February 1996

POPLAR ISLAND, MARYLAND

Environmental Restoration Project

Integrated Feasibility Report and Environmental Impact Statement

BENEFICIAL USE OF DREDGED MATERIAL

US Army Corps of Engineers
Baltimore District

Maryland Port Administration

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, U.S. ARMY CORPS OF ENGINEERS
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U.S. Army Corps
of Engineers
Baltimore District

Maryland Port
Administration

Poplar Island Restoration Study, Maryland

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FEBRUARY 1996

NOTE TO THE READER: The Environmental Impact Statement (EIS) for this project has been integrated into the following Feasibility Report in accordance with ER 1105-2-100. Sections of the report that are required for compliance with the National Environmental Policy Act (NEPA) are noted by an asterisk (*) in the Table of Contents.

AGENCY COOPERATION: This integrated report and EIS was prepared through the cooperative efforts of the Baltimore District, U.S. Army Corps of Engineers (USACE) and the Maryland Port Administration (MPA).

LOCATION OF PROPOSED ACTION: Poplar Island is located in the upper middle Chesapeake Bay, approximately 34 nautical miles southeast of the Port of Baltimore and 1 mile north of Tilghman Island in Talbot County, Maryland, and Chesapeake Bay, Maryland.

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ABSTRACT: This report/EIS presents the findings of a study to determine the feasibility of using uncontaminated dredged material from the approach channels of the Baltimore Harbor and Channels Federal navigation project to recreate and restore ecological habitat at Poplar Island. It provides the findings of economic, social, environmental, and engineering analyses that were used to select a recommended plan of action. The potential impacts, if any, to cultural and environmental resources are evaluated herein in accordance with NEPA 1969 and Section 106 of the National Historic Preservation Act of 1966.

POPLAR ISLAND RESTORATION PROJECT, MARYLAND

Feasibility Report and Environmental Impact Statement

EXECUTIVE SUMMARY

The group of islands known as Poplar Island is located in the upper middle Chesapeake Bay approximately 34 nautical miles southeast of the Port of Baltimore and 1 mile northwest of Tilghman, Talbot County, Maryland. The islands, which are situated on the main stem of the Bay near the confluence of the Chesapeake and Eastern Bays, are subject to severe erosional forces. From a size probably exceeding 1,100 acres in the 1800's, the island has eroded and split into four separate islands (North Point Island, Middle Poplar Island, South Central Poplar Island, and South Poplar Island) collectively referred to as Poplar Island. These islands together total only 5 acres today. The two larger parcels in the group are Coaches Island, which in 1847 was part of Poplar Island, and Jefferson Island, which by 1847 was already separate. Coaches Island currently has a surface area of approximately 74 acres. Jefferson Island is not part of the project area.

Land subsidence, rising sea level, and wave action are causing valuable island habitats like Poplar Island to be lost through erosion throughout the Chesapeake Bay. In the last 150 years, it has been estimated that 10,500 acres have been lost in the middle eastern portion of Chesapeake Bay alone. Islands and the surrounding habitat are preferentially selected by many migratory birds, as well as other fish and wildlife species, as nesting/production areas. Even though similar vegetative communities may occur on the mainland, isolation, lack of human disturbance, and fewer predators make islands more productive. Poplar Island currently supports nesting snowy egrets, common egrets, cattle egrets, common terns, double-crested cormorants, great blue herons, little blue herons, green herons, and black ducks. Diamondback terrapins nest on the beaches, and river otters fish from the island shore. The island is currently eroding at the rapid rate of more than 13 feet per year. If the present rate of land loss continues unabated, the island will probably disappear by the turn of the century.

A project to reconstruct Poplar Island to its approximate size in 1847 using uncontaminated dredged material from the Baltimore Harbor and Channels Federal navigation project has been developed through the cooperative efforts of many state and Federal agencies, as well as private organizations. This Poplar Island restoration project represents a cost-effective and environmentally beneficial solution to the dredged material placement problems facing the Port of Baltimore. Since 1984, the Hart-Miller Island Placement Site, constructed by the Maryland Port Administration (MPA), has been used for the placement of dredged material from the Port of Baltimore and certain reaches of the Baltimore/Chesapeake Bay Navigation Channels. Since its completion, approximately 62 million cubic yards of dredged material have been placed there. The site is expected to reach its capacity and be unavailable for use by the year 1998.

The Port of Baltimore is rapidly reaching a point where available placement area capacity will be insufficient to meet the port's dredging needs. Current projections indicate that without additional dredged material placement sites, existing capacity would prohibit necessary maintenance and modification of the Baltimore Harbor and Channels Federal navigation project.

A disruption in the constant maintenance that is required to keep the Port of Baltimore operational would result in significant adverse effects to both the local and national economy. The Port handles approximately 40 million tons of commerce, including 350,000 containers of cargo that move between the Dundalk Marine and Seagirt Terminals and South Locust Point. Currently the Port generates 87,000 jobs, an estimated 45,000 of which are held by Maryland residents. A total of 18,000 are direct jobs; 6,600 are induced jobs, meaning that they support local purchases made by direct jobs; and 62,500 are jobs indirectly related to activities at the Port. Revenue impact from the Port results in earnings of $1.3 billion for firms in the maritime sector, contributes nearly $3 billion in business, and represents one-tenth of Maryland's gross state product.

Prior to initiation of this feasibility study, an intense evaluation of potential dredged material management options has been ongoing, conducted by a multi-agency group representing Federal, state, and local governments, members of the academic community, groups concerned with protection of the environment, parties involved in maritime commerce, and parties whose livelihood is dependent upon the quality of Bay waters. This effort included a Governor's Task Force on Dredged Material and the MPA's Dredging Needs and Placement Options Program. Over the past several years, an extensive list of potential alternatives have been developed and, subsequently, refined based on cost, engineering feasibility, and environmental concerns. Of these options, the restoration of Poplar Island is the most viable alternative.

During the study, a coastal engineering assessment was made, environmental studies were completed, hydrographic and topographic surveys were performed, and geotechnical and archeological investigations were conducted. Based on the results of these analyses, three potential site alignment alternatives were developed that encompassed the 1847 footprint of Poplar Island. The alignment alternatives ranged in size from 820 acres to 1,340 acres, had wetland/upland ratios ranging from 50 percent wetlands to 100 percent wetlands, and had upland elevations ranging from 10 feet to 20 feet. After evaluation of the various alternatives on the basis of technical, economic, and environmental criteria, a recommended plan was selected (Table ES-1).

This recommended plan would create a 1,110-acre dredged material placement area around the island's 1847 footprint, within a 35,000-ft perimeter. This area would then be filled with uncontaminated dredged material obtained from periodic maintenance dredging of the Federal navigation channels that serve the Port of Baltimore, and developed into low and high marsh wetlands and upland habitat. The projected site capacity associated with the recommended plan is 38 million cubic yards, which is expected to be placed over a period of 24 years. The site would consist of 50 percent tidal wetlands, of which 80 percent would be low marsh and 20 percent would be high marsh, and 50 percent uplands with an elevation up to +20 feet MLLW.

