions, ton/year				
	2006	2007	2008	2009	2010
NOx	2.7	336.7	409.2	10.7	8.0
VOC	0.3	8.4	10.0	1.4	1.0
CO	1.5	67.6	81.4	5.8	4.4

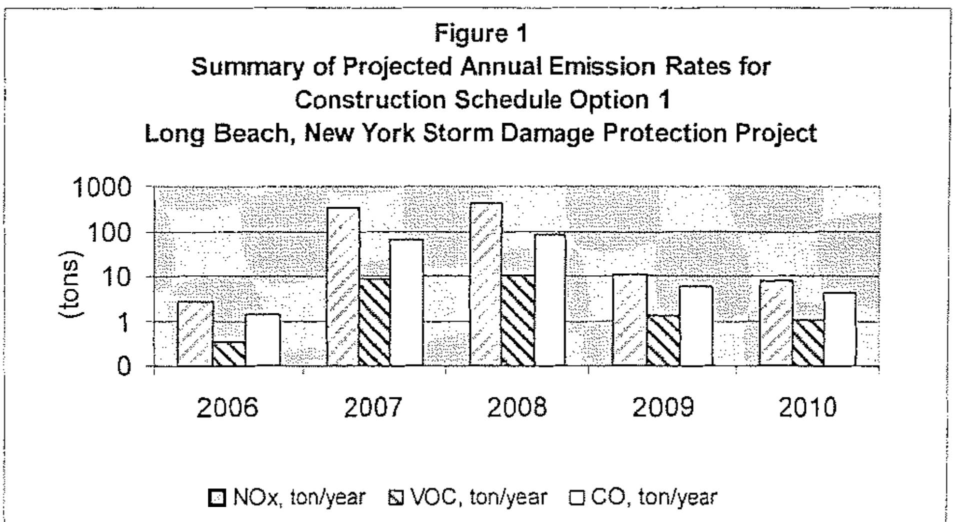
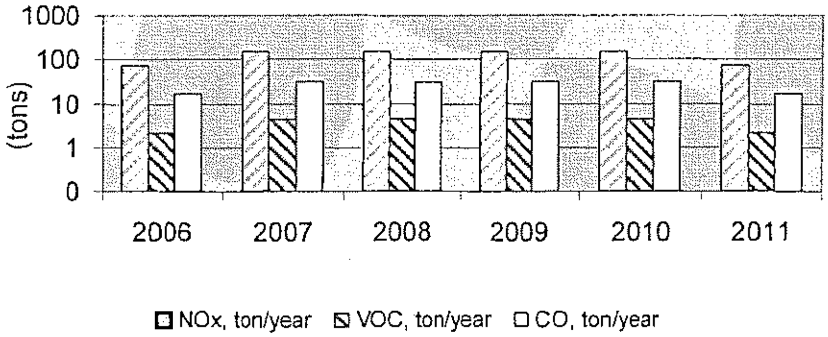


Table 4. Construction Schedule Option 2 Maximum Annual Emissions.

	Annual Emissions, ton/year					
	2006	2007	2008	2009	2010	2011
NOx	76.7	153.5	153.5	153.5	153.5	76.7
VOC	2.1	4.2	4.2	4.2	4.2	2.1
CO	16.1	32.1	32.1	32.1	32.1	16.1

Figure 2
Summary of Projected Annual Emission Rates for Construction Schedule Option 2
Long Beach, New York Storm Damage Protection Project



Annual emissions for Option 1 and Option 2 are well below the Federal de minimis thresholds of 25 tons per year for VOC and 100 ton per year for CO established by the general conformity rule. However, projected emissions exceed the 25 tons per year threshold for NOx from the both Option 1 and Option 2 construction.

Table 5 summarizes the maximum average daily emissions for construction schedule Option 1 compared to the 10 percent regional significance thresholds. Table 6 summarizes average daily emissions for construction schedule Option 2 compared to the 10 percent regional significance thresholds. Average daily emissions were determined by dividing the total emissions by the number of days in the period assuming a six-day work week. Emissions from the project are extremely small compared to the regional inventory, and the project is not considered to be regionally significant.

Table 5. Construction Schedule Option 1 Maximum Average Daily Emissions.

	Tons per Day	
	Average Daily Emissions	Regional Significance Threshold
NOx	2.62	61.9
VOC	0.06	72.8
CO	0.52	267.2

Table 6. Construction Schedule Option 2 Average Daily Emissions.

	Tons per Day	
	Average Daily Emissions	Regional Significance Threshold
NOx	0.98	61.9
VOC	0.03	72.8
CO	0.21	267.2

Projected emissions from either construction schedule Option 1 or Option 2 for the Long Beach Project are not regionally significant but both options exceed the Federal de minimis thresholds of 25 tons per year for NOx. Therefore, NOx emissions from these activities must either be reduced to less than 25 tons per year or a formal conformity determination as outlined in 40 CFR 93.154 is required.

Emissions from the project may be reduced, for example by:

1) Reducing the scope of work
2) Using emission control technologies (e.g. PuriNOx™ Technology),
3) Revising the methods for executing the project (e.g. using electric dredges); and/or
4) Using cleaner burning equipment (e.g. specifying equipment with engines meeting Tier II or Tier III emission levels).

Given the magnitude of the estimated emissions, it may not be feasible to reduce NOx emissions from the project to below 25 tons per year. If NOx emissions cannot be reduced to below 25 tons per year, a conformity demonstration would require that the USACE provide either (1) a demonstration that emissions from the project are included in the SIP or (2) offsets for the project emissions within the same nonattainment area or (3) some combination of the above such that there is no net increase in emissions of NOx resulting from the project. Offsets for the project emissions may not be required if the project is constructed entirely outside of the ozone season (May 1 - September 30) and with concurrence of the NYSDEC.

6.0 REFERENCES

Midwest Research Institute, *Improvement of Specific Emission Factors* (BACM Project No. 1), MRI Project No. 3855, 1996.

State of New York Department of Environmental Conservation, New York State Implementation Plan - Carbon Monoxide Redesignation Request and Maintenance Plan for the New York Metropolitan Area, August 1999.

66 FR 42479 – 42487, Approval and Promulgation of Implementation Plans; New York Reasonable Further Progress Plans and Transportation Conformity Budgets for 2002, 2005 and 2007, August 13, 2001 proposed approval and approved 67 FR 5170 -05194 February 4, 2002.

United States Army Corps of Engineers (USACE) *Construction Equipment Ownership and Operating Expense Schedule, Region I,* August 1995.

United States Army Corps of Engineers (USACE) *Construction Equipment Ownership and Operating Expense Schedule, Region I,* September 1997.

United States Army Corps of Engineers (USACE) *Construction Equipment Ownership and Operating Expense Schedule, Region I,* June 1999.

United States Army Corps of Engineers (USACE) *Construction Equipment Ownership and Operating Expense Schedule, Region I,* August 2001.

United States Environmental Protection Agency (USEPA) *Compilation of Air Pollution Emission Factors, AP-42, Fifth Edition, Volume 1: Stationary Point and Area Sources,* Section 3.3 Gasoline and Diesel Industrial Engines, October 1996.

United States Environmental Protection Agency (USEPA). *Green Book Nonattainment Areas for Criteria Pollutants,* http://www.epa.gov/oar/oaqps/greenbk/, last updated February 20, 2003.

United States Environmental Protection Agency (USEPA). *Nonroad Engine and Vehicle Emission Study – Report,* November 1991.

United States Environmental Protection Agency (USEPA) *Procedures Document for National Emissions Inventory, Criteria Air Pollutants,* 1985-1999, March 2001.

Attachment 1

Backup Emission Factors/Emission Calculations – Marine and Construction Equipment

TABLE 1-1
SUMMARY OF ESTIMATED CONSTRUCTION AIR EMISSIONS
LONG BEACH, NEW YORK STORM DAMAGE PROTECTION PROJECT
USACE NEW YORK DISTRICT

Category	ENGINE HORSEPOWER		Fuel	Total Hours	% LOAD
	Main	Carrier			
Air Compressor	350		DIESEL	543	75.0%
Crane, 50T	125		DIESEL	1943	43.0%
Crane, 85T	213		DIESEL	12896	43.0%
Crawler	125		DIESEL	1092	43.0%
Grader, GD 625A	155		DIESEL	54	57.5%
Excavater	79		DIESEL	1499	58.0%
Excavater	145	200	DIESEL	320	58.0%
Loader, 1.50 CY	90		DIESEL	54	46.5%
Loader, 5.50 CY	300		DIESEL	14949	46.5%
Back-hoe 0.80 CY	60		DIESEL	548	46.5%
Pile hammer	0		DIESEL	543	62.0%
Roller	80		DIESEL	29	57.5%
Roller	132		DIESEL	54	57.5%
Dozer	320		DIESEL	54	57.5%
Tractor	425		DIESEL	54	59.0%
Off-hwy truck	330		DIESEL	29	41.0%
Driller/auger	8		DIESEL	84	62.0%

Category	Emission Factor, gm/hp-hr				
	VOC	CO	NOx	PM	SOx
Air Compressor	1.13	3.03	14.06	1	
Crane, 50T	1.26	4.2	10.3	1.44	0.93
Crane, 85T	1.26	4.2	10.3	1.44	0.93
Crawler	1.26	4.2	10.3	1.44	0.93
Grader, GD 625A	1.54	3.8	9.6	1	0.87
Excavater	0.7	5.2	10.75	1.44	0.93
Excavater	0.7	5.2	10.75	1.44	0.93
Loader, 1.50 CY	1.4	6.8	10.1	1.05	0.85
Loader, 5.50 CY	1.4	6.8	10.1	1.05	0.85
Back-hoe 0.80 CY	1.4	6.8	10.1	1.05	0.85
Pile hammer	1.41	9.2	11.01	1.44	0.93
Roller	0.8	3.1	9.3	0.78	1
Roller	0.8	3.1	9.3	0.78	1
Dozer	1.26	4.2	10.3	1.11	0.85
Tractor	0.6	3.2	10.3	0.9	0.93
Off-hwy truck	0.84	2.8	9.6	0.8	0.89
Driller/auger	1.41	9.2	11.01	1.44	0.93

TABLE 1-1
SUMMARY OF ESTIMATED CONSTRUCTION AIR EMISSIONS
LONG BEACH, NEW YORK STORM DAMAGE PROTECTION PROJECT
USACE NEW YORK DISTRICT

Category	Emissions (lbs)				
	VOC	CO	NOx	PM	SOx
Air Compressor	355	952	4,418	314	
Crane, 50T	290	967	2,371	332	214
Crane, 85T	3,281	10,937	26,821	3,750	2,422
Crawler	163	543	1,333	186	120
Grader, GD 625A	16	40	102	11	9
Excavater	106	787	1,628	218	141
Excavater	99	734	1,518	203	131
Loader, 1.50 CY	7	34	50	5	4
Loader, 5.50 CY	6,436	31,263	46,435	4,827	3,908
Back-hoe 0.80 CY	47	229	340	35	29
Pile hammer	0	0	0	0	0
Roller	2	9	27	2	3
Roller	7	28	84	7	9
Dozer	28	92	226	24	19
Tractor	18	96	307	27	28
Off-hwy truck	7	24	83	7	8
Driller/auger	1	8	10	1	1
Totals, lbs	10,865	46,744	85,754	9,951	7,045
Totals, tons	5.43	23.37	42.88	4.98	3.52

TABLE 1-2
SUMMARY OF ESTIMATED MARINE AIR EMISSIONS
LONG BEACH, NEW YORK STORM DAMAGE PROTECTION PROJECT
USACE NEW YORK DISTRICT

Description	Propulsion Engine			Auxilliary Engine		
	Horsepower	Hours	% Load	Horsepower	Hours	% Load
Booster	5200	8000	50%	0	0	0%
Hydraulic Dredge	9000	8000	50%	3310	8000	40%
Work Tug	250	8000	70%	50	8000	40%
Crew/Survey Boat	100	8000	50%	40	8000	40%
Derrick(s)	200	8000	50%	40	8000	40%

Description	Emission Factors (Propulsion), g/kw-hr				Emission Factors (Auxilliary), g/kw-hr			
	VOC	CO	NOx	PM	VOC	CO	NOx	PM
Booster	0.27	2.5	13	0.3	0.28	1.7	10	0.4
Hydraulic Dredge	0.27	2.5	13	0.3	0.28	1.7	10	0.4
Work Tug	0.27	2.5	13	0.3	0.28	1.7	10	0.4
Crew/Survey Boat	0.27	2.5	13	0.3	0.28	1.7	10	0.4
Derrick(s)	0.27	2.5	13	0.3	0.28	1.7	10	0.4

Description	Emissions (tons)			
	VOC	CO	NOx	PM
Booster	4.61	42.70	222.03	5.12
Hydraulic Dredge	10.42	88.69	471.26	12.35
Work Tug	0.35	3.10	16.26	0.40
Crew/Survey Boat	0.12	1.00	5.32	0.14
Derrick(s)	0.21	1.82	9.59	0.24
Totals	15.70	137.30	724.46	18.25

TABLE 1-3
SUMMARY OF ESTIMATED AIR EMISSIONS
LONG BEACH, NEW YORK STORM DAMAGE PROTECTION PROJECT
U.S.A.C.E NEW YORK DISTRICT

Category	Emissions (tons)				
	VOC	CO	NOx	PM	SOx
Marine equipment					
Booster	4.61	42.70	222.03	5.12	
Hydraulic Dredge	10.42	88.69	471.26	12.35	
Work Tug	0.35	3.10	16.26	0.40	
Crew/Survey Boat	0.12	1.00	5.32	0.14	
Derrick(s)	0.21	1.82	9.59	0.24	
Marine total	15.7	137.3	724.5	18.2	
Land-side Construction					
Air Compressor	0.18	0.48	2.21	0.16	0.00
Crane, 50T	0.15	0.48	1.19	0.17	0.11
Crane, 85T	1.64	5.47	13.41	1.87	1.21
Crawler	0.08	0.27	0.67	0.09	0.06
Grader, GD 625A	0.01	0.02	0.05	0.01	0.00
Excavater	0.05	0.39	0.81	0.11	0.07
Excavater	0.05	0.37	0.76	0.10	0.07
Loader, 1.50 CY	0.00	0.02	0.03	0.00	0.00
Loader, 5.50 CY	3.22	15.63	23.22	2.41	1.95
Back-hoe 0.80 CY	0.02	0.11	0.17	0.02	0.01
Pile hammer	0.00	0.00	0.00	0.00	0.00
Roller	0.00	0.00	0.01	0.00	0.00
Roller	0.00	0.01	0.04	0.00	0.00
Dozer	0.01	0.05	0.11	0.01	0.01
Tractor	0.01	0.05	0.15	0.01	0.01
Off-hwy truck	0.00	0.01	0.04	0.00	0.00
Driller/auger	0.00	0.00	0.01	0.00	0.00
Land-side total	5.43	23.37	42.88	4.98	3.52
TOTAL	**21.1**	**160.7**	**767.3**	**23.2**	**3.5**

TABLE 1-4
SUMMARY OF ANNUALIZED EMISSIONS
LONG BEACH, NEW YORK STORM DAMAGE PROTECTION PROJECT
U.S.A.C.E NEW YORK DISTRICT
4-year Construction Plan[1]

	Estimated Emissions (tons)				
	VOC	CO	NOx	PM	SOx
4Q 2006	0.3	1.5	2.7	0.3	0.2
1Q 2007	0.3	1.5	2.7	0.3	0.2
2Q 2007	2.7	22.1	111.3	3.0	0.2
3Q 2007	2.7	22.1	111.3	3.0	0.2
4Q 2007	2.7	22.1	111.3	3.0	0.2
1Q 2008	2.7	22.1	111.3	3.0	0.2
2Q 2008	2.7	22.1	111.3	3.0	0.2
3Q 2008	2.7	22.1	111.3	3.0	0.2
4Q 2008	1.9	15.2	75.1	2.1	0.2
1Q 2009	0.3	1.5	2.7	0.3	0.2
2Q2009	0.3	1.5	2.7	0.3	0.2
3Q 2009	0.3	1.5	2.7	0.3	0.2
4Q 2009	0.3	1.5	2.7	0.3	0.2
1Q 2010	0.3	1.5	2.7	0.3	0.2
2Q 2010	0.3	1.5	2.7	0.3	0.2
3Q 2010	0.3	1.5	2.7	0.3	0.2
TOTAL	21.1	160.7	767.3	23.2	3.5
2006	0.3	1.5	2.7	0.3	0.2
2007	8.4	67.6	336.7	9.5	0.9
2008	10.0	81.4	409.2	11.3	0.9
2009	1.4	5.8	10.7	1.2	0.9
2010	1.0	4.4	8.0	0.9	0.7
TOTAL	21.1	160.7	767.3	23.2	3.5

[1]Landside construction conducted equally over 4-year period
Marine activities conducted over 20-month period beginning 2Q 2007 through 4Q 2008.

TABLE 1-5
SUMMARY OF ANNUALIZED EMISSIONS
LONG BEACH, NEW YORK STORM DAMAGE PROTECTION PROJECT
U.S.A.C.E NEW YORK DISTRICT
5-year Construction Plan[2]

	Estimated Emissions (tons)				
	VOC	CO	NOx	PM	SOx
4Q 2006	2.1	16.1	76.7	2.3	0.4
1Q 2007	2.1	16.1	76.7	2.3	0.4
4Q 2007	2.1	16.1	76.7	2.3	0.4
1Q 2008	2.1	16.1	76.7	2.3	0.4
4Q 2008	2.1	16.1	76.7	2.3	0.4
1Q 2009	2.1	16.1	76.7	2.3	0.4
4Q 2009	2.1	16.1	76.7	2.3	0.4
1Q 2010	2.1	16.1	76.7	2.3	0.4
4Q 2010	2.1	16.1	76.7	2.3	0.4
1Q 2011	2.1	16.1	76.7	2.3	0.4
TOTAL	21.1	160.7	767.3	23.2	3.5
2006	2.1	16.1	76.7	2.3	0.4
2007	4.2	32.1	153.5	4.6	0.7
2008	4.2	32.1	153.5	4.6	0.7
2009	4.2	32.1	153.5	4.6	0.7
2010	4.2	32.1	153.5	4.6	0.7
2011	2.1	16.1	76.7	2.3	0.4
TOTAL	21.1	160.7	767.3	23.2	3.5

[2]Under 5-year plan, all activities conducted equally in 6-month periods outside "ozone season" (1Q and 4Q).

Attachment 2

TRACES Printout of Estimated Construction Equipment

TOTAL DURATION: 19.90 months.

D \ 2 EQUIPMENT COSTS BID ITEM # 2

DREDGE SIZE 30" Cutter-Suction

	|--DREDGE--|	|----TUGS & TENDERS----	----|	|----------BARGES----------		----------|	|-BOOSTER-|	|--OTHER--|
1a. Plant Description......	HYDRAULIC	WORK TUG	CREW/SURV	DERRICK	FUEL/WATER	WORK	FLOATING	***Unused***
1c. Prime Eng HP...........	9,000	250	100	200	0	0	5,200	0
1d. (1) Dredge El Gen HP....	830	--	--	--	--	--	--	--
1d. Total 2nd Eng HP.......	3,310	50	40	40	10	0	200	0
1e. Plant Value...........	$4,955,000	$327,000	$48,000	$244,000	$122,000	$81,000	$2,154,000	$0
1f. Acquis Year...........	1978	1991	1991	1985	1985	1985	1980	0
1g. Pres Year.............	2004	----->---->	----->---->	----->---->	----->---->	----->---->	----->---->	----->---->
1h. Cost of Money Rate.....	4.000%	----->---->	----->---->	----->---->	----->---->	----->---->	----->---->	----->---->
1i. Disc Money Rate:	3.200%	----->---->	----->---->	----->---->	----->---->	----->---->	----->---->	----->---->
1j. Hrs Worked/Mo..........	402	----->---->	----->---->	----->---->	----->---->	----->---->	----->---->	----->---->
2a. LAF....................	1.150	----->---->	----->---->	----->---->	----->---->	----->---->	----->---->	----->---->
2b. Fuel Cost per Gal......	$1.10	----->---->	----->---->	----->---->	----->---->	----->---->	----->---->	----->---->
3a. Ec Index <for Acq Yr>..	2352	4438	4438	3749	3749	3749	2922	0
3b. Ec Index <for 2004>....	6161	----->---->	----->---->	----->---->	----->---->	----->---->	----->---->	----->---->
4a. Mos Available/Year.....	9	----->---->	----->---->	----->---->	----->---->	----->---->	----->---->	----->---->
5a. Useful Life (in Yrs)...	30	8	8	20	20	20	30	0
5b. Physical Life (in Hrs).	135,000	16,000	16,000	90,000	90,000	90,000	135,000	0
5c. SLV Factor............	0.10	0.10	0.10	0.10	0.05	0.05	0.10	0.00
5d. Pr Eng Fuel Factor.....	0.045	0.045	0.045	0.011	0.011	0.011	0.045	0
5e. 2nd Eng Fuel Factor....	0.039	0.039	0.039	0.011	0.011	0.011	0.039	0
5f. WLS Factor............	0.22	0.38	0.38	0.20	0.20	0.20	0.24	0.00
5g. RPR Factor............	1.30	0.80	0.80	0.70	0.60	0.60	1.20	0.00
6a. Depreciation:	3.00%	11.25%	11.25%	4.50%	4.75%	4.75%	3.00%	0.00%
6b. FCCM:	1.81%	1.94%	1.94%	1.83%	1.76%	1.76%	1.81%	0.00%
6c. Total Ownership/Year:	4.81%	13.19%	13.19%	6.33%	6.51%	6.51%	4.81%	0.00%
7a. Yearly Ownership:	$238,336	$43,131	$6,331	$15,445	$7,942	$5,273	$103,607	$0
7b. Monthly Ownership:	$26,482	$4,792	$703	$1,716	$882	$586	$11,512	$0
8a. (1) Hrly Pr Eng Fuel:	$445.50	$12.38	$4.95	$2.42	$0.00	$0.00	$257.40	$0.00
8a. (2) Hrly 2nd Eng Fuel:	$142.00	$2.15	$1.72	$0.48	$0.12	$0.00	$8.58	$0.00
8b. (1) Hrly Pr Eng WLS:	$98.01	$4.70	$1.88	$0.48	$0.00	$0.00	$61.78	$0.00
8b. (2) Hrly 2nd Eng WLS:	$31.24	$0.82	$0.65	$0.10	$0.02	$0.00	$2.06	$0.00
8c. (1) EAF:	2.619	1.388	1.388	1.643	1.643	1.643	2.108	0.000
8c. (2) Hrly Repair:	$143.71	$26.10	$3.83	$3.59	$1.54	$1.02	$46.42	$0.00
8d. Total Hrly Operating:	$860.46	$46.15	$13.03	$7.07	$1.68	$1.02	$376.24	$0.00
8e. Monthly Operating:	$345,905	$18,552	$5,238	$2,842	$675	$410	$151,248	$0
11. MONTHLY RATE:	$372,387	$23,344	$5,941	$4,558	$1,557	$996	$162,760	$0
12a. HRLY STANDBY ALLOW:	$36.28	$6.56	$0.96	$2.35	$1.21	$0.80	$15.77	$0.00
12b. Gener Fuel Allowance:	$35.61	--	--	--	--	--	--	--
12c. DREDGE HRLY STANDBY:	$71.89	--	--	--	--	--	--	--

** EQUIPMENT BACKUP **

SRC	ID.NO.	EQUIPMENT DESCRIPTION	DEPR	FCCM	FUEL	FOG	TR WR	TR REP	EQ REP	TOTAL RATE	** TOTAL ** HOURS
GEN	A15Z0180	AIR COMPRESSOR,1,200CFM, 100 PSI	9.68	2.59	11.74	4.05	0.15	0.03	11.27	39.50 HR	543
GEN	A20Z0490	AIR HOSE,3.0"X 100'L (76MMX 31M)	0.38	0.03					0.73	1.13 HR	543
EP	C85AM007	CR,ME,CWLR,LIFTING, 50T/ 65'BOOM	25.56	8.14	2.26	0.55			27.64	64.14 HR	1943
EP	C85AM010	CR,ME,CWLR,LIFTING, 85T/160'BOOM	33.40	12.63	3.85	1.02			40.94	91.84 HR	12896
GEN	C85Z2395	DRAGLINE/CLAMSHELL,CRWLR, 2.0CY	27.44	8.19	3.01	1.25			33.63	73.51 HR	1092
EP	G15KM003	GRADER,MOTOR, ARTIC. GD 625A-1	14.94	5.49	4.13	1.71	0.53	0.09	17.25	44.16 HR	54
MAP	H25BS005	HYD EXCAV BKT, 3.25CY, W/TIPS	1.34	0.20					1.63	3.17 HR	1499
MAP	H25CA020	HYD EXCAV, CRWLR, 24,640 LBS,	7.46	1.98	2.24	1.03			8.53	21.24 HR	1499
MAP	H30GA006	HYD EXCAV,TRK MTD,0.750CY,TB,6X4	23.92	4.78	5.31	2.32	0.64	0.11	18.39	55.47 HR	320
EP	L35JD003	LDR,FE, CRWLR, 1.50 CY	9.85	1.94	2.79	1.28			20.18	36.03 HR	54
MAP	L40CA007	LDR,FE, WH, 5.50 CY, ARTIC, 980G	22.41	6.52	8.51	3.13	4.88	0.84	22.39	68.68 HR	14949
GEN	L50Z4640	LOADER/BCK-HOE,WH, 0.80CY(0.6M3)	3.78	1.06	1.70	0.67	0.72	0.12	4.93	12.98 HR	548
GEN	P10Z4840	PILE LEADS, SWING, 26"W X 8"D	2.25	0.46					3.37	6.08 HR	1092
GEN	P20Z4880	PILE HAMMER,DBL, 18,100FT-LBS	9.84	2.00		1.90			20.25	33.99 HR	543
GEN	R30Z5645	ROLLER, STATIC, 9 TIRES, SP,14T	6.01	1.21	2.27	0.65	0.34	0.06	6.35	16.89 HR	29
EP	R45CA010	ROLLER,VIB, 84" X 51",DD,	15.08	2.96	5.22	2.04			24.89	50.20 HR	54
GEN	T15Z6570	DOZER, CRAWLER, 300-340HP	19.25	8.03	9.91	3.42			29.21	69.81 HR	54
EP	T25JD013	TRACTOR,WH,FARM, 351-450HP, 4X4	15.10	2.94	12.06	4.16	3.03	0.52	15.14	52.94 HR	54
EP	T40RS003	WATER TANK, 4,000 GAL	2.18	0.43					1.99	4.59 HR	54
GEN	T40Z6960	TRK FLATBED, 8'X 12'(2.4MX 3.7M)	0.35	0.07					0.32	0.73 HR	126
GEN	T40Z7000	TRK FLATBED, 8'X 20'(2.4MX 6.1M)	0.50	0.10					0.45	1.05 HR	84
GEN	T40Z7015	TRK FLATBED, 8'X 24'(2.4MX 7.3M)	0.58	0.11					0.53	1.22 HR	1381
GEN	T40Z7090	REAR DUMP BODY, 12CY (9.2M3)	0.73	0.14					0.78	1.65 HR	168
EP	T50FO001	TRK,HWY, 4,900GVW,4X2, 1/2T-PKUP	1.56	0.31	2.11	0.73	0.14	0.02	1.64	6.50 HR	320
GEN	T50Z7400	TRUCK, HWY 25,000 (11,340KG)GVW	3.49	0.80	4.54	1.46	0.70	0.12	3.42	14.53 HR	1927
GEN	T60Z7920	TRUCK, OFF-HWY, WATER, 6000GAL	18.43	5.58	9.37	3.66	3.45	0.59	20.04	61.12 HR	29
GEN	XMEZ9300	DRILL, AUGER, FENCE POST, TOWED	0.53	0.13	0.67	0.25		0.12	0.02	1.72 HR	84

Attachment 3

Estimate of Particulate Emissions

The proposed Long Beach Project is located in an area designated as attainment for particulate matter. Therefore, particulate emissions are not subject to the General Conformity requirements. However, construction equipment and fugitive particulate matter emissions for both PM10 and PM2.5 were determined for informational purposes.

Construction equipment particulate emissions included both PM10 and PM2.5 contribution from exhaust of heavy-duty construction equipment used on-site as well as USACE dedicated highway vehicles (Attachment 3). Particulate matter emission factors for heavy duty construction equipment exhaust were taken from the Nonroad Engine and Vehicle Emission Study (USEPA, 1991) and AP-42 (USEPA, 1996) and are detailed along with the gaseous pollutant calculations in Attachment 1. Since particulate matter from combustion processes are typically very fine, it was assumed that particulate matter emissions from the heavy-duty construction equipment exhaust were entirely PM2.5.

In addition to calculating emissions from construction equipment and vehicular exhaust, particulate emissions from fugitive dust from construction activities including grading and excavation were determined. Since fugitive dust emissions are generated on-site, they are directly related to the project and considered direct emissions. It was conservatively assumed that up to 2 acres will be disturbed at any given time due to construction activities during the entire project. Updated PM10 emission factors (Midwest Research Institute, 1996) were used for these operations. Emissions were determined by applying the emission factor of 0.11 ton/acre-month for each month of construction activity. PM2.5 emissions were calculated by multiplying the PM10 emissions by the particulate size adjustment factor of 0.2 for construction activities (USEPA, 2001).

A summary of the total particulate emissions for Construction Schedule Option 1 is provided in Table 3-1 and for Construction Schedule Option 2 is provided in Table 3-2. A summary of maximum annual emissions is provided in Figure 3-1 for Construction Schedule Option 1 and Figure 3-2 for Construction Schedule Option 2.

Table 3-1. Total Particulate Emissions for Construction Schedule Option 1 Long Beach, New York Storm Damage Reduction Project.

	Emissions, tons					
	2006	2007	2008	2009	2010	TOTAL
Construction						
PM10	0.31	9.46	11.28	1.24	0.93	23.22
PM2.5	0.31	9.46	11.28	1.24	0.93	23.22
Fugitive						
PM10	0.66	2.64	2.64	2.64	2.64	11.22
PM2.5	0.13	0.53	0.53	0.53	0.53	2.24
Total						
PM10	0.97	12.10	13.92	3.88	3.57	34.44
PM2.5	0.44	9.98	11.81	1.77	1.46	25.47

Figure 3-1
Summary of Maximum Annual Particulate Emissions for Construction Schedule Option 1
Long Beach, New York Storm Damage Reduction Project

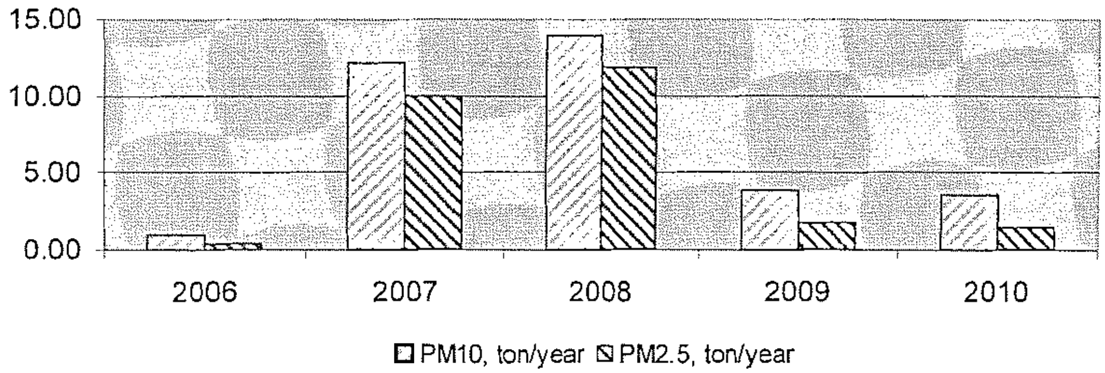
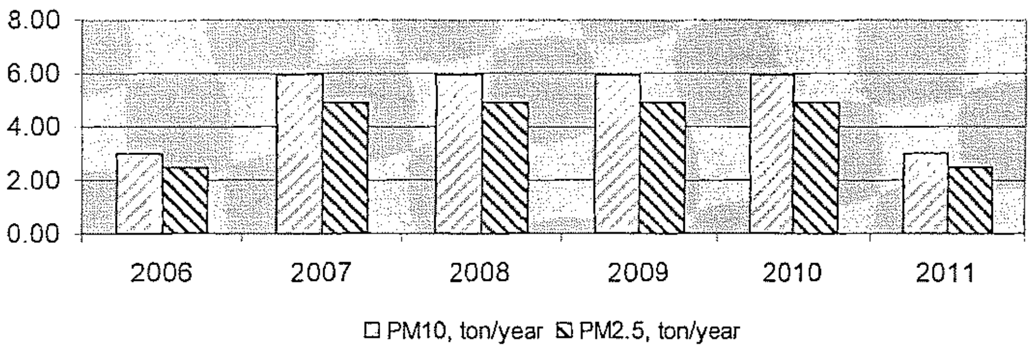


Table 3-2. Total Particulate Emissions for Construction Schedule Option 2 Long Beach, New York Storm Damage Reduction Project.

	Emissions, tons						
	2006	2007	2008	2009	2010	2011	TOTAL
Construction							
PM10	2.32	4.64	4.64	4.64	4.64	2.32	23.22
PM2.5	2.32	4.64	4.64	4.64	4.64	2.32	23.22
Fugitive							
PM10	0.66	1.32	1.32	1.32	1.32	0.66	6.60
PM2.5	0.13	0.26	0.26	0.26	0.26	0.13	1.32
Total							
PM10	2.98	5.96	5.96	5.96	5.96	2.98	29.82
PM2.5	2.45	4.91	4.91	4.91	4.91	2.45	24.54

Figure 3-2
Summary of Maximum Annual Particulate Emissions for Construction Schedule Option 2
Long Beach, New York Storm Damage Reduction Project



ESTIMATE OF FUGITIVE DUST EMISSIONS FOR CONSTRUCTION SCHEDULE OPTION 1 LONG BEACH, NEW YORK STORM DAMAGE REDUCTION PROJECT

	2006	2007	2008	2009	2010	Total
Acres	2	2	2	2	2	
Duration (months)	3	12	12	12	12	
PM10 (tons)	0.66	2.64	2.64	2.64	2.64	11.22
PM2.5 (tons)	0.13	0.53	0.53	0.53	0.53	2.24

PM_{10} Emission Factor[1] = 0.11 ton/acre-month

Assumes that a total 2 acres with grading/construction activities at any time.

[1]Midwest Research Institute, "Improvement of Specific Emission Factors (BACM Project No. 1), MRI Project No. 3855, 1996.

ESTIMATE OF FUGITIVE DUST EMISSIONS FOR
CONSTRUCTION SCHEDULE OPTION 2
LONG BEACH, NEW YORK STORM DAMAGE REDUCTION PROJECT

	2006	2007	2008	2009	2010	2011	Total
Acres	2	2	2	2	2	2	
Duration (months)	3	6	6	6	6	3	
PM10 (tons)	0.66	1.32	1.32	1.32	1.32	0.66	6.60
PM2.5 (tons)	0.13	0.26	0.26	0.26	0.26	0.13	1.32

PM_{10} Emission Factor[1] = 0.11 ton/acre-month

Assumes that a total 2 acres with grading/construction activities at any time.

[1]Midwest Research Institute, "Improvement of Specific Emission Factors (BACM Project No. 1), MRI Project No. 3855, 1996.

Appendix F
New York State Office of Parks, Recreation and Historic Preservation (NYSOPRHP) Correspondence

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

22 December 2004

Environmental Analysis Branch

Ruth Pierpont, Director
New York State Office of Parks, Recreation & Historic Preservation
Historic Preservation Field Service Bureau
Peebles Island, P.O. Box 189
Waterford, New York 12188-0189

RE: CORPS
Long Beach Island Erosion Control
Long Beach, Nassau County
92PR2416

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, *Phase II Underwater Inspection Of Seven Targets In The Eastern Portion Of The Long Beach Project, Nassau County, New York.* This report is a continuation of the ongoing Long Beach Island Erosion Control Study that the Corps is currently undertaking (see project reference number above).

The report investigated and identified seven targets in the revised project area. The current proposed project is the rehabilitation and construction of four groins and the extension of the Jones Inlet jetty. Work undertaken for the report included: sonar and physical investigation by divers of the targets uncovered and a determination for the potential of National Register eligibility.

Based on the information in the enclosed draft report, the Corps concurs with the recommendations presented. Out of the seven investigated targets, five do not appear to have the potential for National Register eligibility, one was deemed to be deeply buried and therefore unaffected by the project and one, Target 50, appears to be eligible for the National Register. As Target 50 lies in the direct path of the Jones Inlet jetty extension, if the proposed project becomes the recommended and accepted project, Target 50 will require further investigation, a Phase III Archaeological Mitigation. If your office concerns with the findings in the draft report, coordination will occur with regard to the Phase III Archaeological Mitigation.

In keeping with Section 106 compliance, the Corps requests a review of the enclosed interim report and your comments by 28 January 2005. If you have any questions, please contact the Project Archaeologist, Chris Ricciardi, at (212) 264-0204.

Sincerely,

Leonard Houston
Chief, Environmental Analysis Branch

Enclosure

OFFICE OF PARKS, RECREATION AND 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 20, 2005

Christopher Ricciardi
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,

Re: CORPS
Long Beach Island Erosion Control
Long Beach, Nassau County, NY
05PR00126 (formerly 92PR2416)

Thank your for requesting the comments of the New York State Historic Preservation Office (SHPO) with regard to the potential for thIs project to affect significant historical/cultural resources. SHPO has reviewed your agencies correspondence of December 22, 2004 and the report "*Phase II Underwater Inspection of Seven Targets in the Eastern Portion of the Long Beach Project, Nassau County, New York - Draft Report*" prepared by Panamerican Consultants in December 2004. SHPO con curs with the findings and recommendations of that report. We have assigned Unique Site Number A05901.000450 to the Marble Wreck Site, which has been determined eligible for the National Register of Historic Places. We request that you have a completed archaeological site inventory form prepared and submitted for this site.

Our review in included a review of the Mitigation Plan included as Appendix C of the report. We concur with the Data Recovery Plan presented, however we would like to request that a protocol for the treatment of humans remains be added as well as a protocol for disseminating the results of the investigations to the public. Public dissemination may take the form of publications, presentations, displays, web sites or other measures appropriate for a particular site. Please provide some discussion/options for this site. The revised plan should be included as part of an Memorandum of Agreement (MOA) that will be developed to mitigate the adverse effects of your project. Please contact me to discuss preparation of the MOA.

Please contact me at extension 3291, or by e-mail at douglas.mackey@oprhp.state.ny.us, if you have any questions regarding these comments.

Sincerely

Douglas P. Mackey

Douglas P. Mackey
Historic Preservation Program Analyst
Archaeology

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

3 March 2005

Environmental Analysis Branch

Ruth Pierpont, Director
New York State Office of Parks, Recreation & Historic Preservation
Historic Preservation Field Service Bureau
Peebles Island, P.O. Box 189
Waterford, New York 12188-0189

RE: CORPS
Long Beach Island Erosion Control
Long Beach, Nassau County
05PR00126 (formerly 92PR2416)

Dear Ms. Pierpont:

The U.S. Army Corps of Engineers, New York District (Corps), is pleased to furnish you with a copy of the final report, *Phase II Underwater Inspection Of Seven Targets In The Eastern Portion Of The Long Beach Project, Nassau County, New York.* This report details the Phase II Underwater Inspection of targets covered in the Limited Reevaluation Report (LRR) that the Corps is currently undertaking. This report serves as an update to the original Environmental Impact Statement that was completed in 1998. At this time, the Corps is unclear as to whether or not the project will move beyond the LRR and into construction. If the Long Beach Project is to progress beyond the LRR, the Corps will initiate formal consultation for the creation of the Memorandum of Agreement, as recommended, with regard to the Phase III Mitigation work.

The current proposed project is the rehabilitation and construction of four groins and the extension of the Jones Inlet jetty. Work undertaken for the report included: sonar and physical investigation by divers of the targets uncovered and a determination for the potential of National Register eligibility. The report investigated and identified seven targets in the revised project area, with one Target (number 50) being identified as potentially eligible for inclusion on the National Register for Historic Places/Shipwrecks and recommended Phase III Archaeological Mitigation for it.

The Corps is pleased that your office concurred with the recommendation in the report as well as offered insightful comments to the future of the project. Once again, we will work with your office if the project should proceed forward.

Thank you, Douglas Mackey and Mark Peckham for your participation in the Section 106 process for this particular aspect of the Long Beach Project. If you have any questions, please contact the Project Archaeologist, Dr. Christopher Ricciardi, at (917) 790-8630.

Sincerely,

Leonard Houston
Chief, Environmental Analysis Branch

Enclosure

APPENDIX G
NATIONAL MARINE FISHERIES SERVICE (NMFS) CORRESPONDENCE

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

September 12, 2005

Ms. Diane Rusanowsky
National Marine Fisheries Service
Milford Lab
212 Rogers Ave.
Milford, CT 06460

Subject: **Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York Storm Damage Reduction Project**

Dear Ms. Rusanowsky:

Enclosed is the Essential Fish Habitat report for the above project prepared in accordance with the Magnuson-Stevens Act, as amended by the Sustainable Fisheries Act of 1996 (PL 104-267). Please review the attached report and provide any comments regarding potential project impacts on Essential Fish Habitat.

I look forward to working with you and your staff on this effort. If you should have any questions, please contact Mr. Robert J. Smith of my staff at 917 790-8729.

Sincerely,

Leonard Houston
Chief, Environmental Analysis Branch

Attachments

LONG BEACH ISLAND

DRAFT

EFH

Introduction

In compliance with Section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act (1996 amendments), the New York District, U.S Army Corps of Engineers, is providing this assessment of the potential effects of beach renourishment, the rehabilitation of 16 groins and the construction of six new groins as part of the Storm Damage Reduction Project, Long Beach Island (LBI), NY on Essential Fish Habitat (EFH). The renourishment requires the dredging of an intermediate borrow area offshore of the proposed construction location. The National Marine Fisheries Service has identified EFH within two 10-minute x 10-minute squares (Table 3). The study area contains EFH for various life stages for 27 species of managed fish.

The councils, with assistance from NMFS, are required to delineate "essential fish habitat" for all managed species. EFH is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The regulations further clarify EFH by defining "waters" to include aquatic areas and their associated physical, chemical, and biological properties 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; and, areas used for spawning, breeding, feeding, and growth to maturity" to cover a species' full life cycle. Prey species are defined as being a forage source for one or more designated fish species, and the presence of adequate prey is one of the biological properties that can make a habitat essential. Federal agencies that fund, permit, or carry out activities that may adversely impact EFH are required to consult with NMFS regarding the potential effects of their actions on EFH. According to NMFS, the contents of an EFH assessment should include:

1) A description of the proposed action;
2) Analysis of the effects (including cumulative) of the proposed action on EFH, the managed fish species, and major prey species;
3) The federal agency's views regarding the effects of the action on EFH; and,
4) Proposed mitigation, if applicable.

This EFH assessment includes:
- a description of the proposed action;
- a description of the existing environment;
- a listing of EFH-designated species and life history stages for the three zones covered in this assessment;
- a summary of the diets and feeding habits of EFH species that are known or suspected to occupy proposed nearshore borrow areas in Long Beach;
- an analysis of the potential direct and indirect impacts of sand mining on EFH in the Borrow area;
- recommendations for minimizing potential impacts;
- a plan for monitoring changes benthic prey populations;

This EFH assessment includes all pelagic and benthic fish habitat in off of Long Beach Island 1,000 feet seaward of mean low water (MLW) and coastal and open Atlantic Ocean. This EFH assessment considers the effects that sand mining and placement could have on EFH within the Long Beach Island borrow area and project.

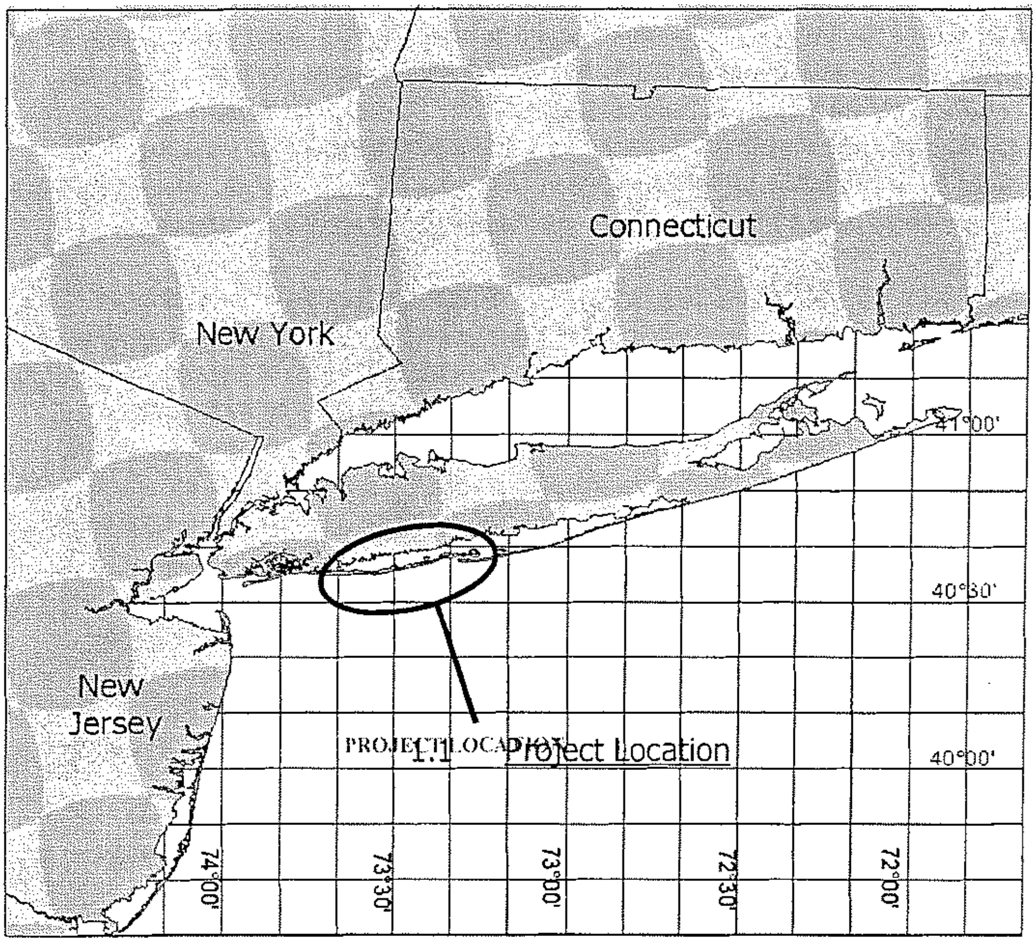


FIGURE 1

Project History and Authorization

The U.S. Army Corps of Engineers (USACE), New York District (District), is proposing to implement a cost-effective solution designed to restore the shoreline and provide shoreline protection for Long Beach Island, a barrier island located between Jones Inlet and East Rockaway Inlet, in Nassau County, New York (Figure 1). The Atlantic Coast of New York, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York Storm Damage Reduction Project (Project), covers approximately 6.7 miles (of which 6.4 miles represents protection provided by the selected plan) of oceanfront along Long Beach Island, including the Town of Hempstead (Point Lookout and Lido Beach), Nassau County (Nickerson Beach), and the City of Long Beach.

In 1965, the USACE evaluated various storm protection options for the area and presented findings in the Beach Erosion Control and Interim Hurricane Study for the Atlantic Coast of

Long Island, New York: Jones Inlet to East Rockaway Inlet (USACE 1965). Local interests did not support the plan and the project was terminated in 1971. Since that time, beach erosion and storm damage have continued in the area. At the request of the local interests following Hurricane Gloria in 1985, the USACE conducted a Reconnaissance Study (completed in 1989), and subsequently a Feasibility Study (completed in February of 1995), to evaluate an array of structural and non-structural measures to provide flood and storm protection for the Long Beach Island area (USACE 1989, 1995, 1998, 1999).

As a result of the Feasibility Study, several alternatives were evaluated and a final plan was selected. The plan, as presented in the Final Feasibility Study and Final Environmental Impact Statement (FEIS) for the Project, included widening of the existing beach with the hydraulic placement of beach fill material, rehabilitation of 16 groins at Long Beach, construction of six new groins west of Point Lookout at Lido Beach, and construction/rehabilitation of numerous dune walkovers and dune access points (USACE 1995, 1998). The December 1998 Record of Decision (ROD) (filed in the Federal Register, January 1999) granted approval of the plan as presented in the 1998 FEIS and was signed on December 23, 1998.

Subsequent to the 1998 release of the FEIS for the Project, the proposed alternative was re-evaluated. The re-evaluation was conducted to address changes to the shoreline since the 1998 evaluation and changes in the Project scope (i.e., a reduction in the size of the Project area), and to address environmental concerns expressed by agencies and/or interest groups (USACE 1998, 2002). Furthermore, this re-evaluation allowed incorporation of advancements in engineering evaluation methods. As a result of project re-evaluation, several modifications were made to the plan that was selected in 1998 and are presented in the 2005 Limited Reevaluation Report (LRR) and subsequent plan modifications for the Project (USACE 2005a). The proposed Project modification is intended to provide a long-term, cost-effective solution for reducing erosion and maintaining the protective dune and beach berm in this area.

When compared to the original Project that was presented in the 1998 FEIS and approved through a Record of Decision in 1999, the proposed Project modification includes several new structural features and activities that are in addition to those proposed in the original Project (Table 1). These include placement of a sand barrier beneath the existing boardwalk in the City of Long Beach, extension and rehabilitation of the eastern terminal groin, dune cross-over structures, boardwalk surface replacement, construction of a lifeguard headquarters in Point Lookout, construction of timber walls around: five existing comfort stations, two comfort/lifeguard stations and one lifeguard headquarters in Long Beach the extension of existing dune cross-over structures in the Town of Hempstead. However, the overall Project area has been reduced in the proposed Project modification and several structural features and activities (vehicle access ramps, new groins, dune walkovers, impacts within a 136-acre shorebird nesting/foraging area) have been eliminated. As a result, the proposed modification has significantly reduced the area of fill placement and the amount of fill material required for the Project. Specifically, 170 fewer acres will be filled (i.e., approximately 104 acres in the upper beach zone, 35 fewer acres in the intertidal zone, and 31 fewer acres in the sub-tidal zone), the amount of fill material required for the Project has been reduced by 2,042,000 cubic yards (cy), and the amount of fill material needed for 5-yr renourishment activities has been decreased by 385,000 cy per yr. The Long Beach Limited Re-evaluation Report (LRR) and subsequent plan modifications provide specific details regarding proposed Project modification components (USACE 2005a).

The District has concluded that, similar to the original Project, the Project modification will still result in some short-term negative impacts to water quality, terrestrial and aquatic habitats and the species that utilize the habitats. There also is a possibility that cultural resources could be affected, however, studies to determine potential impacts are ongoing at this time. In addition, it has been determined that the proposed Project would exceed the Federal de minimis thresholds of 25 tons per year for NO_x air emissions.

Impacts to other environmental resources in the proposed Project Area are expected to be minor and less than those that would have resulted from the original Project. Specifically, the modification will include the placement of unvegetated hard structures (buildings, groins, and beach access walkovers, ramps) in dune/upper beach, intertidal, and subtidal areas. These structures will permanently cover the substrate beneath the footprint and non-mobile benthic species and will limit the use of the area directly within the structure footprint for foraging by shorebirds and wading birds and some fish species. However, these impacts are not significant because of the followng: affected species will utilize other suitable habitat for foraging activities; the existing upper beach and dune areas in these locations are currently of relatively low value to most wildlife species and do not support any Federal or state-listed species; the direct loss of benthic species and vegetation will be minimal and would not affect populations; and groins are likely to reduce the overall rate of beach loss and erosion in the Project Area and will increase the forage base for many fish species by increasing invertebrate biomass. The changes in the conditions of the resources are not significant, and the proposed impacts on these resources as a result of the authorized project are not significantly different than those described in the FEIS which was approved for the original Project in 1999 (USACE 1998).

The use of BMP construction procedures and mitigation measures, pre-construction surveys for species of special concern in the Project Area, post-construction surveys to monitor affects of groins on coastal processes and species, and avoidance of key breeding/nesting and spawning periods, will reduce potential for negative impacts. Furthermore, implementation of the proposed Project will have significant overall beneficial impacts to the environment and surrounding communities, including benefits to aquatic habitats and species, an increase in the availability of suitable habitat for Federal and state-listed species and a diversity of shorebird communities, improved shoreline stabilization and flood protection, and recreational opportunity.

Based on a thorough evaluation of potential impacts performed for the 1998 FEIS and this EA, it has been determined that with the exception of anticipated high NO_x emission levels, there will be no significant adverse impacts due to implementation of the proposed Project modification. Comments from agencies and interested parties have been addressed and all practicable means to avoid or minimize adverse environmental effects have been incorporated into the recommended plan.

Purpose of Proposed Project

The purpose of the Project modifications are:
1) To reduce the threat of future damage to the shoreline due to wave attack, recession, and inundation from storms;
2) Mitigate or prevent the effect of long-term erosion;
3) Provide an economically justified plan;
4) Preserve, restore, and maintain existing ecological resources and habitats for native fish and wildlife, where possible; and,
5) Preserve or mitigate for the loss of historical, archaeological, and cultural resources in the Project area, if present.

Modifications to the Proposed Action

The recommended plan for this Project includes the preferred plan (identified in the 1995 Feasibility Report and subsequent 1998 FEIS filing) with post-Feasibility modifications as detailed in the LRR [USACE 2005a]. The recommended plan provides the most comprehensive, effective, and cost-effective solution to provide storm protection in the Project area.

The proposed action is a modification to the Atlantic Coast of New York, Jones Inlet to East Rockaway Inlet, Island of Long Beach, New York Storm Damage Reduction Project that received a favorable Record of Decision (ROD) in 1999. When compared to the original Project, the Project modification entails an overall reduction in the Project area, which results in a reduction of 7,000 linear feet (lf) of project area (12,000 lf of fill area), a reduction of 2,042,000 cy of fill material needed for initial beach fill and 385,000 cy per yr for 5-year renourishment activities, a reduction of 17 acres (ac) of dune plantings and a reduction of 43,000 lf of sand fence. Specifically, there will be a reduction of 104 ac of filling in the upper beach zone, 35 fewer acres of filling in the intertidal zone, and 31 fewer acres of filling in the sub-tidal zone.

Structural components of the Project modification include the construction of 12 timber dune walkovers, 12 gravel surface dune walkovers, eight extensions of existing dune walkovers, 8 gravel surface vehicle access ways, two swing gate vehicle access structures, one timber raised vehicle access way, construction of 1 lifeguard headquarters, construction of retaining walls around: five existing comfort stations, two comfort/lifeguard stations and one lifeguard headquarters, construction of four new groins (three of the seven groins proposed for the Project have been deferred indefinitely, and are not part of the current proposed Project modification), the rehabilitation of 17 groins, the rehabilitation and extension of the eastern terminal groin, and a modification to the sand placement location in the City of Long Beach such that a sand barrier (instead of a dune) is placed beneath the existing boardwalk instead of in front of the boardwalk. Supplemental NEPA documentation would be prepared to address construction of the three deferred groins as appropriate.

In addition to the decrease in the size of the Project Area and the amount of sand material required for the Project, when compared to the original Project, the Project modification would result in five fewer dune walkovers, one fewer vehicle access ramp, two fewer new groins, and the construction activities originally proposed within a 136-acre shorebird nesting/foraging area would be excluded from the Project. The proposed Project modification would, however, result in an increase, eight walkover extensions, 11,000 lf of boardwalk repair, construction of one lifeguard headquarters, the construction of timber retaining walls around: five existing comfort stations, two comfort/lifeguard stations and one lifeguard headquarters, the rehabilitation of two groins, and the extension of the terminal groin. A comparison of components of the original selected plan and the proposed Project modification are shown in Table 1.

Table 1. Summary Comparison of the Original Proposed Project and the Currently Proposed Project Modifications.

Component	Original Project	Project Modification	Change
Beach fill material (for creation of beach berm, sand barrier and a dune)	41,000 lf, some within shorebird nesting area	29,000 lf, none within shorebird nesting area	-12,000 lf
Borrow area sand removal (i.e., total sandfill quantity, excluding 5-year renourishments)	8,642,000 cy	6,600,000 cy	-2,042,000 cy
Dune plantings	29 ac	12 ac	-17 ac
Sand fence	90,000 lf	47,000 lf	-48,500 lf
Boardwalk extensions	0	0	+15
Dune walkovers (timber and/or gravel surface)	29	24	-5
Walkover extensions	0	8	+8
Vehicle access ramps (timber and/or gravel surface)	12	11	-1
Repair of existing boardwalk surface	0	11,000 lf	+11,000 lf
Reconstruction of lifeguard headquarters	0	1	+1
Construction of timber retaining wall around: existing comfort stations, comfort/lifeguard stations, and lifeguard headquarters	8	8	0
5-yr renourishment	2,111,000 cy/yr	1,746,000 cy/yr	-385,000 cy/yr
Rehab and 100 ft Extension of groin 58	1 (rehab)	2 (rehab and extension)	+ 1
New groins	6	4 (7 proposed, but 3 have been deferred)	- 2
Rehabilitation of existing groins	15	17	+ 2
Impacts to shorebird nesting/foraging area	136 ac	0 ac	No impacts

Beachfill

This component of the Project includes the following: 1) a dune with a top elevation of +15 ft above NGVD, a top width of 25 ft, and landward and seaward slopes of 1V:5H that will extend along the entire project area except where the City of Long Beach boardwalk is located; 2) a sand barrier with a top elevation of +15 ft above NGVD, a top width of 25 ft, a landward slope of 1V:3H and a seward slope of 1V:5H, that will be located directly beneath the existing boardwalk in the City of Long Beach; and, 3) a beach berm that will extend 110 ft from the seaward toe of the recommended dune or sand barrier at an elevation of +10 ft NGVD, then will gradually slope to match the existing bathymetry (slope will be between 1V:20H in Point Lookout and 1V:35H in Long beach and Lido Beach).

Approximately 41,000 lf of beach fill and a total of 8,642,000 cy of fill material were proposed in the original selected plan (USACE 1998). However, the Project area has been re-defined and now excludes portions of Long Beach that were originally part of the Project area. The resulting beach fill plan includes approximately 29,000 lf of beach fill that extends from Point Lookout west to the western boundary of the City of Long Island Beach. This modification results in a reduction of 12,000 lf of project area and 2,042,000 cy of fill material.

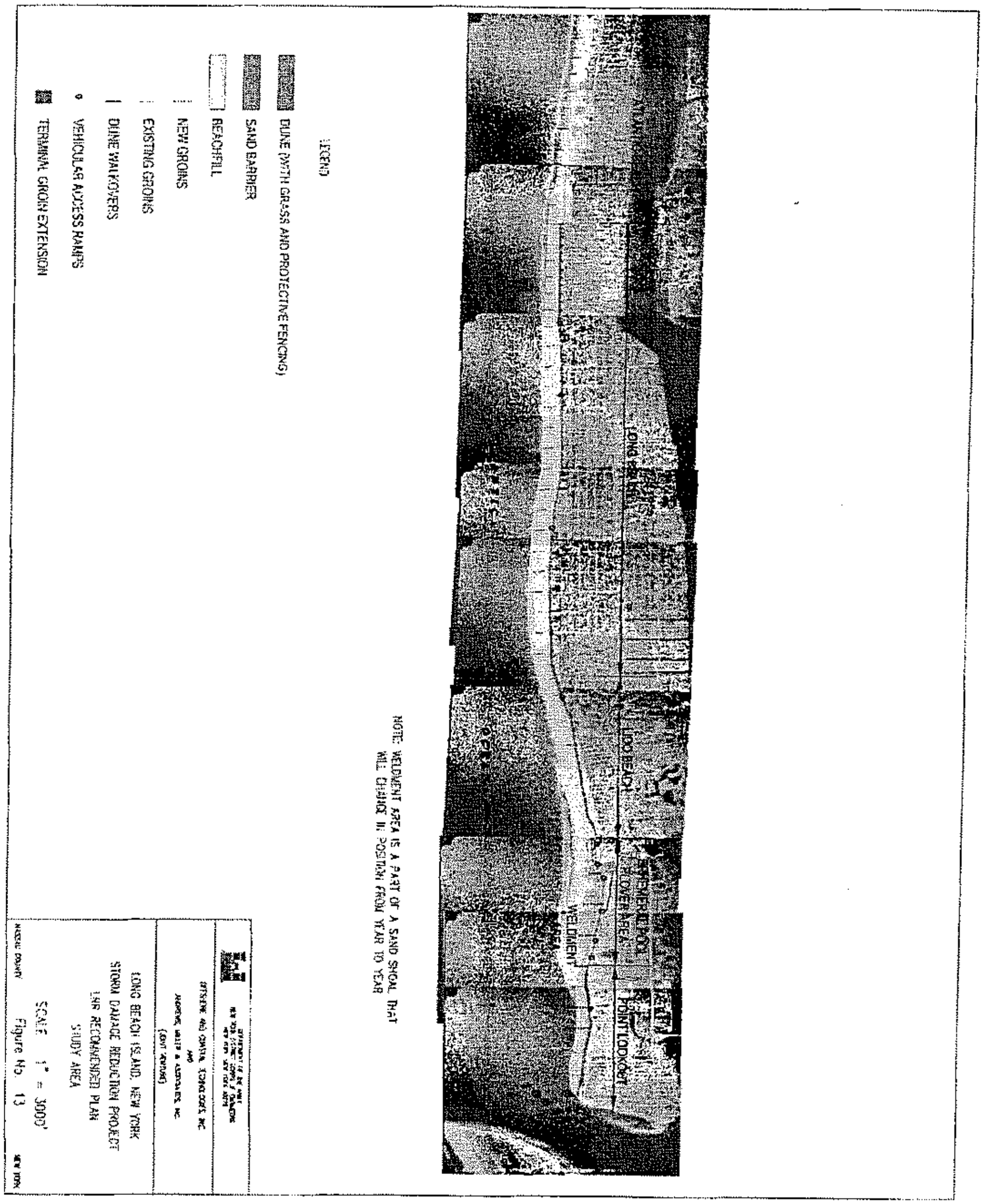
The dune construction portion of beach fill actions includes implementation of dune stabilization methods. Specifically, 12 acres of beachgrass will be planted and 47,000 feet of sand fence will be installed (USACE 2005a).

Rehabilitation of Existing Groins

Sixteen groins were proposed for rehabilitation in the plan selected in 1998. However, the existing groins within the Project were re-evaluated in the LRR (USACE 2005a). The groins were evaluated for structural condition, sand trapping effectiveness, and planform holding effectiveness. As a result of this survey, a total of 17 groins were recommended for rehabilitation, including 15 groins in Long Beach and two groins in Point Lookout (Figure 2).

Rehabilitation will consist of repositioning existing armor stone and adding additional stone where required. The restored groins will have an average length of 144 ft and an average width of 53 ft. Existing groins are on average 144 ft long and 33 ft wide. A primary armor weight of 5 tons was selected for the new armor in order to match the existing armor (USACE 2005a).

Figure 2. Location of Elements Within the Long Beach Island Project Area



Construction of New Groins

The selected 1995 plan proposed eventual construction of seven new groins (all 765 ft long and 70 ft wide) at Point Lookout (USACE 1998). Currently only the first four groins are targeted for immediate construction, whereas the remaining three groins are proposed for deferred construction as needed based on the stability of the existing weldment area (USACE 2005a). However, based on subsequent re-evaluation of the area, some modifications to the original design of the four new groins have been proposed. The Project requires the immediate construction of a new groin field at Point Lookout that will contain four groins that begin 800 feet west of existing Groin 55 in Point Lookout. The four groins would be constructed with tapered lengths and spaced at an interval of 800 feet (USACE 2005a). Groin lengths vary and range from 380 ft to 800 ft. Groin widths will be 115 ft.

A determination to construct the three westernmost groins will be triggered at a later date within the 50-year Project life and be based on monitoring data (USACE 2005a). The criterion for construction includes a change from an accreting beach to an eroding beach in the area where the structures are to be located. The criteria will be evaluated based upon field measurements and analysis (USACE 2005a).

Point Lookout Terminal Groin Rehabilitation and Extension

During re-evaluation of the proposed Project, the USACE determined that Groin #58 (i.e., West Groin), the terminal groin in Point Lookout, required an extension along with the rehabilitation recommended by the Feasibility Study (USACE 2005). Accordingly, the District plans to rehabilitate the existing portion of the groin, extend the length an additional 100 feet (currently 200 ft), and extend the width to between 107 and 170 ft (currently widths range from 50 to 107 ft), in accordance with design specifications presented in the "1999 USACE Terminal Groin Rehabilitation and Extension at Jones Inlet, Long Beach Island, New York Report". Extending the terminal groin may decrease the amount of sediment lost toward the inlet after the beach fill component of the project is carried out (USACE 2005a). It will also possibly retain additional longshore sediment transport without causing large changes in inlet dynamics (USACE 2005a). The median armor weight for the rehabilitated and new portions of Groin #58 is approximately 10 to 10.75 tons (USACE 2005a).

Dune Walkovers and Vehicle Access structures, and Boardwalk Surface Replacement

Several dune walkovers and vehicle access points and are proposed for the City of Long Beach and the Town of Hempstead (USACE 2005a). Construction of these structures will allow the public to gain safe access to the beach without harming the existing and enhanced dune system.

A total of 12 timber dune walkovers (including 8 wheelchair accessible and 4 zig-zag), 12 gravel surface pedestrian walkovers, 8 extensions to existing walkovers, 11,000 lf of boardwalk repair, 8 gravel surface vehicle access ways two swing gate vehicle access structures, and one raised timber vehicle access way, are currently proposed (Figure 2). Originally, 29 dune walkovers (both timber and gravel) and 12 vehicle access ramps were included in the selected plan (USACE 1998). Extensions to existing walkovers and boardwalk surface replacement were not components of the 1995 Feasibility plan.

Comfort Stations and Lifeguard Headquarters

The currently proposed plan includes the construction of timber retaining walls around: five existing comfort stations, two comfort/lifeguard stations, and one lifeguard headquarters (including existing concession stands), and the construction of 1 lifeguard headquarters.

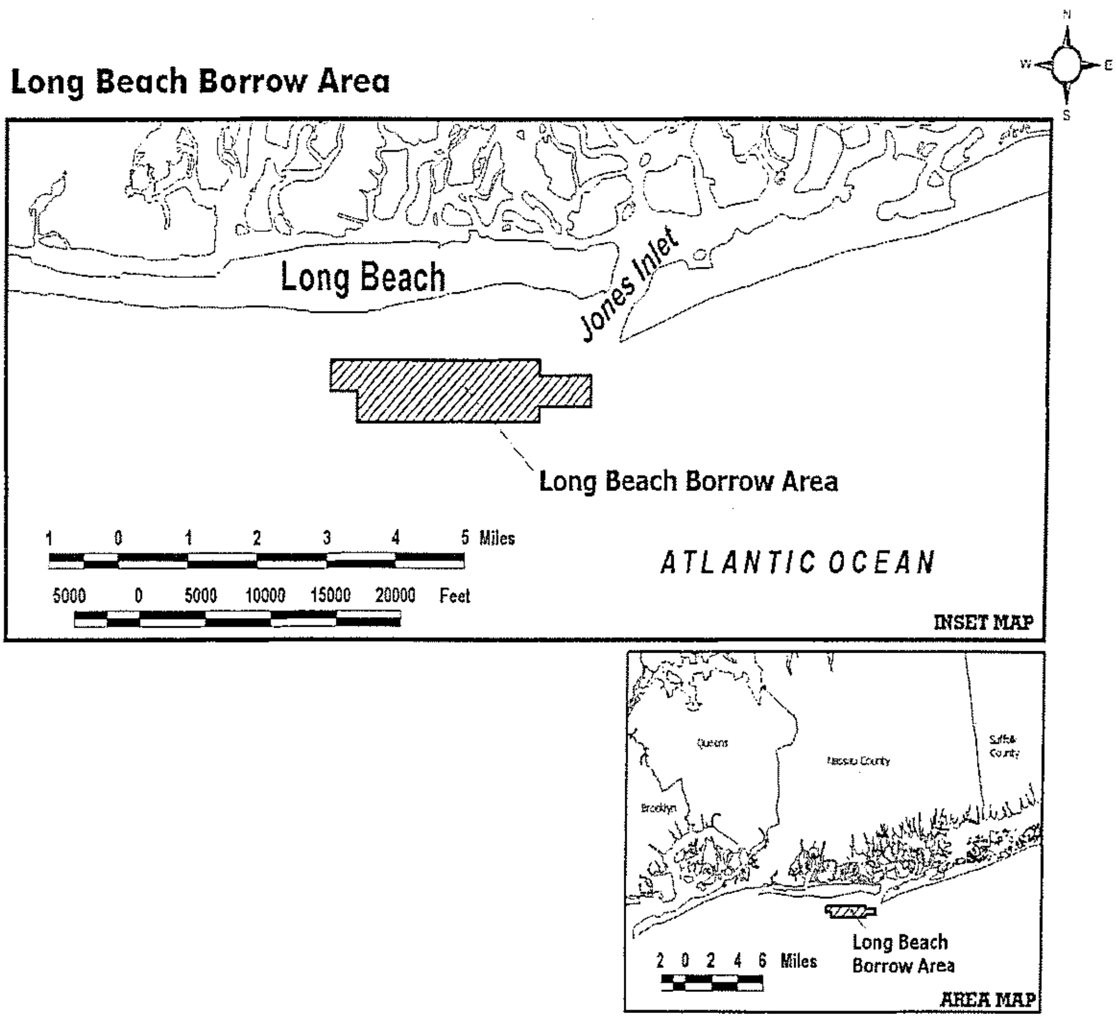
Bird Nesting and Foraging Area

The proposed Project modification has excluded Project activities from within a 93.4-acre ephemeral pool and a 42.3-acre tern/piping plover nesting area located in Point Lookout, near the Jones Inlet ebb shoal attachment point (USACE 2005a). Project activities were proposed within this area as part of the original plan that was selected in 1995. However, the USACE reevaluated proposed Project activities in direct response to concerns regarding shorebird habitat from Federal and State agencies and other interested parties (USACE 1998). As a result, construction of a beach berm and dune within the bird nesting/foraging area has been eliminated from the proposed Project to allow for the continued unimpeded use of the area as shorebird nesting and foraging habitat. Three new groins were originally proposed within the ephemeral pool and tern/piping plover nesting area. However, based on a re-evaluation of the Project, construction of these groins has been deferred indefinitely, and is not part of the proposed Project modification. Supplemental NEPA documentation would be prepared to address construction of the three deferred groins as appropriate. No beach fill activities will take place within the bird foraging and nesting area.

Sand Removal from Offshore Borrow Area

An offshore borrow area, located approximately 1.5 miles south of Long Beach Island (Figure 2) between 25 feet mean low water and about 60 feet mean low water, has been identified as a potential source of sand material for beach fill and dune construction activities (USACE 2005a). Approximately 6,600,000 cy of material will be removed from this area. The original plan selected in 1995 proposed 8,642,000 cy of sand removal (USACE 1998).

Figure 2



Habitat Characteristics – Borrow Area

The borrow site, where beach fill sediments will be dredged, is located in waters between 25 MLW to about 60 ft MLW. The sediments at the borrow site have been found to be predominantly fine to coarse sand typically with only a trace of silts. The important biological resources of this area are the benthos and fin-fisheries. This habitat supports diverse benthic fauna, which serve as prey for demersal fish species present in this area. The nearshore area provides a migratory pathway and spawning, feeding and nursery areas for many species common to the Mid-Atlantic region. Additionally, phytoplankton in this zone is an important food source for filter-feeding bivalves. A sand faunal community is found in the proposed borrow area sediments. Polychaetes worms and blue mussels are the most numerous macrobenthic organisms. The most import invertebrate is the commercially valuable surf clam (*Spisula solidissima*). Additionally, gastropods, amphipods, isopods, sand dollars, starfish, and decapod crustaceans are found in the site. Important recreational species found in the borrow area include Atlantic mackerel

(*Scomber scomblrus*), black sea bass (*Centropristes striatus*), winter flounder (*Psuedopleuronectes americanus*), summer flounder (*Paralichthys dentatus*) and scup (*Stenotumus chrysops*).

Effects on Habitat – Borrow Area

The physical effects of dredging would be the removal of existing sediments resulting in a depression or significant bathymetric low in the seafloor that may persist for several years, dependent on sediment availability and current dynamics in the area. Fine-grained sediments often collect within these lows resulting in a modified habitat for bottom-feeding benthic species, plus a change to epifaunal species that favor finer-grained sediments. In estuaries or embayments with constrained hydrodynamics, reduced bottom water flow may result in lowered dissolved oxygen levels, as could an increased organic content of muds. This may result in finfish populations avoiding this zone. Additionally, during the physical process of removing the sediments, the loss of benthic invertebrate prey species may occur. Small motile and sedentary epifaunal species (*e.g.,Polychaetes*), would be most vulnerable to hydraulic dredging, resulting in decreased prey in this area. A dynamic commercial surf clam industry is located along the south coast of Long Island, including the study zone. However, a stock assessment of the borrow area showed low surf clam population densities (USACE, 2003). However, advance notice of construction to fisherman should allow for a viable local harvest, thereby minimizing any financial impact to the industry. Additionally, allowable weekly vessel yields are tied to the NYSDEC-calculated stock size, maintaining a buffer population that protects both the resource and industry.

Due to the nature of the water quality (typically clean well-oxygenated), hydrodynamics (good tidal flow and periodic wind-driven bottom waters) and the sediments (fine-grained sands with trace quantities of silts), there should be minimal localized turbidity or decreases DO at the borrow area. Additionally, studies performed in the Lower Bay of New York Harbor have shown the benthic community structure is disrupted by dredging, but can reach a new equilibrium Within 12 months (Conover *et al.*, 1995; Cerrato and Sheier, 1984).

Dredging Operation

The size of the offshore borrow area is approximately 1,194 acres; however, this entire area would not be needed for initial construction and renourishment operations, throughout the life of the project. Typically, dredging operations are configured to go no deeper than 20 feet below existing grade. Generally, dredging operations do not specifically contour slopes between the bottom contours, and the existing surface. Slopes are created by the natural slumping of material in response to the material type. As a result of dredging operations, the side slopes are expected to generally slope between 1V:3H and 1V:5H. The configuration of these side slopes would not be expected to interfere with gear used in commercial fishing operations. Based upon the available material within the borrow area, dredging operations could be configured as 5 to 10 foot dredge depths, and still allow for sufficient material for dredging operations. To determine the worst-case for impacts the physical, maximum area of disturbance was considered for initial construction 262 acres with a 33-advance fill.

The use of a cutterhead suction dredge will be the type of equipment used to gather the material and place it on the beach. There are two main components of a cutter suction dredger; the cutterhead and the dredging pump. The cutterhead, which is situated at the entrance of the suction pipe, is used to agitate soft materials or to cut harder materials in order that they may be in a suitable state for removal by hydraulic means.

The cutters are usually rotated at between 10 and 30 rpm, and the rotary motor is located either directly behind the cutter in a submersible drive unit, or with the main power unit of the dredger. The dredging pump in the body of the dredger creates a vacuum in the suction pipe and draws the material up the pipe and through the pump. The material is then discharged by being pumped through a pipeline.

When in operation the cutter suction dredger makes use of two stern spuds, which are arranged to allow the dredger to advance in steps towards the dredging face. In each dredging position the dredger is swung from side to side by means of side wires. The cutter suction dredger is connected to the shore by floating pipelines and this must be arranged so as to allow the dredger to advance forward as far as possible without having to stop dredging.

Effects on Designated EFH Species in LBI

Summary of Essential Fish Habitat (EFH) Designation

Two 10' x 10' Square Coordinates:

Boundary	North	East	South	West
Coordinate	40□ 40.0' N	73□ 30.0' W	40□ 30.0' N	73□ 40.0' W
Boundary	North	East	South	West
Coordinate	40□ 40.0' N	73□ 40.0' W	40□ 30.0' N	73□ 50.0' W

Square Description (i.e. habitat, landmarks, coastline markers): Atlantic Ocean waters within the square within Great South Bay affecting the following: south of Jones Beach State Park, East Bay, Great I., Deep Creek Meadow, Sloop Channel, Cuba I., Big Crow I., Jones Inlet, Garrett I., Meadow I., High Meadow, Sea Dog I., Baldwin Bay, Merrick Bay, Middle Bay, Island Park, NY., eastern Long Beach, NY., Point Lookout, NY., Wantaugh Bellmoe, NY., Freeport, NY., Rockville Center, NY., Baldwin, NY., Lynbrook, NY., East Rockaway, NY., Smith Meadow, NY., Pettit Marsh, western Hempstead Bay, and Oceanside, NY. Atlantic Ocean waters within the square within Great South Bay estuary affecting the following: Western Long Beach, NY., Hewlett, NY., Woodmere, NY., Cedarhurst, NY., Lawrence, NY., Inwood, NY., Far Rockaway, NY., East Rockaway Inlet, eastern Jamaica Bay, Brosewere Bay, Grassy

Bay, Head of Bay, Grass Hassock Channel, eastern Rockaway Beach, Atlantic Beach, Howard Beach, J. F. K. International Airport, Springfield, NY., and Rosedale, NY., along with many smaller islands.

Species	Eggs	Larvae	Juveniles	Adults
Atlantic salmon *(Salmo salar)*				X
Atlantic cod *(Gadus morhua)*				
haddock *(Melanogrammus aeglefinus)*				
pollock *(Pollachius virens)*			X	
whiting *(Merluccius bilinearis)*	X	X	X	
offshore hake *(Merluccius albidus)*				
red hake *(Urophycis chuss)*	X	X	X	
witch flounder *(Glyptocephalus cynoglossus)*				
winter flounder *(Pleuronectes americanus)*	X	X	X	X
yellowtail flounder *(Pleuronectes ferruginea)*				
windowpane *(Scopthalmus aquosus)*	X	X	X	X
American plaice *(Hippoglossoides platessoides)*				
ocean pout *(Macrozoarces americanus)*				
Atlantic sea scallop *(Placopecten magellanicus)*				
Atlantic sea herring *(Clupea harengus)*			X	X
monkfish *(Lophius 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		
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
surf clam *(Spisula solidissima)*	n/a	n/a		
ocean quahog *(Artica islandica)*	n/a	n/a		
spiny dogfish *(Squalus acanthias)*	n/a	n/a		
tilefish *(Lopholatilus chamaeleonticeps)*				
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
tiger shark *(Galeocerdo cuvieri)*		X		

In general, adverse impacts to Federally managed fish species may stem from alterations of the bottom habitat, which result from dredging offshore in the borrow sites and beach fill placement in the intertidal zone and nearshore. EFH can be adversely impacted temporarily through water quality impacts such as increased turbidity and decreased dissolved oxygen content in the dredging and placement locations. These impacts would subside upon cessation of construction activities. More long-term impacts to EFH involve physical changes to the bottom habitat, which involve changes to bathymetry, sediment substrate, and benthic community as a food source.

One major concern with respect to physical changes involves the potential loss of prominent offshore sandy shoal habitat within borrow sites due to sand mining for the beach replenishment. It is generally regarded that prominent offshore shoals are areas that are attractive to fish including the Federally managed species, and are frequently targeted by recreational and commercial fishermen. Despite this, there is little specific information to determine whether shoals of this type have any enhanced value for fish. However, it is reasonable to expect that the increased habitat complexity at the shoals and adjacent bottom would be more attractive to fish than the flat featureless bottom that characterizes much of the mid-Atlantic coastal region (USFWS, 1999a).

Since mining of sand in shoals may result in a significant habitat alteration, it is proposed that these areas be avoided or the flatter areas surrounding the prominent shoals be mined. Prominent shoal habitat was avoided as part of the borrow site screening process. This was accomplished by avoiding sites with prominent shoal habitat such as the "Seaside Lumps" and "Fish Heaven", which are considered important sport and commercial fishing grounds (Long and Figley, 1982). Other physical alterations to EFH involve substrate modifications. An example would be the conversion of a soft sandy bottom into a hard clay bottom through the removal of overlying sand strata. This could result in a significant change in the benthic community composition after recolonization, or it could provide unsuitable habitat required for surf clam recruitment or spawning of some finfish species. This could be avoided by correlating vibracore strata data with sand thickness to restrict dredging depths to avoid exposing a different substrate. Based on vibracore data, dredging depths would be considered to minimize the exposure of dissimilar substrates.

Habitat Utilization of Identified EFH Species for Representative Life Stages

MANAGED SPECIES	EGGS	LARVAE	JUVENILES	ADULTS
Atlantic Salmon (*Salmo salar*) (Bigelow, 1963)				**Habitat**: Pelagic in Mid-Atlantic **Prey:** herring, alewives, smelts, capelin, small mackerel, sand lace, and small codshellfish.
Whiting (*Merluccius bilinearis*) (Morse et al. 1998)	**Habitat:** Pelagic continental shelf waters in preferred depths from 50-150 m.	**Habitat:** Pelagic continental shelf waters in preferred depths from 50-130 m. (Morse et al. 1998)	**Habitat:** Bottom (silt-sand) nearshore waters in preferred depths from 150-270 m in spring and 25-75 m in fall. **Prey:** fish, crustaceans (euphasids, shrimp), and squids (Morse et al. 1998)	
Red hake (*Urophycis chuss*) (Steimle et al. 1998)	**Habitat:** Surface waters, May – Nov.	**Habitat:** Surface waters, May –Dec. Abundant in mid-and outer continental shelf of Mid-Atl. Bight. **Prey:** copepods and other microcrustaceas under floating eelgrass or algae.	**Habitat:** Pelagic at 25-30 m and bottom at 35-40 m. Young inhabit depressions on open seabed. Older juveniles inhabit shelter provided by shells and shell fragments. **Prey:** small benthic and pelagic	

MANAGED SPECIES	EGGS	LARVAE	JUVENILES	ADULTS
			crustaceans (decapod shrimp, crabs, mysids, euphasiids, and amphipods) and polychaetes).	
Pollock (Pollachius virens) *(Fahay, 1998)*			**Habitat:** Bottom (rocks, pebbles, or gravel) winter for Mid-Atlantic **Prey:** shellfish, crabs, and other crustaceans (amphipods) and polychaetes, squid and fish (capelin redfish, herring, plaice, haddock	
Winter Flounder (Pseudopleuronectes americanus) (Pereira et. al., 1998)	**Habitat:** Been reported as sand, muddy sand, mud and gravel, although sand seems to be the most	**Habitat:** arvae are found inshore **Prey:**Nauplii, invertebrate eggs, protozoans, polychaetes	**Habitat:** Young of the year (YOY) are demersal, nearshore low (primarily inlets and coves) energy shallows with sand, muddy sand, mud and gravel bottoms. **Prey:** YOY Amphipods and annelids JUV – Sand dollar, Bivalve siphons, Annelids, Amphipods	**Habitat:** Demersal offshore (in spring) except when spawning where they are in shallow inshore waters (fall). **Prey:** Amphipods, Polychaetes, Bivalves or siphons, Capelin eggs, Crustaceans
Windowpane *(Scopthalmus aquosus)* (Chang, 1998)	**Habitat:** Surface waters <70 m, Feb-July; Sept-Nov.	**Habitat:** Initially in pelagic waters, then bottom <70m,. May-July and Oct-Nov. **Prey:** copepods and other zooplankton	**Habitat:** Bottom (fine sands) 5-125m in depth, in nearshore bays and estuaries less than 75 m **Prey:** small crustaceans (mysids and decapod shrimp) polychaetes and various fish larvae	**Habitat:** Bottom (fine sands), peak spawning in May, in nearshore bays and estuaries less than 75 m **Prey:** small crustaceans (mysids and decapod shrimp) polychaetes and various fish larvae
Atlantic mackerel (*Scomber scombus)*	**Habitat:** Eggs pelagic, distributed at depths ranging from 10- 325 m, majority from 30- 70 m;	**Habitat:** Most distributed at depths from 10-130 m, usually at < 50 m. Depth varies diurnally,	**Habitat:** Depth varies seasonally. Offshore in fall, most abundant at ~ 20-40 m, range from 0-320 m. In	**Habitat:** Depth changes seasonally, perhaps influenced by prey availability. Fall: 10-340 m, > 50% at 60-80 m. Winter: ~ 50% at 20-30 m.

MANAGED SPECIES	EGGS	LARVAE	JUVENILES	ADULTS
	depth varies with season, egg diameter, thermocline.	also with age and with thermocline; i.e., newly hatched larvae found between 5-10 m during the day, however, as they grow they're at depths closer to the surface.	winter, 50-70 m. Spring, although dispersed through water column, concentrated 30-90 m. Move higher in summer to 20-50 m, range from 0-210m.	Spring: down to 380 m, ~ 25% at 60-170 m. Summer: > 60% at 50-70 m. Larger fish deeper than smaller ones. Distribution may also be correlated with downwelling events and onshore advection of warm surface water.
Atlantic sea herring *(Clupea harengus)* (Reid et al., 1998)			**Habitat:** Pelagic waters and bottom, < 10 C and 15-130 m depths **Prey:** zooplankton (copepods, decapod larvae, cirriped larvae, cladocerans, and pelecypod larvae)	**Habitat:** Pelagic waters and bottom habitats; **Prey:** chaetognath, euphausiids, pteropods and copepods.
Monkfish *(Lophius americanus)* (Steimle et al., 1998)	**Habitat:** Surface waters, Mar. – Sept. peak in June in upper water column of inner to mid continental shelf	**Habitat:** Pelagic waters in depths of 15 – 1000 m along mid-shelf also found in surf zone **Prey:** zooplankton (copepods, crustacean larvae, chaetognaths)		
Bluefish *(Pomatomus saltatrix)*			**Habitat:** Pelagic waters of continental shelf and in Mid Atlantic estuaries from May-Oct.	**Habitat:** Pelagic waters; found in Mid Atlantic estuaries April – Oct.
Long finned squid *(Loligo pealei)*	n/a	n/a	**Habitat:** Inhabit upper 10 m at depths of 50-100 m on continental shelf. Found in coastal inshore waters in spring/fall, offshore in winter. Migrate to surface at night. Ontogenetic descent: at 45 mm, chromatophores are concentrated on	

MANAGED SPECIES	EGGS	LARVAE	JUVENILES	ADULTS
			dorsal rather than ventral surface, indicating a change from inhabiting surface waters to demersal lifestyle. **Prey:** Primary prey varies with size: < 4.0 cm: plankton, copepods; 4.1-6.0 cm: euphausiids, arrow worms; 6.1-10.0 cm: crabs, polychaetes, shrimp. Cannibalism observed in specimens larger than 5 cm ML (small *Illex illecebrosus* were found in 49 of 322 *Loligo* stomachs).	
Short finned squid *(Illex ilecebrosus)*	n/a	n/a		
Atlantic butterfish *(Peprilus tricanthus)*	**Habitat:** Surface waters from continental shelf into estuaries and bays; collected to about 60 m deep in shelf waters. Common in high salinity zone of estuaries and bays from MA through VA. MARMAP Survey: collected in surface waters in 10- 1250 m of water.	**Habitat:** Surface waters from continental shelf into estuaries and bays; collected to about 60 m deep in shelf waters; common in high salinity zone of estuaries and bays; may spend day deeper in the water column and migrate to the surface at night. MARMAP Survey: collected in surface waters in water 10-1750 m deep.	**Habitat:** Pelagic waters in 10 – 360 m **Prey:** Feed mainly on planktonic prey, including thaliaceans, squids, copepods, amphipods, decapods, coelenterates, polychaetes, small fishes, and ctenophores.	**Habitat:** From surface waters to depths of 270-420 m on continental shelf; into coastal bays and estuaries; common in inshore areas, including the surf zone, and in high salinity and mixed salinity zones of bays and estuaries. NEFSC Trawl Survey: collected on continental shelf in 10-360 m of water; most collected in < 180 m. **Prey:** Feed mainly on planktonic prey, including thaliaceans, squids, copepods, amphipods, decapods, coelenterates, polychaetes, small fishes, and ctenophores.
Summer flounder *(Paralicthys dentatus)*			**Habitat:** Demersal waters (mud and sandy substrates)	**Habitat:** Demersal waters (mud and sandy substrates). Shallow coastal areas in warm months, offshore in cold months
Scup *(Stenotomus chrysops)*	n/a	n/a	**Habitat:** Demersal waters	**Habitat:** Demersal waters offshore from Nov – April
Black sea bass *(Centropristus*	n/a		**Habitat:**	**Habitat:** Demersal waters over

MANAGED SPECIES	EGGS	LARVAE	JUVENILES	ADULTS
striata)			Demersal waters over rough bottom, shellfish and eelgrass beds, man-made structures in sandy-shelly areas and wintere off shore at depths of 1-38 m in shell beds and shell patches	structured habitats (natural and man-made), and sand and shell areas and winters off shore at depths of 25-50 m in shell beds and shell patches.
Sand tiger shark (*Odontaspis Taurus*)		**Habitat:** Shallow coastal waters, bottom or demersal		
Ocean quahog *(Artica islandica)*	n/a	n/a		
Spiny dogfish *(Squalus acanthias)*	n/a	n/a		
King mackerel *(Scomberomorus cavalla)*	**Habitat:** Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone.	**Habitat:** Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone	**Habitat:** Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone	**Habitat:** Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone
Spanish mackerel *(Scomberomorus maculates)*	**Habitat:** Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone. Migratory	**Habitat:** Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone. Migratory	**Habitat:** Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone. Migratory	**Habitat:** Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone. Migratory
Cobia *(Rachycentron canadum)*	**Habitat:** Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone.	**Habitat:** Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone.	**Habitat:** Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone.	**Habitat:** Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone. Migratory

MANAGED SPECIES	EGGS	LARVAE	JUVENILES	ADULTS
	Migratory	Migratory	Migratory	
Dusky shark *(Charcharinus obscurus)*		**Habitat:** Shallow coastal waters		
Sandbar shark *(Charcharinus plumbeus)*		**Habitat:** Shallow coastal waters	**Habitat:** Coastal and pelagic waters	**Habitat:** Shallow coastal waters
Tiger shark *(Galeocerdo cuvieri)*		**Habitat:** Shallow coastal waters	**Habitat:** Shallow coastal waters	**Habitat:** This sharks inhabits coastal waters close to shore to outer continental shelf and offshore including oceanic island groups.
Little skate (Leucoraja erinacea) (NEFMC 2004)			**Habitat:** bottom habitats with a sandy or gravelly substrate or mud, generally found from the shore to 137 meters, with the highest abundance from 73-91 meters. Most juveniles are found between 4-15□C	**Habitat:** bottom habitats with a sandy or gravelly substrate or mud within the same range as the juveniles
Winter skate (Leucoraja ocellata) (NEFMC 2004)			sand and gravel or mud. shoreline to about 400 meters and are most abundant at depths less than 111 meters. The temperature range for these skates is from -1.2□C to around 21□C, with most found from 4-16 □C, depending on the season.	**Habitat:** sand and gravel or mud substrate.found shoreline to 371 meters, but are most abundant at less than 111 meters. The temperature range is also very similar, with a range from –1.2 □C to around 20 □C, with most found from 5-15 □C.