Table ES-1 Alternative Designs Comparison

Alternative Design	Available[1] Size/Capacity	Est.[8] Haul Distance	Est.[9] Cost per cy	Bene. Use/ Restor. Opp.	Constraints	Eng[17] Feas	Estimated[18] Long-term Environmental Consequences	Significance[18] of Environment Consequences	Agency[21] Support	Reason for Alternative Selection or Elimination
Open Water Placemt										
Deep Trough	100mcy[2]	15mi	2.02	min.[11]	state law[13]	+	+/-	min. to signif.	partial	state law
Other Open Wtr Site	varies	varies	varies	min.[11]	see note[14]	+	+/-	min. to signif.	partial	lack of support
Shallow Water Placemt										
Poole's Island	2.9mcy[3]	12mi	2.02	min.[11]	site unavail[4]	+	+/-	min. to signif.	partial	unavail/capacity[3]
Other Shallow Sites	varies	varies	varies	min.[11]	see note[14]	+	+/-	min. to signif.	partial	lack of support
Upland Placement										
HMI	4mcy[4]	10mi	4.21	fair[12]	site unavail[15]	+	+/-	min.	partial	unavail/capacity[3]
CSX/Cox Creek	6 mcy[5]	8mi	4.21	min.[12]	site unavail[15]	+	+/-	min. to signif.	partial	site unavailable
Other Upland Sites	varies	varies	4.21	min.[12]	see note[12]	+	+/-	min. to signif.	partial	lack of support
Island Restoration										
Bay islands	varies[6]	varies	varies	max.	see note[6]	+	+	min. to signif.	partial	transport cost[6]
Poplar Island										
Plan A	776ac/9mcy[7]	26mi	4.73	max.	see note[16]	+	+[19]	sig. benefits	partial[22]	lack of support
Plan B	965ac/10.5mcy[7]	26mi	4.73	max.	see note[16]	+	+[19]	sig. benefits	partial[22]	lack of support
Plan C (PFR)	1000ac/11mcy[7]	26mi	4.73	max.	see note[16]	+	+[19]	sig. benefits	partial[22]	lack of support
Alignmt. #1	820ac/28.7mcy[7]	26mi	4.73	max.	see note[16]	+	+[19]	sig. benefits	partial[22]	lack of support
Alignmt. #2	1340ac/46.7mcy[7]	26mi	4.73	max.	see note[16]	+	+[19]	sig. benefits	partial[22]	lack of support
Alignmt. #3	1110ac/40mcy[7]	26mi	4.73	max.	see note[16]	+	+[19]	sig. benefits	full[22]	consensus
No Action	0	0	0[10]	0	negative impacts to port traffic	+	+/-[20]	significant[20] negative impacts	none	economically infeasible[10]

Table ES-1 (Continued)

1. The capacity of placement sites depends on the location and depth of the specific site, the type of material to be placed, and the proposed method of placement.

2. Estimates for capacity of the Deep Trough range from approximately 100 to 500mcy.

3. The Poole's Island site has approximately 2.9 mcy of capacity over FY 96, 97, 98. The use of Poole's Island for dredged material placement is dedicated to the approach channels of the C and D Canal.

4. HMI currently has capacity for approximately 1.6mcy of material to be placed in FY97. In FY99 and FY00 2.4mcy of clean will be used to cap and close the site.

5. The CSX/Cox Creek placement sites have been identified as containment areas for contaminated harbor material. It is expected that approximately 6mcy of contaminated material will be placed between FY97 and FY07.

6. Several Bay islands or island remnants exist along the Eastern shore. They offer reduced restoration opportunities compared to Poplar Island due to the longer distance from the areas to be dredged and less need for the restoration of wildlife habitat than that of the mid-Bay Poplar Island area.

7. For purposes of comparison, it is assumed that alternatives A, B, and C include 50% wetlands and 10' upland elevation. Alignments 1, 2, and 3 are assumed to have 50% wetlands and 20' elevations; a 10' elevation would accomodate less material.

8. Haul distance is estimated from the mid-point of the maintenance dredging area to the mid-point of the potential placement site.

9. A rough cost estimate was developed using estimated dredging, transportation, as well as off-loading and mobilization/de-mobilization costs, as necessary. Material management costs are not included. Estimates are for comparison only.

10. An estimate of the revenue loss due to reduced port traffic resulting from inadequate channel maintenance has not been calculated as part of this study, however, it may be assumed to be significant.

11. Open water and shallow water placement can provide beneficial use opportunities such as increasing benthic diversity and creating wetlands.

12. Upland contained placement sites can provide beneficial use opportunities such as creating upland wildlife habitat, creating commercial property, or recreation land. Typically, the cost of land acquisition is a constraint.

13. State Law bars dredged material placement in the Deep Trough.

14. There is a general lack of support by resource management agencies and the public for placement of dredged material in open and shallow water. The lack of support and/or opposition may be based on the fear that dispersion, which sometimes results in greater impacts, will occur, or that material will be placed in areas of diverse and sensitive aquatic resources.

15. Both HMI and CSX/Cox Creek have been identified as containment sites for contaminated material.

16. Constraints on the Poplar Island project have been minimized and/or resolved through extensive coordination and a collaborative design process.

17. Costs and environmental impacts, rather than engineering feasibility, are the limiting factors in dredge material placement projects in the Bay.

18. Long-term environmental consequences and the significance of the consequences for the use of each site would vary depending on the design, construction, and management of the specific project.

19. Minor negative impacts include a small increase in flow velocities and some loss of Bay bottom and associated benthic community. Positive impacts include protecting and promoting SAV in Poplar Harbor and restoring valuable wetland and upland habitats to benefit many species, including black duck, herons, egrets, and other colonial nesting waterbirds.

20.The No Action alternative would result in negative impacts due to the need to place material at sites that provide fewer environmental benefits.

21. The formal mission of each agency, office, or other entity involved with the placement of dredged material shapes which project(s) they support.

22. Each of the Poplar Island alternatives had some agency support. Discussion among working group members, as well as public response to the alternatives, resulted in a decision by consensus that Alignment #3 is the preferred/recommended plan.

A dike would surround the entire area but would not tie directly into Coaches Island. Along the dike alignment adjacent to Coaches Island, a sand dune configuration is currently proposed that would allow for a small tideway to remain open between Coaches Island and the Poplar Island restoration area. This will protect ownership rights of both Coaches Island and the proposed restored island.

The recommended design for the initial western dike incorporates a structure slope of 3H:1V to 5H:1V, an 11.4-feet crest height, and 1.5- to 2-ton armor stone. The armored eastern dike would also have a 3H:1V to 5H:1V structural slope, but a crest elevation of 8 feet and 0.1-ton armor stone. The unarmored eastern dike would have a crest elevation of 8.0 feet and 5H:1V side slopes. The initial armored perimeter dikes and internal dikes will be built to allow the placement of dredged materials in the upland cells to approximately elevation 10. They will be constructed of on-site sand hydraulically dredged from within the project site and access channel. To account for differential erosional forces, western and eastern exposures of the restoration area would be supported by differing dike designs, and the dike face of each exposure would be armored or not as appropriate. The dikes providing containment of the upland cells will be raised to +23 feet MLLW to allow development of the upland cells to approximately +20 feet MLLW. The extent of removal of weak foundation soils will be sufficient to assure stability of the dike section of the final crest elevation. The interior slope of the initial dikes will be overbuilt by approximately 60 feet to provide a reliable foundation for the raising. The raising will be accomplished using sand obtained from a borrow site immediately south of the project on either side of the approach channel, or sand generated by channel dredging work. This approach assures that upland habitat can be accomplished to elevation 20 as proposed.

No significant adverse impacts will occur to the region's economic, cultural, recreational, or social resources as a result of the implementation of the recommended plan. Cumulative negative effects of the dredged material placement and Poplar Island restoration are minimal. Some local effects associated with loss of present bottoms and open waters can be expected, but such habitats are relatively extensive in the region. Cumulative positive effects and overall benefits to the Chesapeake Bay economic and ecological systems are great and long lasting. Major economic benefits are associated with the provision of maintained channel access to the Port of Baltimore. Cumulative environmental benefits of the restoration will accrue throughout the central Chesapeake Bay area and the mid-Atlantic region. High-quality, island-based wetland and upland habitat will support commercially and recreationally valuable finfish and shellfish; birds and wildlife; and rare, threatened, and endangered species. Water quality will improve as present erosion is eliminated, and the reconstructed island will provide erosion protection for adjacent islands in the group.