Biological impacts on EFH are more indirect involving the temporary loss of benthic food prey items or food chain disruptions. The following table provides a brief description of direct or indirect impacts on the designated Federally managed species and their EFH with respect to their life stage within the designated EFH squares that encompasses the entire project impact area.

As discussed in the Section, there are a number of Federally managed fish species where essential fish habitat (EFH) was identified for one or more life stages within the project impact areas. Fish occupation of waters within the project impact areas is highly variable spatially and temporally. Some of the species are strictly offshore, while others may occupy both nearshore and offshore waters. In addition, some species may be suited for the open ocean or pelagic waters, while others may be more oriented to bottom or demersal waters. This can also vary between life stages of Federally managed species. Also, seasonal abundances are highly variable, as many species are highly migratory.

Table 2 - Direct and Indirect Impacts on Identified EFH Species for Representative Life Stages

MANAGED SPECIES	EGGS	LARVAE	JUVENILES	ADULTS
1. Atlantic Salmon *(Salmo salar)*				**Direct Impacts:** Adults are pelagic and highly migratory, therefore no adverse impacts are anticipated. **Indirect Impacts:** Minor indirect adverse effects on food chain through disruption of benthic community, however, salmon are highly migratory
2. Whiting (Merluccius bilinearis)	Eggs are pelagic and are concentrated in depth of 50 – 150 meters, therefore no direct or indirect effects are expected.	Larvae are pelagic and are concentrated in depth of 50 –150 meters, therefore no direct or indirect effects are expected.	**Direct:** Occur near bottom. Physical habitat in borrow site should remain basically similar to pre-dredge conditions. However, some mortality of juveniles could be expected from entrainment into the dredge. **Indirect:** Temporary disruption of benthic food prey organisms.	
3. Red hake *(Urophycis chuss)*	Eggs occur in surface waters; therefore, no direct or indirect effects are expected.	Larvae occur in surface waters; therefore, no direct or indirect effects are expected.	**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. However, some mortality of juveniles could be expected from entrainment into the dredge. **Indirect:** Temporary disruption of benthic food prey organisms.	
4. Pollock (Pollachius virens)			**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. However, some mortality of juveniles could be expected from entrainment into the dredge. **Indirect:** Temporary	

MANAGED SPECIES	EGGS	LARVAE	JUVENILES	ADULTS
			disruption of benthic food prey organisms	
5. Winter flounder (Pseudo*pleuronectes americanus*)	Eggs are demersal in very shallow waters of coves and inlets in Spring. Dredging may have some effect on eggs if construction occurs during Spring.	Larvae are initially planktonic, but become more bottom-oriented as they develop. Potential for some to become entrained during dredging in borrow areas.	**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. However, some mortality of juveniles could be expected from entrainment into the dredge. **Indirect:** Temporary disruption of benthic food prey organisms	**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. **Indirect:** Temporary disruption of benthic food prey organisms.
6. Windowpane flounder *(Scopthalmus aquosus)*	Eggs occur in surface waters; therefore, no direct or indirect effects are expected.	Larvae occur in pelagic waters; therefore, no direct or indirect effects are expected.	**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. However, some mortality of juveniles could be expected from entrainment into the dredge. **Indirect:** Temporary disruption of benthic food prey organisms.	**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. **Indirect:** Temporary disruption of benthic food prey organisms.
7. Atlantic Mackerel *(Scomber scombrus*	**Direct Impacts:** Eggs are pelagic, therefore no adverse impacts are anticipated. **Indirect Impacts:** None anticipated	**Direct Impacts:** Larvae are pelagic, therefore no adverse impacts are anticipated. **Indirect Impacts:** None anticipated.	**Direct:** Juvenile mackerel are pelagic species. No significant direct effects anticipated. **Indirect:** Temporary disruption of benthic food prey organisms	**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. **Indirect:** Temporary disruption of benthic food prey organisms
8. Atlantic sea herring *(Clupea harengus)*			**Direct:** Occur in pelagic and near bottom. Physical habitat in borrow site should remain basically similar to pre-dredge conditions. However, some mortality of juveniles could be expected from entrainment into the dredge. **Indirect:** None, prey items are planktonic	**Direct:** Occur in pelagic and near bottom. Physical habitat in borrow site should remain basically similar to pre-dredge conditions. **Indirect:** None, prey items are primarily planktonic
9. Monkfish *(Lophius americanus)*	Eggs occur in surface waters with depths greater than 75 ft; therefore, no direct or indirect effects are expected.	Larvae occur in pelagic waters with depths greater than 75 ft; therefore, no direct or indirect effects are expected.		
10. Bluefish *(Pomatomus saltatrix)*			**Direct:** Juvenile bluefish are pelagic species. No significant direct effects	**Direct:** Adult bluefish are pelagic species. No significant direct effects anticipated.

MANAGED SPECIES	EGGS	LARVAE	JUVENILES	ADULTS
			anticipated. **Indirect:** Temporary disruption of benthic food prey organisms.	**Indirect:** Temporary disruption of benthic food prey organisms.
11. Long finned squid *(Loligo pealei)*	n/a	n/a	**Direct:** squid tend to be demersal during the day and pelagic at night (Hammer, 2000). There is a potential for entrainment.	
12. Short finned squid *(Illex ilecebrosus)*	n/a	n/a		
13. Atlantic butterfish *(Peprilus tricanthus)*	**Direct Impacts:** Eggs are pelagic, therefore no adverse impacts are anticipated. **Indirect Impacts:** None anticipated.	**Direct Impacts:** Larvae are pelagic, therefore no adverse impacts are anticipated. **Indirect Impacts:** None anticipated.	**Direct:** Juvenile butterfish are pelagic species. No significant direct effects anticipated. **Indirect:** Temporary disruption of benthic food prey organisms.	**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. Adults should be capable of relocating during impact. **Indirect:** Temporary disruption of benthic food prey organisms.
14. Summer flounder *(Paralicthys dentatus)*			**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. However, some mortality of juveniles could be expected from entrainment into the dredge. **Indirect:** Temporary disruption of benthic food prey organisms.	**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. **Indirect:** Temporary disruption of benthic food prey organisms.
15. Scup *(Stenotomus chrysops)*	N/a	n/a	**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. However, some mortality of juveniles could be expected from entrainment into the dredge. **Indirect:** Temporary disruption of benthic food prey organisms.	**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. Adults should be capable of relocating during impact. **Indirect:** Temporary disruption of benthic food prey organisms.
16. Black sea bass *(Centropristus striata)*	N/a		**Direct:** Physical habitat in borrow sites should remain basically similar to pre-dredge conditions. Offshore sites are mainly sandy soft-bottoms, however, some pockets of gravelly or shelly bottom may be impacted. Some mortality of juveniles could be expected from entrainment into the dredge. Some intertidal and subtidal rocky habitat may be impacted due to sand partially	**Direct:** Physical habitat in borrow sites should remain basically similar to pre-dredge conditions. Offshore sites are mainly sandy soft-bottoms, however, some pockets of gravelly or shelly bottom may be impacted. Some intertidal and subtidal rocky habitat may be impacted due to sand partially covering groins and potential shipwrecks along the shoreline.

MANAGED SPECIES	EGGS	LARVAE	JUVENILES	ADULTS
			covering groins and potential shipwrecks along the shoreline. **Indirect:** Temporary disruption of benthic food prey organisms.	**Indirect:** Temporary disruption of benthic food prey organisms.
17. Sand tiger shark *(Odontaspis taurus)*		**Direct:** Physical habitat in borrow site should remain basically similar to predredge conditions. Mortality from dredge unlikely because embryos are reported up to 39 inches in length (. Therefore, the newborn may be mobile enough to avoid a dredge or placement areas. **Indirect:** Temporary disruption of benthic food prey organisms and food chain within borrow and placement sites.		
18. Ocean quahog *(Artica islandica)*	n/a	n/a		
19. Spiny dogfish *(Squalus acanthias)*	n/a	n/a		
20. King mackerel *(Scomberomorus cavalla)*	**Direct Impacts:** Eggs are pelagic, therefore no adverse impacts are anticipated. **Indirect Impacts:** None anticipated.	**Direct Impacts:** Larvae are pelagic, therefore no adverse impacts are anticipated. **Indirect Impacts:** None anticipated.	**Direct Impacts:** Juveniles are pelagic, therefore no adverse impacts are anticipated. **Indirect Impacts:** Minor indirect adverse effects on food chain through disruption of benthic community, however, mackerel are highly migratory.	**Direct Impacts:** Adults are pelagic and highly migratory, therefore no adverse impacts are anticipated. **Indirect Impacts:** Minor indirect adverse effects on food chain through disruption of benthic community, however, mackerel are highly migratory.
21. Spanish mackerel *(Scomberomorus maculatus)*	**Direct Impacts:** Eggs are pelagic, therefore no adverse impacts are anticipated. **Indirect Impacts:** None anticipated.	**Direct Impacts:** Larvae are pelagic, therefore no adverse impacts are anticipated. **Indirect Impacts:** None anticipated.	**Direct Impacts:** Juveniles are pelagic, therefore no adverse impacts are anticipated. **Indirect Impacts:** Minor indirect adverse effects on food chain through disruption of benthic community, however, mackerel are highly migratory.	**Direct Impacts:** Adults are pelagic and highly migratory, therefore no adverse impacts are anticipated. **Indirect Impacts:** Minor indirect adverse effects on food chain through disruption of benthic community, however, mackerel are highly migratory.
22. Cobia *(Rachycentron canadum)*	**Direct Impacts:** Eggs are pelagic, therefore no adverse impacts are anticipated. **Indirect Impacts:** None anticipated.	**Direct Impacts:** Larvae are pelagic, therefore no adverse impacts are anticipated. **Indirect Impacts:** None anticipated.	**Direct:** Cobia are pelagic and migratory species. No significant direct effects anticipated. **Indirect:** Temporary disruption of benthic food prey organisms.	**Direct:** Cobia are pelagic and migratory species. No significant direct effects anticipated. **Indirect:** Temporary disruption of benthic food prey organisms.
23. Dusky shark *(Charcharinus obscurus)*		**Direct:** Physical habitat in borrow site should remain basically similar to predredge conditions. Mortality from dredge unlikely because embryos are reported up		

MANAGED SPECIES	EGGS	LARVAE	JUVENILES	ADULTS
		to 3 feet in length (McClane, 1978). Therefore, the newborn may be mobile enough to avoid a dredge or placement areas. **Indirect:** Temporary disruption of benthic food prey organisms and food chain within borrow and placement sites.		
24. Sandbar shark *(Charcharinus plumbeus)*		**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. However, some mortality of larvae may be possible from entrainment into the dredge or burial in nearshore, but not likely since newborns are approx. 1.5 ft in length (pers. conv. between J. Brady-USACE and H.W. Pratt-NMFS) and are considered to be mobile. **Indirect:** Temporary disruption of benthic food prey organisms and food chain within borrow and placement sites.	**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. Juveniles are mobile and are capable of avoiding impact areas. **Indirect:** Temporary disruption of benthic food prey organisms and food chain within borrow and placement sites.	**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. Adults are highly mobile and are capable of avoiding impact areas. **Indirect:** Temporary disruption of benthic food prey organisms and food chain within borrow and placement sites.
25. Tiger shark *(Galeocerdo cuvieri)*		Physical habitat in borrow site should remain basically similar to pre-dredge conditions. Mortality from dredge or fill placement unlikely because newborn are reported up to 1.5 feet in length (McClane, 1978). Therefore, the newborn may be mobile enough to avoid a dredge or placement areas. **Indirect:** Temporary disruption of benthic food prey organisms and food chain within borrow and placement sites.		
26. Little Skate			**Direct:** Juvenile skate are pelagic species. No significant direct effects anticipated. **Indirect:** Temporary disruption of benthic food prey organisms.	**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. Adults should be capable of relocating during impact. **Indirect:** Temporary disruption of benthic food prey organisms.
27. Winter Skate			**Direct:** Juvenile	**Direct:** Physical habitat

MANAGED SPECIES	EGGS	LARVAE	JUVENILES	ADULTS
			butterfish are pelagic species. No significant direct effects anticipated. **Indirect:** Temporary disruption of benthic food prey organisms.	in borrow site should remain basically similar to pre-dredge conditions. Adults should be capable of relocating during impact. **Indirect:** Temporary disruption of benthic food prey organisms.

*Sharks are neonate = larvae

Of the 27 species identified with Fishery Management Plans, the proposed project could have immediate direct impacts on habitat for winter flounder eggs and larval stages and entrainment of juveniles black sea bass, whiting, red hake, pollock, winter flounder, windowpane, atlantic sea herring, long finned squid, summer flounder, and scup. This is attributable to the benthic or demersal nature of these species and their affected life stages. However, the affect on benthic food-prey organisms present in the borrow areas and sand placement areas is considered to be temporary as benthic studies have demonstrated recolonization following dredging operations within 13 months to 2 years. Minor elevation differences resulting from dredging may even serve to enhance bottom habitat for a number of these species.

Published information on life history and habitat requirements for EFH-designated species or life history stages that were not collected in bottom trawl surveys of the borrow areas was compiled in order to provide a more complete listing of species to include in this assessment. Based on this information the following EFH-designated species and life history stages were identified as probable occupants of the borrow areas in LBI:

- Adult scup are often caught over soft, sandy bottoms (Steimle *et al.* 1999a) and most scup occupying Sandy Hook Bay in the summer are young adults (Wilk and Silverman 1976);
- Adult butterfish are common in nearshore open coastal areas, including the surf zone, and occur in sheltered bays and estuaries in the mid-Atlantic region during the summer (Cross *et al.* 1999);
- Juvenile and adult Atlantic mackerel (*Scomber scombrus*) are found in bays and estuarine waters from New Jersey to Canada and are common in saline waters of the LBI in the spring and fall (Studholme *et al.* 1999);
- Adult Atlantic herring are common in LBI in the winter and early spring (Reid *et al.* 1999);
- Adult and early juvenile sandbar sharks (*Charcharinus obscurus*) can occur in shallow, intertidal waters and bear live young in shallow bays and estuaries of the east-central U.S. in the summer (Compagno 1984);
- Juvenile red hake are found in Sandy Hook Bay during the spring and early summer, in much reduced numbers (Able and Fahay 1998) and Reid *et al.* (1979) suggest that juveniles in Long Island Sound prefer silty, fine sand sediments;
- Adult hake occur in the LBI during the cooler months (Stone *et al.* 1994) and are

abundant in offshore waters of Raritan Bay (Wilk *et al.* 1998);

- Adult Atlantic herring occupy mid-Atlantic continental shelf waters in the winter and early spring;

The species and life history stages that are not believed to occupy the proposed borrow areas in LBI are king mackerel juveniles and adults, adult spanish mackerel, adult cobia, and early juvenile dusky shark (*Charcharinus obscurus*). King mackerel (*Scomberomorus cavalla*), cobia, and spanish mackerel are southern species that are near the northern limit of their range and rare in LBI. They would therefore be rare in LBI and only occur in the warmer months., but are not common in estuarine embayments like RBSHB (Reid *et al.* 1999). Reproducing dusky sharks tend to avoid estuaries (Compagno 1984).

DIETS AND PREY FOR EFH-DESIGNATED SPECIES

Long Beach Island

Polychaete annelids and amphipods are primary food items for winter flounder and scup (Table 3). These prey organisms were commonly found in the proposed LBI borrow area offshore surveys conducted in June of 1993,(Appendix). The tube-dwelling polychate *Asabellides oculata* sp., was the most abundant species collected in the June 1993 survey and the second most abundant species collected was *Gammarus lawrencius sp.* Small benthic crustaceans are also an important food source for many EFH designated fish species like windowpane, scup, black sea bass, and red hake. Piscivorous (fish-eating) EFH species like bluefish and summer flounder also have an abundant supply of small forage fish such as bay anchovies (*Anchoa mitchilli*), atlantic menhaden (*Brevoortia tyrannus*), silversides (*Menidia menidia*), and alewives (*Alosa pseudoharengus*) in the LBI. These species were commonly caught in bottom trawls in LIB borrow area in 1985-86 (NYSOGS, 1992).

Table 3. Prey Species for Primary EFH-Designated Species

Species	**Life Stage**	**Principal Prey**	**Source**
Bottom Feeders			
Winter Flounder	J, A	Polychaetes, amphipods, (*Ampelisca abdita*) and small crustaceans (*Crangon*), sand dollars, and bivalves	Pereira et al. (1999)
Windowpane	J,A	Small crustacean, (mysids, decapod shrimp) and fish larvae	Chang et al. (1999)
Pollock	J,A	Benthic invertebrates: decapod crustaceans polychaetes, amphipods, pandalid shrimp	Fahay et al. (1999)
Sandbar shark	J,A	Small bottom fishes, small mollusks and crustacean	Compagno (1984)
Winter skate	J	Polychaetes and amphipods are the most important prey items,	Packer et al. (2003)

		followed by decapods, isopods, bivalves and fish	
Winter skate	A	Polychaetes and amphipods are the most important prey items, followed by decapods, isopods, bivalves and fish.	Packer et al. (2003)
Little skate		Invertebrates: decapod crustaceans and amphipods are the most important prey items, followed by polychaetes. Isopods, bivalves, and fishes are of minor importance	Packer et al. (2003)
Little skate	J	Invertebrates: crustaceans and amphipods are the most important prey items for the little skate, followed by polychaetes. Isopods, bivalves, and fishes are of minor importance	Packer et al. (2003)
Bottom and Pelagic Feeders			
Summer flounder	J	YOY (<100mm) polychaetes, small crustaceans. Older juveniles same plus small fish	Packer et al. (1999)
Summer flounder	A	Crustaceans, bivalves, marine worms, sand dollars, hydroids & variety of fish	Packer et al. (1999)
Scup	J	Polychaetes, amphipods, small crustaceans, small mollusks, fish eggs and larvae	Steimle et al. (1999)
Scup	A	Small crustacean, polychaetes, mollusks, small squid, hydroids, sand dollars, and small fish	Steimle et al. (1999)
Black sea bass	J	Small crustacean (isopods, amphipods, small crab sand shrimp, copepods, mysids) and small fish	Steimle et al. (1999)
Black sea bass	A	Crabs, mysids, polychaetes, caridean shrimp, and small bait fish	Steimle et al. (1999)
Red hake	J	Polychaetes and small benthic & pelagic crustaceans (decapods, shrimp, crabs, mysids, euphausids, and amphipods	Steimle et al. (1999)
Atlantic salmon	A	Variety of fish, including some that are bioluminescent. smolts eat zooplankton (euphasids, amphipods, decapods, etc.); at sea the diet consisting primarily of sand lance, herring, capelin and shrimp.	Atlantic salmon unlimited
Pelagic Feeders			
Whiting	J	Crustaceans, other small fish (mackerel, menhaden and squid)	Morse et al. (1999)
Bluefish	J	Polychaetes and crustaceans but mainly a variety of fish species	Fahay (1999)

Bluefish	A	Variety of fish species	Fahay (1999)
Butterfish	J,A	Zooplankton	Cross et al. (1999)
Atlantic herring	J,A	Zooplankton	Reid et al. (1999)
Atlantic mackerel	J	Small crustaceans (copepods, amphipods, mysids shrimp, and decapod larvae.	Studholme et al. (1999)
Atlantic mackerel	A	Small crustaceans (copepods, amphipods, mysids shrimp, and decapod larvae, also squid and a variety of fish species.	Studholme et al. (1999)
King mackerel	J,A	A variety of pelagic fish species	Godcharles and Murphy (1983)
Spanish mackerel	J,A	A variety of pelagic fish species	Godcharles and Murphy (1983)
Cobia	J,A	Variety of fish, squid, and crustaceans	National Audubon Society (1983)
Longfin squid	J	Crustaceans, small fish, and even smaller members of it's own species.	Cargnelli *et al.* 1999

A – Adult J – Juvenile

Potential Direct/Indirect Impacts, Cumulative, and Mitigation

Dredging and placement activities in the LIB area are not expected to have any significant or long-term lasting effects on the "spawning, breeding, feeding, or growth to maturity" of the designated EFH species that occupy the borrow areas. However, the proposed activity would have immediate, short-term, direct and indirect impacts on EFH for some of the designated fish species and life history stages that occur in the immediate vicinity of the borrow and placement areas. This section identifies the direct and indirect impacts that could result from dredging and makes recommendations for minimizing these impacts.

Direct Impacts

Due to the mobility of larger fish, direct impacts from suction dredging and placement would be limited to eggs, larvae, small fish, and benthic invertebrates which would be removed by the dredge. The EFH designated species most likely to suffer mortality from dredging are juvenile winter flounder and windowpane. Mortality of young-of-the-year (YOY) juvenile windowpane and winter flounder would be highest in the spring, just after they settle to the bottom and metamorphose. During that time of year, YOY juveniles are <50 millimeters (mm) long and not capable of avoiding a suction dredge. Mortalities of small flounder would be minimized if dredging was restricted to the fall (October-December), after they are larger and start to move into deeper water (Pereira *et al.* 1999) and would be less plentiful on shallow borrow areas. Dredging in the fall would also minimize any possible impacts on pelagic fish eggs and larvae produced by EFH-designated species since most of them spawn in the spring.

Unlike any of the other EFH-designated species winter flounder deposit their eggs on the bottom in nearshore waters in depths of 1 to 15 ft on mud, sand, and gravel substrates along the Atlantic coast of New York during the winter (peak spawning in February and March) (Pereira *et al.* 1999). There is a high probability that dredging on borrow areas in the winter would cause the mortality of winter flounder eggs. If dredging was restricted to the fall October- December), any risk of removing winter flounder eggs would be eliminated. Borrow pits left behind after dredging ceases would eventually provide good spawning habitat for winter flounder since the sand that would accumulate in them is substrate for eggs.

Indirect Impacts

As a result of sand removal (suction dredging) and placement of the materail, the most immediate, indirect effect on EFH areas would be the loss of benthic invertebrate prey species. Small motile and sedentary epifaunal species (*e.g.*, small crabs, snails, tube-dwelling amphipods), and all infaunal species (*e.g.*, polychaetes), would be most vulnerable to suction dredging and burial.

The EFH-designated species most vulnerable to the loss of prey organisms are winter flounder, windowpane, scup, and black sea bass. Winter flounder are obligate bottom feeders, preying primarily on infaunal polychaetes and tube-dwelling amphipods. The removal of benthic prey organisms will affect them more directly than any other EFH species. Windowpane have larger mouths than winter flounder and feed primarily on small crustaceans (*i.e.*, mysid and decapod shrimp) and fish larvae. These are motile prey organisms that live in the water column or near the bottom and could, to some extent, avoid being removed by the dredge. Scup and black sea bass feed on a variety of benthic infaunal and epifaunal organisms that would be affected by dredging, The immediate impact of prey removal would be negligible since bottom feeding EFH species would re-locate to nearby areas with intact benthic food resources. It would also be a temporary condition, lasting only as long as it takes for benthic organisms to re-colonize the dredged area. In addition, the dislocation of some benthic prey organisms into the water column by the dredge will attract fish to the area to feed (Brinkhuis 1980).

The removal of sand leaves a depression or hole (borrow pit) in the sea floor that can persist for years. The rate at which borrow pits fill up will depend on the amount of sediment that is available and the direction and strength of currents in the area. Borrow pits can modify the habitat for benthic, bottom-feeding fishes since they are deeper than the surrounding sea floor and act as traps for fine grained sediments. Accumulation of mud can cause a change in benthic community structure that favors certain species of fish. Also, if circulation of bottom water in the pits is reduced, DO can fall to low enough levels (<2-3 ppm) that fish will avoid them all together. High organic contents of mud accumulating in pits could also cause oxygen depletion.

Studies performed in the Lower Bay of New York Harbor have shown that benthic community structure is disrupted by dredging, but can reach a new equilibrium fairly rapidly. Cerrato and Scheier (1984) found that the borrow pits on the West Bank of the Ambrose Channel had distinctly different habitats from a nearby undredged control site. The benthic fauna at the control site was more diverse (*i.e.*, more species) and, in general, more stable (less susceptible to seasonal shifts in species composition and abundance) through time, whereas there were fewer species in the borrow pits, but some of them were very abundant. In a related study, Conover *et al.* (1985) found that fish, including some EFH-designated species, were actually more abundant in borrow pits. Of the EFH designated species, butterfish (mostly juveniles) were more abundant in the borrow pits, as were winter flounder (in the fall). Red hake were more abundant in one of the borrow pits and the largest catches of windowpane were made in one of the pits in the spring. Summer flounder were generally more abundant in the borrow pits.

In addition, Conover *et al.* (1985) also examined the stomach contents of winter flounder in the three sampling sites and related them to benthic populations identified by Cerrato and Scheier (1984). The results indicated that, despite changes in the species composition of benthic communities after dredging, the feeding success of winter flounder in the pits was not affected. Winter flounder, like many other bottom-feeding species, are selective feeders that adapt their diets to whatever prey species are readily available. These results suggest that the feeding success of other bottom-feeding EFH species are also likely to not be affected by changes in benthic community structure caused by dredging.

The degree to which water quality is degraded, or temperature and salinity changes in borrow pits depends on the depth of the pit, the circulation of water through the pit, and the amount of fine sediment and organic matter that accumulates in the pit. Conover *et al.* (1985) determined that summer water temperatures tended to be lower in borrow pits and salinities consistently higher (generally by 1-3 ppt, but by 7.3 ppt in January). More importantly, DO concentrations measured between June and November did not vary between sites.

Bottom currents along the LBI shore are strong, thus it is likely that DO levels near the bottom of borrow pits in LBI would not be reduced, There is, in fact, so much sand that is transported west along the outer New York coast that any hole created by dredging would fill in naturally within a very short time. If fine sediments accumulate in them, the benthic invertebrate community will change from a sand-dominated to a mud-dominated fauna. However, as long as water quality is not degraded, there would be no adverse impact on EFH. In fact, if summer water temperatures in borrow pits are lower than on adjacent shoal areas, EFH might be improved. Monitoring of DO levels in borrow pits would indicate whether or not remedial action needs to be taken to improve habitat quality. Limiting the depth to which dredging would proceed and/or filling the borrow pits, partially or totally, with clean fill when oxygen concentrations drop to unacceptable levels after dredging would reduce the possibility of DO concentration levels falling below 2-3 ppm.

Cumulative Impacts

Given the growth capacity of EFH-designated fish populations within LBI borrow area and the expected recolonization rates of benthic prey species, there would be no expected cumulative effects from dredging of the borrow area. Cumulative impacts can be avoided by dredging at times of year when EFH-designated species are not spawning.

The cumulative impacts on Essential Fish Habitat (EFH) are not considered significant. Like the benthic environment, the impacts to EFH are temporary in nature and do not result in a permanent loss in EFH. The borrow sites proposed for this project do not contain prominent shoal habitat features, wrecks and reefs, or any known hard bottom features that could be permanently lost due to the impacts from dredging. These types of habitat were avoided through careful site selection and coordination with fishery resource agencies. Some minor and temporary impacts would result in a loss of food source in the affected areas with each periodic nourishment. This impact would affect demersal or bottom-feeding EFH species such as summer flounder and windowpane. Cumulative losses of EFH can be avoided by not dredging deep holes, and leaving similar sandy substrate (w/ 3 feet of sand or more) for recruitment.

It should be noted, however, that some fishery habitat might be slightly impacted over time in the nearshore area. As previously discussed, 17 nearshore groins will be rehabilitated and 4 new groin will be constructed along with the extension of the terminal groin 58 which will provide some form of hard structure for fish habitat. These targets could be impacted over time as the construction template stabilizes into the design template to meet existing conditions. This is accomplished through the migration of sand from the placement site seaward. This migration of sand has the potential to cover part, or all of any hardened structure within the nearshore area. It is anticipated that these impacts would be minor and would most likely only result in an accumulation of sand around the bottom of any given structure.

Steps taken to minimize impacts during construction are also fairly standard among the District's beach restoration projects. Dredging windows are employed when necessary, dredging is conducted in a manner to avoid creating deep pits, dredging locations within borrow areas are rotated when possible to reduce impacts, buffer areas are established around cultural targets within borrow areas, and borrow areas are chosen to minimize impacts to shellfish and fisheries resources. With the inclusion of these measure in all projects, cumulative impacts for the District activities are expected to be minimized to the greatest extent possible.

Monitoring

The District plans to conduct a biological monitoring program (BMP) to evaluate the effects of dredging clean sand for flood control/shoreline stabilization construction activities for five years. The offshore area to be evaluated is LBI borrow area (Figure) and it will be compared to the 1994 date collected as well as comparing the date to East

Rockaway benthic date. The offshore and nearshore components will focus on benthic infauna, grain size, and water quality. The following provides a brief outline of the District's proposed BMP for the offshore borrow areas in LBI. A more detailed plan will be developed prior to implementation.

The collection of benthic fauna is scheduled to occur every spring and fall for five continuous years: one year of pre-construction, one year during construction, and two years of post construction. The BMP will involve establishing twenty evenly-spaced sampling stations in the borrow area. Prior to the initial sampling events, Differential Georeferenced Positioning System (DGPS) coordinates will be established to ensure that subsequent sampling events will be conducted at the same locations. At each benthic station, water quality will be collected (at the bottom, mid-depth, and surface) and one benthic and grain size sample will be collected using a ¼ cubic yard Smyth-MacIntyre spring-loaded benthic grab. Each benthic sample will be preserved in a 10% formaldehyde solution and shipped to a pre-approved laboratory for analysis. The laboratory will sort, identify, weigh, and numerate species to the lowest practicle identification level (LPIL). Grain size samples will be analyzed to determine the percentage of sand, silt, and clay.

Appendix

Plan Sheets

APPENDIX H
ENVIRONMENTAL COMPLIANCE STATEMENT

Environmental Compliance

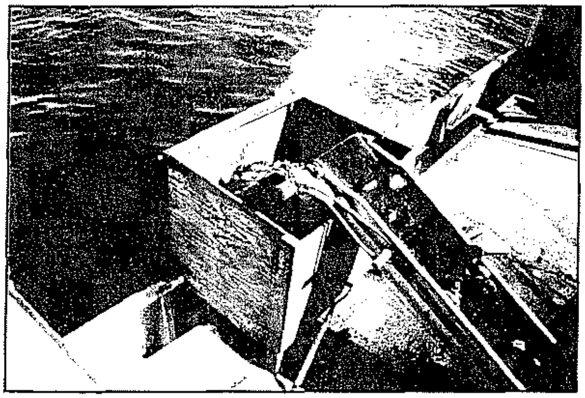
Federal Policies	Compliance
Abandoned Shipwreck Act of 1987	Full
Archaeological and Historic Preservation Act of 1979, as amended	Full
Clean Air Act OF 1977, as amended	Full
Clean Water Act of 1977, as amended	Full
Coastal Zone Management Act of 1972, as amended	Full
Endangered Species Act of 1973, as amended	Full
Estuary Protection Act (PL 90-454)	N/A
Federal Water Project Recreation Act, as amended	N/A
Fish and Wildlife Coordination Act 0f 1958, as amended	Full
Floodplain Management (E.O.11988)	N/A
Gateway National Recreation Area 1972 Legislation	N/A
Land and Water Conservation Fund Act of 1965, as amended	Full
Marine Protection, Research and Sanctuary Act of 1969, as amended	N/A
National Environmental Policy Act of 1969, as amended	Full
National Historic Preservation Act of 1966, as amended	Full
Rivers and Harbors Appropriation Act of 1899, as amended	N/A
Toxic Substances Control Act (PL-94-469), as amended	N/A
Watershed Protection and Flood Prevention Act, as amended	N/A
Wild and Scenic River Act, as amended	N/A

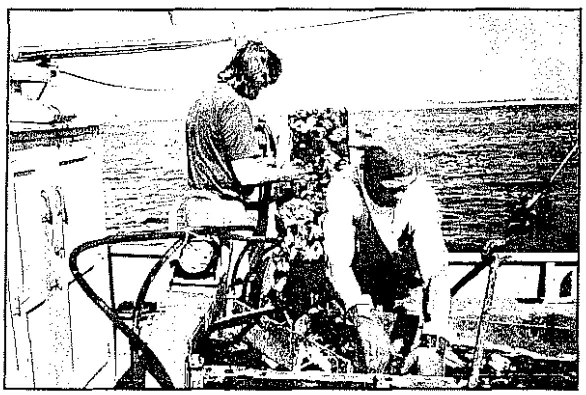
Executive Orders, Memoranda

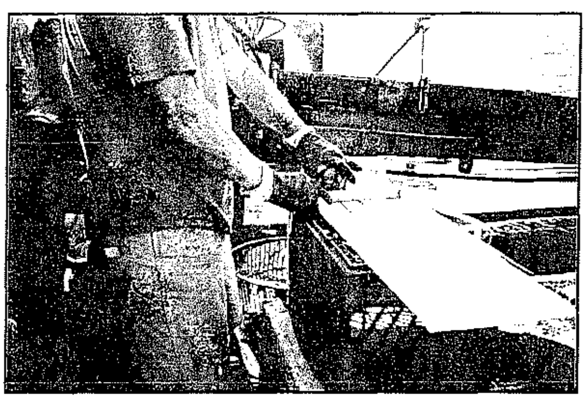
Protection of Wetlands (E.O. 11990)	Full
Environmental Effects Abroad of Major Federal Actions (E.O. 12114)	N/A
Impacts Upon Prime and Unique Farmlands (CEQ Memo 8-30-76)	N/A
Protection and Enhancement of the Cultural Environment (E.O. 11593)	N/A

APPENDIX I
BORROW AREA SURVEY OF SURF CLAMS

Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, New York: Limited Reevaluation Report







Long Beach Island Borrow Area Survey Surf Clam (*Spisula solidissima*) Stock Assessment

Revised Draft
December 2003

US Army Corps
of Engineers
New York District

1.0 Introduction

Long Beach Island, New York, lies on the Atlantic Coast of Long Island, and was the subject of a Storm Damage Reduction Feasibility Study completed in 1995. The authorized project resulting from the Feasibility Study will provide storm damage protection to the island's highly developed communities, which are subject to wave attack and flooding during major storms and hurricanes. The US Army Corps of Engineers-New York District is currently conducting a Limited Reevaluation Report (LRR) to finalize plans. In support of the LRR, field investigations and data analyses were conducted to identify a suitable borrow area, or offshore location from which to take suitable beach fill material. This report presents the results of a surf clam stock assessment (the survey) that was conducted to characterize the existing relative abundances of surf clams in the proposed offshore borrow area.

The survey was conducted on August 22, 2003 along the south shore of Long Beach Island, New York in coastal waters approximately 1 mile southwest of Jones Inlet. A map of the overall survey area is presented in Figure 1.

Random sampling stations were selected within the potential borrow area (Figure 2) to estimate the density of surf clams. The methods used to conduct the survey are discussed below. Photographs were taken at sea to document field methods employed in the survey (Appendix A).

The objectives of the surf clam survey are to: (1) quantify the number of surf clams occurring within the delineated borrow area off the south shore of Long Beach Island, New York; and (2) compare the results of this survey to surf clam stock assessments conducted by the New York State Department of Environmental Conservation (NYSDEC) in 1992, 1993, 1996, 1999, and 2002. The US Army Corps of Engineers-NY District will use the data generated by the survey to assist the District in refining the potential borrow area. In addition to quantifying the numbers of surf clams, size distribution data was also collected.

2.0 Methodology

The following methods were also used by the NYSDEC in conducting prior surf clam stocks assessments. Furthermore, the protocol used in this survey follows the same methodology of the clam survey conducted between Fire Island and Montauk Point for the US Army Corps of Engineers-New York District (USACE, 2002). Using the same survey methods increases data comparability and compatibility.

Sampling of surf clam populations was undertaken in one (1) delineated borrow area. The locations of the sampling stations within the potential borrow area were randomly selected from a grid system using a random number generator. The grid was placed over the borrow area on a nautical chart. The interval of the grid was approximately 8 seconds of latitude by 4 seconds of longitude. Each corner of the boxes formed by the grid was numbered, and the numbers were entered into a random number generator program. Thirty primary sampling stations and two alternate sampling stations were randomly selected.

A local commercial clamming vessel (*F/V Ocean Girl*) was subcontracted to conduct the survey. The *F/V Ocean Girl* is an 80-foot stern-rigged commercial surf clam and ocean quahog fishing vessel owned and operated by Winter Harbor Brands, Inc. The clamming vessel's dredge was outfitted with modified gear to retain sub-legal clams. The modified gear consisted of lining the vessel's 90-inch clam dredge with 1-inch by 3-inch wire mesh. The small mesh size enabled the dredge to retain sub-legal clams. Culling rollers were also kept close together to facilitate the sorting of the sub-legal clams. A surf clam must be at least four inches (102 mm) in length to be retained for sale. A sub-legal clam is any clam shorter than four inches. The blade of the dredge was set at a depth of 4.5 inches. Hose length and tow warp was 140 feet and 130 feet, respectively. Water pressure was set at 80 psi. Documentation of each tow position was recorded using the vessel's on-board navigation system (LORAN C).

The vessel located each sampling station within the borrow areas using its on-board navigation system. Once the vessel reached a station, the captain dropped the dredge for a three-minute tow at a speed of 1.5 knots. At the end of the three minutes, the dredge was hauled back. The contents of the dredge were dumped into a hopper (Photograph 1).

Two on-board biologists, assisted by a two-man deck crew, sorted the contents of the dredge (Photographs 2-5). Hydraulically driven belts conveyed the contents of the dredge. Trash and non-target animals were removed from the catch. Catches that were less than 10 bushels, as estimated by eye, were measured in US bushels. Those catches that were greater than 10 bushels were conveyed to a calibrated hopper with a maximum capacity of 25 US bushels (Photographs 6 and 7). A one-half bushel of clams was retained and measured for overall length. Measurements were recorded to the nearest millimeter (Photographs 8 – 10). Note that when the catch was less than one half bushel (the required amount to represent a sub-sample), the entire catch was measured.

3.0 Results

3.1 Surf Clam Density

The survey data have been analyzed for surf clam population densities at each of the sampling stations. The catch was standardized for each trawl for varying speed and distance. A standard trawl by NYSDEC is 3,418 square feet. The catch was divided by the ratio of actual trawl area to standard trawl area (Table 1).

Standardized data indicate that the offshore borrow area delineated by the New York District has very small, to no localized surf clam populations (Figure 2).Twelve of the 32 stations sampled had less than one US Bushel taken. The maximum number of US

Bushels taken in one tow was 15.5. Table 2 presents the number of bushels taken from the sample stations within the potential borrow area.

Stations that contained limited numbers of clams were located in the deepest water and the stations containing the most clams were those closest to shore in the shallowest water (Figure 3). The stations that yielded 0.5 bushel of clams or less were all in water with depths greater than 30 feet, whereas the stations contain greater than 10 bushels were at depths less than 30 feet. These data are consistent with the known vertical distribution of adult surf clam beds that have an average depth of 50 feet (Fay et al, 1983).

3.2 Size Distribution Analysis

The clamming gear employed for the survey enabled the dredge to retain sub-legal clams (<102 mm). Only two of the stations sampled within the potential borrow area, contained sub-legal clams (Stations 258 and 267). Furthermore, out of 104 clams taken at these two stations, only 3 were of sub-legal length.

Legal-sized clams measured from representative sub-samples were large. Of the 32 stations that were sampled, 28% contained clams that ranged from 120 to 170 mm. Only two (Stations 267 and 216) had clams with a mean length of less than 120 mm. Figure 4 presents the representative size distributions of those clams retained and measured from sub-samples.

The density and size distribution of surf clams found in this study is consistent with other investigations. Surf clams can inhabit waters from the surf zone to a depth of 400 feet; however, Ropes (1978) reported that the highest populations off Long Island are found at depths of less than 60 feet. It has also been reported that clams offshore grow faster and attain a larger maximum size than clams inshore (Wagner, 1984; Ambrose et al, 1980). Cerrato and Keith (1992) report an inverse relationship between density and growth rate with high clam density negatively affecting growth rates. Thus, sparsely populated areas will tend to have larger clams.

3.3 Comparison to NYSDEC Surf Clam Surveys

The New York State Department of Environmental Conservation (the Department) conducted annual surf clam surveys in 1992, 1993, 1994, 1996, 1999, and 2002. Since 1996, the Department has conducted surveys every three years to determine an annual harvest quota that allows for sustainable population levels. The Department contracted the *F/V Ocean Girl* to conduct the surveys, and the methodologies employed in this survey are the same as those employed by the Department.

The Department established sampling locations in the certified shellfishing waters of New York from approximately two miles east of Rockaway Inlet east to Montauk Point. Distance from shore was from the beach out to three miles offshore (Fox, 1992, 1993, 1994). Note that the surf zone was excluded from the survey due to vessel draft restrictions. The stratification of the survey location was based on historical landings of commercial surf clamming operations. Those waters west of Fire Island Inlet were sampled more extensively because they were thought to contain the greatest concentrations of clams as well as the highest variability in populations due to 'patchy' distributions (Fox, 1992). Accordingly, this stratum was allocated the highest number of stations. Conversely, those waters east of Fire Island Inlet approximately three miles from shore were allocated the fewest number of stations because this stratum historically contained lower concentrations of clams and the least amount of population variability. Three regions were established in both the west and east strata (i.e., W1, W2, W3, etc.) Each region was named according to the distance from shore. For example, W1 contained sampling locations to the west of Fire Island Inlet one mile offshore. Figure 5 presents the sampling locations surveyed by the Department in 1992, 1993, and 1994.

From 1996 to 2002, the NYSDEC survey area extended from the shellfish closure line west of Rockaway Inlet to Montauk Point (Davidson and Linehan, 2002). The survey area was divided into four regions: Rockaway Inlet to Jones Inlet (RJ), Jones Inlet to Fire Island Inlet (JF), Fire Island Inlet to Moriches Inlet (FM), and Moriches Inlet to Montauk Point (MM). Each region contained strata defined by the distance from shore as in the surveys conducted from 1992-1994. Figure 6 presents the sampling locations surveyed by the Department in 2002.

Note that although the Department did not extensively survey the proposed borrow areas described above, the apparent trends in catch data are complimentary to those from this study. Concentrations of surf clams are greater in sampling locations that are closer to shore in shallower water (Figure 5). In 2002, the greatest number of surf clams was taken in strata close to shore, and stratum JF-2 (two miles offshore) had the greatest average catch, 50.1 bushels (Figure 6). Similarly, in this survey the greatest numbers of surf clams were taken at stations 193, 238, 225, and 267 in the proposed borrow area (Figure 2). These stations are located close to shore in water depths of less than 30 feet.