The total dredging and construction cost is estimated to be $458.4 million. All costs are based on present worth costs as of 1 December 1995. Under Section 204 of the Water Resources Development Act of 1992, the incremental costs, defined as the project costs above the base plan, are cost-shared 75 percent Federal, 25 percent non-Federal. The base plan for this project has been determined to be the Deep Trough, since it would accomplish the placement of dredged material in the least costly manner that is consistent with sound engineering practice and that meets all Federal environmental standards. The Deep Trough is a large region of deep water, up to 140 feet in depth, along the eastern shore of the Chesapeake Bay. The trough extends approximately 20 miles beginning offshore of Kent Island and extending south to the mouth of the Little Choptank River. The cost of dredging, transporting and placing dredged material in the Deep Trough during the project life is $151.2 million. Consequently, the incremental project cost is estimated to be $307 million, not including $11 million for state maintenance during construction.

In summary, the results of the feasibility phase support Federal involvement in using clean dredged material from the Baltimore Harbor and Channels Federal navigation project to restore aquatic and ecologically related habitat at Poplar Island, Maryland. The non-Federal sponsor, MPA, agrees with the findings in this report and has indicated their intent to provide the non-Federal cooperation required for project implementation. A letter of intent to sign the Project Cooperation Agreement is anticipated. In view of this expression of non-Federal support and the favorable results of the technical analyses, the District Engineer recommends that the feasibility report be approved and that the improvements associated with the recommended plan be authorized for construction.

Poplar Island Restoration Study, Maryland

Integrated Feasibility Report
and
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Table of Contents

NOTE: *Indicates information required for National Environmental Policy Act compliance.

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LIST OF ANNEXES

LIST OF APPENDICES

LIST OF FIGURES

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Section 1

Introduction

Section 204 of the Water Resources Development Act of 1992 allows the Corps of Engineers (USACE) to protect, restore, and create aquatic and ecologically related habitats in connection with dredging (construction and/or maintenance) of an authorized Federal navigation project. This report presents an investigation to determine the feasibility of using clean dredged material from the Baltimore Harbor and Channels Federal navigation project to protect, restore, and create aquatic and ecologically related habitat at Poplar Island, Maryland.

1.1 Study Purpose

In a letter dated May 3, 1994, the Maryland Department of Transportation (on behalf of the Maryland Port Administration) requested that a study be conducted under the authority of Section 204 of the Water Resources Development Act of 1992. The purpose of the study would be to determine whether uncontaminated material dredged from the approach channels to the Baltimore Harbor and Channels project could be used to restore Poplar Island to its approximate size 150 years ago. Upon receipt of the formal request, the District was advised by the Corps Headquarters (HQUSACE) in Washington, DC, and by the North Atlantic Division (CENAD) office in New York to prepare an initial appraisal report using Operations and Maintenance funds. The District was also advised to seek approval to conduct a Section 204 study with Section 204 funds. The initial appraisal was conducted and approval was received for conducting the study under Section 204.

The purposes of this study are (1) to determine the technical, economic, and environmental feasibility of protecting, restoring, and creating aquatic, intertidal wetland, and upland habitat for fish and wildlife at Poplar Island using dredged material from the Baltimore Harbor and Channels Federal navigation project and (2) to identify a sponsor to share the cost of project implementation.

This feasibility report incorporates the USACE's Environmental Impact Statement (EIS) for the proposed project pursuant to the National Environmental Policy Act (NEPA).

1.2 Study Authority

This study is being conducted pursuant to Section 204 of the Water Resources Development Act of 1992 (Public Law 102-580), Beneficial Use of Dredged Material, which states:

"*(a) IN GENERAL. - The Secretary is authorized to carry out projects for the protection, restoration, and creation of aquatic and ecologically related habitats, including wetlands, in connection with dredging for construction, operation, or maintenance by the Secretary of an authorized navigation project.*

(b) SECRETARIAL FINDINGS. - Subject to subsection (c) of this section, projects for the protection, restoration, or creation of aquatic and ecologically related habitats may be undertaken in any case where the Secretary finds that -

(1) the environmental, economic, and social benefits of the project, both monetary and nonmonetary, justify the cost thereof; and

(2) the project would not result in environmental degradation.

(c) COOPERATIVE AGREEMENT. - Any project undertaken pursuant to this section shall be initiated only after non-Federal interests have entered into a cooperative agreement in accordance with the requirements of section 221 of the Flood Control Act of 1970 in which the non-Federal interests agree to -

(1) provide 25 percent of the cost associated with construction of the project for the protection, restoration, and creation of aquatic and ecologically related habitats, including provision of all lands, easements, rights-of-way, and necessary relocations; and

(2) pay 100 percent of the operation, maintenance, replacement, and rehabilitation costs associated with the project for the protection, restoration, and creation of aquatic and ecologically related habitats.

(d) DETERMINATION OF CONSTRUCTION COSTS. - Costs associated with construction of a project for the protection, restoration, and creation of aquatic and ecologically related habitats shall be limited solely to construction costs which are in excess of those costs necessary to carry out the dredging for construction, operation, or maintenance of the authorized navigation project in the most cost effective way, consistent with economic, engineering, and environmental criteria.

(e) AUTHORIZATION OF APPROPRIATIONS. - There is authorized to be appropriated not to exceed $15,000,000 annually to carry out this section. Such sums shall remain available until expended. "

1.3 Existing Federal Navigation Project

The Baltimore Harbor and Channels Federal navigation project was adopted by the River and Harbor Act of August 8, 1917, and modified by the River and Harbor Acts of January 21, 1927; July 3, 1930; October 7, 1940; March 2, 1945; July 3, 1958; and December 31, 1970. The existing navigation project is shown in Figure 1-1.

The existing project includes a main channel, 50 feet deep, between Cape Henry, Virginia, and Fort McHenry at Baltimore. The authorized dimensions of the channels are as follows:

1. Cape Henry Channel: 50 feet deep and 1,000 feet wide from the 50-foot depth curve in the Atlantic Ocean to that depth in the Chesapeake Bay, a distance of 3 miles.

2. York Spit Channel: 50 feet deep and 1,000 feet wide connecting the 50-foot depth curves in the Chesapeake Bay opposite the York River near York Spit, a distance of 18.4 miles.

3. Rappahannock Shoal Channel: 50 feet deep and 1,000 feet wide connecting the 50-foot depth curves in the Chesapeake Bay opposite the Rappahannock River, a distance of 10.3 miles.

4. Craighill Approach Channel to Fort McHenry: 50 feet deep and generally 800 feet wide, widened at the entrance and bends, from the 50-foot depth curve in the Chesapeake Bay opposite the mouth of the Magothy River to Fort McHenry on the Patapsco River, a distance of 20.7 miles.

The existing project also authorizes a series of branch channels that provide access to the various public and private terminals serving the Port of Baltimore and that connect the main channel with the Chesapeake Bay & Delaware (C&D) Canal. The dimensions of the branch channels are as follows:

1. Connecting Channel to C&D Canal Approach Channel: 35 feet deep, 600 feet wide, and 15.6 miles long from the Cutoff Angle in the main channel to the 35-foot depth curves in the natural channel on the east side of the Chesapeake Bay, which is part of the inland waterway from the Delaware River to the Chesapeake Bay. The channel includes the Brewerton Channel Eastern Extension, and the Swan Point and Tolchester Channels.

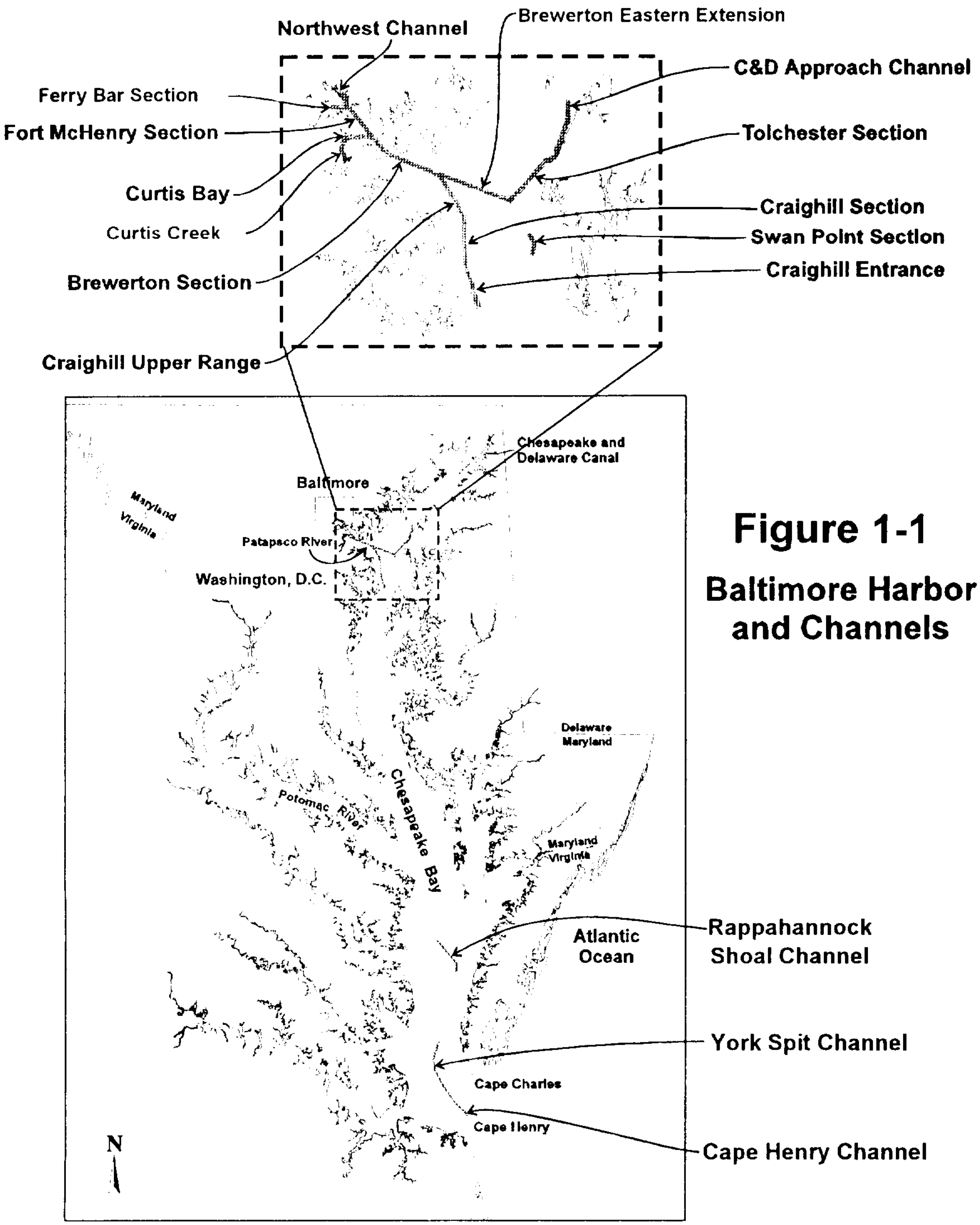

Figure 1-1

Baltimore Harbor and Channels

2. Curtis Bay Channel: 50 feet deep, 600 feet wide, and 2.2 miles long from the main channel to and including a 1,275-foot-wide turning basin at the head of Curtis Bay.

3. Curtis Creek:

a. A channel 35 feet deep and 200 feet wide from the 50-foot channel in Curtis Bay to 750 feet downstream of the Pennington Avenue Bridge, a distance of 0.9 mile.

b. A channel 22 feet deep and 200 feet wide from the 35-foot channel to and along the marginal wharf of the Curtis Bay Ordnance Depot.

c. An irregularly shaped basin 18 feet deep and 320 feet wide, adjacent to the head of the 22-foot channel, a distance of 600 feet.

d. A basin 15 feet deep and 450 feet wide, from the end of the 22-foot channel to the end of the marginal wharf, a distance of 0.2 mile.

e. A channel 22 feet deep and 200 feet wide, from the 22-foot channel of the CSX Rail Transport bridge to the vicinity of Arundel Cove, a distance of 2,800 feet, then 100 feet wide in Arundel Cove for a distance of 2,100 feet, with an anchorage basin 700 feet square adjacent to the channel and southwest of the wharf of the Coast Guard Depot at Curtis Bay.

4. Middle Branch (Ferry Bar East Section): A channel 42 feet deep and 600 feet wide, from the main channel at Fort McHenry to Ferry Bar, a distance of 1.4 miles.

NOTE: The West Ferry Bar and Spring Garden Sections of the existing project were deauthorized by Section 1001 of the Water Resources Development Act of 1986, PL 99-662.

5. Northwest Branch:

a. East Channel: 600 feet wide and 49 feet deep for 1.3 miles, with a 950-foot-wide turning basin at the head of the channel.

b. West Channel: 600 feet wide and 40 feet deep for 1.3 miles, with a 1,050-foot-wide turning basin at the head of the channel.

1.4 Scope of Study

The approach channels to the Port of Baltimore provide shipping access to and from the Ports of Norfolk, Philadelphia, New York, and the rest of the world. The channels in the upper

Chesapeake Bay must be dredged and maintained to navigable depths to maintain Port commerce. Approximately 100 million cubic yards of material are expected to be dredged from the Baltimore Harbor and Channels project, the approaches to the C&D Canal, and the C&D Canal itself over the next 20 years. This volume exceeds the capacity of the existing dredged material placement sites.

This submission examines the possibility of utilizing clean dredged material from the approach channels that serve the Port of Baltimore to create environmental habitat at Poplar Island. These channels, including the Craighill Entrance, Channel, Angle, and Upper Range, the Cutoff Angle, Swan Point Channel, and the Brewerton Channel Eastern Extension, have a capacity need of 40 million cubic yards over the next 20 years. The evaluations are based on site-specific technical information collected as part of the feasibility study. This information includes new bathymetric surveys and environmental, hydraulic, and geotechnical evaluations. Alternatives considered include open water placement and upland placement, as well as island restoration and creation. Assessments are presented for geotechnical, cultural, environmental, and engineering investigations. These important study elements were fully incorporated into evaluations for this report.

1.5 Poplar Island Study Area

The group of islands known as Poplar Island is located in the upper middle Chesapeake Bay at latitude 38° 46' N, and longitude 76° 23' W, approximately 34 nautical miles southeast of the Port of Baltimore and 1 mile northwest of Tilghman Island, Talbot County, Maryland (Figures 1-2 and 1-3). The closest point of mainland is Green Marsh Point (GMPT) on the eastern shore of Maryland just north of Tilghman Island, approximately 2 miles east of the site. The islands, which are situated on the main stem of the Bay near the confluence of the Chesapeake and Eastern Bays, are subject to severe erosional forces. From a size probably exceeding 1,100 acres in the 1800's, the island has eroded and split into four separate islands (North Point Island, Middle Poplar Island, South Central Poplar Island, and South Poplar Island) collectively referred to as Poplar Island. These islands together total only 5 acres today. The two larger parcels in the group are Coaches Island, which in 1847 was part of Poplar Island, and Jefferson Island, which by 1847 was already separate (Figure 1-4).

1.6 Study Process

A significant amount of work had been completed in identifying a restoration project at Poplar Island. Section 2 details the effort by Federal and state agencies to develop and screen placement opportunities. Options have been investigated for open water, shallow water, upland placement, island creation/restoration, and even non-structural solutions such as rehandling/re-use and recycling. For a variety of reasons, ranging from cost effectiveness to environmental or cultural concerns, the long list of potential options has been narrowed to only a few opportunities. The most promising alternative for the clean dredged material from the Chesapeake Bay channels is the restoration of Poplar Island.