Offshore populations grow faster and attain a larger maximum size than clams inshore (Wagner, 1984; Ambrose et al, 1980). In 2002, the frequencies for the smaller size classes decreased with increasing distance from the shore. Stratum RJ-3 had the maximum length frequency of clams at 130-139 mm size class. Of the 32 stations sampled in this survey, only two (Stations 267 and 216) had clams with a mean length of less than 120 mm. The absence of small clams in the proposed borrow pit may indicate an absence of surf clam seed as found in the 2002 survey for this region.

3.4 Commercial Implications

Note that commercial industry depends on a healthy and viable stock of surf clams to thrive. As a result of the most recent data collected by the NYSDEC (not including the data presented in this report), individual licensed commercial clamming vessels are allowed to take up to 672 Industry Bushels per week. An Industry Bushel is 1.5 times larger than a standard US Bushel. The NYSDEC has calculated that the actual stock size is twice that which vessels are allowed to keep. The NYSDEC maintains this 'buffer' to protect both resource and industry.

Because a vessel's harvest of clams is limited by permit, decisions on where to clam are based on obtaining the maximum allowable harvest at the lowest cost per bushel. This decision considers the density and proximity of clam beds. Because the permit limits maintain a healthy stock of clams available for harvest, clammers generally meet the permit quotas. Decisions on how much to harvest are therefore controlled by the permit levels, not by the availability clams for harvest.

The clam population in the proposed borrow area is small. The proposed borrow area is in deep water where populations densities are lower. It is unlikely the commercial clammers currently exploit the borrow area because of the combination of lower clam densities and greater distance from port. Thus, the loss of clams in the proposed borrow area would have a negligible effect on the surf clam industry.

4.0 References

1. Ambrose, W.G. Jr., D.S. Jones, and I. Thompson. 1980. Distance from shore and growth rate of the suspension feeding bivalve, Spisula solidissima. Proc. Nat. Shellfish. Assoc. 70: 207-215.

2. Cerrato, R.M. and D.L. Keith. 1992. Age structure, growth, and morphometric variations in the Atlantic surf clam. Mar. Biol. 114: 581-593.

3. Davidson, M. and J. Linehan. 2002. New York State Department of Environmental Conservation: Atlantic Ocean Surfclam Population Assessment Survey.

4. 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 Wildlife Service, Div. Biol. Serv., FWS/OBS-82/11.13.23 pp.

5. Fox, Richard, E. 1992. New York State Department of Environmental Conservation: Atlantic Ocean Surf Clam Population Assessment.

6. Fox, Richard, E. 1993 New York State Department of Environmental Conservation: Atlantic Ocean Surf Clam Population Assessment-Summary Data.

7. Fox, Richard E. 1994. New York State Department of Environmental Conservation: Atlantic Ocean Surf Clam Population Assessment – Summary Data.

8. Ropes, J.W. 1978 Biology and distribution of surf clams *(Spisula solidissima)* and ocean quahogs *(Arctica islandica)* off the northeast coast of the United States. In

Proceedings of the northeast clam industries: management for the future. April 27-28. Hyannis MA.]

9. USACE. 2002. Atlantic Coast of Long Island, Fire Island Inlet to Montauk Point, Storm Damage Reduction Reformulation Study - Surf Clam Assessment.

10. Wagner, E.S. 1984. Growth rate and annual shell structure patterns in a single year class of surf clams (*Spisula solidissima*) off Atlantic City, New Jersey. M.S. thesis, Rutgers University. New Brunswick, NJ. 161 pp.

Tables

Table 1. Standardization of surf clam raw catch within the potential Long Beach borrow area in August 2003.[1]

Station ID	Speed (knots)	Knots Covered per trawl	Length of trawl (ft)	Trawl Area (sq. ft.)	Ratio (Trawl to Standard)	Raw Catch	Standardized Catch
193	1.4	0.07	425.32	3190	93%	14.5	15.5
267	1.2	0.06	364.56	2734	80%	10.5	13.1
225	1.3	0.065	394.94	2962	87%	10	11.5
238	1.5	0.075	455.7	3418	100%	11	11.0
138	1.5	0.075	455.7	3418	100%	10.5	10.5
241	1.7	0.085	516.46	3873	113%	10.5	9.3
121	1.4	0.07	425.32	3190	93%	7.5	8.0
287	1.5	0.075	455.7	3418	100%	8	8.0
258	1.7	0.085	516.46	3873	113%	9	7.9
277	1.3	0.065	394.94	2962	87%	6.5	7.5
136	1.7	0.085	516.46	3873	113%	8	7.1
149	1.4	0.07	425.32	3190	93%	6.5	7.0
216	1.5	0.075	455.7	3418	100%	7	7.0
222	1.4	0.07	425.32	3190	93%	6.5	7.0
76	1.5	0.075	455.7	3418	100%	6.5	6.5
24	1.5	0.075	455.7	3418	100%	5	5.0
211	1.5	0.075	455.7	3418	100%	5	5.0
169	1.3	0.065	394.94	2962	87%	3.5	4.0
73	1.2	0.06	364.56	2734	80%	2.5	3.1
112	1.4	0.07	425.32	3190	93%	2.5	2.7
157	1.3	0.065	394.94	2962	87%	0.5	0.6
33	1.5	0.075	455.7	3418	100%	0.5	0.5
213	1.6	0.08	486.08	3646	107%	0.5	0.5
5	1.7	0.085	516.46	3873	113%	0.5	0.4
18	1.7	0.085	516.46	3873	113%	0.5	0.4

[1] Catch is standardized to an area of 3,418 square feet.

Table 1. (Continued.)

Station ID	Speed (knots)	Knots Covered per trawl	Length of trawl (ft)	Trawl Area (sq. ft.)	Ratio (Trawl to Standard)	Raw Catch	Standardized Catch
9	1.3	0.065	394.94	2962	87%	0.25	0.3
88	1.6	0.08	486.08	3646	107%	0.25	0.2
130	1.9	0.095	577.22	4329	127%	0.25	0.2
21	1.2	0.06	364.56	2734	80%	0	0.0
27	1.2	0.06	364.56	2734	80%	0	0.0
67	1.5	0.075	455.7	3418	100%	0	0.0
79	1.5	0.075	455.7	3418	100%	0	0.0

Table 2. Number of US bushels of surf clams taken from sample stations within the potential Long Beach borrow area in August 2003.[1]

Station ID	Latitude	Longitude	Standardized Catch	Water depth	Clam Width (mm) Max	Min	Mean
193	40 34 05	73 35 42	15.5	23.0	157.48	119.38	139.7
267	40 34 25	73 38 16	13.1	29.2	137.16	101.6	119.38
225	40 34 16	73 37 18	11.5	25.4	147.32	116.84	132.08
238	40 34 18	73 36 08	11.0	23.0	149.86	119.38	137.16
138	40 34 01	73 36 00	10.5	28.0	177.8	124.46	137.16
241	40 34 16	73 35 95	9.3	21.0	154.94	119.38	142.24
121	40 34 00	73 37 27	8	28.8	152.4	114.3	124.46
287	40 34 25	73 36 21	8.0	23.5	154.94	116.84	137.16
258	40 34 23	73 38 61	7.9	29.5	149.86	45.72	129.54
277	40 34 25	73 37 14	7.5	25.9	154.94	119.38	134.62
136	40 34 00	73 36 10	7.1	29.0	167.64	121.92	137.16
149	40 33 98	73 35 05	7	33.5	167.64	104.14	134.62
216	40 34 16	73 38 14	7	29.5	144.78	104.14	119.38
222	40 34 16	73 37 39	7	25.0	142.24	116.84	129.54
76	40 33 50	73 37 02	6.5	37.0	157.48	129.54	142.24
24	40 33 45	73 37 00	5.0	35.8	154.94	132.08	142.24
211	40 34 12	73 38 39	5	32.7	154.94	116.84	132.08
169	40 34 09	73 37 54	4	27.3	139.7	106.68	124.46
73	40 33 51	73 37 16	3.1	35.5	160.02	124.46	137.16
112	40 33 01	73 38 28	2.7	31.7	170.18	139.7	152.4
157	40 34 08	73 38 52	0.6	31.6	160.02	121.92	137.16
33	40 33 42	73 36 12	0.5	38.2	165.1	121.92	139.7
213	40 34 16	73 38 23	0.5	30.0	157.48	114.3	137.16
5	40 33 46	73 38 44	0.4	33.3	170.18	111.76	137.16
18	40 33 46	73 37 34	0.4	39.1	165.1	119.38	142.24
9	40 33 48	73 38 27	0.3	33.3	157.48	111.76	137.16
88	40 33 52	73 35 94	0.2	39.0	144.78	119.38	134.62
130	40 34 06	73 36 46	0.2	30.4	160.02	134.62	144.78
21	40 33 43	73 37 20	0	38.3	0	0	0
27	40 33 46	73 36 54	0	30.5	0	0	0
67	40 33 49	73 37 52	0	37.7	0	0	0
79	40 33 54	73 36 45	0	35.0	0	0	0

[1] The number of US bushels was standardized for varying trawl speed and distance. Legal clam size is 102 mm. Stations are listed from highest to lowest number of bushels taken.

Figures

Long Beach Borrow Area

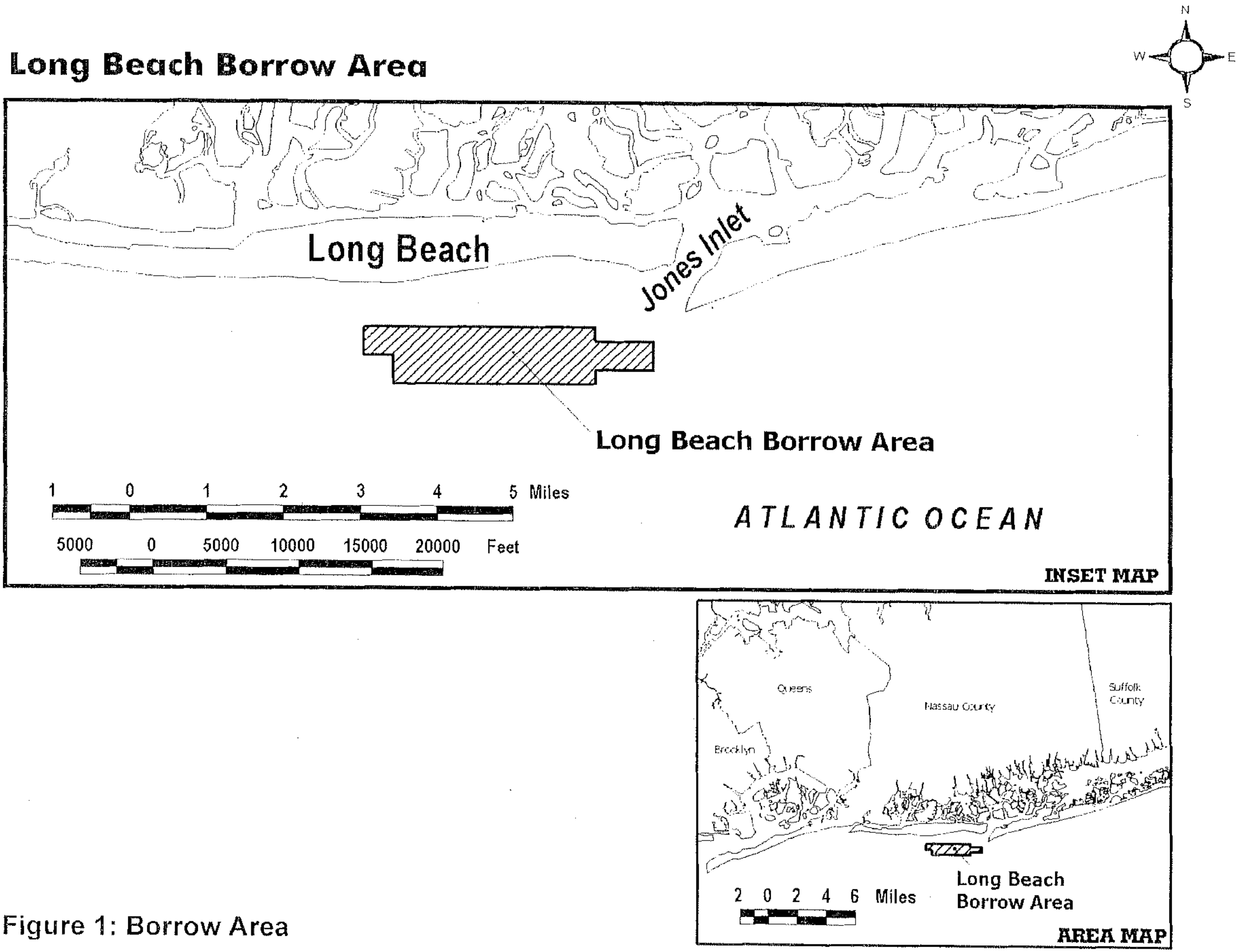
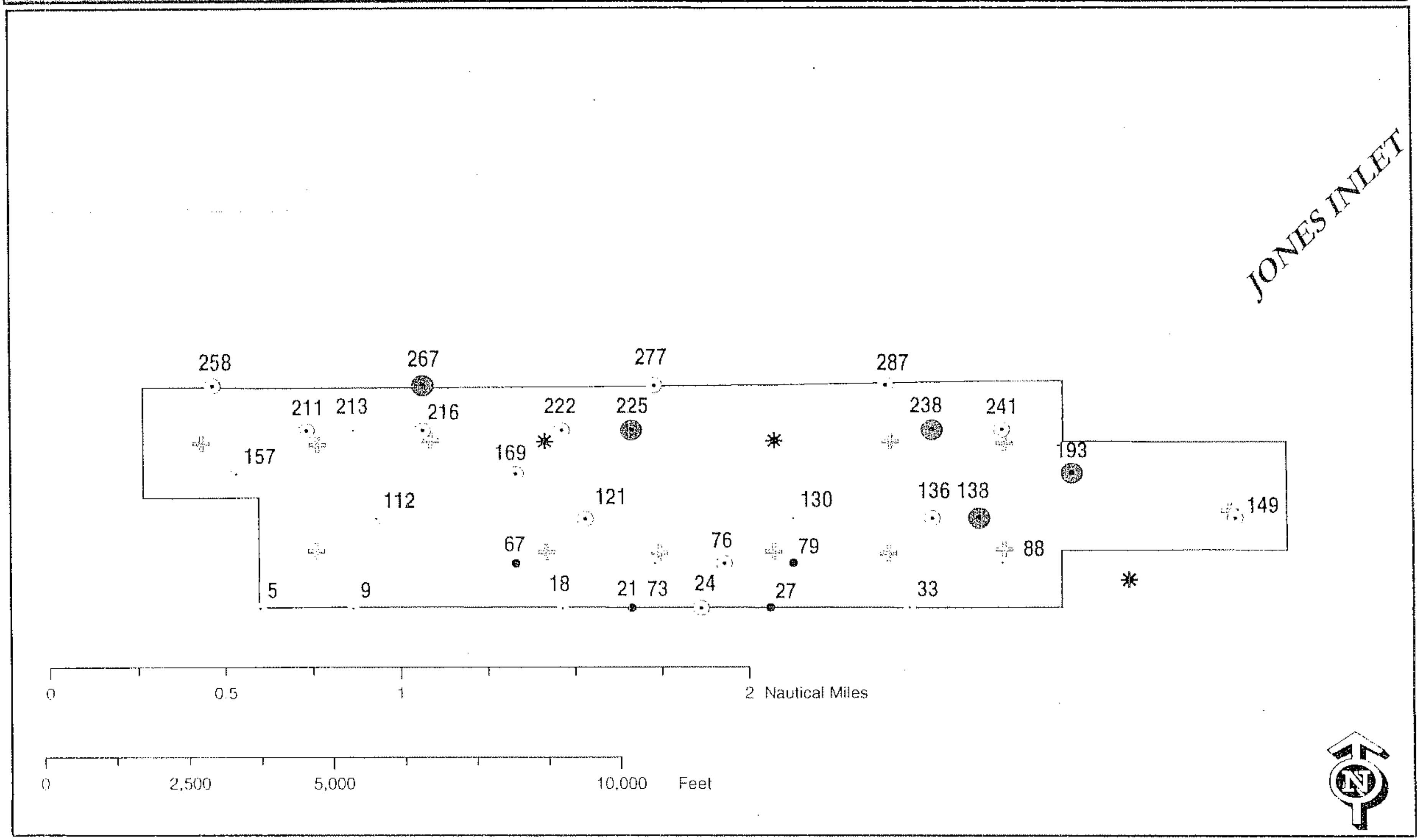


Figure 1: Borrow Area



Legend

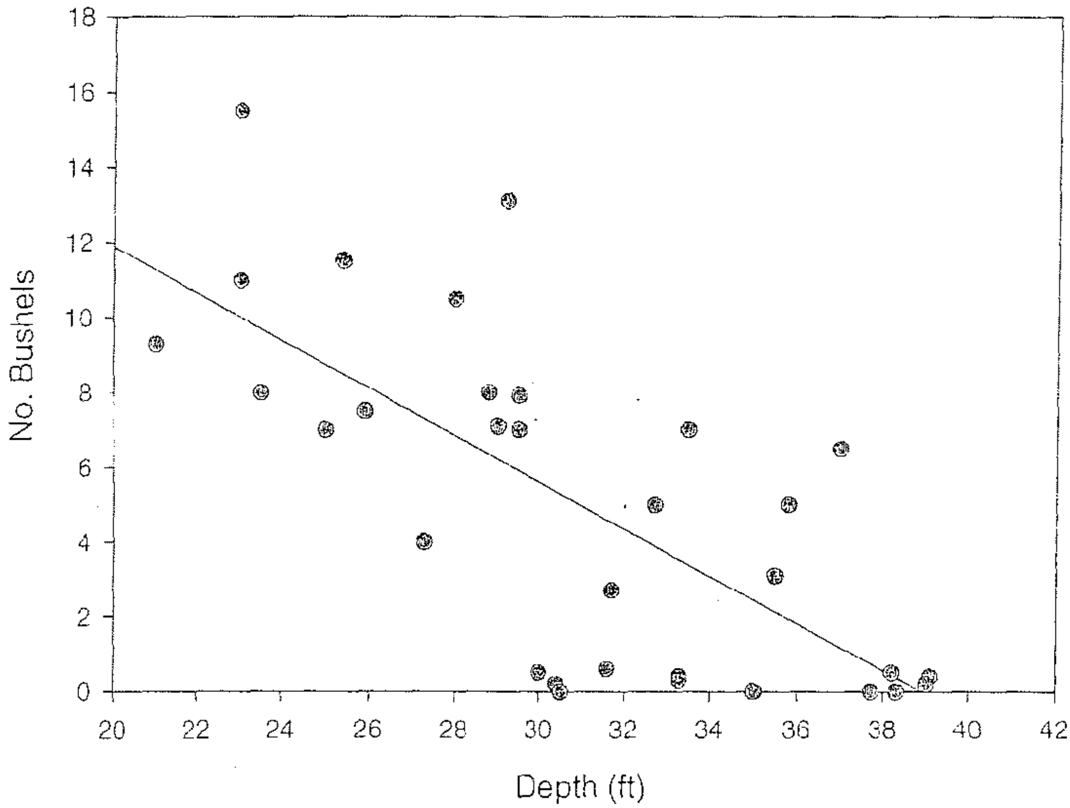
No. of Standardized US Bushels

- 0.00
- 0.25 - 3.50
- 5.00 - 10.00
- 10.50 - 15.50

Sand Core Quality

- Suitable Sand
- Unsuitable Sand

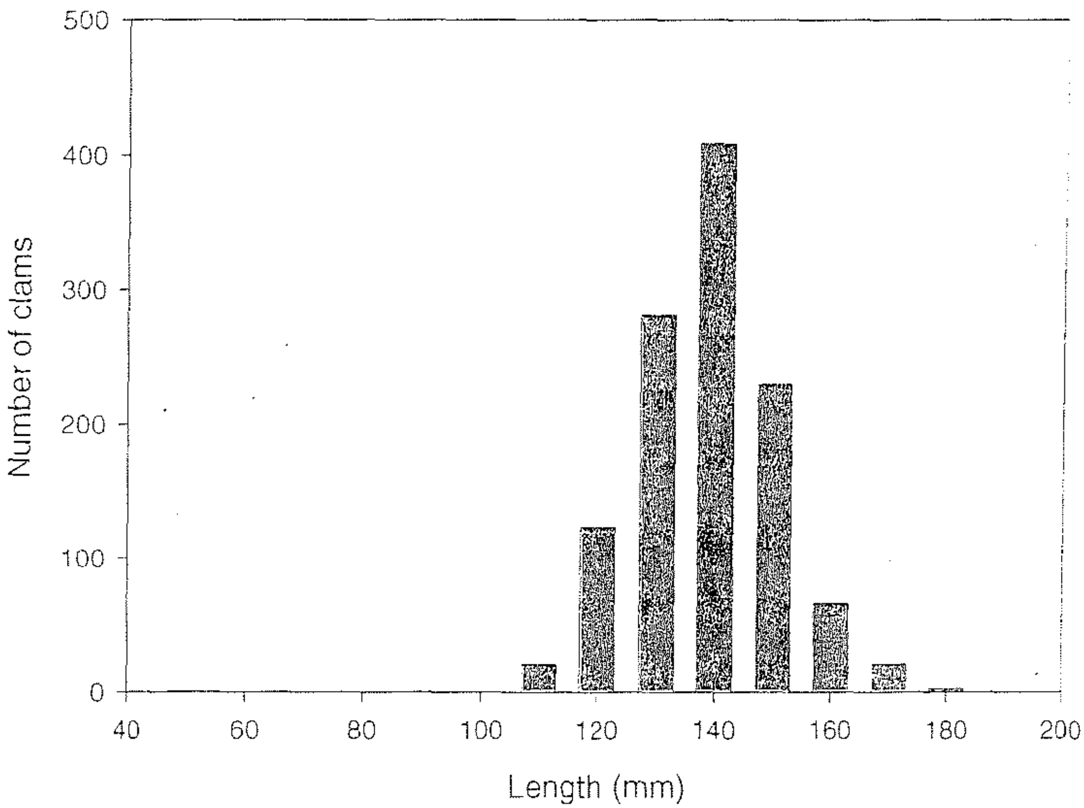
Figure 2: Survey Results



Long Beach Borrow Area Survey

Depth of Water vs. the Number of Bushels of Surf Clams taken in the Long Beach Borrow Area Surf Clam Stock Assessment
August 2003

Figure 3



Representative Size Distribution of Surf Clams taken in the Long Beach Borrow Area Surf Clam Stock Assessment
August 2003

Long Beach Borrow Area Survey

Figure 4

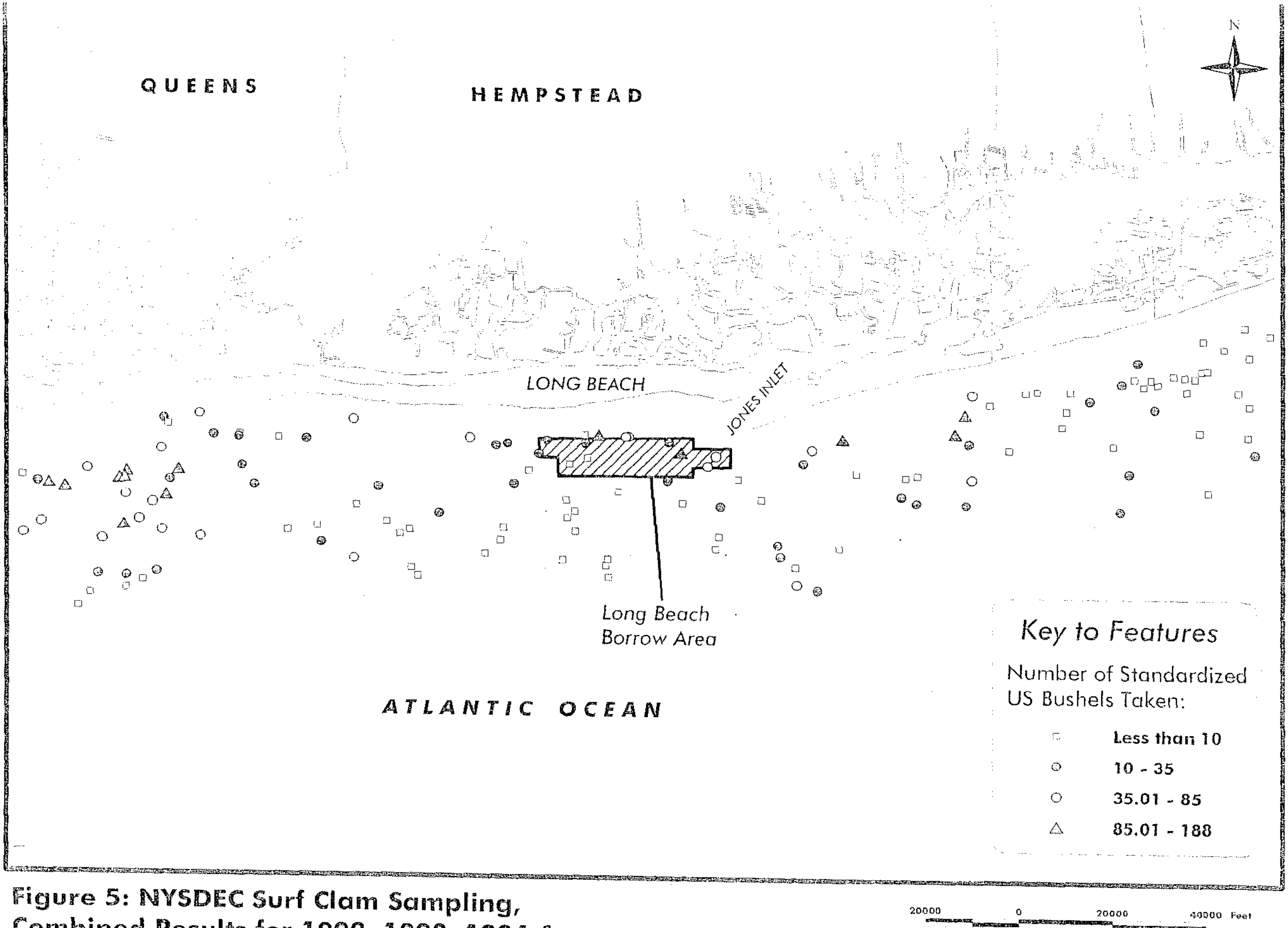


Figure 5: NYSDEC Surf Clam Sampling, Combined Results for 1992, 1993, 1994 Assessments