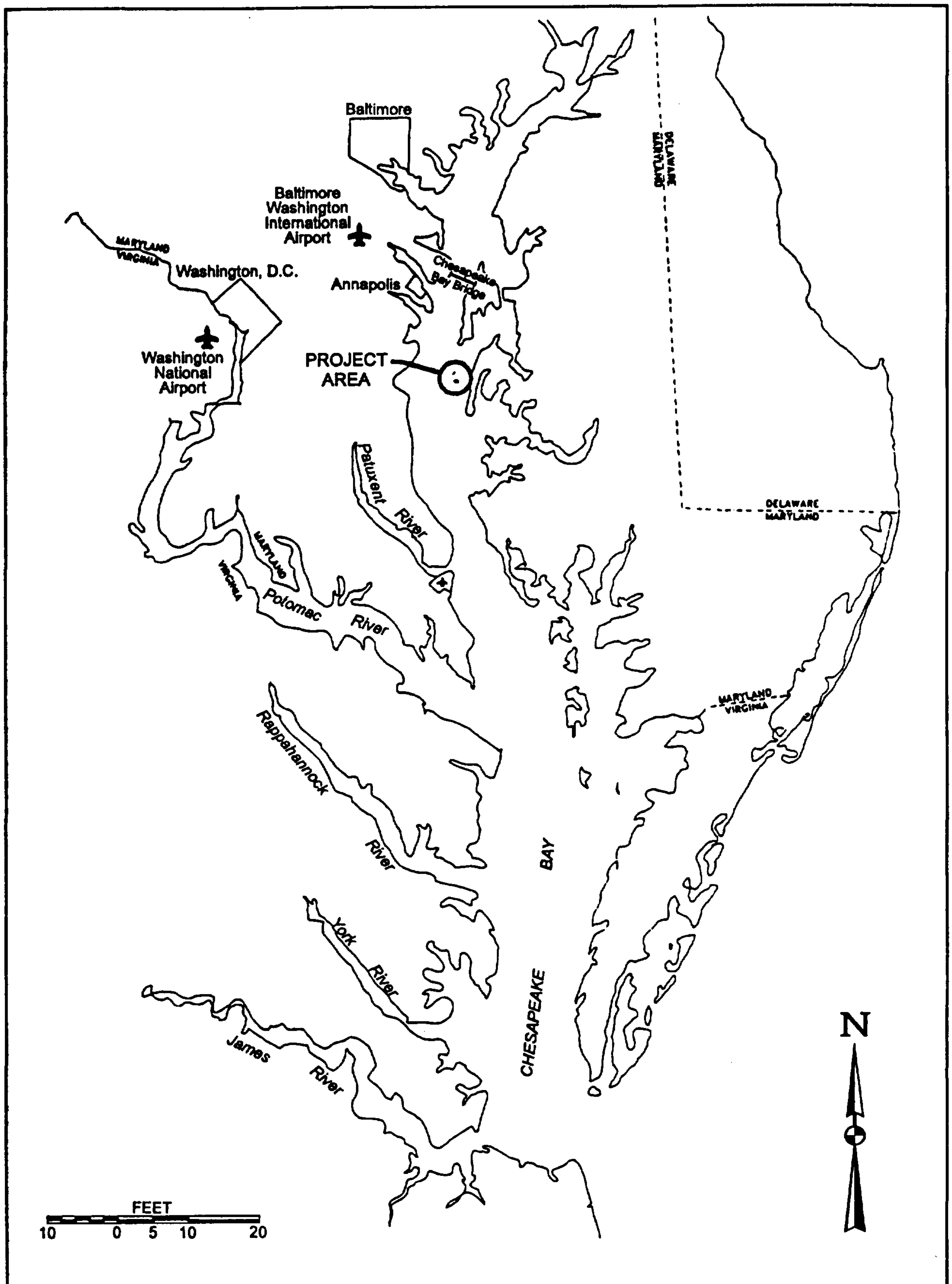

Figure 1-2. Poplar Island site location map.

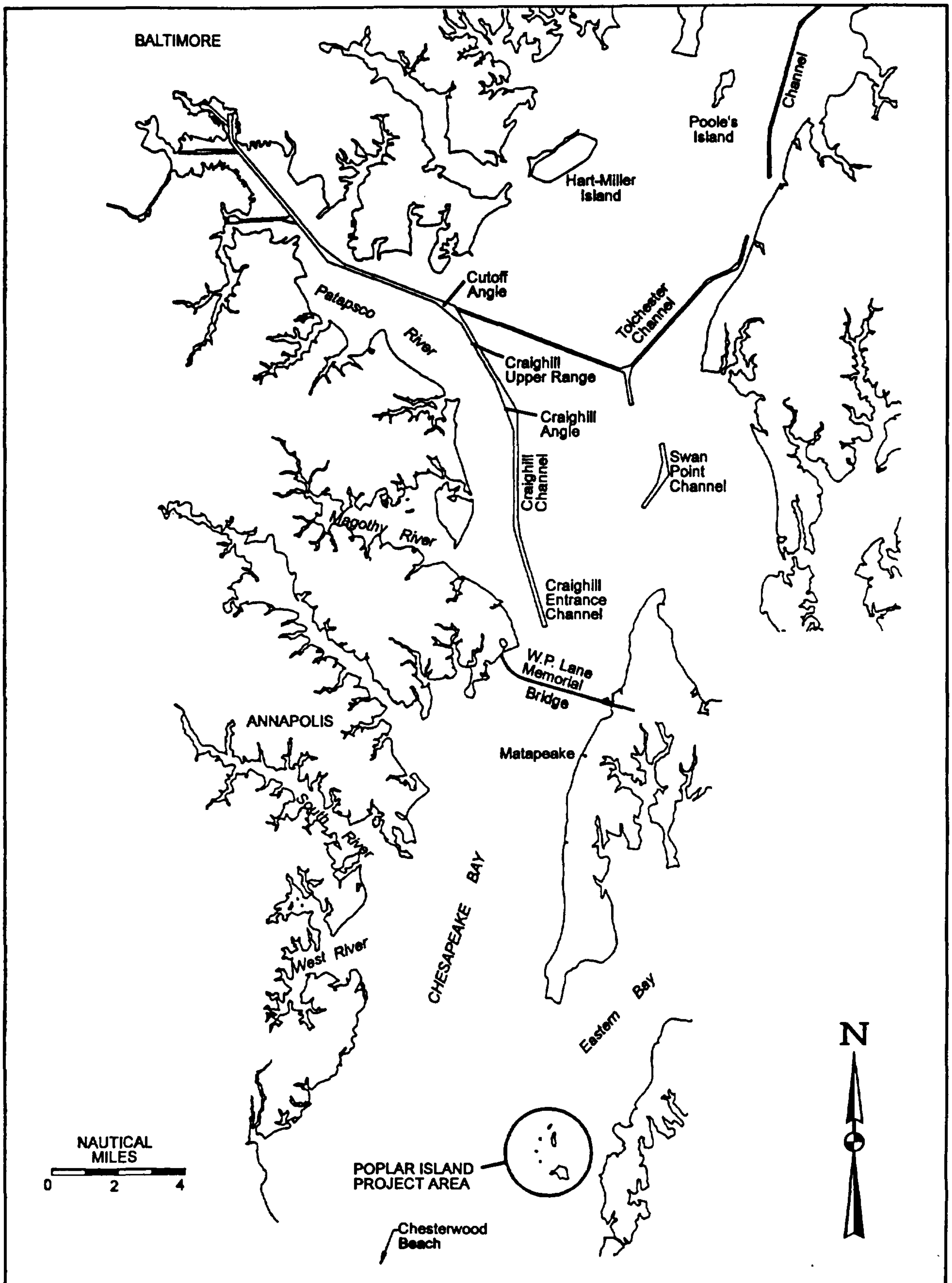

Figure 1-3. Poplar Island site vicinity map.

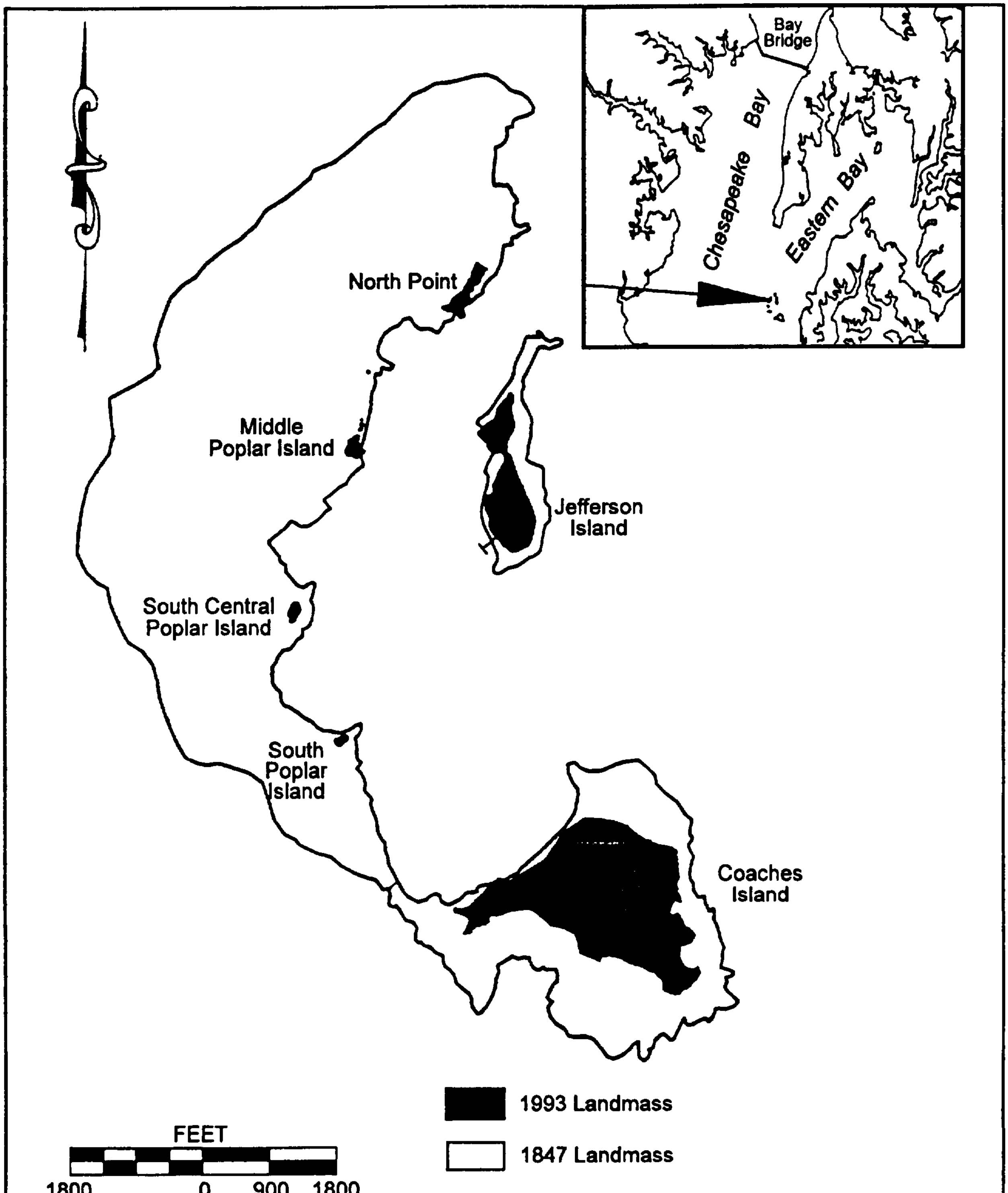

Figure 1-4. Poplar Island landmass comparison, 1847–1993.

Due to the critical shortage of dredged material placement sites in the upper Chesapeake Bay, and the intense interest of the various natural resource management agencies and publics on the subject of dredged material placement, the process used to accomplish this study was considered carefully. At the inception of the study, it became obvious that in order to identify a dredged material placement site that would be supported by the natural resource management community and the public, extensive coordination would be required. The process used to accomplish the feasibility study is discussed in detail in the following sections.

1.6.1 Study Team

Due to the limited remaining capacity at the current dredged material placement sites being utilized to accommodate material from the Baltimore Harbor and Channels Project, the Baltimore District of USACE and the Maryland Port Administration (MPA) formed a partnership to expedite the completion of the feasibility study. This partnership resulted in the establishment of a study team, which was comprised of an interdisciplinary professional staff from the technical disciplines necessary to accomplish the study. These individuals included civil engineers, hydraulic engineers, geotechnical engineers, cost engineers, biologists, environmental scientists, archaeologists, public involvement specialists, real estate specialists, lawyers, and technicians.

USACE team members were drawn from the staff of the Baltimore District, and were supplemented as needed by USACE personnel at the Waterways Experiment Station. MPA team members were drawn from the staffs of the Harbor Development Branch of the MPA and the Maryland Environmental Service (MES), which was under contract to the MPA to provide environmental and project management expertise. In addition, the MPA hired a contractor to assist with the technical studies required for the project. This contractor was a Joint Venture (JV) of Gahagan & Bryant Associates, Inc. (GBA) and Moffatt & Nichol Engineers, Inc. (M&N), both of Baltimore, Maryland. For this project, Gahagan & Bryant's primary areas of engineering and technical expertise were dredging, civil engineering, and project management, while Moffatt & Nichol's were coastal engineering, civil engineering, and wetland hydrodynamics. In addition to the principal firms of the JV, there were several subconsultant firms. These firms included EA Engineering, Science & Technology, which performed environmental analysis including socio-economic analysis; STV Group, which performed quality assistance/quality control duties and prepared the construction documents; Earth Engineering & Sciences (E2SI), which performed the geotechnical investigation and analysis; Environmental Concern Inc. (ECI), which performed the wetland/terrestrial habitat design; and R. Christopher Goodwin and Associates, which performed the marine and terrestrial archeological surveys.

The State of Maryland is undertaking a major program to restore the environmental quality of the Chesapeake Bay while providing feasible solutions to the management of sediments from the federally authorized shipping channels. This initiative, referred to as the Dredging Needs and Placement Options Program (DNPOP), was developed in response to the need to utilize dredged materials as a resource material. The program also calls for creative partnerships among all parties concerned with the Bay environment and maritime activities. In order to foster these creative partnerships, several Working Groups, a Management Committee, and an Executive Committee have been established to provide advice, guidance, and direction for the DNPOP.

In an effort to optimize the environmental restoration alternatives developed through this study and to ensure the final plan recommended would be supported by the other resource agencies, a multi-agency approach was developed to complete the formation of the study team. Multi-agency staffing was essential to facilitate the flow of needed information among agencies, and, more importantly, to achieve buy-in and ownership by the key public agencies. The Poplar Island Working Group formed as part of the DNPOP provided this multi-agency coordination. This group, which was directed by MES for the MPA, included personnel from other agencies such as Alliance for the Chesapeake Bay, Chesapeake Bay Charterboat Association, Chesapeake Bay Critical Areas Commission, Chesapeake Bay Foundation, Maryland Department of the Environment (MDE), Maryland Department of Natural Resources (DNR), Maryland Department of Transportation, Maryland Environmental Service, Maryland Port Administration, National Biological Survey, National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Talbot County Department of Public Works, USACE, U.S. Environmental Protection Agency - Region III (EPA), U.S. Environmental Protection Agency - Chesapeake Bay Program (CBP) and U.S. Fish and Wildlife Service (USFWS). The participants from these agencies/organizations were funded by their respective agencies/organizations.

In addition to the Poplar Island Working Group, the DNPOP Management and Executive Committees were kept apprised of the study team's progress. While the Poplar Island Working Group was comprised of staff level personnel, the Management and Executive Committees were comprised of middle level and senior level managers from the same agencies. The District Engineer was a member of the Executive Committee as were the Secretaries of the Department of Natural Resources, Department of the Environment, and the Department of Transportation. These additional groups were included to ensure that the recommendations and decisions made by the staff level personnel were supported at all levels within the various resource agencies.