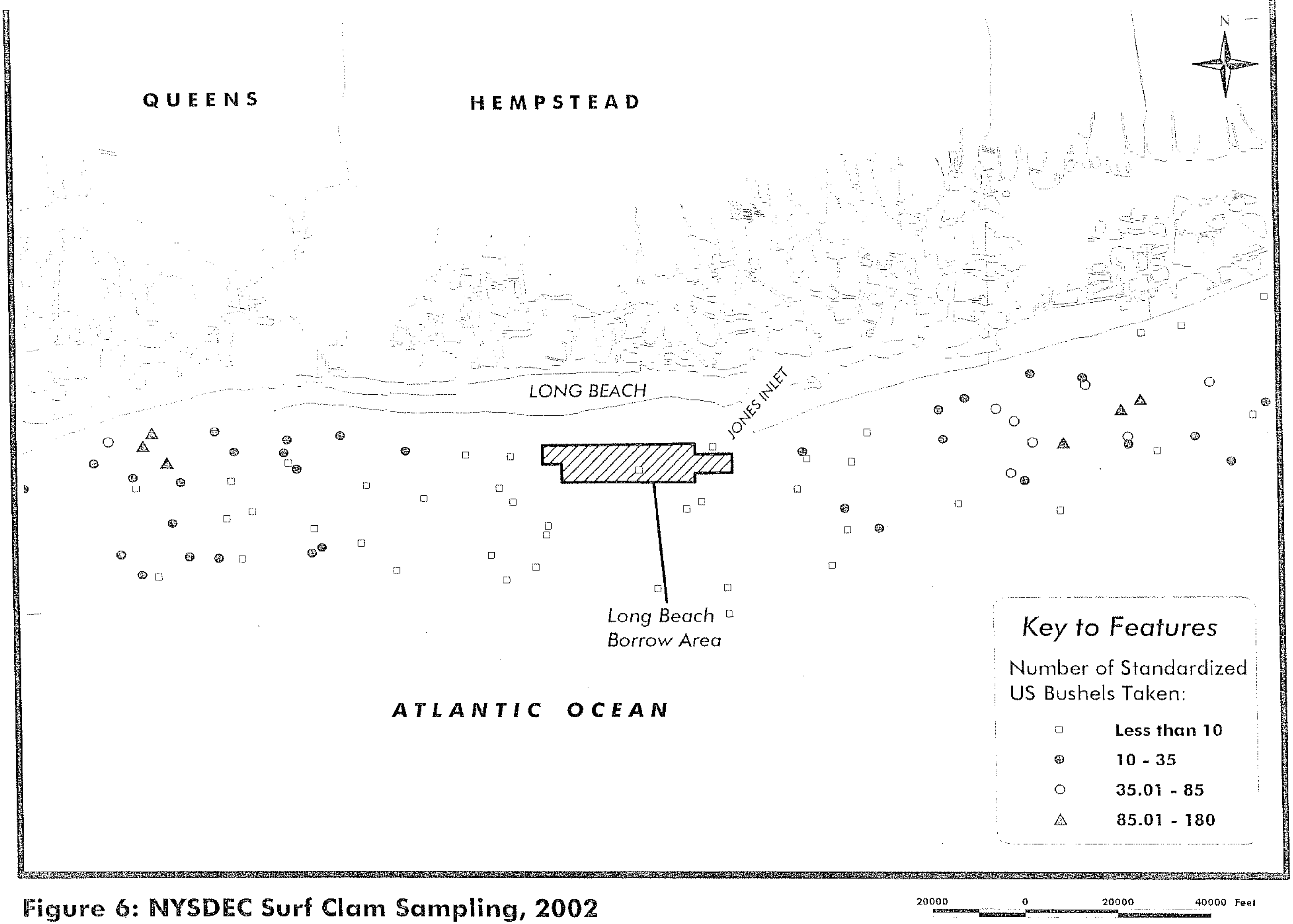


Figure 6: NYSDEC Surf Clam Sampling, 2002

Appendix A

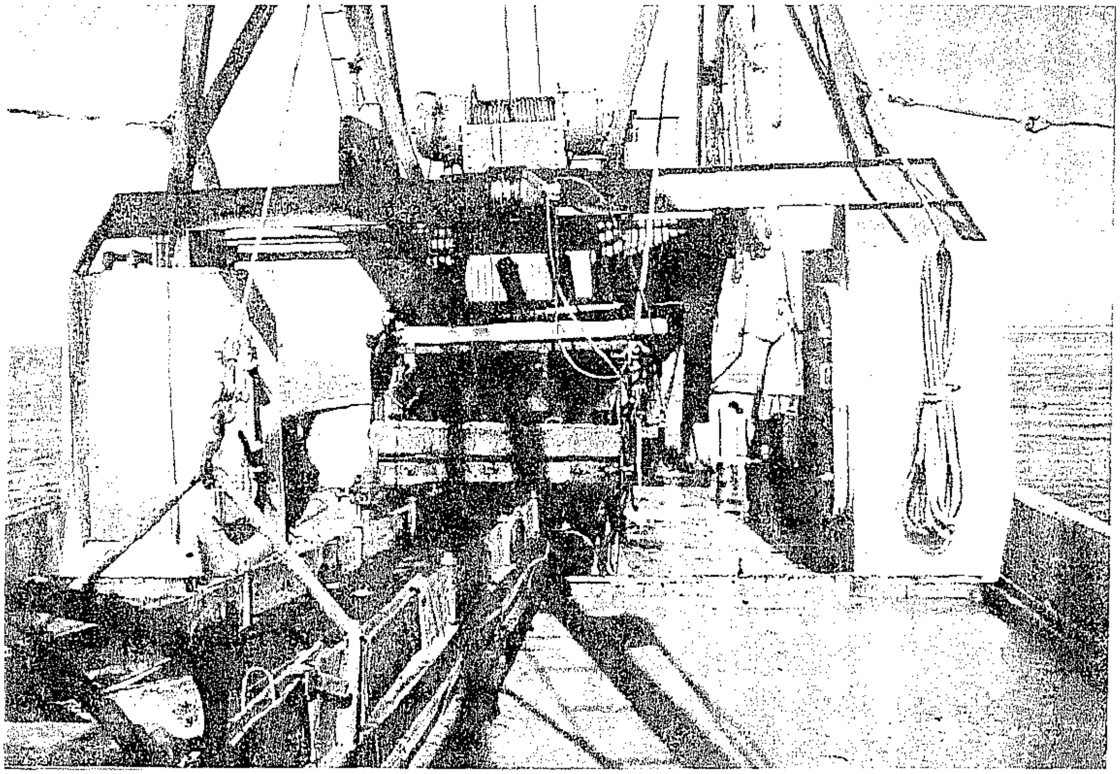


Photo 1

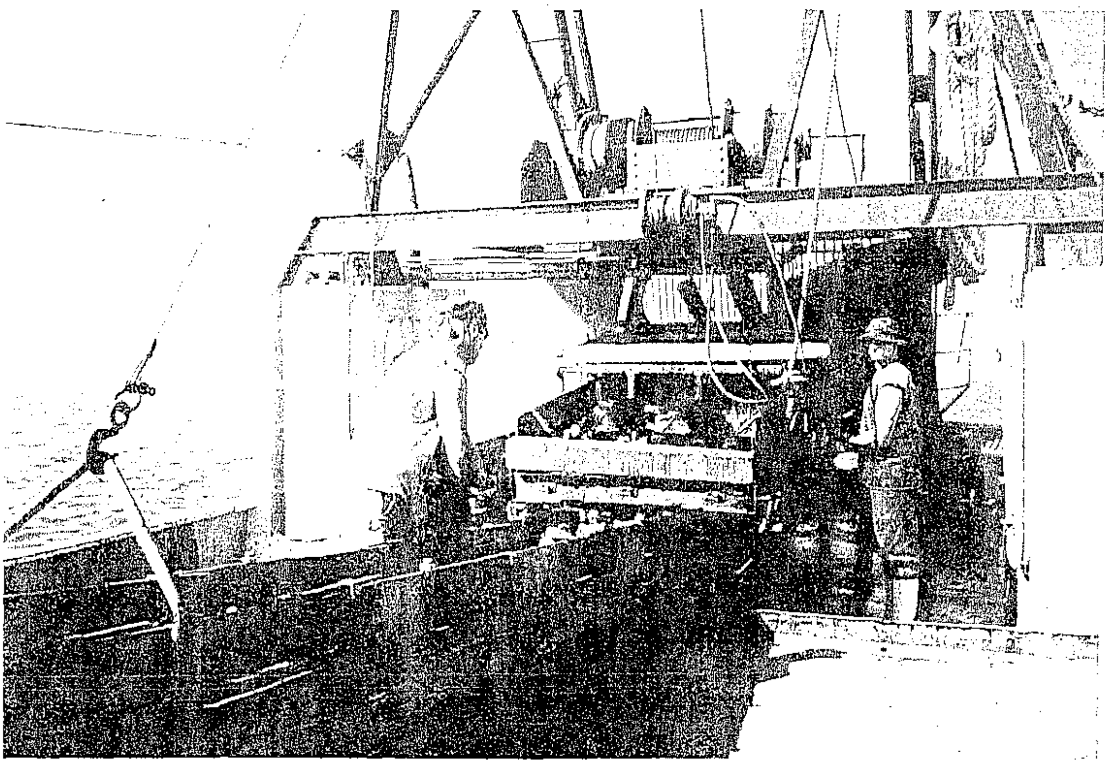


Photo 2

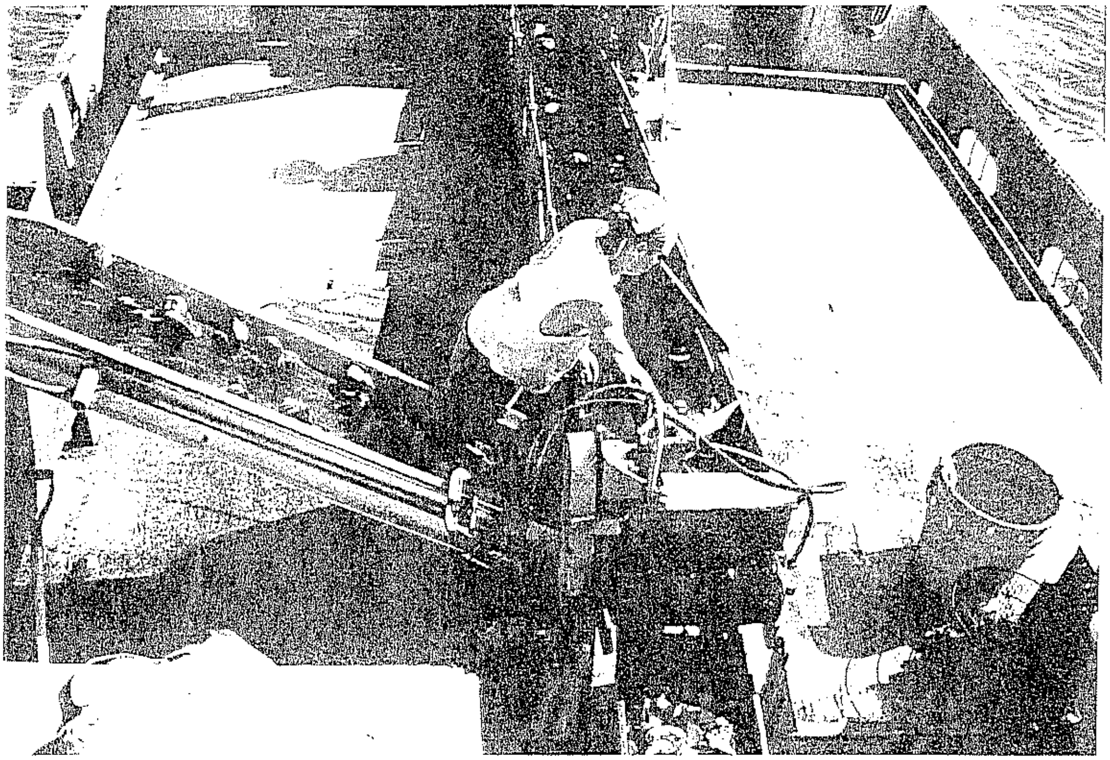


Photo 3

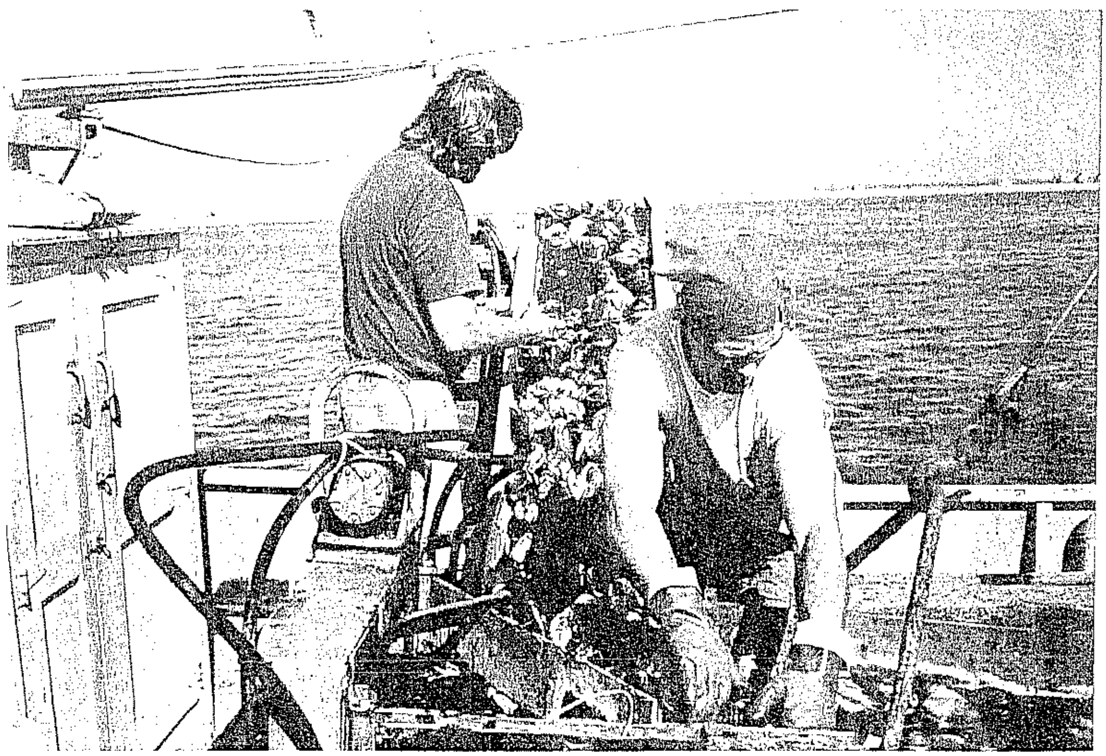


Photo 4

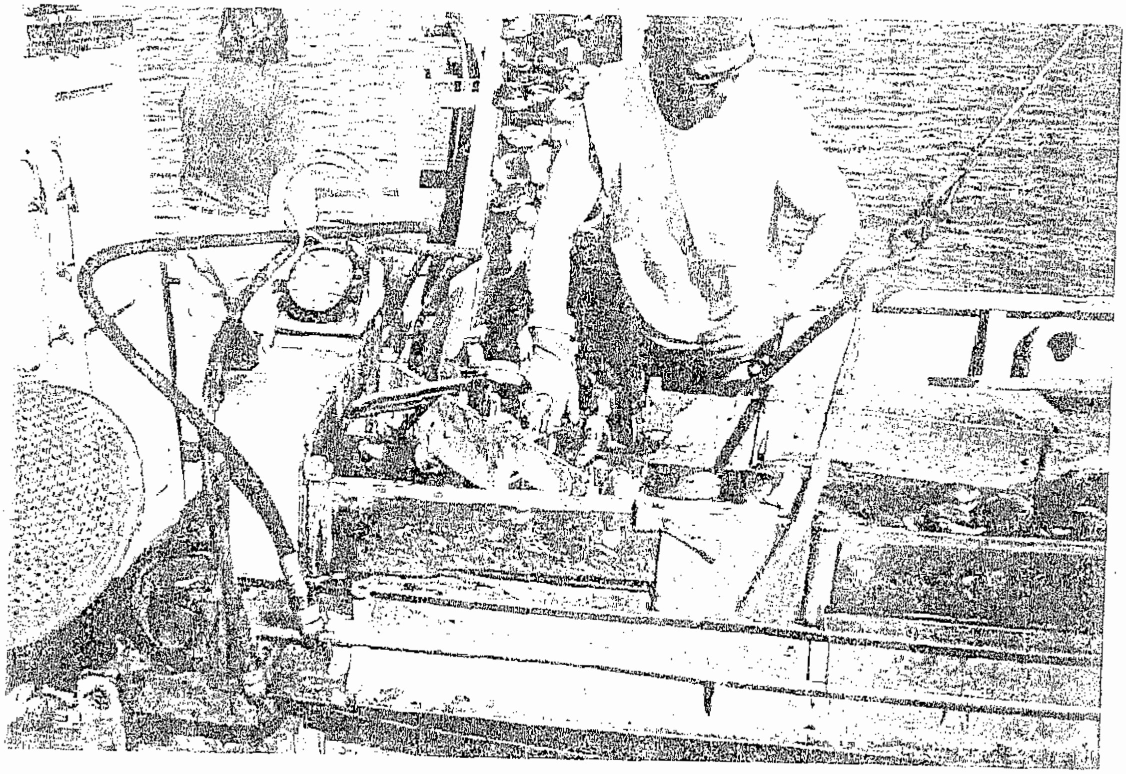


Photo 5

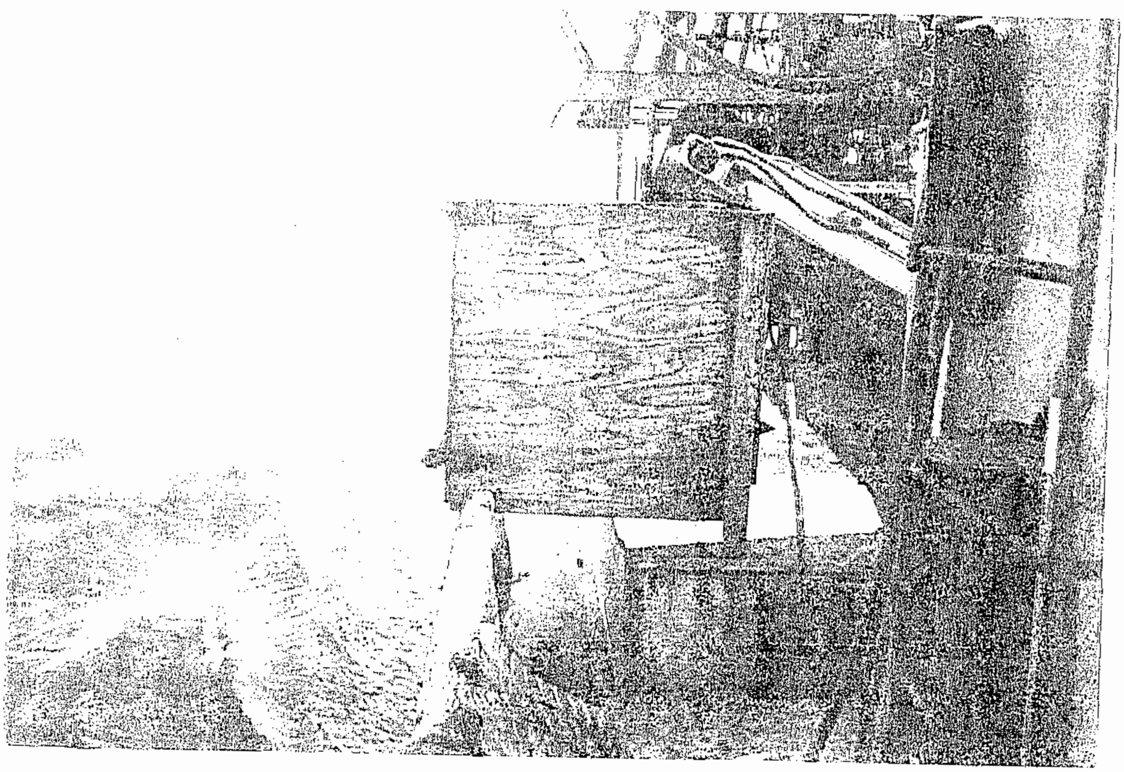


Photo 6

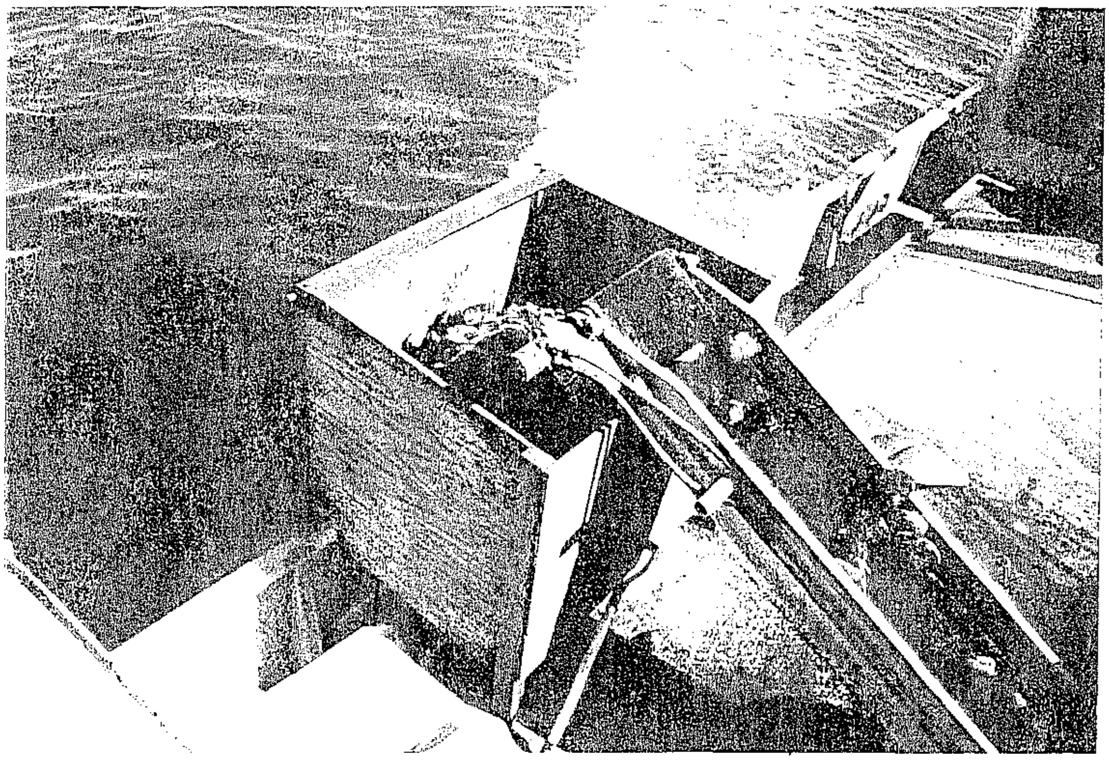


Photo 7

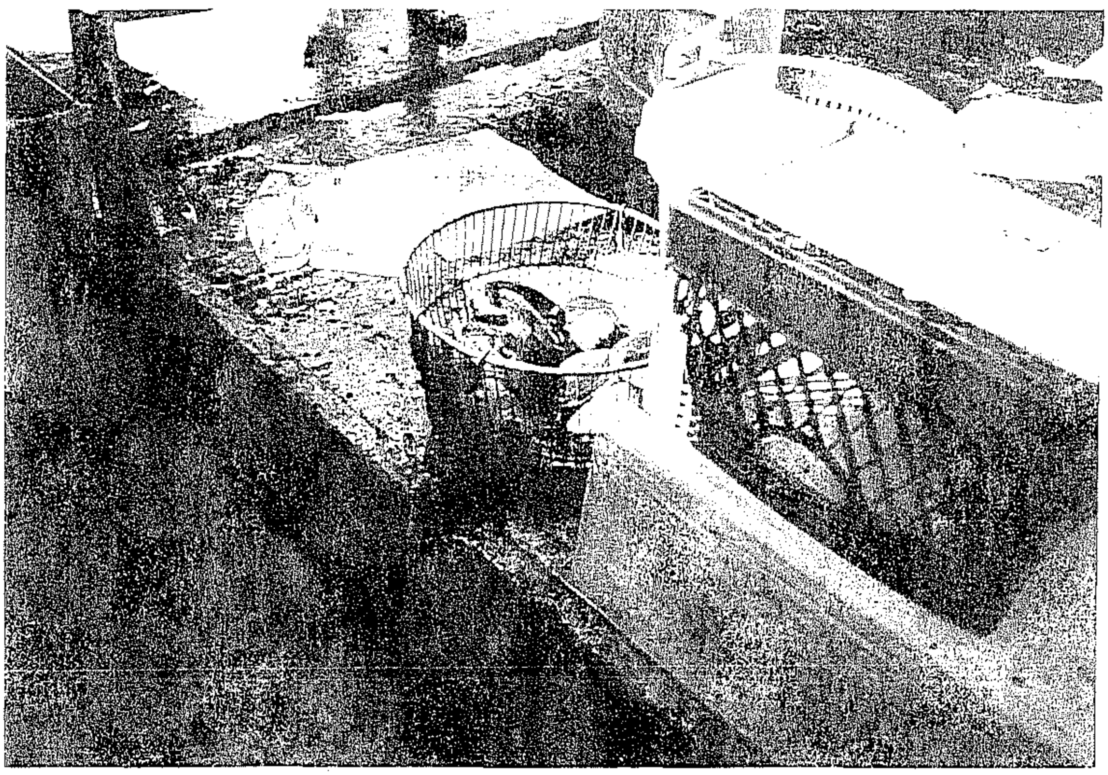


Photo 8

Photo 9

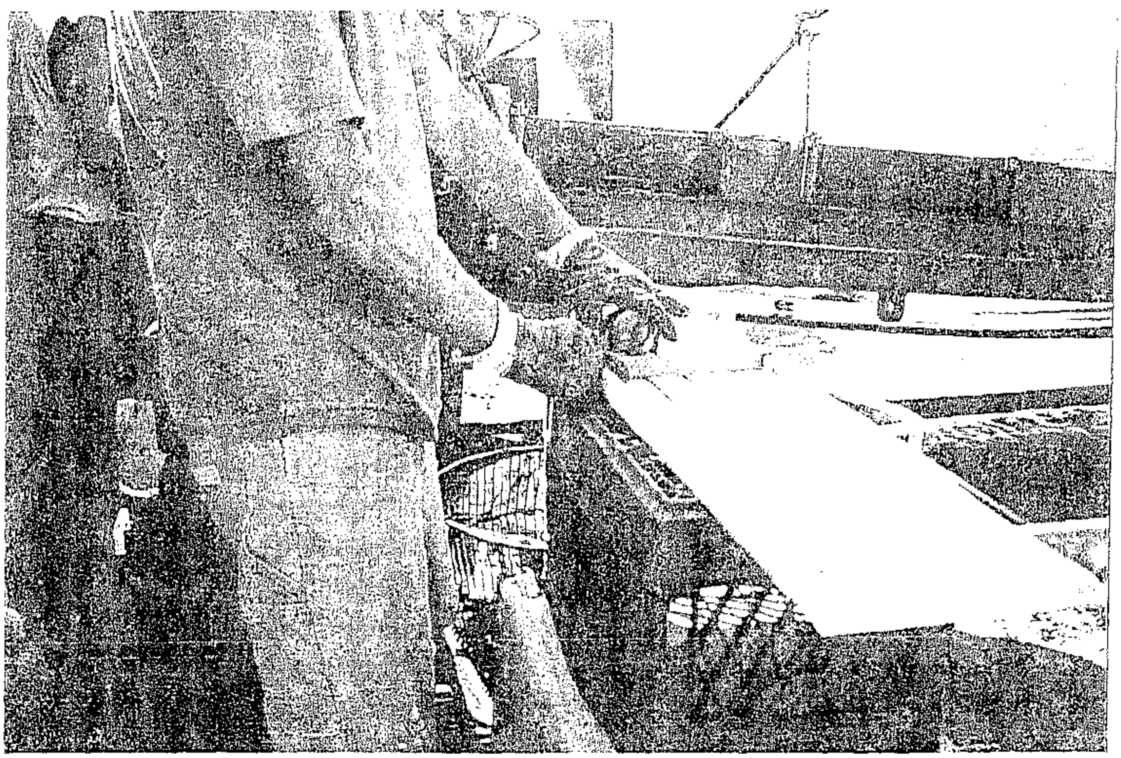


Photo 10

APPENDIX J
PROJECT MAILING LIST

Senator Hillary Rodham Clinton
United States Senate
476 Russell Senate Office Building
Washington, DC 20510

Senator Hillary Rodham Clinton
155 Pinelawn Road
Suite 250 North
Melville, NY 11747

Senator Charles Schumer
United States Senate
313 Hart Senate Building
Washington, DC 20510

Senator Charles Schumer
145 Pine Lawn Road #300
Melville, NY 11747

Congressman Peter King
436 Cannon House Office Building
Washington, DC 20515

Congressman Peter King
1003 Park Boulevard
Massapequa Park, NY 11762

Governor George E. Pataki
State Capitol
Albany, NY 12224

Senator Dean G. Skelos
New York State Senate
Room 503
State Capitol
Albany, NY 12247

Senator Dean G. Skelos
New York State Senate
55 Front Street
Rockville Centre, NY 11570

Assemblyman Harvey Weisenberg
New York State Assembly
LOB 731
Albany, NY 12248

Assemblyman Harvey Weisenberg
20 West Park Avenue
Long Beach, NY 11561

Mr. Roman Rakoczy
NYSDEC
Bureau of Flood Protection
625 Broadway
Albany, NY 12233-3507

Mr. John J. Laffey
City of Long Beach: City Manager
Kennedy Plaza
Long Beach, NY 11561

Mr. Leonard G. Remo
City of Long Beach: Council President
Kennedy Plaza
Long Beach, NY 11561

Mr. Rob Raab
City of Long Beach
Kennedy Plaza
Long Beach, NY 11561

Mr. Ron Masters
Town of Hempstead
Department of Conservation and
Waterways
Lido Boulevard
Point Lookout, NY 11569

Mr. Thomas Mahr
Director of Environmental Coordination
Office of the Nassau County Executive
1 West Street
Mineola, NY 11501

Ms. Denise Ford
Nassau County Legislature
1 West Street
Mineola, NY 11501

Mr. John Pavacic
NYSDEC
Building 40 SUNY
Stony Brook, NY 11790-2356

Mr. George Stafford
NYS Department of State
Division of Coastal Resources
and Water Front Revitalization
41 State Street
Albany, NY 12231

Mr. Steve Resler
NYS Department of State
Division of Coastal Resources
and Water Front Revitalization
41 State Street
Albany, NY 12231

Mr. Fred Anders
New York State Dept of State
Division of Coastal Resources
and Water Front Revitalization
41 State Street
Albany, NY 12231

Ms. Diane Rusanowsky
NOAA - Fisheries
Milford Lab
212 Rogers Ave.
Milford, CT 06460

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

Ms. Rosemarie Gnam
Field Supervisor
U.S. Fish and Wildlife Service
P.O. Box 608
Islip, NY 11751

Ms. Grace Musumeci
USEPA-Region II
290 Broadway
25th Floor
New York, NY 10007-3809

Ms. Ruth L. Pierpont
New York State Office of Parks,
Recreation & Historic Preservation
Historic Preserve Field Service Bureau
Peebles Island, PO Box 189
Waterford, NY 12188-0189

Mr. Mark Peckman
New York State Office of Parks,
Recreation & Historic Preservation
Historic Preservation Field Service
Bureau Peebles Island
P.O. Box 189
Waterford, NY 12188-0189

Mr. Barry S. Drucker
USGS – Marine Minerals Program
381 Elden Street
Mail Stop 4030
Herndon, VA 20170-4817

Mr. Joel Banslaben
Surfrider Foundation
NYC Chapter
P.O. Box 257
New York, NY 10014

Mr. Chris Manthey
Surfrider Foundation
19 Marquette Road
Montclair NJ 07043

Mr. Joe Moses
Surfrider Foundation
Central Long Island Chapter
P.O. Box 2817
North Babylon, NY 11703

Ms. Ericka D'avanzo
Surfrider Foundation
PO Box 683
Jensen Beach, FL 34958

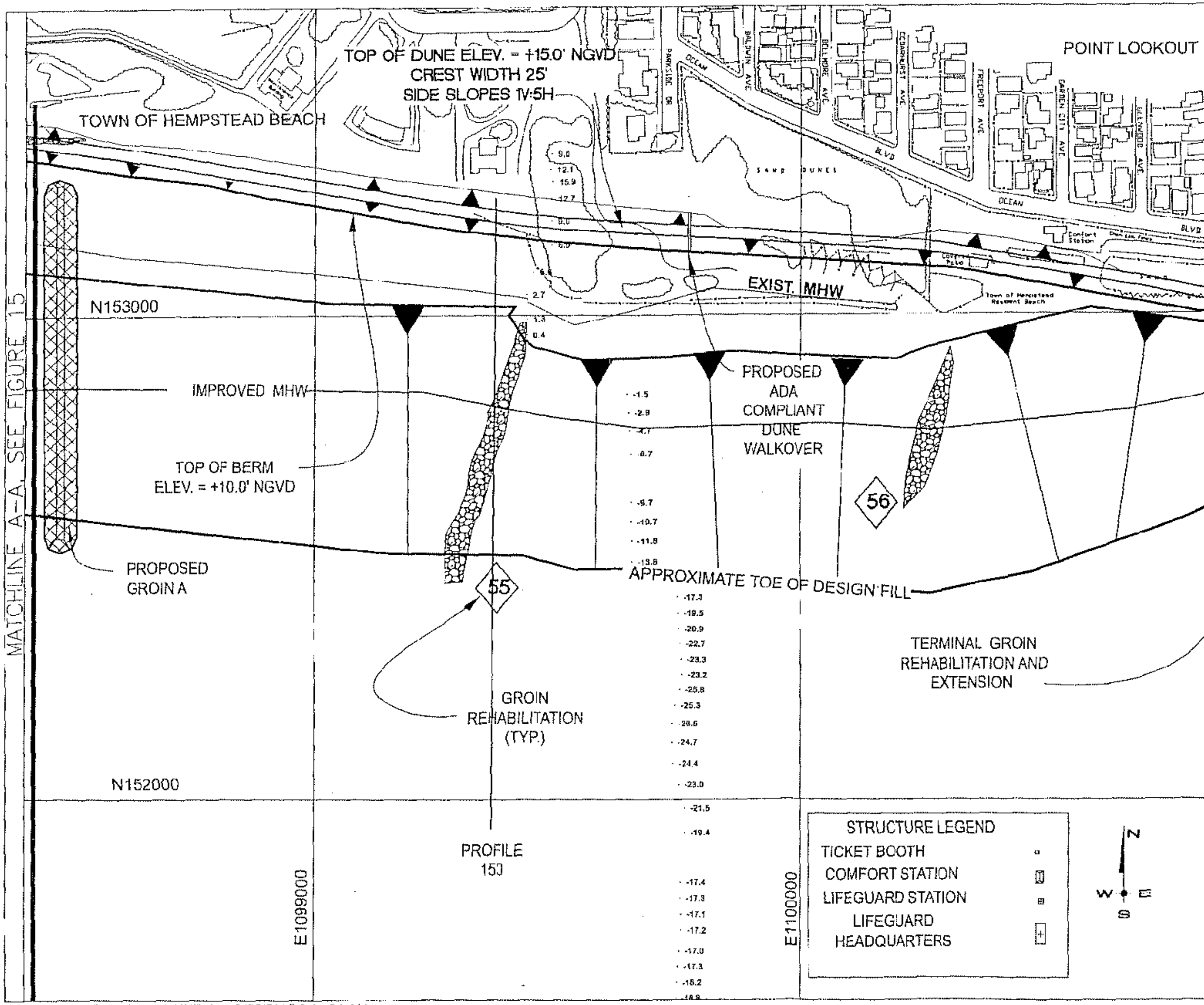
US Coast Guard
USCG Station Jones Beach
Freeport, NY 11520

Long Beach Public Library
111 W Park Avenue
Long Beach, NY 11561-3322

Long Beach Public Library
West End Branch
868 W Beech Street
Long Beach, NY 11561-1518

Long Beach Public Library
Point Lookout Branch
26B Lido Boulevard
Lido Beach, NY 11561-4857

APPENDIX K
PROJECT PLAN SHEETS



DEPARTMENT OF THE ARMY
NEW YORK DISTRICT CORPS OF ENGINEERS
NEW YORK, NEW YORK 10278

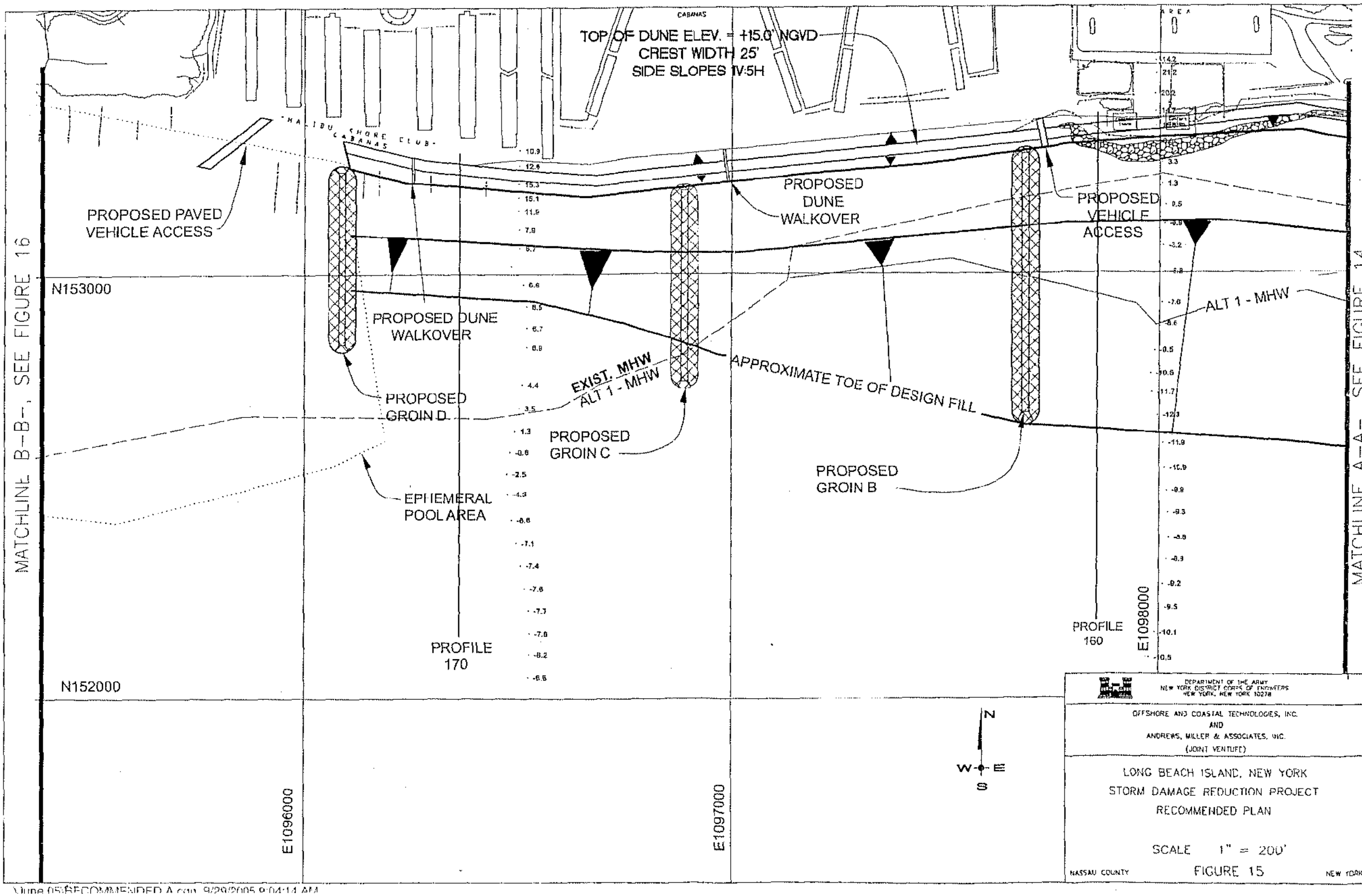
OFFSHORE AND COASTAL TECHNOLOGIES, INC.
AND
ANDREWS, MILLER & ASSOCIATES, INC.
(JOINT VENTURE)

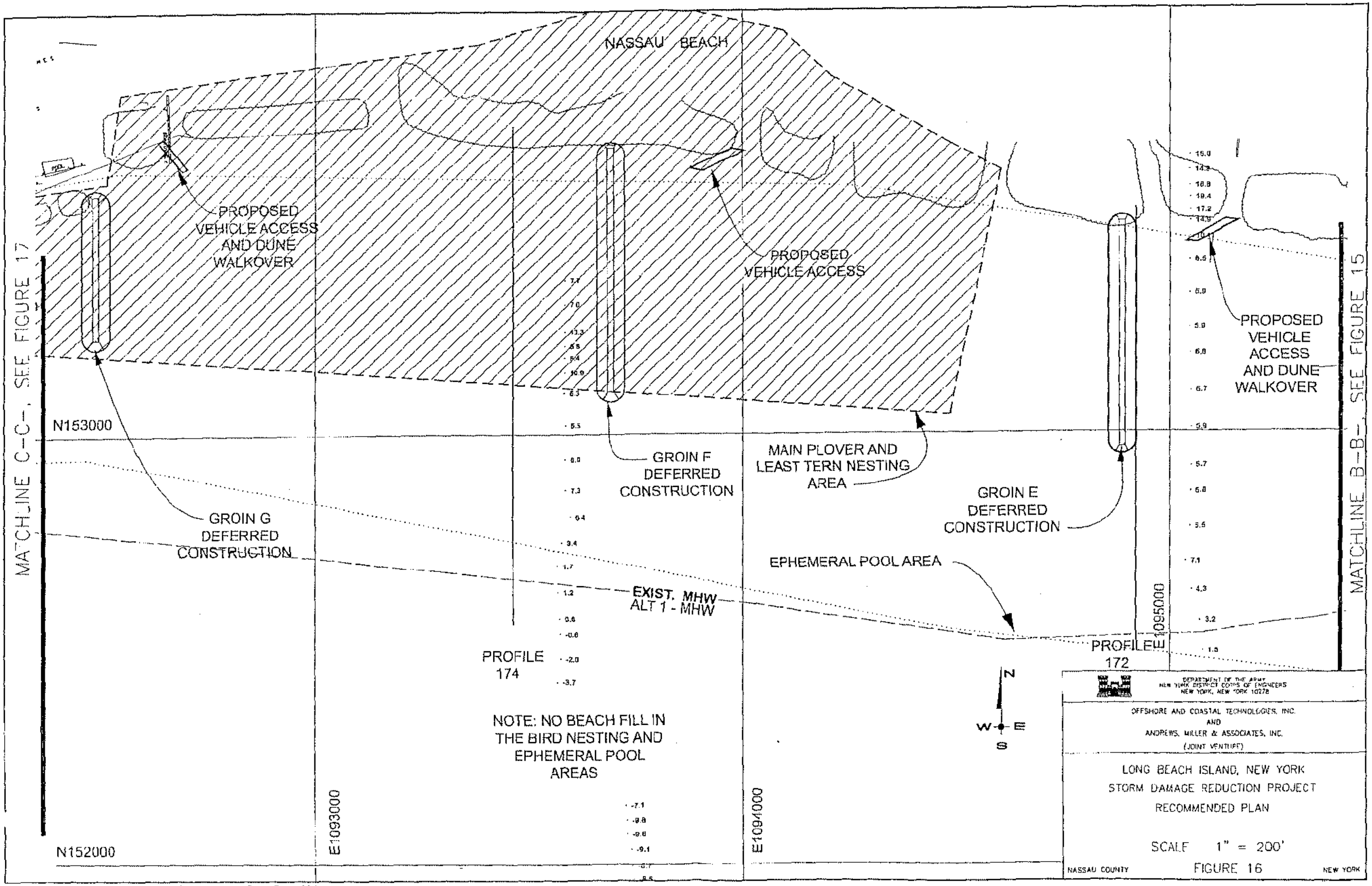
LONG BEACH ISLAND, NEW YORK
STORM DAMAGE REDUCTION PROJECT

RECOMMENDED PLAN
SCALE 1" = 200'
FIGURE 14

NASSAU COUNTY NEW YORK

...\June 05\RECOM-MOD DUNE.dgn 9/29/2005 9:01:04 AM


MATCHLINE B–B–, SEE FIGURE 16
MATCHLINE A–A–, SEE FIGURE 14
CABANAS
TOP OF DUNE ELEV. = +15.0' NGVD
CREST WIDTH 25'
SIDE SLOPES 1V:5H
MALIBU SHORE CLUB CABANAS
PROPOSED PAVED VEHICLE ACCESS
PROPOSED DUNE WALKOVER
PROPOSED DUNE WALKOVER
PROPOSED VEHICLE ACCESS
N153000
N152000
ALT 1 - MHW
EXIST. MHW
ALT 1 - MHW
APPROXIMATE TOE OF DESIGN FILL
PROPOSED GROIN D
PROPOSED GROIN C
PROPOSED GROIN B
EPHEMERAL POOL AREA
PROFILE 170
PROFILE 160
E1096000
E1097000
E1098000
N
W
E
S
DEPARTMENT OF THE ARMY NEW YORK DISTRICT CORPS OF ENGINEERS NEW YORK, NEW YORK 10278
OFFSHORE AND COASTAL TECHNOLOGIES, INC. AND ANDREWS, MILLER & ASSOCIATES, INC. (JOINT VENTURE)
LONG BEACH ISLAND, NEW YORK
STORM DAMAGE REDUCTION PROJECT
RECOMMENDED PLAN
SCALE 1" = 200'
NASSAU COUNTY
FIGURE 15
NEW YORK
June 05\RECOMMENDED A.con 9/29/2005 9:04:14 AM



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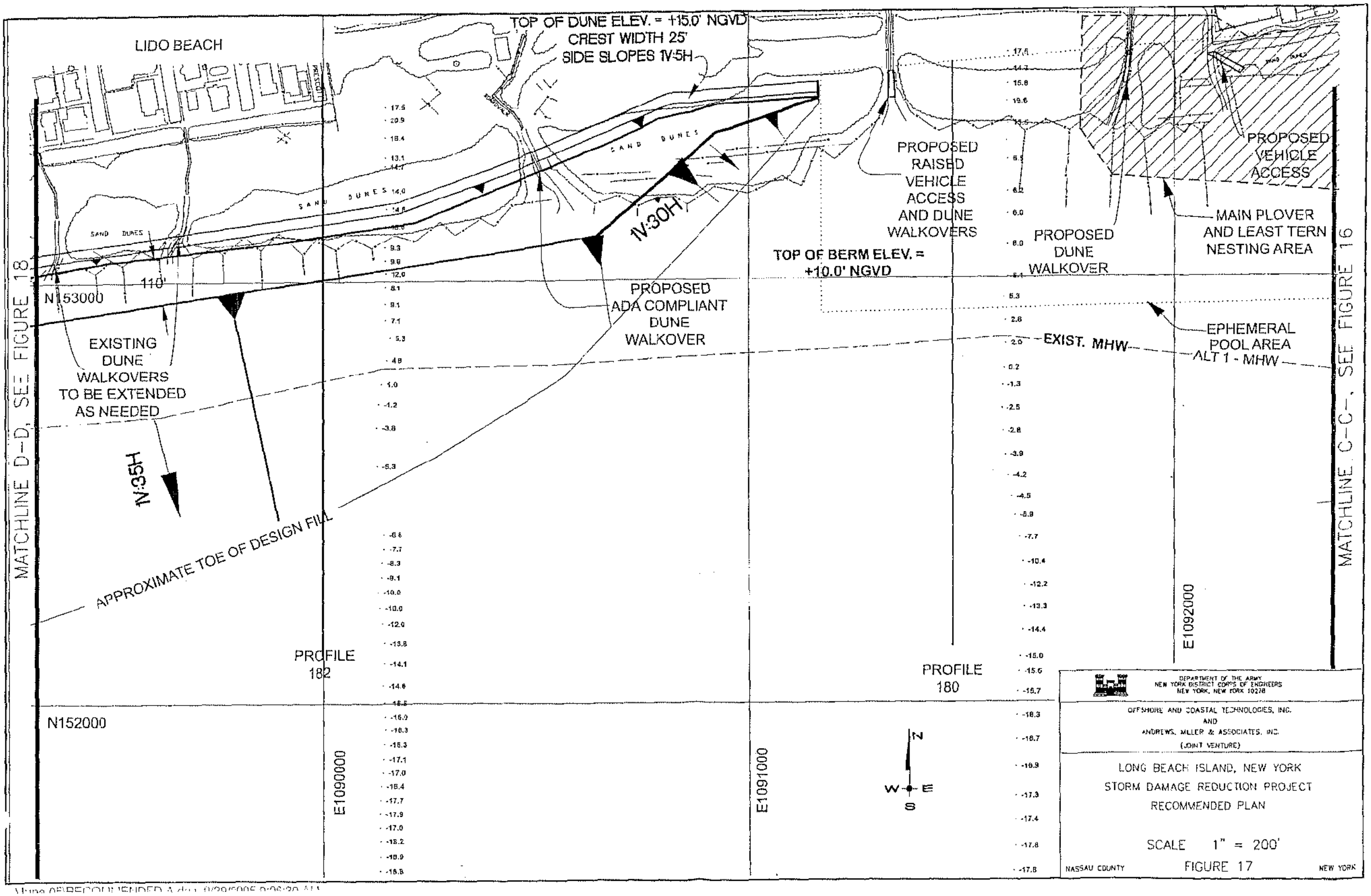
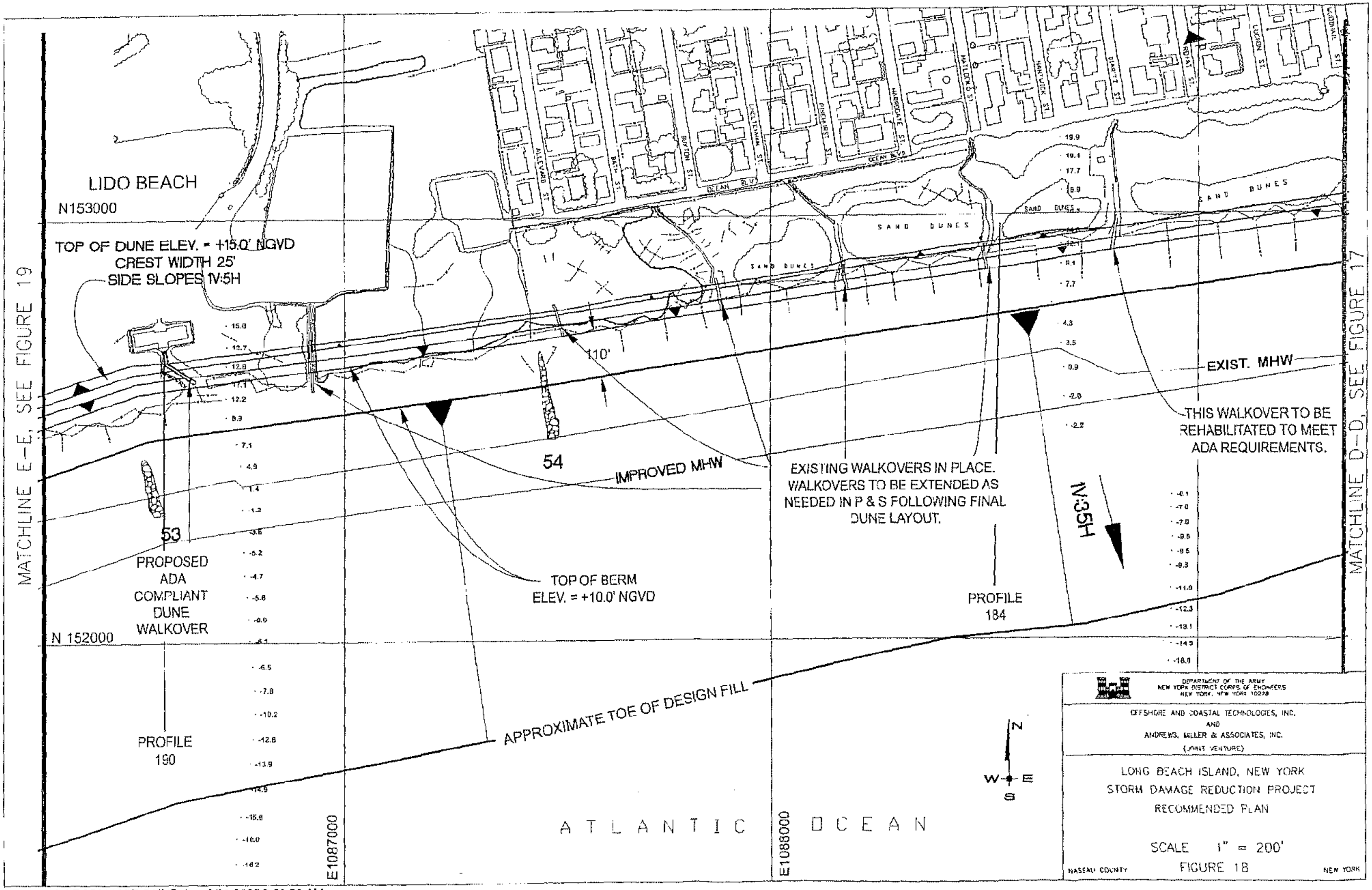


LIDO BEACH
TOP OF DUNE ELEV. = +15.0' NGVD
CREST WIDTH 25'
SIDE SLOPES 1V:5H
SAND DUNES
1V:30H
PROPOSED RAISED VEHICLE ACCESS AND DUNE WALKOVERS
PROPOSED VEHICLE ACCESS
TOP OF BERM ELEV. = +10.0' NGVD
PROPOSED DUNE WALKOVER
MAIN PLOVER AND LEAST TERN NESTING AREA
PROPOSED ADA COMPLIANT DUNE WALKOVER
EPHEMERAL POOL AREA
EXIST. MHW
ALT 1 - MHW
110'
N153000
EXISTING DUNE WALKOVERS TO BE EXTENDED AS NEEDED
1V:35H
APPROXIMATE TOE OF DESIGN FILL
MATCHLINE D-D, SEE FIGURE 18
MATCHLINE C-C, SEE FIGURE 16
PROFILE 182
PROFILE 180
N152000
E1090000
E1091000
E1092000
N
W
E
S
DEPARTMENT OF THE ARMY
NEW YORK DISTRICT CORPS OF ENGINEERS
NEW YORK, NEW YORK 10278
OFFSHORE AND COASTAL TECHNOLOGIES, INC.
AND
ANDREWS, MILLER & ASSOCIATES, INC.
(JOINT VENTURE)
LONG BEACH ISLAND, NEW YORK
STORM DAMAGE REDUCTION PROJECT
RECOMMENDED PLAN
SCALE 1" = 200'
NASSAU COUNTY
FIGURE 17
NEW YORK



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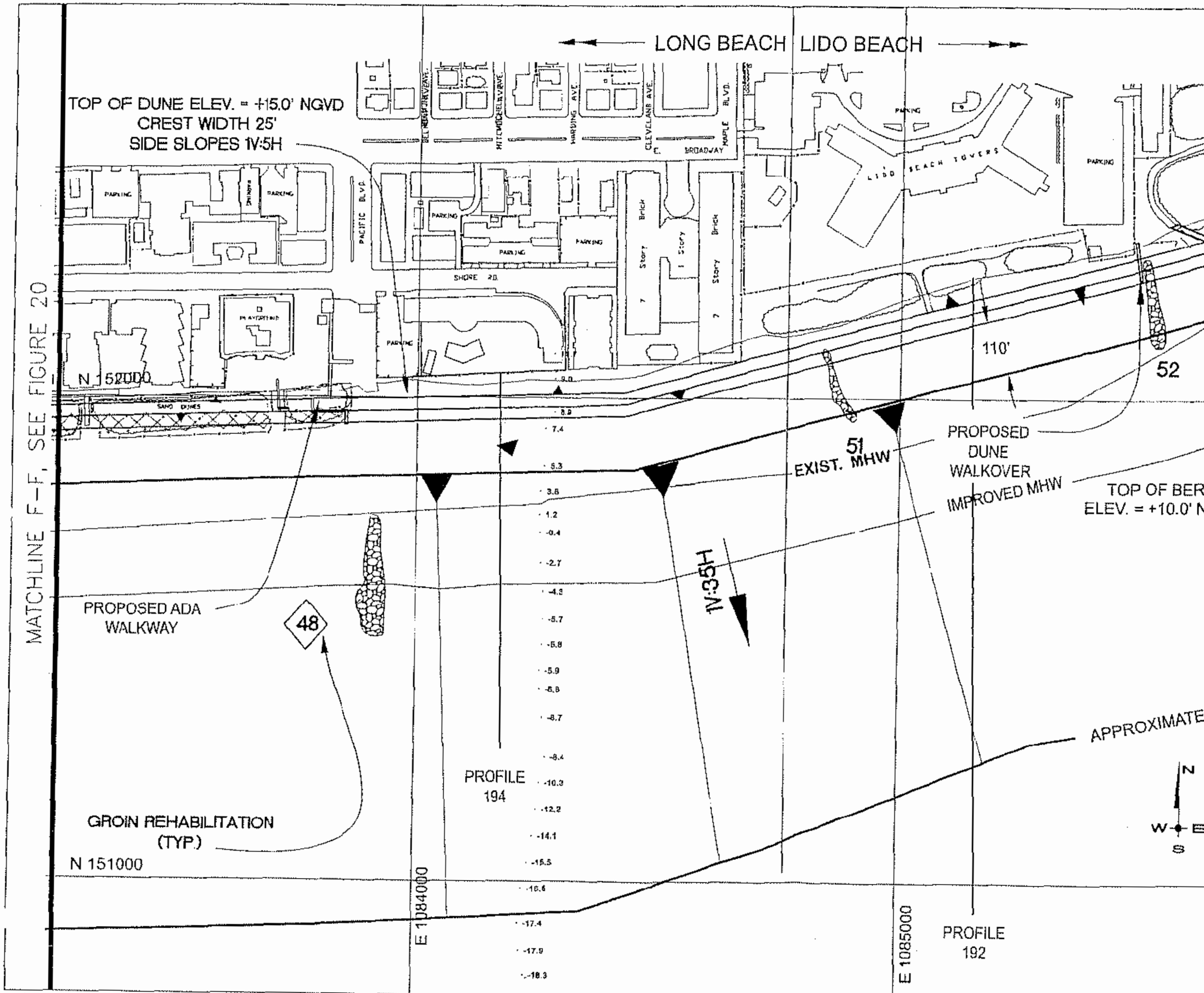


DEPARTMENT OF THE ARMY
NEW YORK DISTRICT CORPS OF ENGINEERS
NEW YORK, NEW YORK 10278

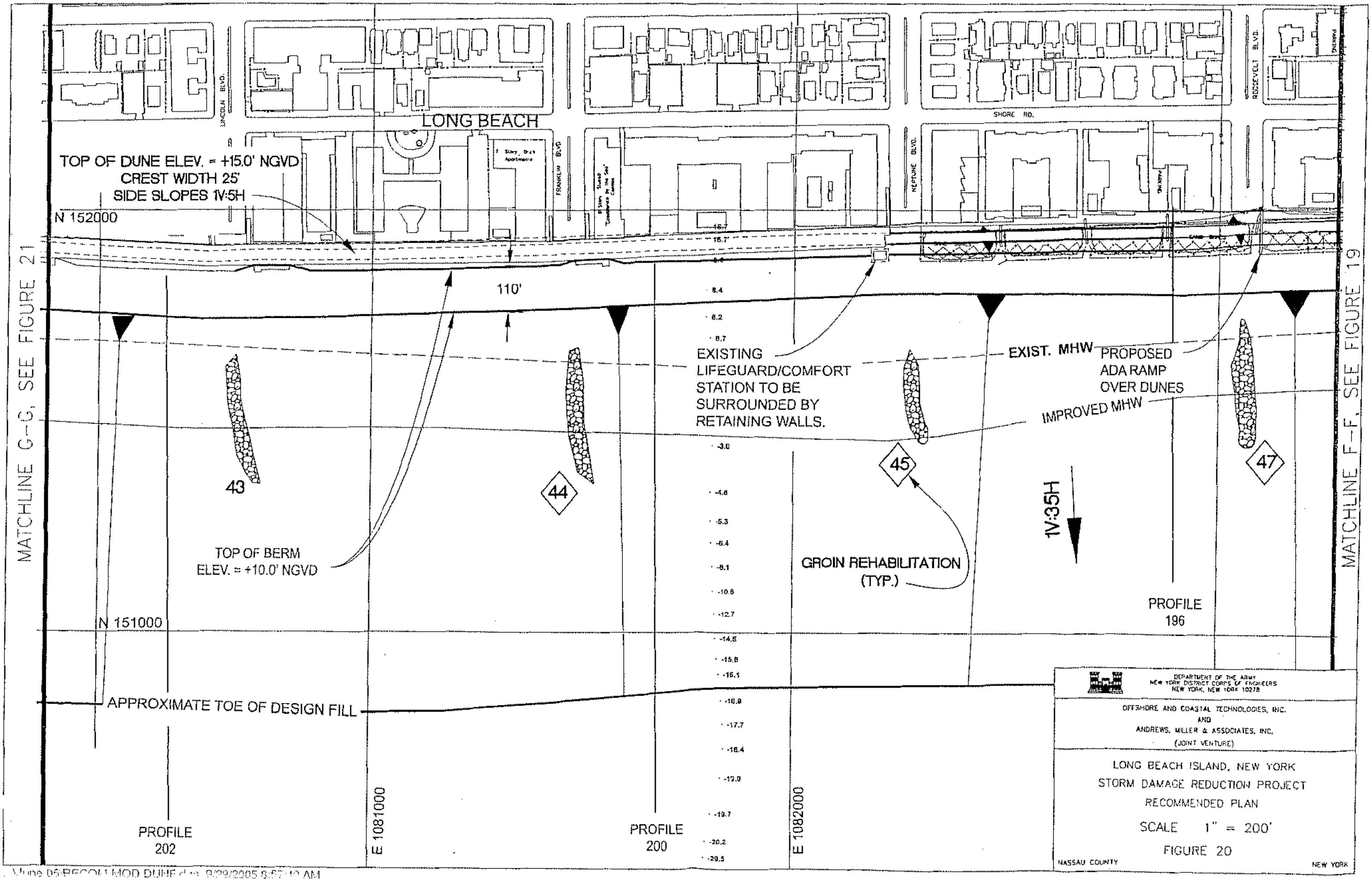
OFFSHORE AND COASTAL TECHNOLOGIES, INC.
AND
ANDREWS, MILLER & ASSOCIATES, INC.
(JOINT VENTURE)