1.6.2 Study Tasks

Prior to the initiation of the feasibility study, the MPA had directed the MES to conduct a prefeasibility study. This study was somewhat similar to a USACE reconnaissance study. The purpose of the prefeasibility study was to determine whether it would be feasible to utilize dredged material to develop environmental habitat at Poplar Island. The prefeasibility study concluded that it would be feasible and recommended that further archeological, geotechnical, hydrodynamic, and environmental studies be conducted. This prefeasibility study, the Request for Proposal prepared by the MPA, the technical proposal submitted by the JV, and the USACE Planning Guidance Notebook (ER 1105-2-10) provided a framework for the study activities conducted as part of the feasibility effort. The feasibility study process involved these major tasks:

- **Problem Identification.** As part of this task, public concerns were identified, analyses were conducted to investigate the public and scientific concerns, and planning objectives and constraints were developed.

- **Formulation of Alternative Plans.** Using the planning objectives and constraints as a guide, a number of components were developed and from those, a range of alternative plans was developed to solve the problems that had been identified.

- **Evaluation of Alternative Plans.** This task involved the analyses needed to estimate the costs, outputs (benefits), and impacts of the alternative plans. Through these analyses, the plans were screened to identify the most viable components.

- **Recommendations.** The evaluation process identified the recommended plan and detailed the steps necessary to implement the plan.

1.6.3 Review of Study Products

During the study process, working drafts of study products were developed by the JV. These working drafts were provided to selected study team members for review and comment. All of the working drafts were provided to the appropriate study team members on the USACE and MPA study teams. In addition, working drafts of study products related to environmental issues were provided to the Poplar Island Working Group for their review and comment. In addition to the monthly design team meetings held between the USACE and MPA study teams, semi-monthly meetings were held with the Poplar Island Working Group. At these meetings the study progress and results were discussed, affording agencies the opportunity to comment on the alternative plans and recommendations as they were being formulated. Additional subgroups consisting of members from the Poplar Island Working Group were established for habitat development and monitoring.

Section 2

PROBLEM IDENTIFICATION

2.1 Dredged Material Management Problems

2.1.1 Background

The Port of Baltimore is located on a 32-square-mile area of the Patapsco River approximately 12 miles northwest of the Chesapeake Bay. The Patapsco River originates near Westminster, in Carroll County, Maryland, and flows southeasterly for 65 miles to enter the Chesapeake Bay 9 miles south of Fort McHenry. The Patapsco River sub-basin has an area of 634 square miles and a mean discharge of 675 cubic feet per second (Figure 2-1). It drains Baltimore City and portions of Anne Arundel, Baltimore, Carroll, and Howard Counties. The river has high suspended sediment, nutrient, and bacterial levels in the upper watershed due to agricultural runoff. Of the Patapsco River's 634-square-mile watershed, forest and wetland areas account for 32 percent, agricultural lands account for 24 percent, and developed lands account for 44 percent.

While the Patapsco River is the source of the majority of the sediment that causes shoaling in the Harbor itself, the bottom sediments in the Chesapeake Bay and the Bay channels originates from other sources. The upper Chesapeake Bay is a sediment deposition zone, with the Susquehanna River as the principle source of new sediment. Sediments which shoal in the channels are comprised predominantly of local sediments, which originate through shoreline erosion, overland flow, and resuspension of material located adjacent to the channels.

Due to the inflow of sediment-laden water from rivers, water currents, and tidal action, the channels leading to any port are in continual need of maintenance. The Port of Baltimore is no exception to this rule. In 1706, when the port was first established, ships were small and easily accommodated by the Patapsco River. However, beginning in the 1850's, dredging of the navigation channels began, allowing larger vessels to utilize the port. As ships have continued to increase in size, deeper and wider channels are required. In order to accommodate these vessels, dredging of channels and placement of dredged material is crucial if the Port of Baltimore is to remain one of America's busiest deep-water ports and a significant contributor to the national and state economies.

2.1.2 Existing Needs

USACE is responsible for operating and maintaining the 126 miles of Federal navigation channels that serve the Port of Baltimore. These channels are maintained through periodic dredging with the material removed being placed in dredged material placement sites. The MPA

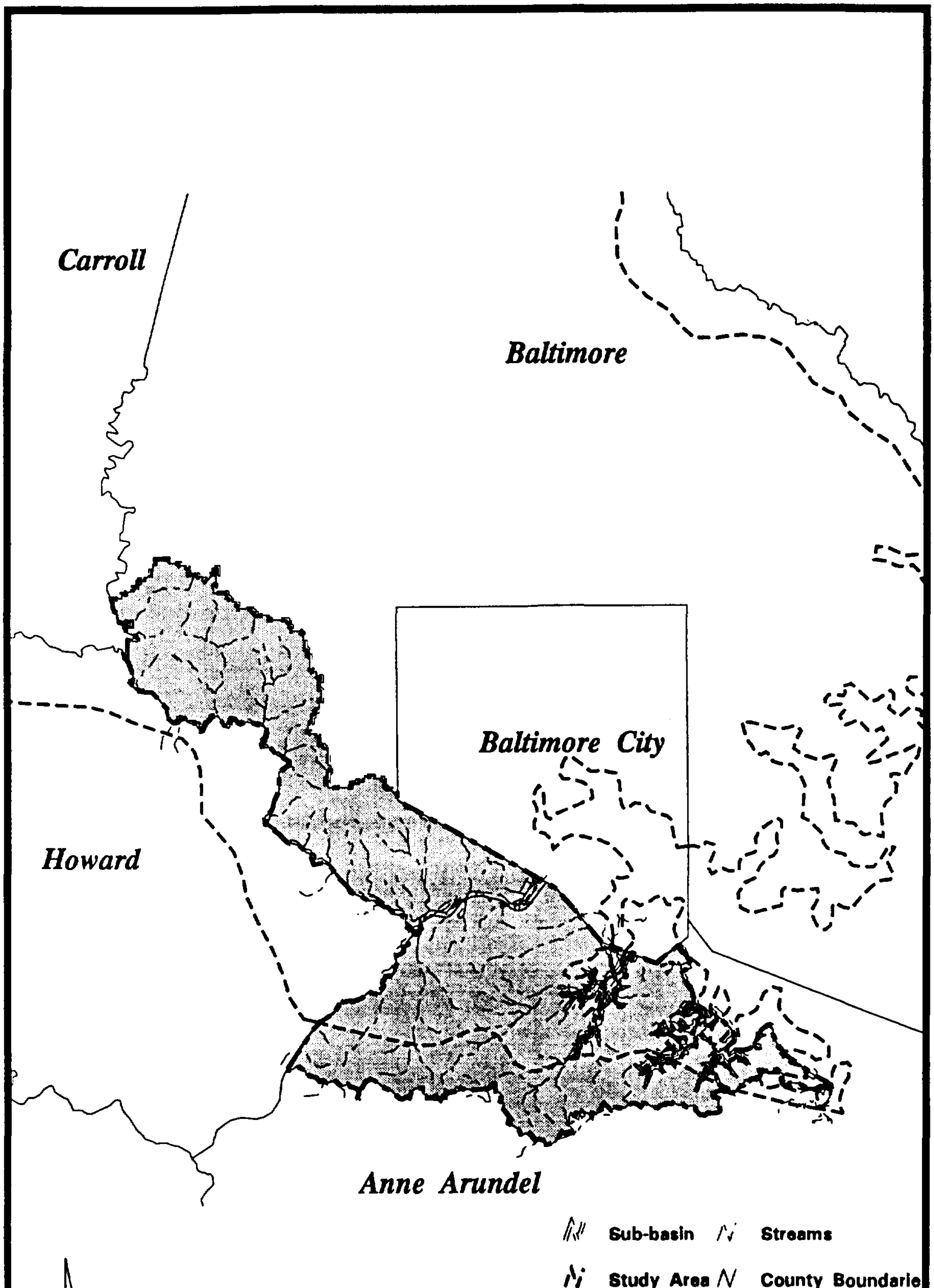

Figure 2-1
Patapsco River Sub-basin

is generally responsible for obtaining all lands, easements, rights-of-way, and relocations necessary for the development of placement sites, as well as for providing placement areas for the materials dredged from the navigation channels.