LONG BEACH ISLAND, NEW YORK
STORM DAMAGE REDUCTION PROJECT
RECOMMENDED PLAN

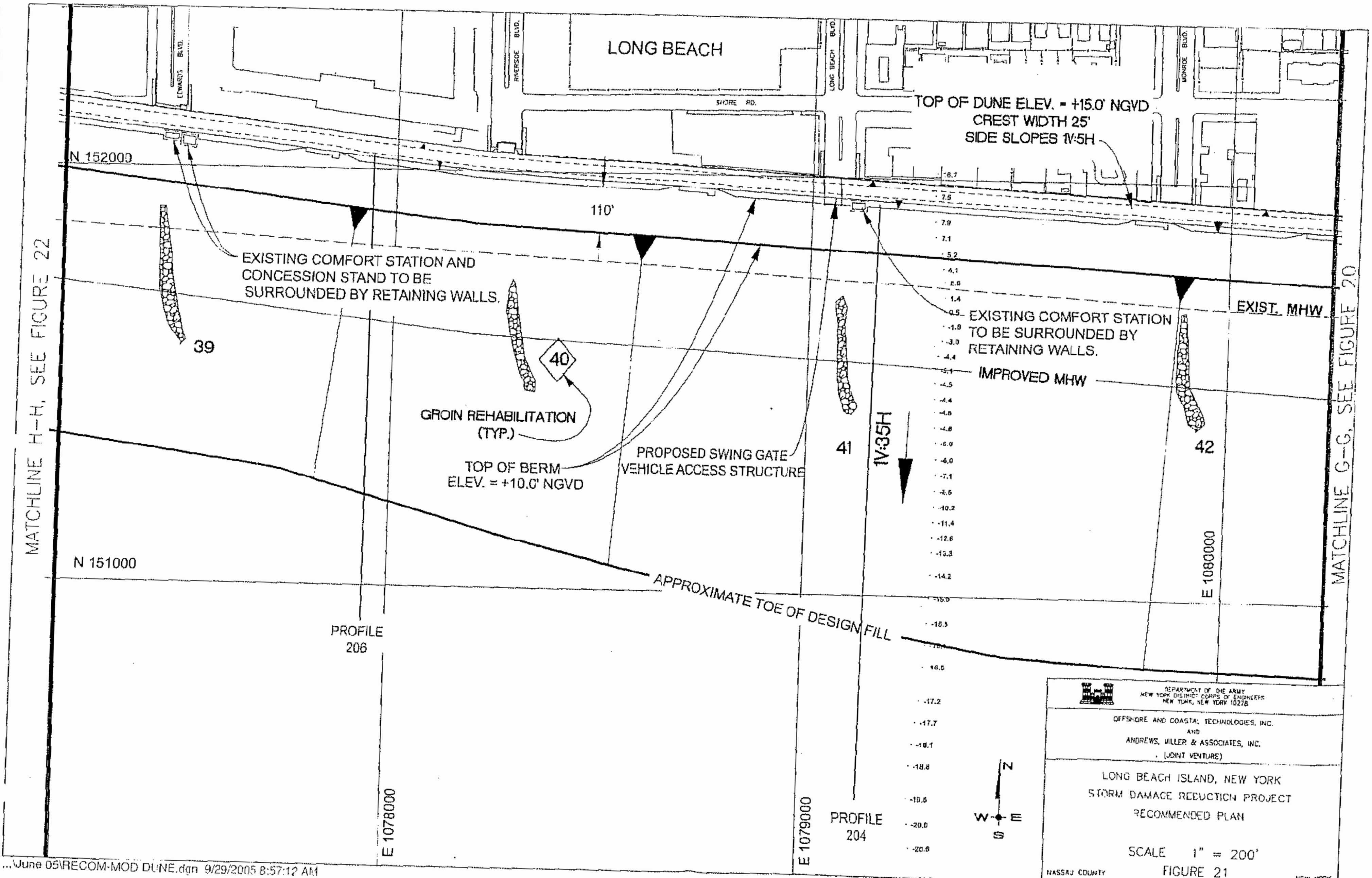
SCALE 1" = 200'

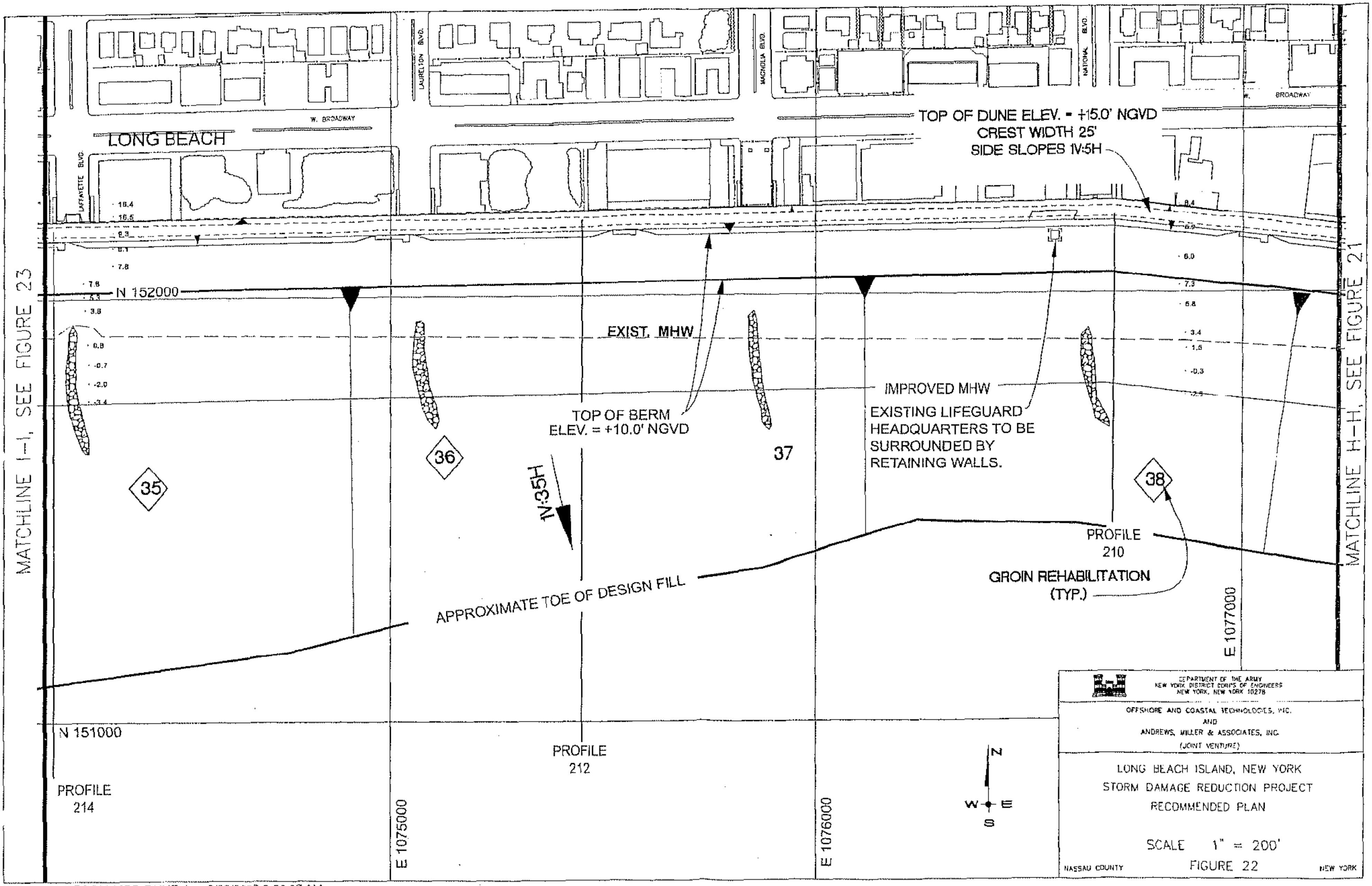
NASSAU COUNTY
FIGURE 19
NEW YORK

\June 05\RECOM-MOD DUNE.dgn 9/29/2005 8:59:10 AM

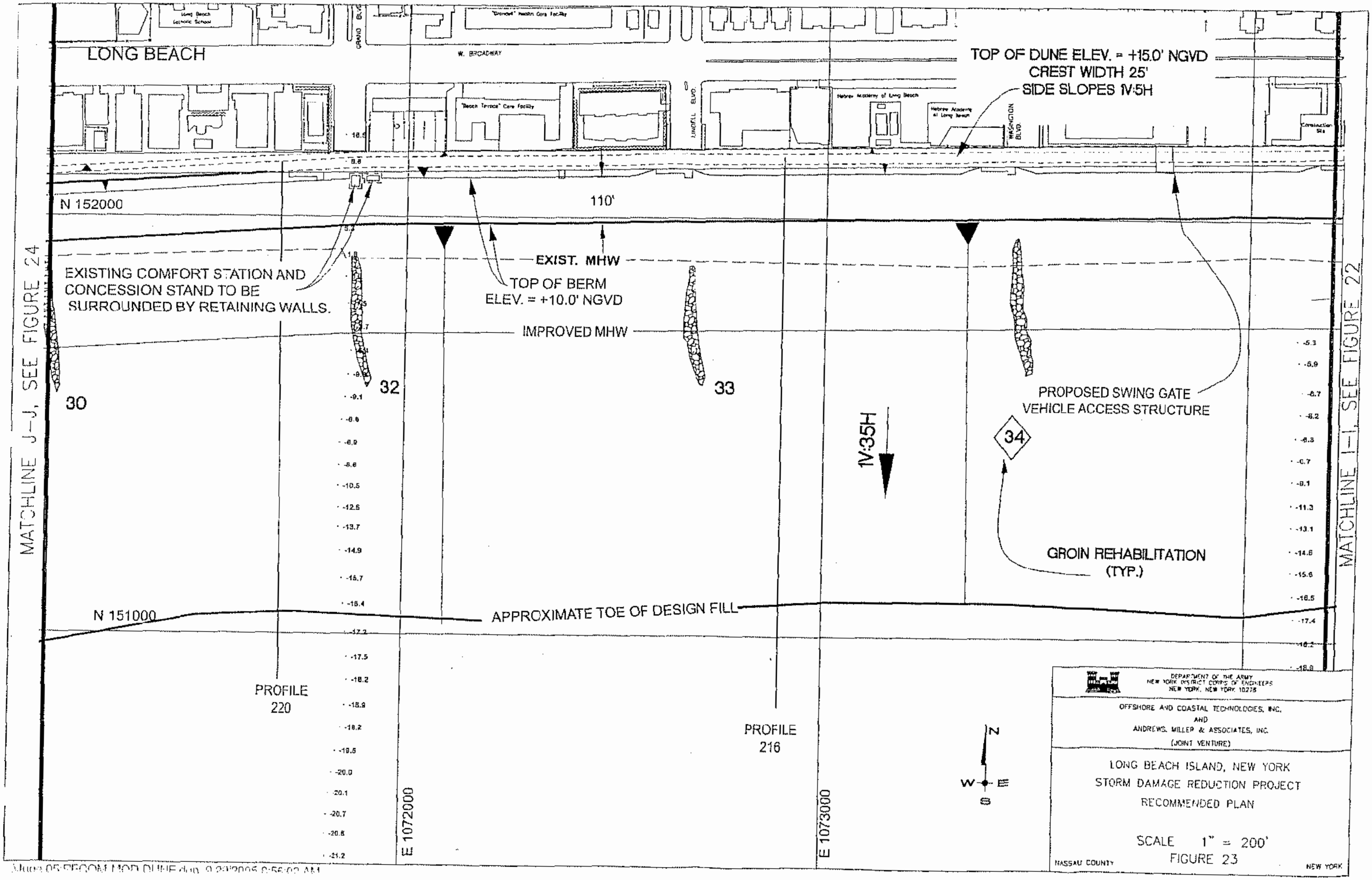


LONG BEACH
LINCOLN BLVD.
FRANKLIN BLVD.
NEPTUNE BLVD.
ROOSEVELT BLVD.
SHORE RD.
TOP OF DUNE ELEV. = +15.0' NGVD
CREST WIDTH 25'
SIDE SLOPES 1V:5H
N 152000
N 151000
110'
EXISTING LIFEGUARD/COMFORT STATION TO BE SURROUNDED BY RETAINING WALLS.
EXIST. MHW
PROPOSED ADA RAMP OVER DUNES
IMPROVED MHW
43
44
45
47
1V:35H
TOP OF BERM ELEV. = +10.0' NGVD
GROIN REHABILITATION (TYP.)
PROFILE 196
APPROXIMATE TOE OF DESIGN FILL
PROFILE 202
PROFILE 200
E 1081000
E 1082000
MATCHLINE G-G, SEE FIGURE 21
MATCHLINE F-F, SEE FIGURE 19
DEPARTMENT OF THE ARMY
NEW YORK DISTRICT CORPS OF ENGINEERS
NEW YORK, NEW YORK 10278
OFFSHORE AND COASTAL TECHNOLOGIES, INC.
AND
ANDREWS, MILLER & ASSOCIATES, INC.
(JOINT VENTURE)
LONG BEACH ISLAND, NEW YORK
STORM DAMAGE REDUCTION PROJECT
RECOMMENDED PLAN
SCALE 1" = 200'
FIGURE 20
NASSAU COUNTY
NEW YORK

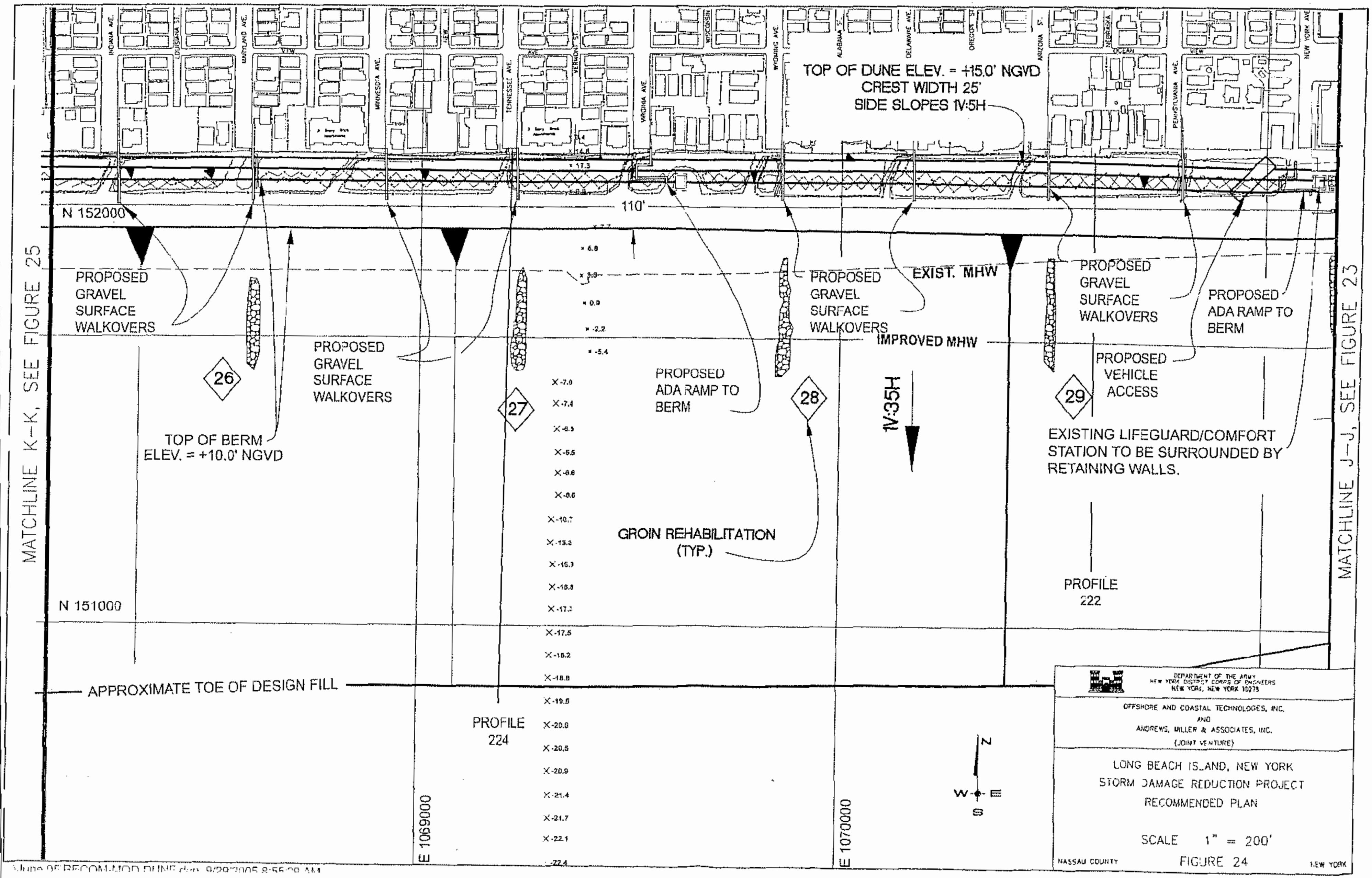

MATCHLINE H–H, SEE FIGURE 22
MATCHLINE G–G, SEE FIGURE 20
LONG BEACH
EDWARDS BLVD.
RIVERSIDE BLVD.
SHORE RD.
LONG BEACH BLVD.
MONROE BLVD.
TOP OF DUNE ELEV. = +15.0' NGVD
CREST WIDTH 25'
SIDE SLOPES 1V:5H
N 152000
N 151000
110'
EXISTING COMFORT STATION AND
CONCESSION STAND TO BE
SURROUNDED BY RETAINING WALLS.
EXISTING COMFORT STATION
TO BE SURROUNDED BY
RETAINING WALLS.
EXIST. MHW
IMPROVED MHW
39
40
41
42
GROIN REHABILITATION
(TYP.)
TOP OF BERM
ELEV. = +10.0' NGVD
PROPOSED SWING GATE
VEHICLE ACCESS STRUCTURE
1V:35H
APPROXIMATE TOE OF DESIGN FILL
PROFILE
206
PROFILE
204
E 1078000
E 1079000
E 1080000
N
W
E
S
DEPARTMENT OF THE ARMY
NEW YORK DISTRICT CORPS OF ENGINEERS
NEW YORK, NEW YORK 10278
OFFSHORE AND COASTAL TECHNOLOGIES, INC.
AND
ANDREWS, MILLER & ASSOCIATES, INC.
(JOINT VENTURE)
LONG BEACH ISLAND, NEW YORK
STORM DAMAGE REDUCTION PROJECT
RECOMMENDED PLAN
SCALE 1" = 200'
NASSAU COUNTY
FIGURE 21
NEW YORK
...June 05\RECOM-MOD DUNE.dgn 9/29/2005 8:57:12 AM

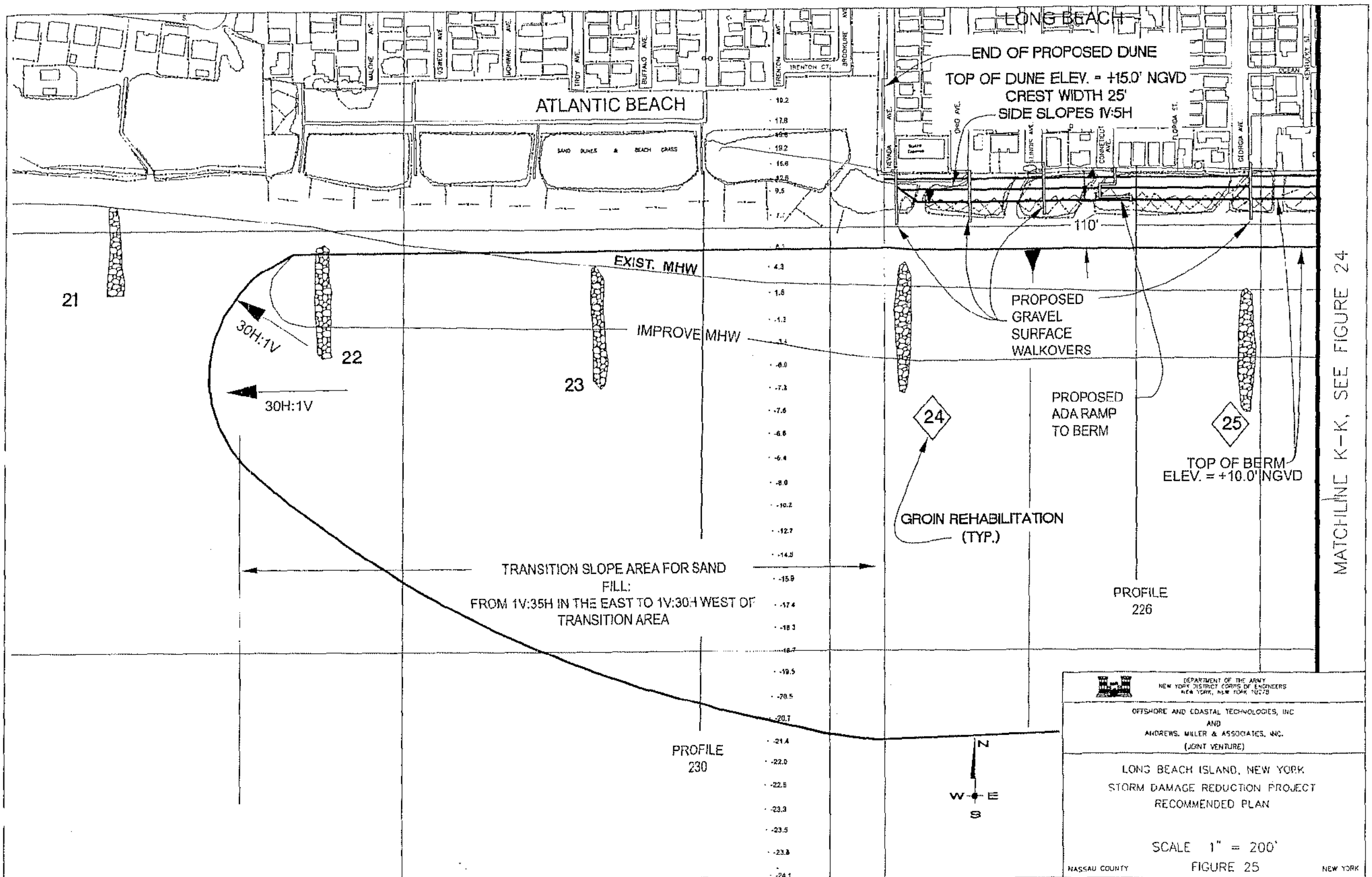


MATCHLINE I–I, SEE FIGURE 23
MATCHLINE H–H, SEE FIGURE 21
LONG BEACH
W. BROADWAY
LAFAYETTE BLVD.
LAURELTON BLVD.
MAGNOLIA BLVD.
NATIONAL BLVD.
TOP OF DUNE ELEV. = +15.0' NGVD
CREST WIDTH 25'
SIDE SLOPES 1V:5H
N 152000
N 151000
EXIST. MHW
IMPROVED MHW
EXISTING LIFEGUARD
HEADQUARTERS TO BE
SURROUNDED BY
RETAINING WALLS.
TOP OF BERM
ELEV. = +10.0' NGVD
35
36
37
38
1V:35H
APPROXIMATE TOE OF DESIGN FILL
PROFILE
210
PROFILE
212
PROFILE
214
GROIN REHABILITATION
(TYP.)
E 1075000
E 1076000
E 1077000
N
W
E
S
DEPARTMENT OF THE ARMY
NEW YORK DISTRICT CORPS OF ENGINEERS
NEW YORK, NEW YORK 10278
OFFSHORE AND COASTAL TECHNOLOGIES, INC.
AND
ANDREWS, MILLER & ASSOCIATES, INC.
(JOINT VENTURE)
LONG BEACH ISLAND, NEW YORK
STORM DAMAGE REDUCTION PROJECT
RECOMMENDED PLAN
SCALE 1" = 200'
FIGURE 22
NASSAU COUNTY
NEW YORK



MATCHLINE J–J, SEE FIGURE 24
MATCHLINE I–I, SEE FIGURE 22
LONG BEACH
W. BROADWAY
GRAND BLVD.
LINDELL BLVD.
WASHINGTON BLVD.
TOP OF DUNE ELEV. = +15.0' NGVD
CREST WIDTH 25'
SIDE SLOPES 1V:5H
N 152000
110'
EXIST. MHW
EXISTING COMFORT STATION AND
CONCESSION STAND TO BE
SURROUNDED BY RETAINING WALLS.
TOP OF BERM
ELEV. = +10.0' NGVD
IMPROVED MHW
30
32
33
34
1V:35H
PROPOSED SWING GATE
VEHICLE ACCESS STRUCTURE
GROIN REHABILITATION
(TYP.)
N 151000
APPROXIMATE TOE OF DESIGN FILL
PROFILE
220
PROFILE
216
E 1072000
E 1073000
N
W
E
S
DEPARTMENT OF THE ARMY
NEW YORK DISTRICT CORPS OF ENGINEERS
NEW YORK, NEW YORK 10278
OFFSHORE AND COASTAL TECHNOLOGIES, INC.
AND
ANDREWS, MILLER & ASSOCIATES, INC.
(JOINT VENTURE)
LONG BEACH ISLAND, NEW YORK
STORM DAMAGE REDUCTION PROJECT
RECOMMENDED PLAN
SCALE 1" = 200'
FIGURE 23
NASSAU COUNTY
NEW YORK

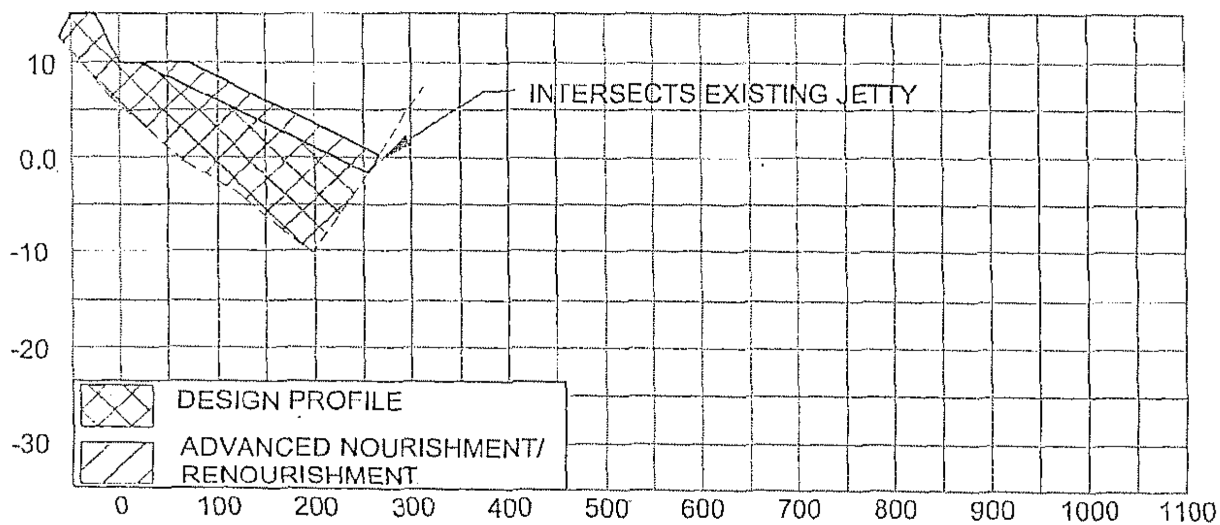

MATCHLINE K–K, SEE FIGURE 25
MATCHLINE J–J, SEE FIGURE 23
TOP OF DUNE ELEV. = +15.0' NGVD
CREST WIDTH 25'
SIDE SLOPES 1V:5H
N 152000
N 151000
110'
PROPOSED GRAVEL SURFACE WALKOVERS
PROPOSED ADA RAMP TO BERM
PROPOSED VEHICLE ACCESS
EXIST. MHW
IMPROVED MHW
1V:35H
TOP OF BERM ELEV. = +10.0' NGVD
GROIN REHABILITATION (TYP.)
EXISTING LIFEGUARD/COMFORT STATION TO BE SURROUNDED BY RETAINING WALLS.
26
27
28
29
PROFILE 224
PROFILE 222
APPROXIMATE TOE OF DESIGN FILL
E 1069000
E 1070000
N
W E
S
DEPARTMENT OF THE ARMY
NEW YORK DISTRICT CORPS OF ENGINEERS
NEW YORK, NEW YORK 10278
OFFSHORE AND COASTAL TECHNOLOGIES, INC.
AND
ANDREWS, MILLER & ASSOCIATES, INC.
(JOINT VENTURE)
LONG BEACH ISLAND, NEW YORK
STORM DAMAGE REDUCTION PROJECT
RECOMMENDED PLAN
SCALE 1" = 200'
NASSAU COUNTY
FIGURE 24
NEW YORK


LONG BEACH
END OF PROPOSED DUNE
TOP OF DUNE ELEV. = +15.0' NGVD
CREST WIDTH 25'
SIDE SLOPES 1V:5H
ATLANTIC BEACH
SAND DUNES & BEACH GRASS
110'
EXIST. MHW
IMPROVE MHW
30H:1V
30H:1V
21
22
23
24
25
PROPOSED
GRAVEL
SURFACE
WALKOVERS
PROPOSED
ADA RAMP
TO BERM
TOP OF BERM
ELEV. = +10.0' NGVD
GROIN REHABILITATION
(TYP.)
TRANSITION SLOPE AREA FOR SAND
FILL:
FROM 1V:35H IN THE EAST TO 1V:30H WEST OF
TRANSITION AREA
PROFILE
230
PROFILE
226
MATCHLINE K-K, SEE FIGURE 24
N
W E
S
DEPARTMENT OF THE ARMY
NEW YORK DISTRICT CORPS OF ENGINEERS
NEW YORK, NEW YORK
OFFSHORE AND COASTAL TECHNOLOGIES, INC
AND
ANDREWS, MILLER & ASSOCIATES, INC.
(JOINT VENTURE)
LONG BEACH ISLAND, NEW YORK
STORM DAMAGE REDUCTION PROJECT
RECOMMENDED PLAN
SCALE 1" = 200'
NASSAU COUNTY
FIGURE 25
NEW YORK

APPENDIX L
CROSS-SECTION

PROFILE No. 140

15' NGVD DUNE
110' BERM @ 10' NGVD



EXISTING DESIGN AND NOURISHMENT PROFILES FOR RECOMMENDED PLAN

SCALE: HORZ. 1" = 200'
VERT. 1" = 20'

ATLANTIC COAST OF LONG ISLAND
JONES INLET TO EAST ROCKAWAY INLET
LONG BEACH ISLAND, NEW YORK
STORM DAMAGE REDUCTION PROJECT

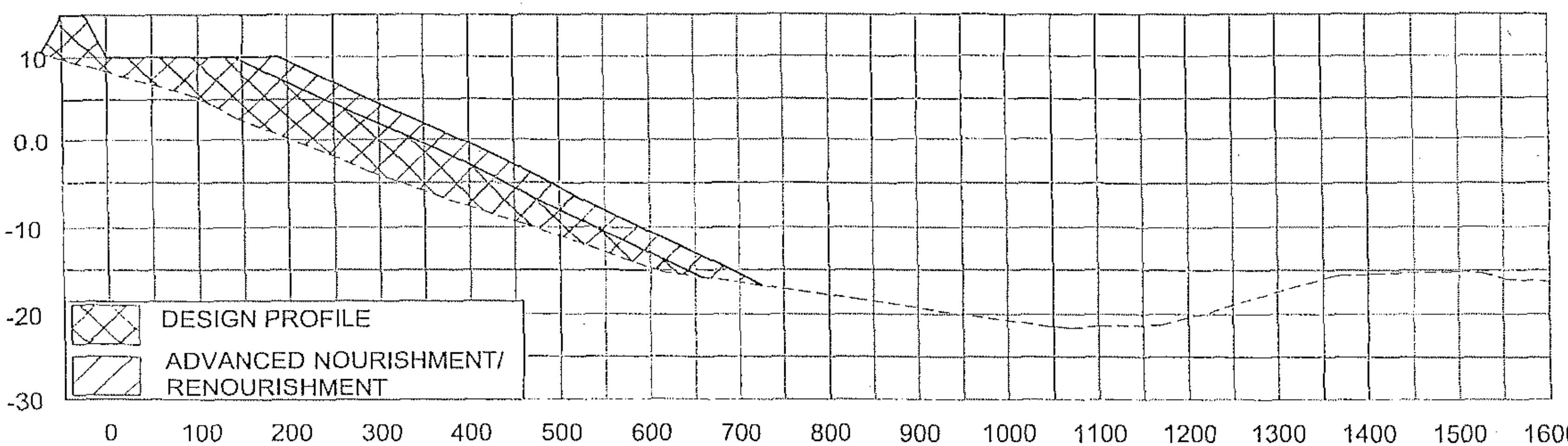
LRR RECOMMENDED PLAN
CROSS SECTION

NASSAU CO. NEW YORK

FIGURE No. 8-13

PROFILE No. 150

15' NGVD DUNE
110' BERM @ 10' NGVD



EXISTING DESIGN AND NOURISHMENT PROFILES FOR RECOMMENDED PLAN

SCALE: HORZ. 1" = 200'
VERT. 1" = 20'

ATLANTIC COAST OF LONG ISLAND
JONES INLET TO EAST ROCKAWAY INLET

LONG BEACH ISLAND, NEW YORK
STORM DAMAGE REDUCTION PROJECT

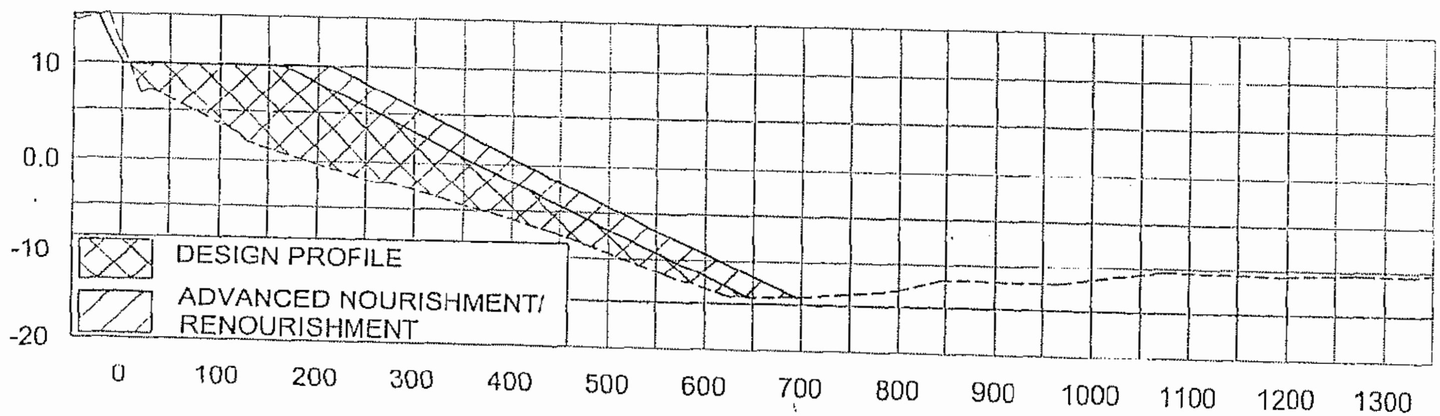
LRR RECOMMENDED PLAN
CROSS SECTION

NASSAU CO. NEW YORK

FIGURE No. 8-14

PROFILE No. 160

15' NGVD DUNE
110' BERM @ 10' NGVD



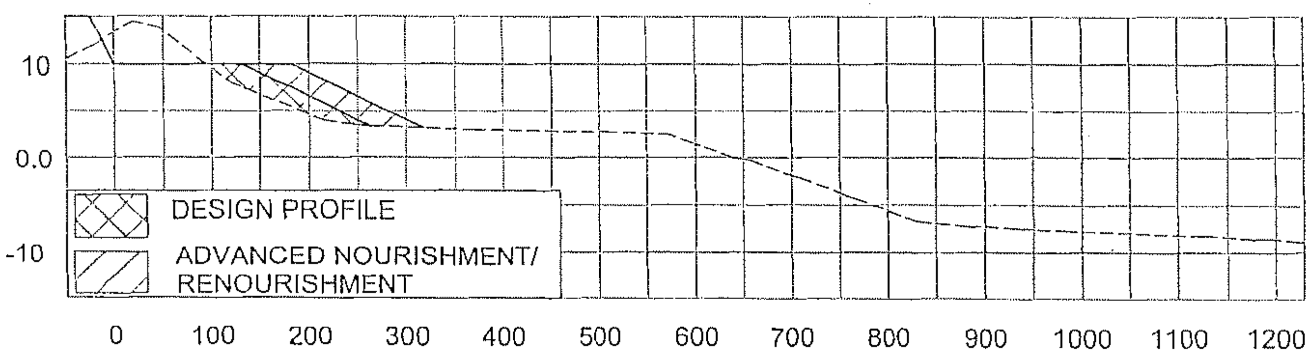
EXISTING DESIGN AND NOURISHMENT PROFILES FOR RECOMMENDED PLAN

SCALE: HORZ. 1" = 200'
VERT. 1" = 20'

ATLANTIC COAST OF LONG ISLAND
JONES INLET TO EAST ROCKAWAY INLET
LONG BEACH ISLAND, NEW YORK
STORM DAMAGE REDUCTION PROJECT
LRR RECOMMENDED PLAN
CROSS SECTION
NASSAU CO. NEW YORK
FIGURE No. 8-15

PROFILE No. 170

15' NGVD DUNE
110' BERM @ 10' NGVD



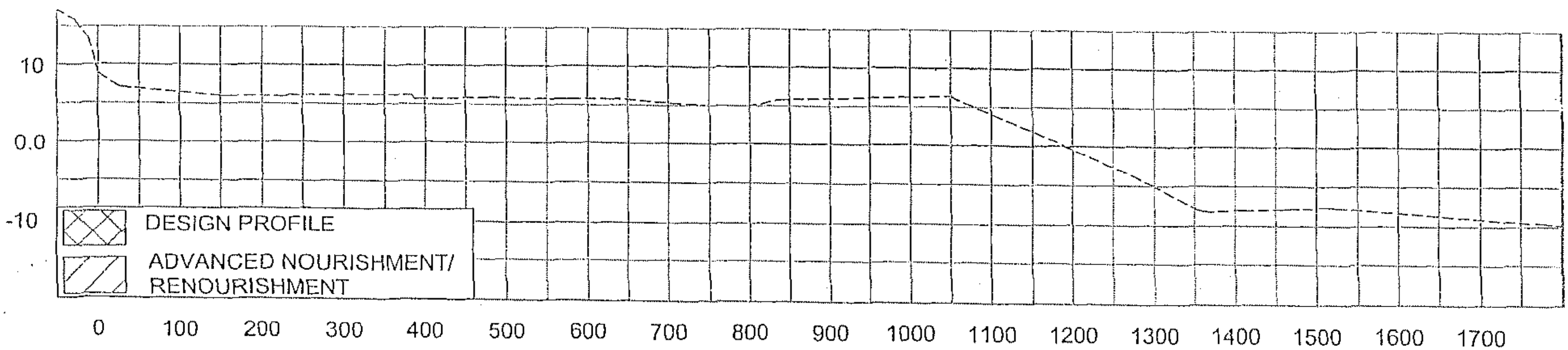
EXISTING DESIGN AND NOURISHMENT PROFILES FOR
RECOMMENDED PLAN

SCALE: HORZ. 1" = 200'
VERT. 1" = 20'

ATLANTIC COAST OF LONG ISLAND
JONES INLET TO EAST ROCKAWAY INLET
LONG BEACH ISLAND, NEW YORK
STORM DAMAGE REDUCTION PROJECT
LRR RECOMMENDED PLAN
CROSS SECTION
NASSAU CO. NEW YORK
FIGURE No. B-16

PROFILE No. 172

15' NGVD DUNE
110' BERM @ 10' NGVD



EXISTING DESIGN AND NOURISHMENT PROFILES FOR
RECOMMENDED PLAN

SCALE: HORZ. 1" = 200'
VERT. 1" = 20'

ATLANTIC COAST OF LONG ISLAND
JONES INLET TO EAST ROCKAWAY INLET

LONG BEACH ISLAND, NEW YORK
STORM DAMAGE REDUCTION PROJECT

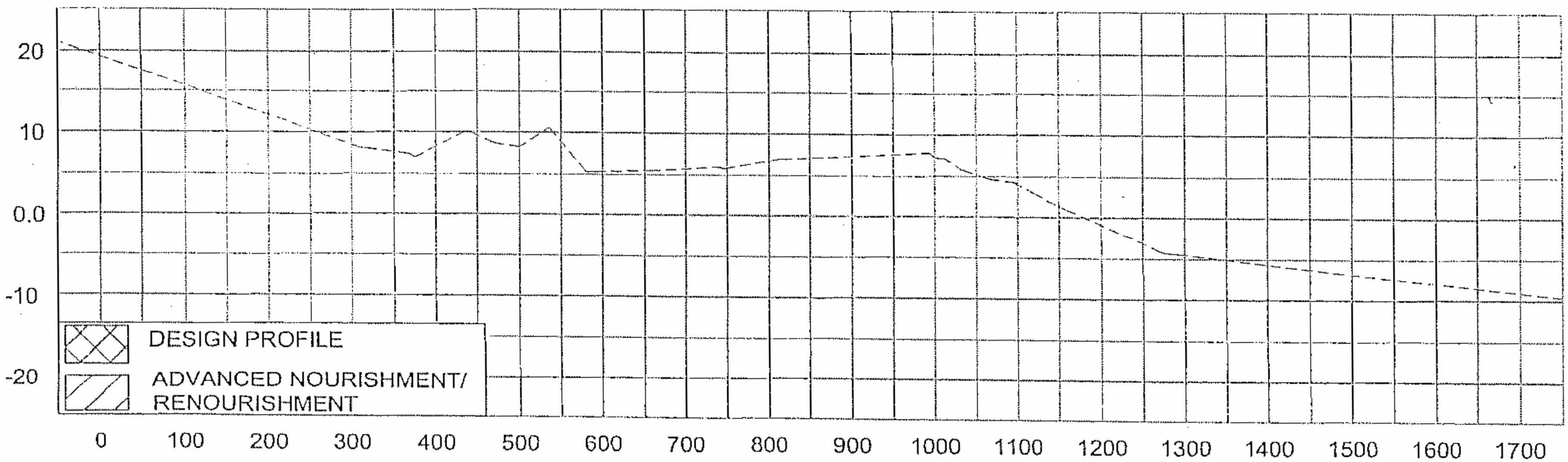
LRR RECOMMENDED PLAN
CROSS SECTION

NASSAU CO. NEW YORK

FIGURE No. 8-17

PROFILE No. 174

15' NGVD DUNE
110' BERM @ 10' NGVD



EXISTING DESIGN AND NOURISHMENT PROFILES FOR
RECOMMENDED PLAN

SCALE: HORZ. 1" = 200'
VERT. 1" = 20'

ATLANTIC COAST OF LONG ISLAND
JONES INLET TO EAST ROCKAWAY INLET
LONG BEACH ISLAND, NEW YORK
STORM DAMAGE REDUCTION PROJECT

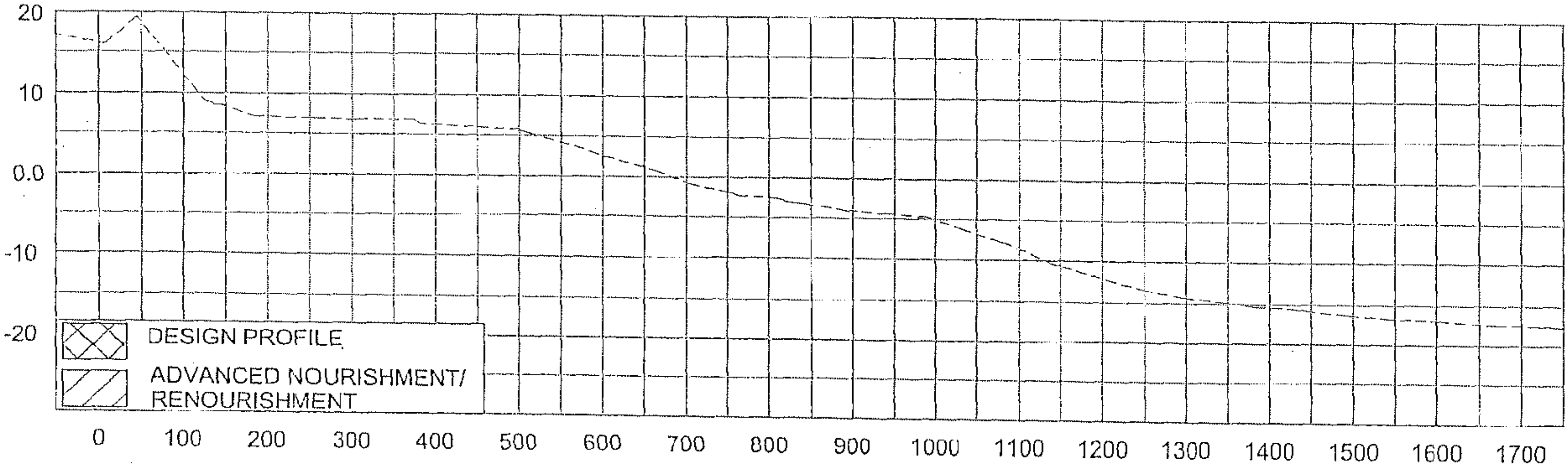
LRR RECOMMENDED PLAN
CROSS SECTION

NASSAU CO. NEW YORK

FIGURE No. B-18

PROFILE No. 180

15' NGVD DUNE
110' BERM @ 10' NGVD



EXISTING DESIGN AND NOURISHMENT PROFILES FOR RECOMMENDED PLAN

SCALE: HORZ. 1" = 200'
VERT. 1" = 20'

ATLANTIC COAST OF LONG ISLAND
JONES INLET TO EAST ROCKAWAY INLET
LONG BEACH ISLAND, NEW YORK
STORM DAMAGE REDUCTION PROJECT

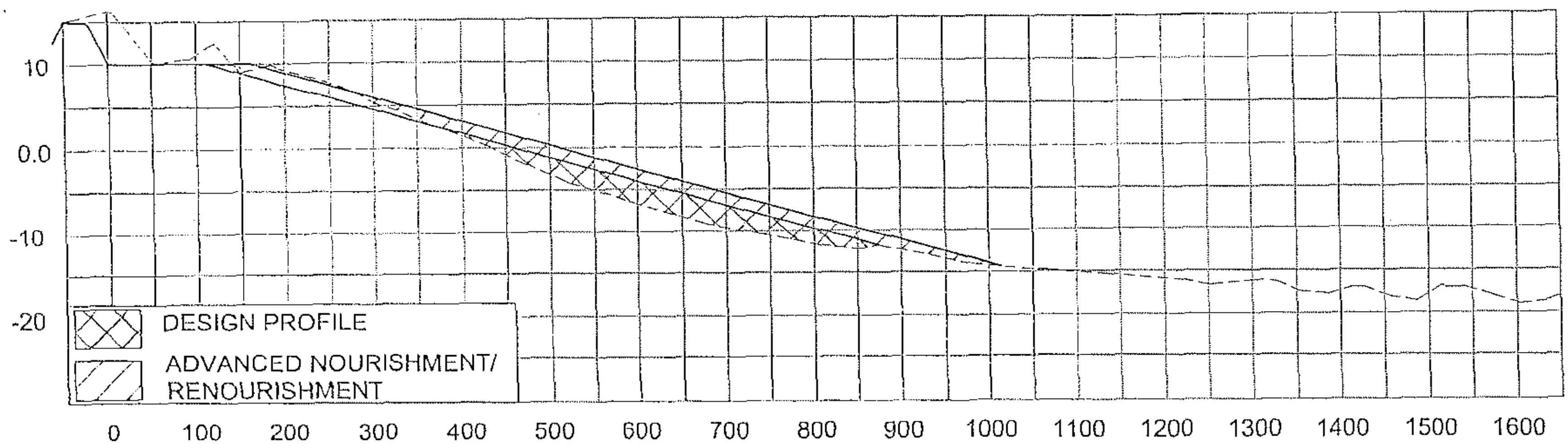
LRR RECOMMENDED PLAN
CROSS SECTION

NASSAU CO. NEW YORK

FIGURE No. 8-19

PROFILE No. 182

15' NGVD DUNE
110' BERM @ 10' NGVD



EXISTING DESIGN AND NOURISHMENT PROFILES FOR
RECOMMENDED PLAN

SCALE: HORZ. 1" = 200'
VERT. 1" = 20'

ATLANTIC COAST OF LONG ISLAND
JONES INLET TO EAST ROCKAWAY INLET
LONG BEACH ISLAND, NEW YORK
STORM DAMAGE REDUCTION PROJECT

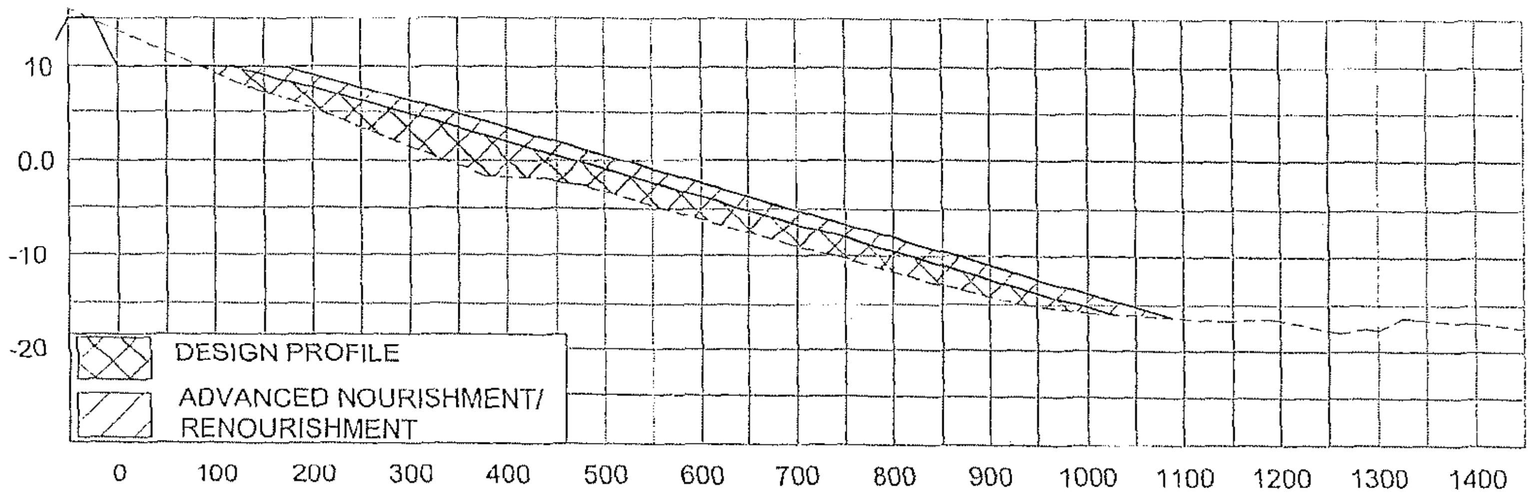
LRR RECOMMENDED PLAN
CROSS SECTION

NASSAU CO. NEW YORK

FIGURE No. 8-20

PROFILE No. 184

15' NGVD DUNE
110' BERM @ 10' NGVD



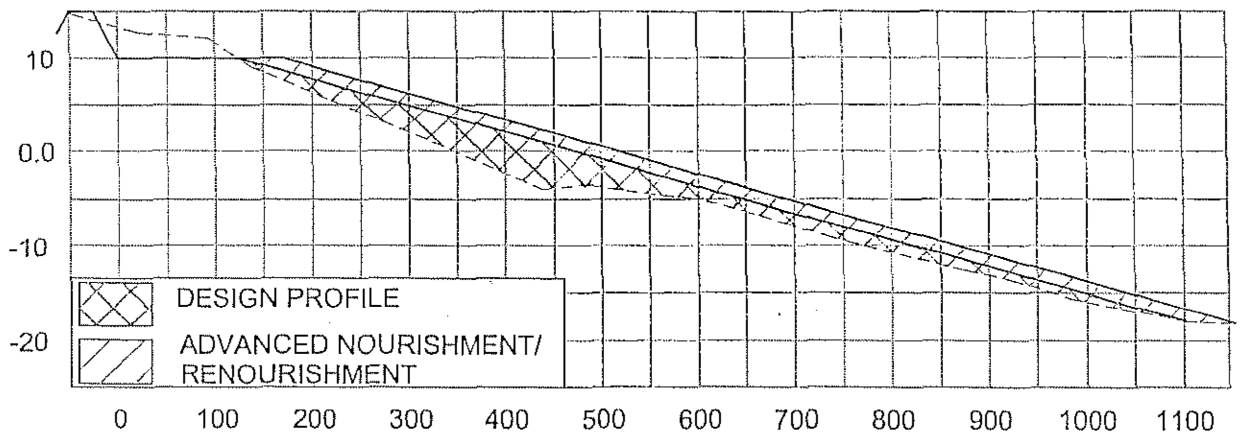
EXISTING DESIGN AND NOURISHMENT PROFILES FOR RECOMMENDED PLAN

SCALE: HORZ. 1" = 200'
VERT. 1" = 20'

ATLANTIC COAST OF LONG ISLAND
JONES INLET TO EAST ROCKAWAY INLET
LONG BEACH ISLAND, NEW YORK
STORM DAMAGE REDUCTION PROJECT
LRR RECOMMENDED PLAN
CROSS SECTION
NASSAU CO. NEW YORK
FIGURE No. 8-21

PROFILE No. 190

15' NGVD DUNE
110' BERM @ 10' NGVD



EXISTING DESIGN AND NOURISHMENT PROFILES FOR RECOMMENDED PLAN

SCALE: HORZ. 1" = 200'
VERT. 1" = 20'

ATLANTIC COAST OF LONG ISLAND
JONES INLET TO EAST ROCKAWAY INLET

LONG BEACH ISLAND, NEW YORK
STORM DAMAGE REDUCTION PROJECT

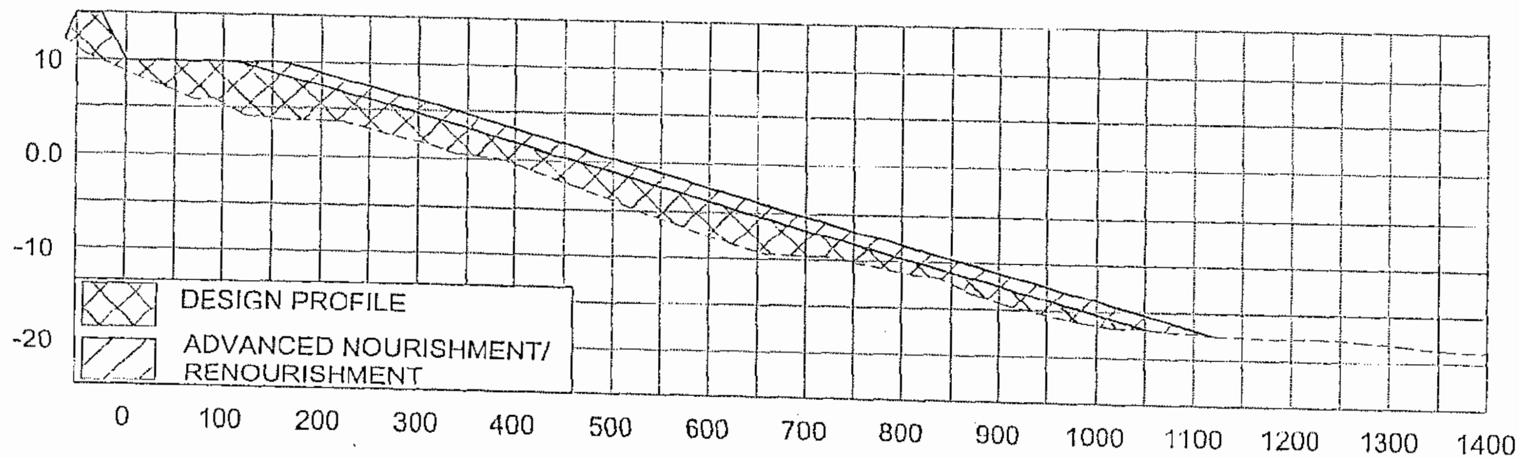
LRR RECOMMENDED PLAN
CROSS SECTION

NASSAU CO. NEW YORK

FIGURE No. 8-22

PROFILE No. 192

15' NGVD DUNE
110' BERM @ 10' NGVD



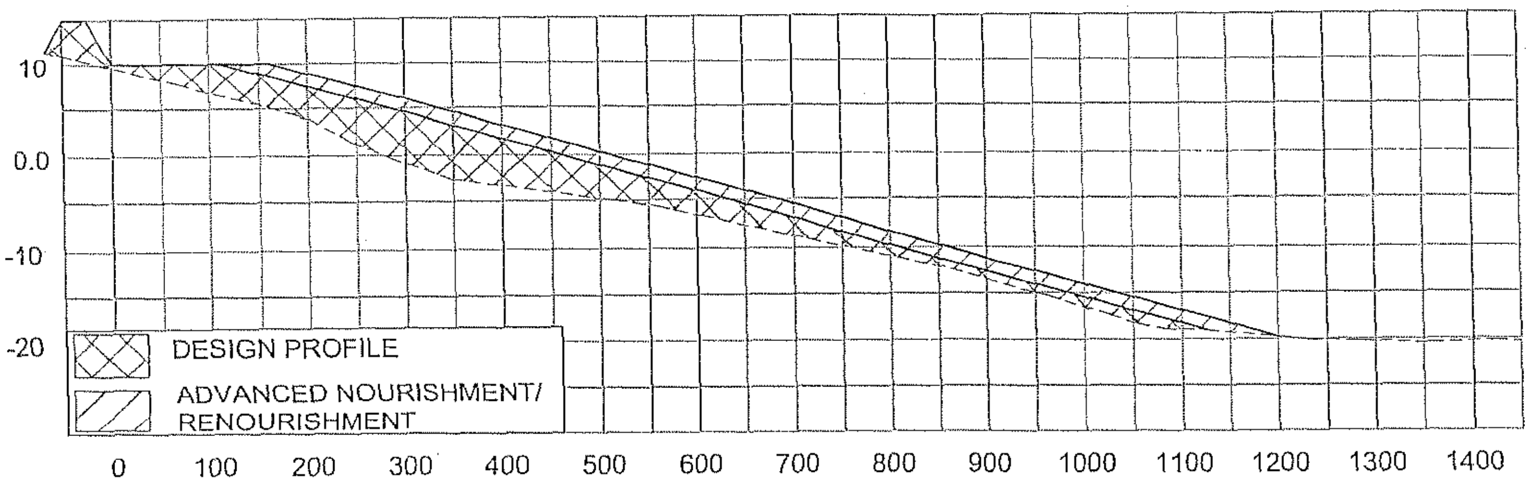
EXISTING DESIGN AND NOURISHMENT PROFILES FOR RECOMMENDED PLAN

SCALE: HORZ. 1" = 200'
VERT. 1" = 20'

ATLANTIC COAST OF LONG ISLAND
JONES INLET TO EAST ROCKAWAY INLET
LONG BEACH ISLAND, NEW YORK
STORM DAMAGE REDUCTION PROJECT –
LRR RECOMMENDED PLAN
CROSS SECTION
NASSAU CO. NEW YORK
FIGURE No. B-23

PROFILE No. 194

15' NGVD DUNE
110' BERM @ 10' NGVD



EXISTING DESIGN AND NOURISHMENT PROFILES FOR RECOMMENDED PLAN

SCALE: HORZ. 1" = 200'
VERT. 1" = 20'

ATLANTIC COAST OF LONG ISLAND
JONES INLET TO EAST ROCKAWAY INLET

LONG BEACH ISLAND, NEW YORK
STORM DAMAGE REDUCTION PROJECT

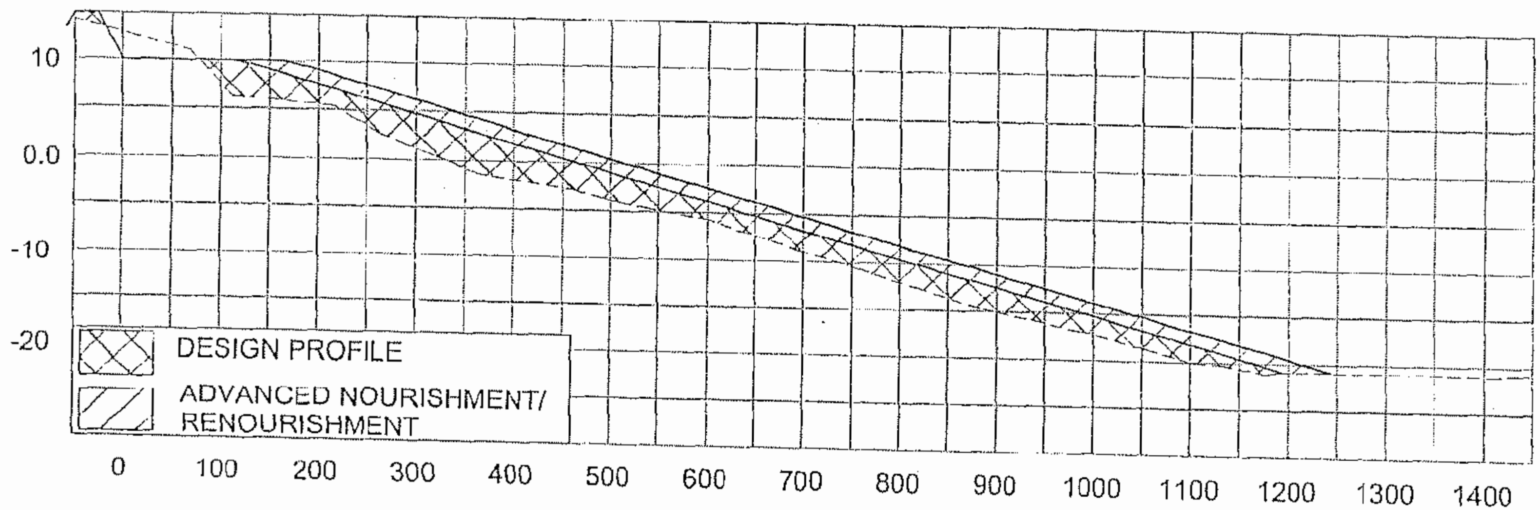
LRR RECOMMENDED PLAN
CROSS SECTION

NASSAU CO. NEW YORK

FIGURE No. 8-24

PROFILE No. 196

15' NGVD DUNE
110' BERM @ 10' NGVD



EXISTING DESIGN AND NOURISHMENT PROFILES FOR RECOMMENDED PLAN

SCALE: HORZ. 1" = 200'
VERT. 1" = 20'

ATLANTIC COAST OF LONG ISLAND
JONES INLET TO EAST ROCKAWAY INLET
LONG BEACH ISLAND, NEW YORK
STORM DAMAGE REDUCTION PROJECT

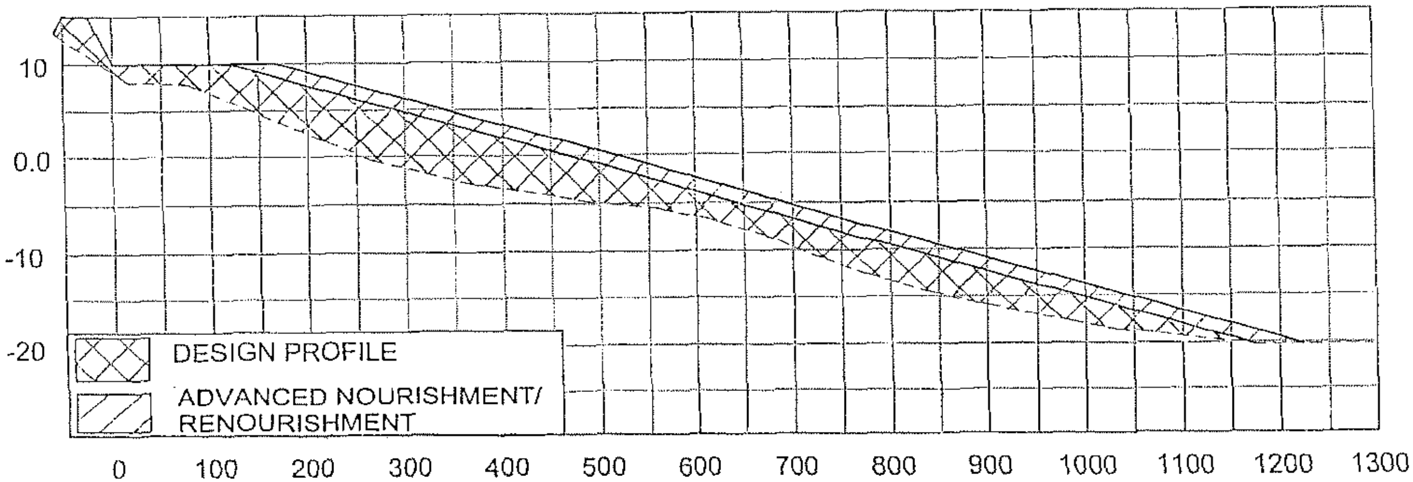
LRR RECOMMENDED PLAN
CROSS SECTION

NASSAU CO. NEW YORK

FIGURE No. 8-25

PROFILE No. 200

15' NGVD DUNE
110' BERM @ 10' NGVD



EXISTING DESIGN AND NOURISHMENT PROFILES FOR RECOMMENDED PLAN

SCALE: HORZ. 1" = 200'
VERT. 1" = 20'

ATLANTIC COAST OF LONG ISLAND
JONES INLET TO EAST ROCKAWAY INLET
LONG BEACH ISLAND, NEW YORK
STORM DAMAGE REDUCTION PROJECT

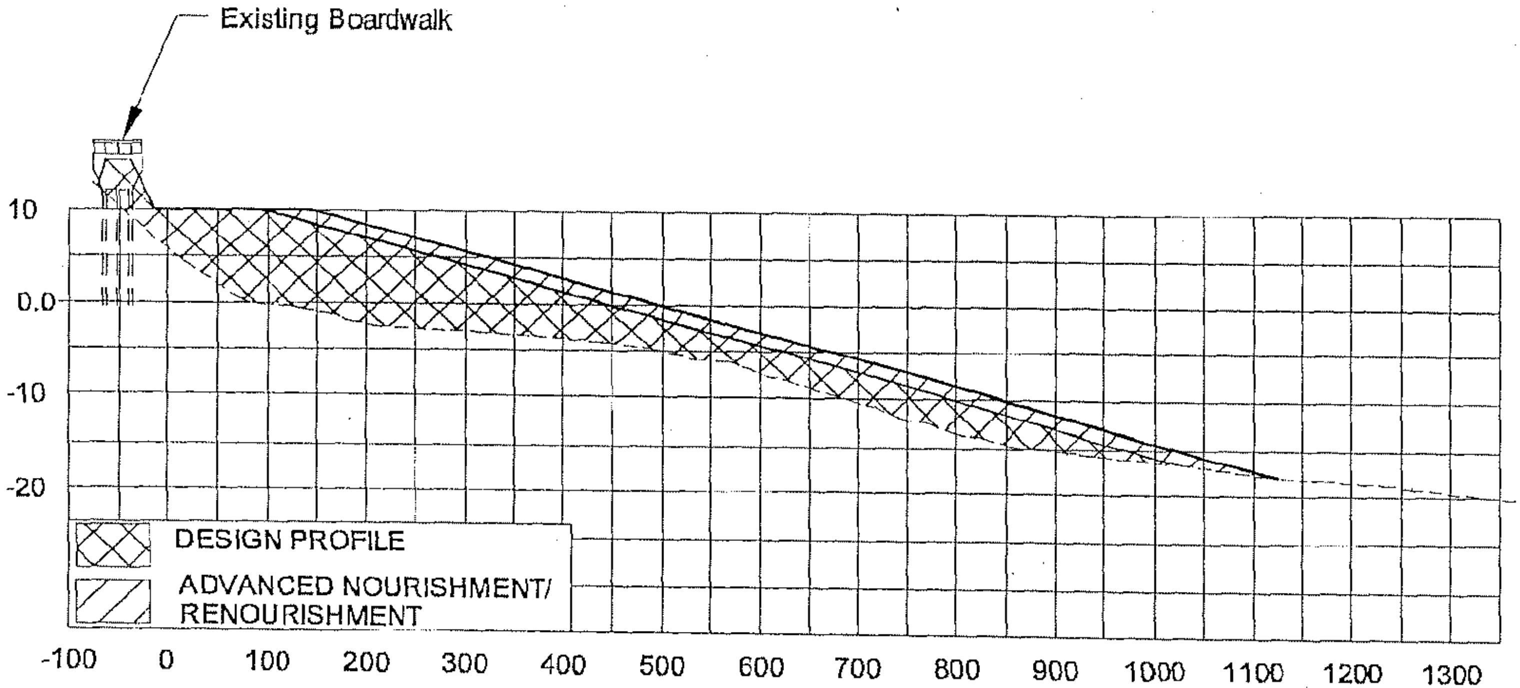
LRR RECOMMENDED PLAN
CROSS SECTION

NASSAU CO. NEW YORK

FIGURE No. 8-26

PROFILE No. 202

15' NGVDSAND BARRIER
110' BERM @ 10' NGVD



EXISTING DESIGN AND NOURISHMENT PROFILES FOR
RECOMMENDED PLAN

SCALE: HORZ. 1" = 200'
VERT. 1" = 20'

ATLANTIC COAST OF LONG ISLAND
JONES INLET TO EAST ROCKAWAY INLET
LONG BEACH ISLAND, NEW YORK
STORM DAMAGE REDUCTION PROJECT

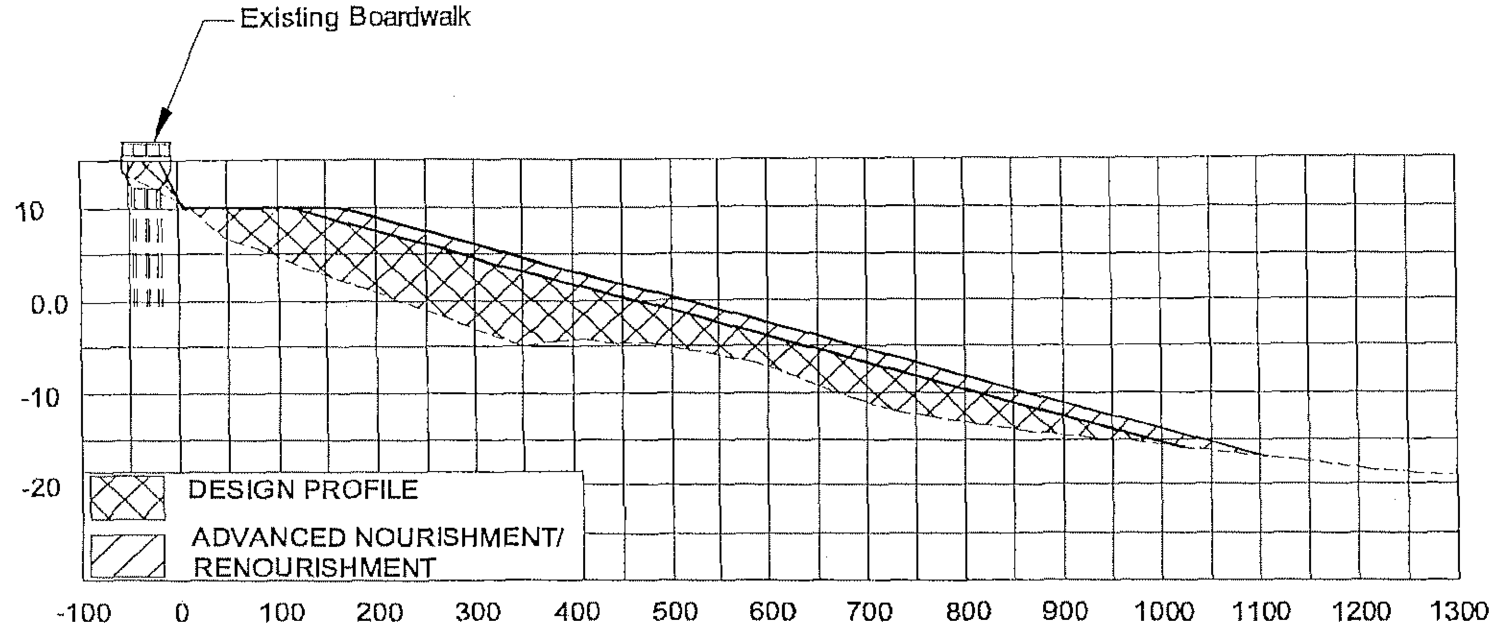
LRR RECOMMENDED PLAN
CROSS SECTION

NASSAU CO. NEW YORK

FIGURE No. 8-27

PROFILE No. 204

15' NGVD SAND BARRIER
110' BERM @ 10' NGVD



EXISTING DESIGN AND NOURISHMENT PROFILES FOR RECOMMENDED PLAN

SCALE: HORZ. 1" = 200'
VERT. 1" = 20'

ATLANTIC COAST OF LONG ISLAND
JONES INLET TO EAST ROCKAWAY INLET
LONG BEACH ISLAND, NEW YORK
STORM DAMAGE REDUCTION PROJECT

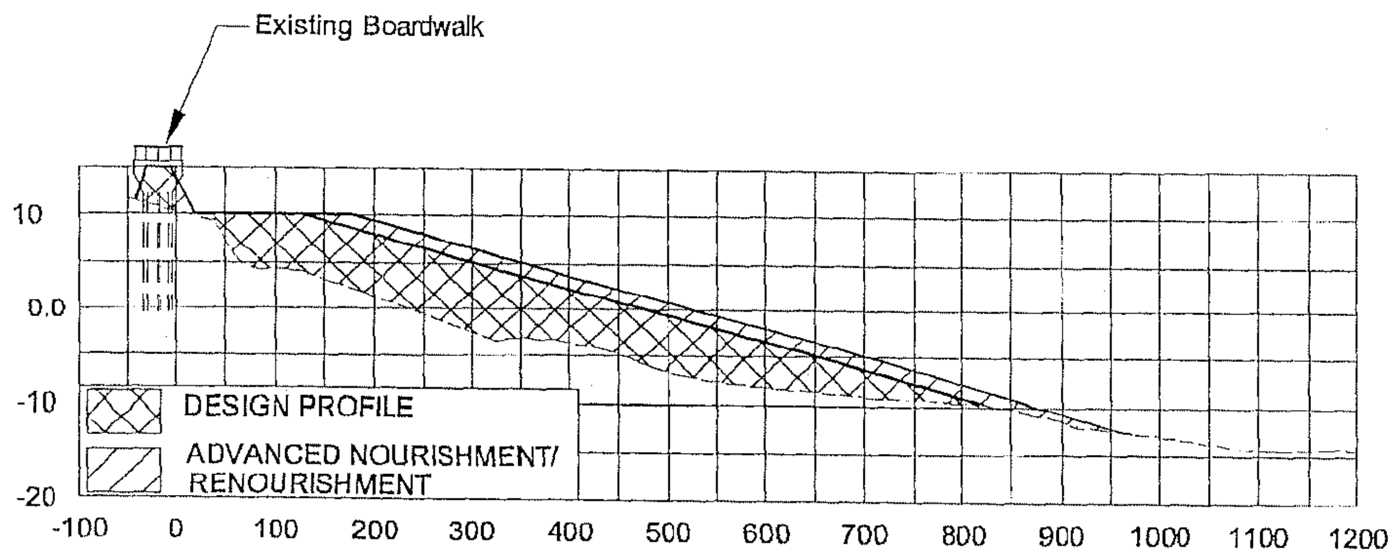
LRR RECOMMENDED PLAN
CROSS SECTION

NASSAU CO. NEW YORK

FIGURE No. 8-28

PROFILE No. 206

15' NGVD SAND BARRIER
110' BERM @ 10' NGVD



EXISTING DESIGN AND NOURISHMENT PROFILES FOR RECOMMENDED PLAN

SCALE: HORZ. 1" = 200'
VERT. 1" = 20'

ATLANTIC COAST OF LONG ISLAND
JONES INLET TO EAST ROCKAWAY INLET
LONG BEACH ISLAND, NEW YORK
STORM DAMAGE REDUCTION PROJECT

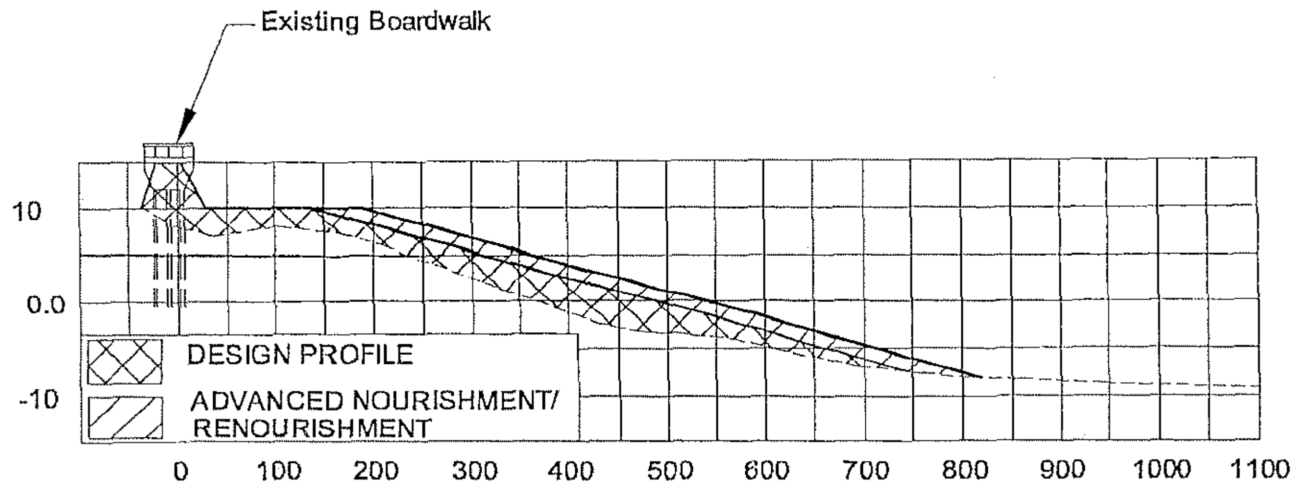
LRR RECOMMENDED PLAN
CROSS SECTION

NASSAU CO. NEW YORK

FIGURE No. 8-29

PROFILE No. 210

15' NGVD SAND BARRIER
110' BERM @ 10' NGVD



EXISTING DESIGN AND NOURISHMENT PROFILES FOR
RECOMMENDED PLAN

SCALE: HORZ. 1" = 200'
VERT. 1" = 20'

ATLANTIC COAST OF LONG ISLAND
JONES INLET TO EAST ROCKAWAY INLET
LONG BEACH ISLAND, NEW YORK
STORM DAMAGE REDUCTION PROJECT

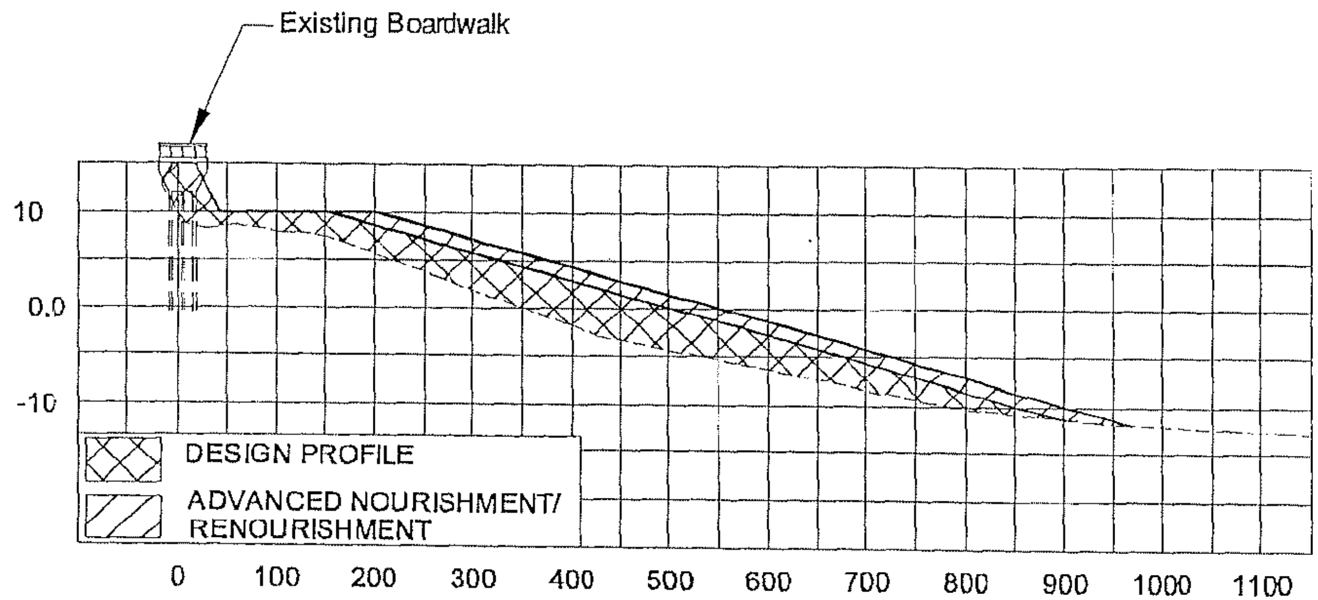
LRR RECOMMENDED PLAN
CROSS SECTION

NASSAU CO. NEW YORK

FIGURE No. 8-30

PROFILE No. 212

15' NGVD SAND BARRIER
110' BERM @ 10' NGVD



EXISTING DESIGN AND NOURISHMENT PROFILES FOR RECOMMENDED PLAN

SCALE: HORZ. 1" = 200'
VERT. 1" = 20'

ATLANTIC COAST OF LONG ISLAND
JONES INLET TO EAST ROCKAWAY INLET
LONG BEACH ISLAND, NEW YORK
STORM DAMAGE REDUCTION PROJECT

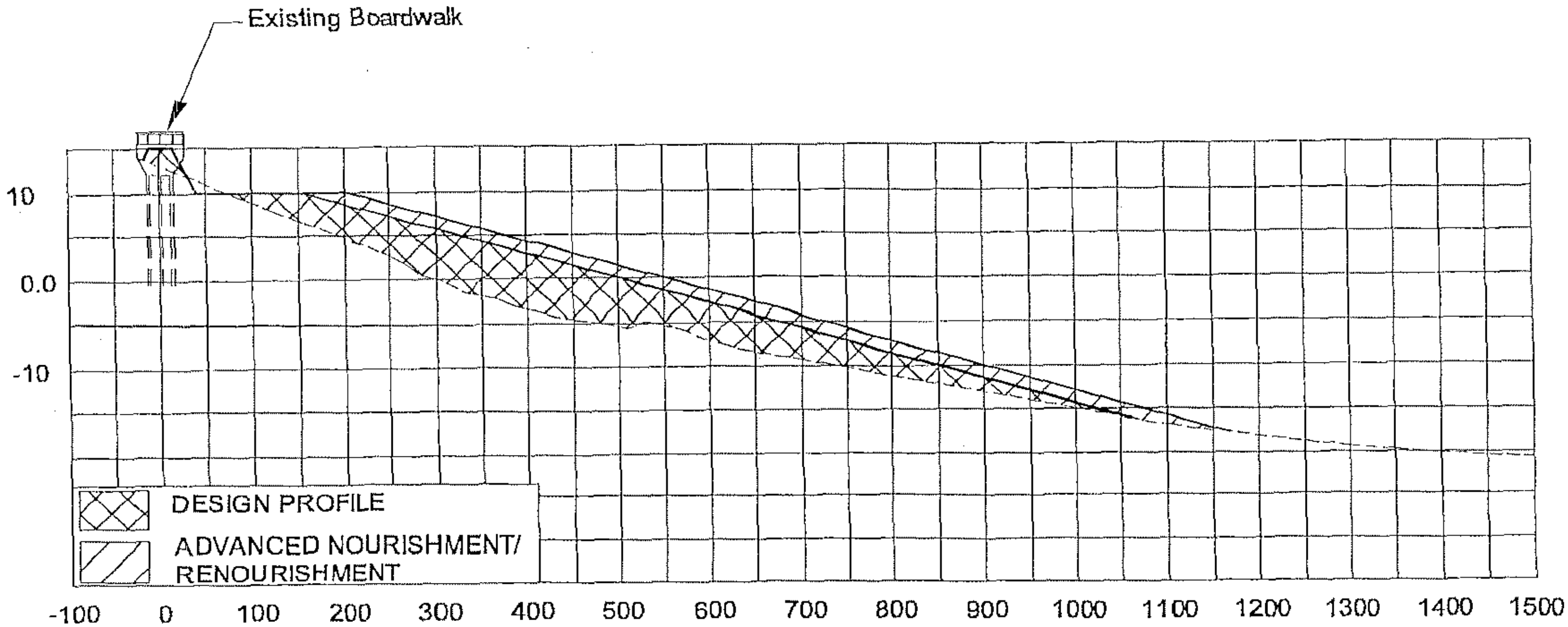
LRR RECOMMENDED PLAN
CROSS SECTION

NASSAU CO. NEW YORK

FIGURE No. 8-31

PROFILE No. 214

15' NGVD SAND BARRIER
110' BERM @ 10' NGVD



EXISTING DESIGN AND NOURISHMENT PROFILES FOR
RECOMMENDED PLAN

SCALE: HORZ. 1" = 200'
VERT. 1" = 20'

ATLANTIC COAST OF LONG ISLAND
JONES INLET TO EAST ROCKAWAY INLET
LONG BEACH ISLAND, NEW YORK
STORM DAMAGE REDUCTION PROJECT

LRR RECOMMENDED PLAN
CROSS SECTION

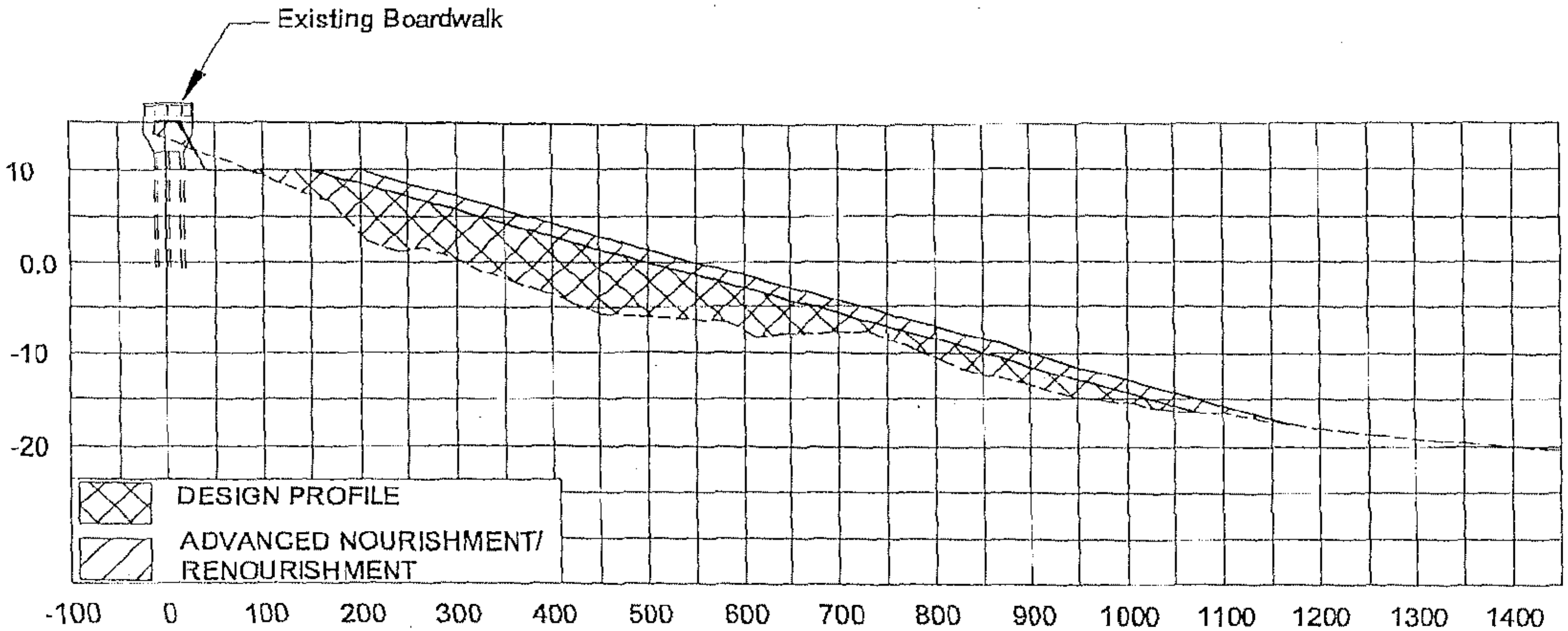
NASSAU CO. NEW YORK

FIGURE No. 8-32

PROFILE No. 216

15' NGVD SAND BARRIER

110' BERM @ 10' NGVD



EXISTING DESIGN AND NOURISHMENT PROFILES FOR RECOMMENDED PLAN

SCALE: HORZ. 1" = 200'
VERT. 1" = 20'

ATLANTIC COAST OF LONG ISLAND
JONES INLET TO EAST ROCKAWAY INLET
LONG BEACH ISLAND, NEW YORK
STORM DAMAGE REDUCTION PROJECT

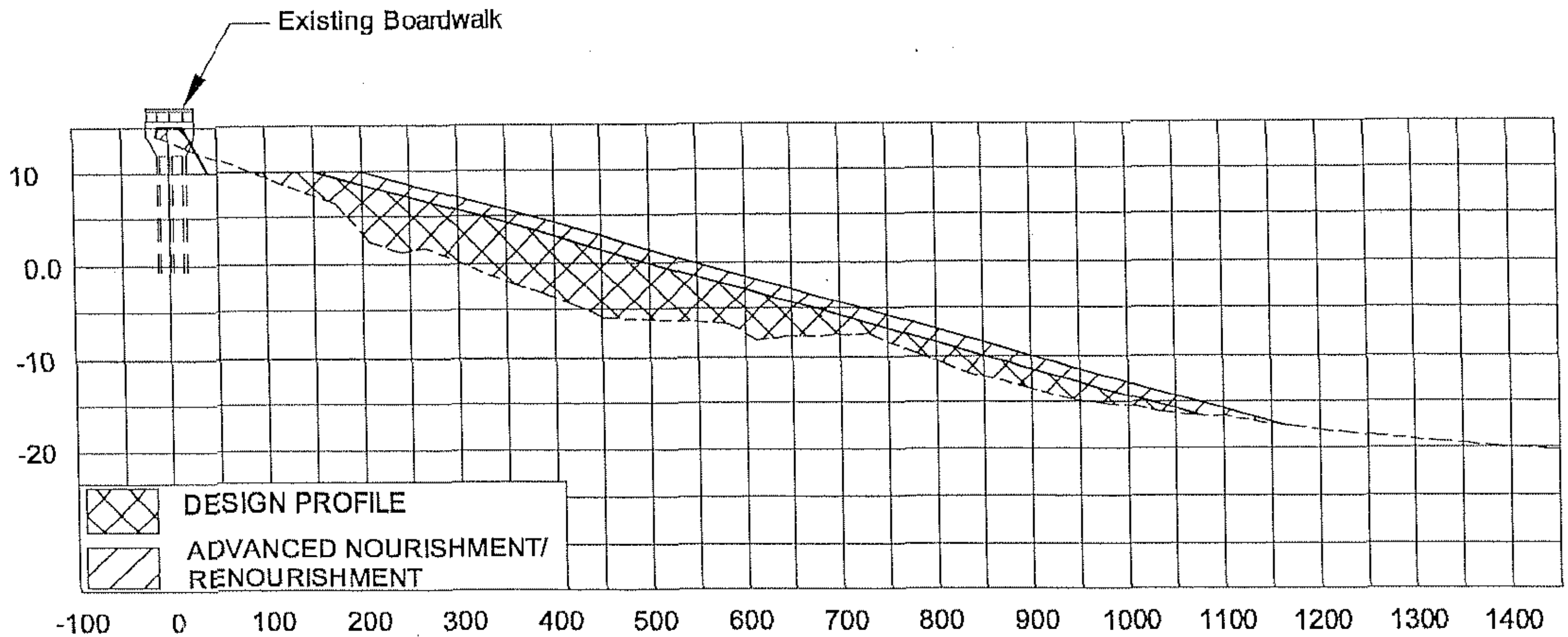
LRR RECOMMENDED PLAN
CROSS SECTION

NASSAU CO. NEW YORK

FIGURE No.8-33

PROFILE No. 216

15' NGVD SAND BARRIER
110' BERM @ 10' NGVD



EXISTING DESIGN AND NOURISHMENT PROFILES FOR RECOMMENDED PLAN

SCALE: HORZ. 1" = 200'
VERT. 1" = 20'

ATLANTIC COAST OF LONG ISLAND
JONES INLET TO EAST ROCKAWAY INLET
LONG BEACH ISLAND, NEW YORK
STORM DAMAGE REDUCTION PROJECT

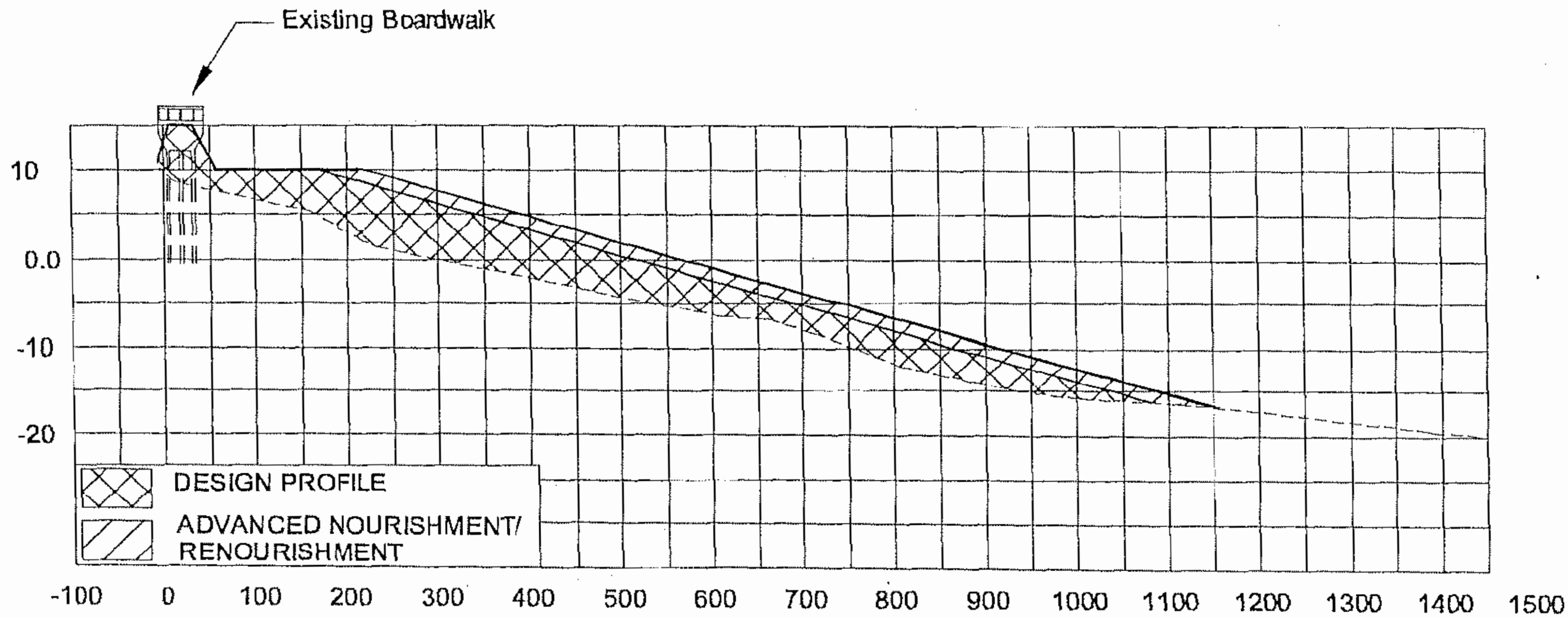
LRR RECOMMENDED PLAN
CROSS SECTION

NASSAU CO. NEW YORK

FIGURE No.8-33

PROFILE No. 220

15' NGVD SAND BARRIER
110' BERM @ 10' NGVD



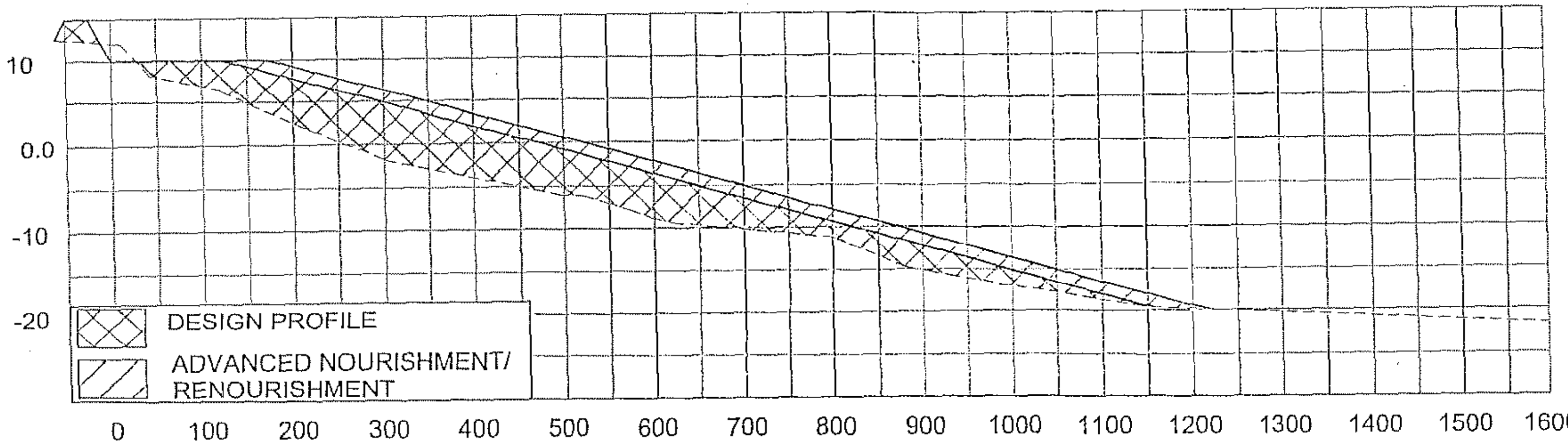
EXISTING DESIGN AND NOURISHMENT PROFILES FOR RECOMMENDED PLAN

SCALE: HORZ. 1" = 200'
VERT. 1" = 20'

ATLANTIC COAST OF LONG ISLAND
JONES INLET TO EAST ROCKAWAY INLET
LONG BEACH ISLAND, NEW YORK
STORM DAMAGE REDUCTION PROJECT
LRR RECOMMENDED PLAN
CROSS SECTION
NASSAU CO. NEW YORK
FIGURE No. 8-34

PROFILE No. 222

15' NGVD DUNE
110' BERM @ 10' NGVD



EXISTING DESIGN AND NOURISHMENT PROFILES FOR RECOMMENDED PLAN

SCALE: HORZ. 1" = 200'
VERT. 1" = 20'

ATLANTIC COAST OF LONG ISLAND
JONES INLET TO EAST ROCKAWAY INLET

LONG BEACH ISLAND, NEW YORK
STORM DAMAGE REDUCTION PROJECT

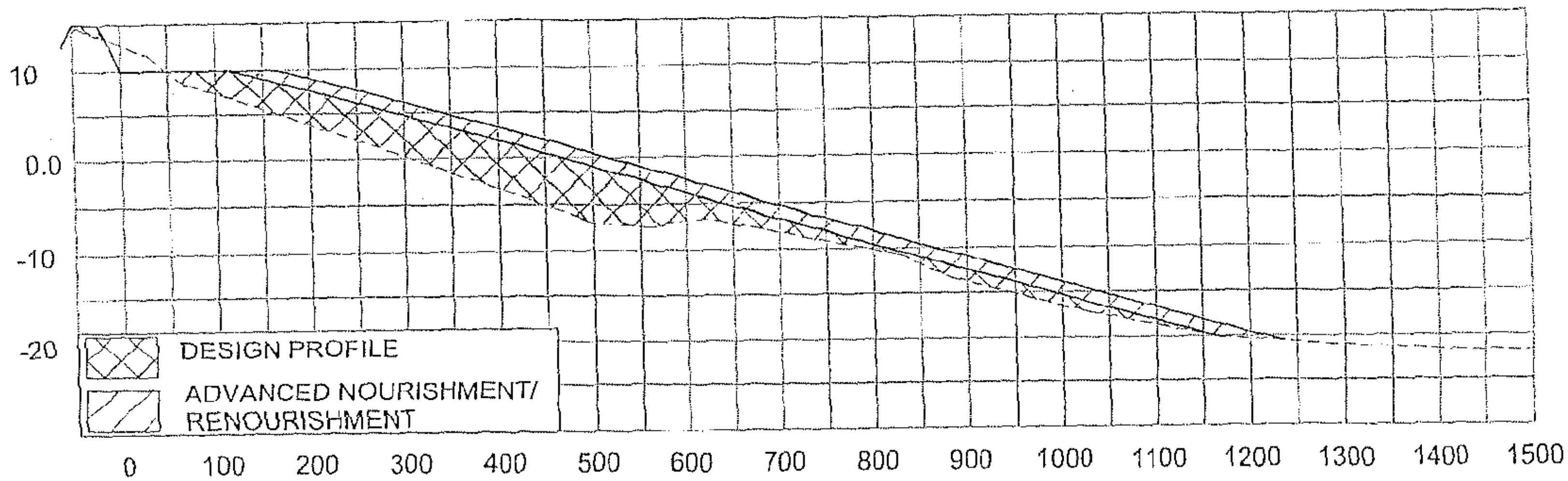
LRR RECOMMENDED PLAN
CROSS SECTION

NASSAU CO. NEW YORK

FIGURE No. 8-35

PROFILE No. 224

15' NGVD DUNE
110' BERM @ 10' NGVD



EXISTING DESIGN AND NOURISHMENT PROFILES FOR RECOMMENDED PLAN

SCALE: HORZ. 1" = 200'
VERT. 1" = 20'

ATLANTIC COAST OF LONG ISLAND
JONES INLET TO EAST ROCKAWAY INLET

LONG BEACH ISLAND, NEW YORK
STORM DAMAGE REDUCTION PROJECT

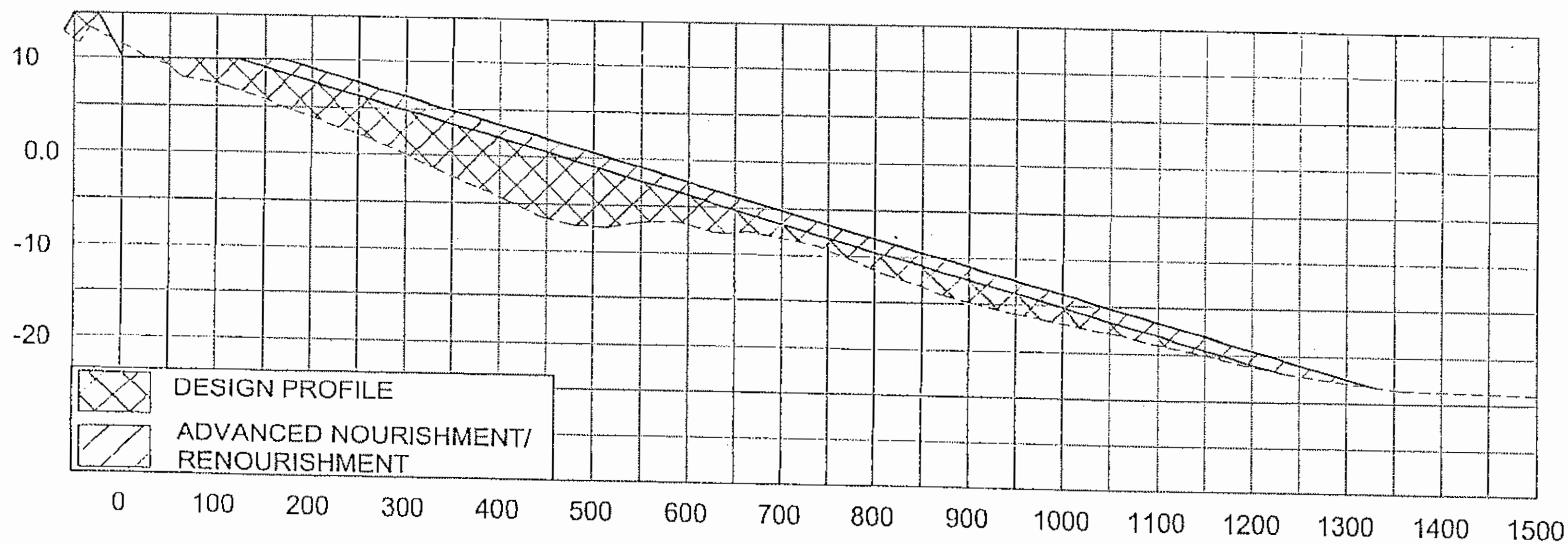
LRR RECOMMENDED PLAN
CROSS SECTION

NASSAU CO. NEW YORK

FIGURE No. 9-36

PROFILE No. 226

15' NGVD DUNE
110' BERM @ 10' NGVD



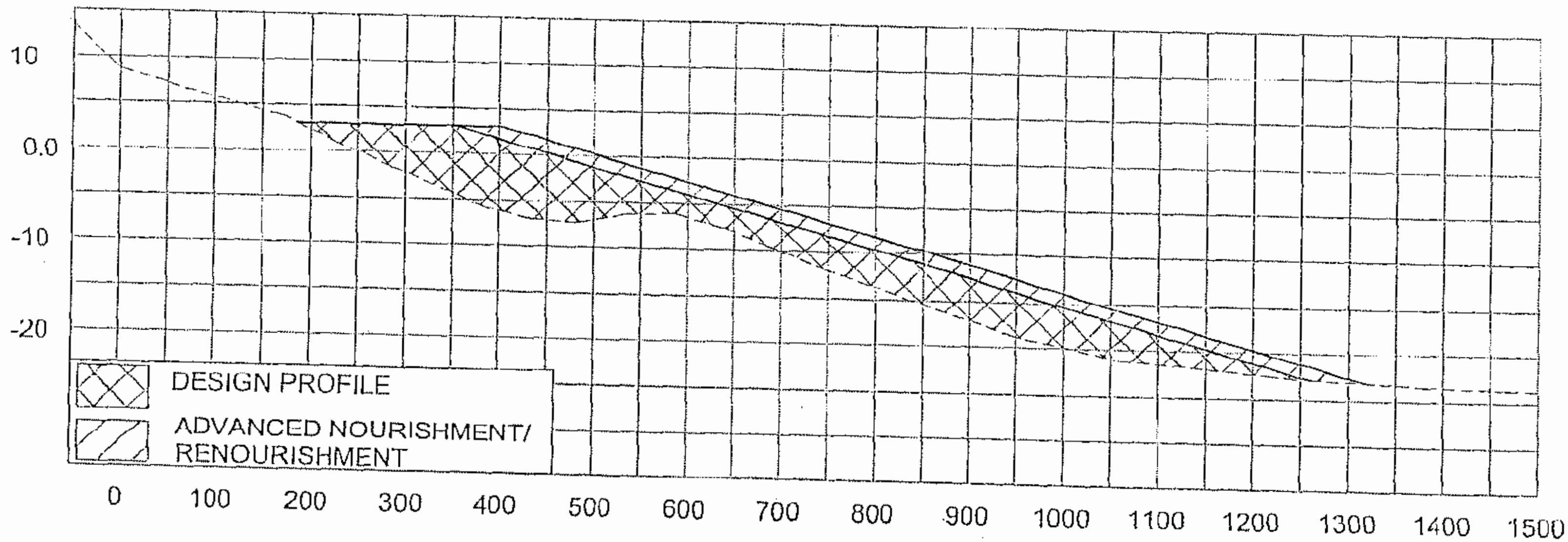
EXISTING DESIGN AND NOURISHMENT PROFILES FOR RECOMMENDED PLAN

SCALE: HORZ. 1" = 200'
VERT. 1" = 20'

ATLANTIC COAST OF LONG ISLAND
JONES INLET TO EAST ROCKAWAY INLET
LONG BEACH ISLAND, NEW YORK
STORM DAMAGE REDUCTION PROJECT
LRR RECOMMENDED PLAN
CROSS SECTION
NASSAU CO. NEW YORK
FIGURE No. 8-37

PROFILE No. 230

15' NGVD DUNE
110' BERM @ 10' NGVD



EXISTING DESIGN AND NOURISHMENT PROFILES FOR RECOMMENDED PLAN

SCALE: HORZ. 1" = 200'
VERT. 1" = 20'

ATLANTIC COAST OF LONG ISLAND
JONES INLET TO EAST ROCKAWAY INLET
LONG BEACH ISLAND, NEW YORK
STORM DAMAGE REDUCTION PROJECT

LRR RECOMMENDED PLAN
CROSS SECTION

NASSAU CO. NEW YORK

FIGURE No. B-38

APPENDIX M
BIOLOGICAL ASSESSMENT AND OPINION

APPENDIX N

WATER QUALITY CERTIFICATE
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYSDEC)

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

June 10, 2003

REPLY TO
ATTENTION OF

Environmental Analysis Branch

Mr. John Pavacic
Regional Permit Administrator
N.Y.S. Department of Environmental Conservation
Building 40 – S.U.N.Y. Campus
Stony Brook, New York 11790-2356

RE: NYSDEC Permit No. 1-2899-00008/00001

Dear Mr. Pavacic:

The New York District of the U.S. Army Corps of Engineers received NYSDEC Permit No. 1-2899-00008/00001 authorizing establishment of a protective dune system, beach renourishment, groin rehabilitation, and construction of new groins in Long Beach, New York. The referenced permit was issued July 17, 1998 and expires July 31, 2003. Due to a delayed project start date, this office is requesting a five-year extension to the DEC permit.

The Long Beach project scope has changed since permit issuance (please see Enclosure). Additionally, this office will be initiating consultation with the U.S. Fish and Wildlife Service to minimize potential impacts to threatened and endangered species now present in the vicinity of the project action area. This office anticipates the need for a permit modification and will request one in the near future.

Enclosure

Sincerely,

L Houston

Leonard Houston
Chief, Environmental Analysis Branch

CF: Roman Rakoczy, New York State Department of Environmental Conservation

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 30, 2004

Mr. John Pavacic, Regional Permit Administrator
NYSDEC, Region 1
Building 40 – SUNY Campus
Stony Brook, NY 11790-2356

RE: **MODIFICATION REQUEST**
Water Quality Certification # 1-2899-00008/00002
US Army Corps of Engineers, NY District
Long Beach Island Project

Dear Mr. Pavacic,

Please accept this letter as New York District (NYD) official request to modify the above referenced Water Quality Certification Permit for our Long Beach Island project permit # 1-2899-00008/00002.

NYD's modification request addresses the New York State Department of Conservation (NYSDEC) Description of Authorized Activity which states; "Establish a protective dune system for Long Beach Barrier Island by placement of 8,642,000 cubic yards of sand from offshore borrow site. Renourishment with 1,746,200 cubic yards of sand every 5 years. Rehabilitate 17 existing groins, construct 4 new groins, dune walkovers and boardwalk extensions, vehicle access ramps, and establish grass planting. All work shall be in accordance with Final Feasibility Report with FEIS, Storm Damage Reduction project prepared by the USACE dated March 1998." The initial placement volume has been reduced from 8,642,000 cubic yards to 7,120,900 cubic yards. NYD requests a time that the authorized activities reflect the attached modified proposed project plan.

If you need any further documentation and/or assistance to process this request, please feel free to contact: Mr. Robert J. Smith, Project Biologist, at (212) 264-0189.

Sincerely,

L. Houston

Leonard Houston
Chief, Environmental Analysis Branch

Cc: NYSDEC, Region 2 Marine Resource
NYSDEC Region 1 Division of Law Enforcement

New York State Department of Environmental Conservation
Division of Environmental Permits, Region One
Building 40 - SUNY, Stony Brook, New York 11790-2356
Phone: (631) 444-0365 FAX: (631) 444-0360

PERMIT RENEWAL

August 6, 2003

U.S. Army Corps of Engineers
Jacob K. Javits Federal Building
New York, New York 10278-0090

Attn: Mr. Leonard Houston
Chief Environmental Analysis Branch

Re: NYSDEC #1-2899-00008/00001
U.S. Army Corps of Engineers
Rockaway Inlet to Jones Inlet
Atlantic Coast of Long Island

Dear Permittee:

Your recent request to extend the above permit has been reviewed pursuant to 6NYCRR Part 621 (Uniform Procedures Regulations) and found to be approvable. Therefore, the permit is hereby extended to **June 30, 2008**.

This letter is a modification to the original permit and, as such, shall be available at the permitted site whenever authorized work is in progress.

All other terms and conditions remain as written in the original permit.

Sincerely,

Roger Evans

Roger Evans
Permit Administrator

cc: BMHP/mep
File

New York State Department of Environmental Conservation
Division of Environmental Permits, Region One
Building 40 - SUNY, Stony Brook, NY 11790-2356
Phone: (516) 444-0365 Fax : (516) 444-0360

John P. Cahill
Commissioner

July 17, 1998

U.S. Army Corps of Engineers
Jacob K. Javits Federal Building
New York, NY 10278-0090

RE: 1-2899-00008/00001

Dear Permittee:

In conformance with the requirements of the State Uniform Procedures Act (Article 70, ECL) and its implementing regulations (6NYCRR, Part 621) we are enclosing your permit. Please read all conditions carefully. If you are unable to comply with any conditions, please contact us at the above address.

Also enclosed is a permit sign which is to be conspicuously posted at the project site and protected from the weather.

Very truly yours,

Marilyn Peterson

Marilyn E. Peterson
Environmental Analyst I

MEP:cg
enclosure

DEC PERMIT NUMBER 1-2899-00008/00001	PERMIT Under the Environmental Conservation Law	EFFECTIVE DATE July 17, 1998
FACILITY/PROGRAM NUMBER(S)		EXPIRATION DATE(S) July 31, 2003

TYPE OF PERMIT ■ New ☐ Renewal ☐ Modification ☐ Permit to Construct ☐ Permit to Operate

☐ Article 15, Title 5: Protection of Waters

☐ Article 15, Title 15: Water Supply

☐ Article 15, Title 15: Water Transport

☐ Article 15, Title 15: Long Island Wells

☐ Article 15, Title 27: Wild, Scenic and Recreational Rivers

■ 6NYCRR 608: Water Quality Certification

☐ Article 17, Titles 7, 8: SPDES

☐ Article 19: Air Pollution Control

☐ Article 23, Title 27: Mined Land Reclamation

☐ Article 24: Freshwater Wetlands

☐ Article 25: Tidal Wetlands

☐ Article 27, Title 7; 6NYCRR 360: Solid Waste Management

☐ Article 27, Title 9; 6NYCRR 373: Hazardous Waste Management

☐ Article 34: Coastal Erosion Management

☐ Article 36: Floodplain Management

☐ Articles 1, 3, 17, 19, 27, 37; 6NYCRR 380: Radiation Control

☐ Other:

PERMIT ISSUED TO			TELEPHONE NUMBER
U.S. Army Corps of Engineers			(212) 264-4663
ADDRESS OF PERMITTEE Jacob K. Javits Federal Building New York, NY 10278-0090			
CONTACT PERSON FOR PERMITTED WORK Peter Weppler			TELEPHONE NUMBER
NAME AND ADDRESS OF PROJECT/FACILITY US Army Corps of Engineers Atlantic Coast of Long Island			
LOCATION OF PROJECT/FACILITY Rockaway Inlet to Jones Inlet			
COUNTY Nassau	TOWN Hempstead	WATERCOURSE Atlantic Ocean	NYTM COORDINATES

DESCRIPTION OF AUTHORIZED ACTIVITY

Establish a protective dune system for Long Beach Barrier Island by placement of 8,642,000 cubic yards of sand from offshore borrow site. Renourish with 2,000,000 cuubic yards of sand every 5 years. Rehabilitate 16 existing groins, construct 6 new groins, dune walkover, vehicle access ramps and establish grass plantings. All work shall be in accordance with Final Feasibility Report with FEIS, Storm Damage Reduction Project prepared by USACE dated March 1998.

By acceptance of this permit, the permittee agrees that the permit is contingent upon strict compliance with the ECL, all applicable regulations, the General Conditions specified (see page 2) and any Special Conditions included as part of this permit.

DEPUTY REGIONAL PERMIT ADMINISTRATOR: Roger Evans MEP	ADDRESS Bldg. 40, SUNY, Room 121, Stony Brook, NY 11790-2356	
AUTHORIZED SIGNATURE Roger Evans	DATE July 17, 1998	Page 1 of 7

NOTIFICATION OF OTHER PERMITTEE OBLIGATIONS

Item A: Permittee Accepts Legal Responsibility and Agrees to Indemnification

The permittee has accepted expressly, by the execution of the application, the full legal responsibility for all damages and costs, direct or indirect, of whatever nature and by whomever suffered, for liability it incurs resulting from activity conducted pursuant to this permit or in noncompliance with this permit and has agreed to indemnify and save harmless the State from suits, actions, damages and costs of every name and description resulting from such activity.

Item B: Permittee to Require it's Contractors to Comply with Permit

The permittee shall require its independent contractors, employees, agents and assigns to read, understand and comply with this permit, including all special conditions, and such persons shall be subject to the same sanctions for violations of this permit as those prescribed for the permittee.

Item C: Permittee Responsible for Obtaining Other Required Permits

The permittee is responsible for obtaining any other permits, approvals, lands, easements and rights-of-way that may be required for this project.

Item D: No Right to Trespass or Interfere with Riparian Rights

This permit does not convey to the permittee any right to trespass upon the lands or interfere with the riparian rights of others in order to perform the permitted work nor does it authorize the impairment of any rights, title, or interest in real or personal property held or vested in a person not a party to the permit.

GENERAL CONDITIONS

General Condition 1: Facility Inspection by the Department

The permitted site or facility, including relevant records, is subject to inspection at reasonable hours and intervals by an authorized representative of the Department of Environmental Conservation (the Department) to determine whether the permittee is complying with this permit and the ECL. Such representative may order the work suspended pursuant to ECL 71-0301 and SAPA 401(3).

The permittee shall provide a person to accompany the Department's representative during an inspection to the permit area when written or verbal notification is provided by the Department at least 24 hours prior to such inspection.

A copy of this permit, including all referenced maps, drawings and special conditions, must be available for inspection by the Department at all times at the project site. Failure to produce a copy of the permit upon request by a Department representative is a violation of this permit.

General Condition 2: Relationship of this Permit to Other Department Orders and Determinations

Unless expressly provided for by the Department, issuance of this permit does not modify, supersede or rescind any order or determination previously issued by the Department or any of the terms, conditions or requirements contained in such order or determination.

General Condition 3: Applications for Permit Renewals or Modifications

The permittee must submit a separate written application to the Department for renewal, modification or transfer of this permit. Such application must include any forms or supplemental information the Department requires. Any renewal, modification or transfer granted by the Department must be in writing.

The permittee must submit a renewal application at least:

a) 180 days before expiration of permits for State Pollutant Discharge Elimination System (SPDES), Hazardous Waste Management Facilities (HWMF), major Air Pollution Control (APC) and Solid Waste Management Facilities (SWMF); and
b) 30 days before expiration of all other permit types.

Submission of applications for permit renewal or modification are to be submitted to:

NYSDEC Regional Permit Administrator, Region 1
Bldg #40 SUNY, Stony Brook, NY 11790-2356

General Condition 4: Permit Modifications, Suspensions and Revocations by the Department

The Department reserves the right to modify, suspend or revoke this permit when:

a) the scope of the permitted activity is exceeded or a violation of any condition of the permit or provisions of the ECL and pertinent regulations is found;
b) the permit was obtained by misrepresentation or failure to disclose relevant facts;
c) new material information is discovered; or
d) environmental conditions, relevant technology, or applicable law or regulation have materially changed since the permit was issued.

6NYCRR 608: Water Quality Certification

1. If future operations by the State of New York require an alteration in the position of the structure or work herein authorized, or if, in the opinion of the Department of Environmental Conservation it shall cause unreasonable obstruction to the free navigation of said waters or flood flows or endanger the health, safety or welfare of the people of the State, or cause loss or destruction of the natural resources of the State, the owner may be ordered by the Department to remove or alter the structural work, obstructions, or hazards caused thereby without expense to the State, and if, upon the expiration or revocation of this permit, the structure, fill, excavation, or other modification of the watercourse hereby authorized shall not be completed, the owners, shall, without expense to the State, and to such extent and in such time and manner as the Department of Environmental Conservation may require, remove all or any portion of the uncompleted structure or fill and restore to its former condition the navigable and flood capacity of the watercourse. No claim shall be made against the State of New York on account of any such removal or alteration.

2. The State of New York shall in no case be liable for any damage or injury to the structure or work herein authorized which may be caused by or result from future operations undertaken by the State for the conservation or improvement of navigation, or for other purposes, and no claim or right to compensation shall accrue from any such damage.

3. Granting of this permit does not relieve the applicant of the responsibility of obtaining any other permission, consent or approval from the U.S. Army Corps of Engineers, U.S. Coast Guard, New York State Office of General Services or local government which may be required.

4. All necessary precautions shall be taken to preclude contamination of any wetland or waterway by suspended solids, sediments, fuels, solvents, lubricants, epoxy coatings, paints, concrete, leachate or any other environmentally deleterious materials associated with the project.

5. Any material dredged in the prosecution of the work herein permitted shall be removed evenly, without leaving large refuse piles, ridges across the bed of a waterway or floodplain or deep holes that may have a tendency to cause damage to navigable channels or to the banks of a waterway.

6. There shall be no unreasonable interference with navigation by the work herein authorized.

7. If upon the expiration or revocation of this permit, the project hereby authorized has not been completed, the applicant shall, without expense to the State, and to such extent and in such time and manner as the Department of Environmental Conservation may require, remove all or any portion of the uncompleted structure or fill and restore the site to its former condition. No claim shall be made against the State of New York on account of any such removal or alteration.

8. If granted under 6NYCRR Part 608, the NYS Department of Environmental Conservation hereby certifies that the subject project will not contravene effluent limitations or other limitations or standards under Sections 301, 302, 303, 306 and 307 of the Clean Water Act of 1977 (PL 95-217) provided that all of the conditions listed herein are met.

9. All activities authorized by this permit must be in strict conformance with the approved plans submitted by the applicant or his agent as part of the permit application.

   Such approved plans were Stamped NYSDEC Approved

   on 5/28/98.

1. Prior to commencement of dredging activities, the exact borrow area must be defined based upon the abundance of surf clams within the overall area. In order to define the specific borrow area the following survey shall be conducted before every phase of dredging:

   Within 6 months of proposed commencement of dredging activities, the borrow area shall be surveyed for surf clam populations and distribution. A total of 30 Stations shall be randomly selected within the borrow area. Each station shall be sampled with modified commercial gear which has been lined with 2" x 3" rectangular mesh (turkey wire) for retention of sub-legal clams. Each tow will be standardized as per NYSDEC Shell fisheries Protocol. Tow duration shall be 5 minutes at a speed f 1.5 knots.

   Surf clam abundance shall be plotted for each station. Specific borrow areas will them be determined for each dredging event based upon use of the lowest abundance areas only. Proposed specific borrow area along with survey data shall be submitted to Lou Chiarella, Regional Manager, Bureau of Marine Habitat Protection, NYSDEC Building #40, SUNY Stony Brook, NY 11790-2356 within 30 days of survey for approval.

2. If the areas are found to be of high surf clam use, NYSDEC and ACOE will implement mitigation measures to minimize impacts to this resource. Possible alternatives identified in the EIS include:

a. Depending on the magnitude and distribution of the resource, dredge in areas of lower surf clam use when such action can be accomplished without creating isolated holes.
b. Harvesting the resources before dredging is initiated.
c. Developing a monitoring program to determine the actual impacts and the possibility of modifying future nourishments for them.

3. As part of the mitigation for long-term cumulative impact concerns, the applicant shall no later than 6 months prior to the commencement of any dredging or other construction activity within the borrow areas or on the beach, submit to the Department, including its Region I office, for its review and approval a detailed coastal processes monitoring plan for both pre-construction and post-construction periods which contains and adequately addresses all the elements listed on page FEIS-45 of the FEIS and in the "Monitoring Plan" in Appendix H of the Long Beach Island, New York Final Feasibility Report Volume II: Technical Appendices.

   In implementing the plan the applicant shall do the following:

a. Conduct and submit the results of pre-construction data collection and monitoring efforts to the Department, including its Region I office, prior to any construction activity.
b. Within 3 months following the completion of the initial construction, commence post-construction data collection and monitoring effort, which duplicates the pre-construction coastal processes monitoring effort. Said post-construction monitoring shall also be conducted in accordance with the following criteria:

   ii. Results from each data collection interval will be submitted to the Department, including its Region I office, within 2 months of the completion of each data collection effort.

   iii. Lab and data analysis will be conducted and will be summarized in reports which shall be prepared and submitted to the Department, including its Region I office, within 4 months of the completion of each interval of data collection.

4. If the results of the re-analysis of the groins being conducted with new modeling tools, as described in paragraph 2 on page FEIS-ii of the FEIS, indicate that a significant design change is required in the NED Plan that was not adequately addressed at all in the DEIS (including a change in the size, shape or configuration of the groins or an increase in the number of groins, especially in the 7,000 foot gap between Long Beach and Lido Beach) then the applicant shall prepare and circulate additional NEPA documentation to address the potential environmental impacts of these changes as necessary, which may include a supplemental EIS. In its consideration of which form of additional NEPA documentation to prepare, the applicant shall coordinate with both the Region I and Albany offices of the New York State Department of Environmental Conservation (the Department). Furthermore, the NEPA documentation prepared shall consider the relationship of the proposed changes to the overall project, segmentation and cumulative impacts in order to ensure the review is compatible with and satisfies the required elements of the New York State Environmental Quality Review Act. It is understood that the Region I office of the Department shall not issue state permits required for the project nor shall the Department sign a construction agreement for the entire project with the Army Corps until the aforementioned design re-analysis has been conducted and accompanying NEPA documentation prepared, both the Region I and Albany offices of the Department have actively participated in the preparation of both the design re-analysis and NEPA documentation prepared in conjunction with the re-analysis satisfies the requirements of the New York State Environmental Quality Review Act.

5. For each month following commencement of dredging activities, a written report shall be prepared which indicates the exact location of dredging activities which occurred during that month and which summarizes the work which has been completed during that month. Said report shall be submitted, by the 15th of the following month, to Louis Chiarella, Regional Manager of the Bureau of Marine Habitat Protection, NYSDEC, Building 40 SUNY, Stony Brook, NY 11790-2356.

6. Due to the occurrence of New York State listed endangered/threatened species at this site, no work which involves the operation of machinery, redistribution of sand, or other physical disturbance is authorized during the period from March 15 to August 31, inclusive.

7. Notification Obligation Item A and Additional General Condition #2 are included by the State of New York as the permit issuing authority under the Clean Water Act. Such General conditions do not, nor are they intended to, apply to, abrogate, or annul any obligation, responsibility or liability on the part of the State of New York, including indemnification by the State of New York to the Federal Government under the Project Cooperation Agreement (PCA) for the Fire Island Breach Contingency Plan. Any obligations by the Federal Government under this Water Quality Certification are limited to available funds authorized for and appropriated to the Fire Island Breach Project. Pursuant to the PCA, the State of New York remains legally responsible to hold and save the Federal Government free from all damages arising from the construction, operation, maintenance, repair replacement, and rehabilitation, of the Project and any Project related betterments, including liabilities arising from Notification Item A and Additional General Condition #2 except for damages due to the fault or negligence of the Federal Government or it's contractors.

8. The borrow area(s) shall be dredged so as to create a gradual (1:5 maximum) slope down to final project depth.

9. All dredging shall be conducted so as to leave a uniform bottom elevation, free of mounds or holes, at the completion of each dredging cycle.

10. Any debris or excess material from construction of this project shall be completely removed from the adjacent area (upland) and removed to an approved upland area for disposal. No debris is permitted in tidal wetlands and/or protected buffer areas.

11. There shall be no disturbance to vegetated tidal wetlands or protected buffer areas as a result of the permitted activity.

12. The storage of construction equipment and materials shall be confined to within the project work site and/or upland areas greater than 50 linear feet from the tidal wetland boundary.

13. Within 90 days of completion of the initial project and each nourishment cycle, tow (2) copies each of a post-dredging contoured bathymetric survey of the borrow area(s) , and an "as built" topographic survey of the beach, dune, new and modified groins and all other project fill and work areas will be provided to the DEC.

14. In order to develop a comprehensive borrow area management plan and detect long-term adverse impacts created by the dredging of the borrowed area(s), the following parameters shall be monitored for each borrow area:

a. One set of Conductivity, Temperature and Depth (CTD) profiles (including Dissolved Oxygen, Temperature, Salinity) shall be taken once between August 1 and August 15 for a period of five years after the completion of the initial excavation. Two stations shall be monitored which include the center of the deepest section of the borrow area and 100M north of the borrow area.

b. A survey of benthic recolonization (benthic grab sample) shall be conducted in the borrow area one and three years (twice) after initial project completion. Three locations shall be sampled consisting of three replicates. Locations shall include the center of the deepest area, mid-way on the side slope, and at the northern limit of the excavation. Surveys shall be conducted between August 1 and August 15 and shall be accompanied by CTD profiles.

All data and results shall be submitted to the Regional Manager of the Bureau of Marine Habitat Protection, Region One, within 60 days of completion. Submission shall include data, sample analysis, and station locations.

15. The dune shall be planted with Cape American Beach grass on a minimum of 18" centers and the permittee shall replant the beach grass during each subsequent nourishment cycle, as necessary, to ensure a minimum of 85% survival rate.

Supplementary Special Conditions (A) through (F) Attached

SUPPLEMENTARY SPECIAL CONDITIONS

The following conditions apply to all Tidal Wetlands; Freshwater Wetlands; Coastal Erosion Management; and Wild, Scenic, and Recreational Rivers Permits:

A. A copy of this permit, including all conditions and approved plans, shall be available at the project site whenever authorized work is in progress. The permit sign enclosed with the permit shall be protected from the weather and posted in a conspicuous location at the work site until all authorized work has been completed.

B. The permittee shall require that any contractor, project engineer, or other person responsible for the overall supervision of this project reads, understands, and complies with this permit and all its general, special, and supplementary special conditions. Any failure to comply precisely with all of the terms and conditions of this permit, unless authorized in writing, shall be treated as a violation of the Environmental Conservation Law. If any of the permit conditions are unclear, the permittee shall contact the Division of Regulatory Affairs at the address on page one or telephone (516) 444-0365.

C. If project design modifications become necessary after permit issuance, the permittee shall submit the appropriate plan changes for approval by the Regional Permit Administrator prior to undertaking any such modifications. The permittee is advised that substantial modification may require submission of a new application for permit.

D. At least 48 hours prior to commencement of the project, the permittee and contractor shall sign and return the top portion of the enclosed notification form certifying that they are fully aware of and understand all terms and conditions of this permit. Within 30 days of completion of the permitted work, the bottom portion of that form shall also be signed and returned, along with photographs of the completed work and, if required, a survey.

E. For projects involving activities to be undertaken in phases over a period of more than one year, the permittee shall notify the Regional Permit Administrator in writing at least 48 hours prior to recommencing work in subsequent years.

F. The granting of this permit does not relieve the permittee of the responsibility of obtaining a grant, easement, or other necessary approval from the Division of Land Utilization, Office of General Services, Tower Building, Empire State Plaza, Albany, NY 12242 (516) 474-2195, which may be required for any encroachment upon State owned lands underwater.

95-20-1 (8/87)—9d

New York State

Department of Environmental Conservation

NOTICE

The Department of Environmental Conservation (DEC) has issued permit(s) pursuant to the Environmental Conservation Law for work being conducted at this site. For further information regarding the nature and extent of work approved and any Departmental conditions on it, contact the Regional Permit Administrator listed below. Please refer to the permit number shown when contacting the DEC.

Regional Permit Administrator

JOHN W. PAVACIC

Permit Number 1-2899-00008/00001

Expiration Date 7/31/2003

NOTE: This notice is **NOT** a permit