Since 1984, the HMI Placement Site (Figure 1-3), constructed by the MPA, has been used for the placement of dredged material from the Port of Baltimore and certain reaches of the Baltimore/Chesapeake Bay Navigation Channels. Since its completion, approximately 62 million cubic yards of dredged material have been placed there. Originally, HMI was designed as a placement area for contaminated dredged material from construction of the Baltimore Harbor 50-foot project and was estimated to have an operational life of 15 years. Sediments from Baltimore Harbor are contaminated with a diverse suite of anthropogenic substances. Title 8, Section 8-1601, Subsection (a) of the Annotated Code of Maryland defines "Baltimore Harbor" as:

> *"...the waterway which consists of the tidal portions of the Patapsco River and its tributaries lying westward of a line extending from Rock Point in Anne Arundel County to North Point in Baltimore County."*

Title 8, Section 8-1602, Subsection (a) of the Annotated Code of Maryland prohibits the placement of any material, all of which is presumed to be polluted, from Baltimore Harbor into any portion of the water or bottomland of the Chesapeake Bay, or the tidewater portions of any of its tributaries outside of Baltimore Harbor:

> *(a) Spoil from Baltimore Harbor. - A person may not dump, deposit, or scatter in an unconfined manner spoil from Baltimore Harbor into or onto any portion of the water or bottomland of the Chesapeake Bay or of the tidewater portions of any of the Chesapeake Bay's tributaries outside of Baltimore Harbor. However, the spoil may be redeposited in contained areas approved by the Department.*

However, demands for placement areas and funding constraints, especially in the Baltimore Harbor 50-foot channel deepening and widening project, resulted in HMI being filled in less time and with a mixture of clean and contaminated material. As a result, the site is expected to reach its capacity, be capped with clean material, and be unavailable for use by the year 1998.

The Port of Baltimore is rapidly reaching a point where available placement area capacity will be insufficient to meet the Port's dredging needs. Current projections indicate that without additional dredged material placement sites, existing capacity will be unable to meet dredging demand starting in 1996. A lack of placement capacity would prohibit necessary maintenance and modification of the Baltimore Harbor and Channels Federal navigation project.

In July 1990, Maryland Governor William Donald Schaefer convened a task force to review dredged material management options. The membership of the task force was broadly based, representing state, Federal, and local governments, members of the academic community, groups concerned with protection of the environment, parties involved in maritime commerce, and parties whose livelihood is dependent upon the quality of Bay waters. In the February 1991 report of its recommendations to the Governor, the task force noted

> *The Chesapeake Bay, one of the country's most valuable natural treasures, remains a highly productive resource even after centuries of intensive use. It contributes significantly to Maryland's economy. Its waters supply millions of pounds of seafood and play an important role in Atlantic Coast fisheries. It provides extensive habitat for wildlife. It is a nesting area for endangered species such as the bald eagle. The Bay also offers a wide variety of opportunities for recreation and tourism. In short, the Chesapeake Bay greatly enhances Maryland life....New strategies addressing the dredging issue are required to both protect and promote the recovery of the Bay and safeguard the vitality of the Port of Baltimore.*

The task force's primary recommendation was to provide

> *A new, comprehensive, and integrated approach linking dredged material management, environmental issues, and community development is recommended. The foundation for this unique approach is supported by four principles:*
>
> - *Minimization: The amount of material to be dredged, and the amount of material requiring containment should be minimized.*
>
> - *Comprehensive Monitoring: Ongoing State and Federal water quality and sediment transport monitoring programs should be integrated with pre-, during, and post- event monitoring of dredging and placement activities. This will provide a more comprehensive assessment of environmental aspects of dredging projects.*
>
> - *Emphasis on Beneficial Use of Dredged Materials: Material dredged from shipping channels need not be seen as spoil to be disposed—instead, it can and should be utilized as a resource. Decisions regarding placement of dredged materials should emphasize productive uses—those benefitting the environment and communities. Opportunities to use dredged materials as a marketable product should be fully explored.*
>
> - *Use of existing placement sites and creation or designation of new sites: Conventional means of placement (containment sites, open*

water placement, and upland placement sites) will be required to accommodate both short- and long-term demand for placement of dredged materials.

The task force further recommended

Use of dredged material for beneficial purposes should be a high priority. Dredged material should be viewed as a resource which, where feasible, can improve the environment and communities. Much material dredged from ship channels might be placed within or adjacent to the Bay or at upland locations. Examples of possible "beneficial uses" of dredged materials include:

- *beach replenishment and enhancement*
- *erosion control and shoreline protection*
- *island creation*
- *wetland creation*
- *shallow water habitat creation*
- *oyster bar and fish reef creation*
- *mine and forest reclamation*
- *recycling material as construction products*
- *placement on roads (traction during winter storms)*
- *capping underwater contaminated sediments*

Subsequent to the task force report, the MPA developed the DNPOP program mentioned previously. The program, like the task force, is a multigovernmental program charged with developing a comprehensive dredged material management plan. The objective of the program is to identify and develop near-term to long-term dredged material placement options for the Port of Baltimore and its approach channels. These include the Baltimore Harbor channels (those channels that lie inside the North Point to Rock Point line); the Bay Channels, which include the Brewerton Extension, Tolchester, and Swan Point channels and the southern approach from the Craighill Entrance to the Cutoff angle; the C&D Approaches, which include those channels from Pooles Island north to Courthouse Point; and the C&D Canal, which includes those channels from Courthouse Point to Reedy Point. These channels are shown in Figure 1-1.

In the 1992 "Dredging Needs and Placement Options Program," the MPA estimated that 104 million cubic yards of sediment would have to be dredged over 20 years (1992 to 2012) just for maintenance of the channels to the Port of Baltimore (Table 2-1). The mid-Bay approach channels to Baltimore Harbor and the Harbor itself would generate an estimated 40 million cubic yards over that period.

Table 2-2 shows the estimated quantities of annual dredging for the southern channels through 2003 as documented in the "Dredging Needs and Placement Options Program." The average annual amount of dredged material is 1.2 million cubic yards.

Table 2-1 MPA Estimate of Dredging Needs versus Placement Capacity 1992 to 2012 (20 years)[1] (Million Cubic Yards - mcy)

Channel Locations	Maintenance Dredging Required[1]	Available Placement Site Volumes[2]	Shortfall - New Capacity Needed
Harbor[3]	16 (0.8/yr)	5.1 (Hart-Miller Is.)	40.9
Bay Channels	30 (1.5/yr)		
C&D Approaches	32 (1.6/yr)	2.6 (Pooles Is.)	29.4
C&D Canal	16 (0.8/yr)	7.2 (Upland)	8.8
VA Channels	10 (0.5/yr)	10.0 (Aquatic)	--
	104 MCY	24.9 MCY	79.1 MCY

1. New work not included.
2. Existing, available volume only. Future modifications not included.
3. Likely to be unsuitable for beneficial use projects.
Source: MPA 1992.

Table 2-2 MPA Estimate of Anticipated Dredging Quantities 1996 to 2003 Southern Approach Channels[2] (Million Cubic Yards - mcy)

Section	1996	1997	1998	1999	2000	2001	2002	2003	Total
Craighill Entrance		0.5			0.5				1.0
Craighill Channel	0.1				0.1				0.2
Craighill Angle	0.8	0.8		0.8		0.8		0.8	4.0
Craighill Upper Range		0.05				0.05			0.1
Cutoff Angle			0.6		0.6		0.6		1.8
Swan Point			0.35		0.35				0.7
Brewerton Channel Eastern Extension	0.5		0.5			0.5			1.5
								Total	9.3
								Annual Avg.	1.2

Source: MPA 1992.

1 1996 Estimates of Dredging Requirements for the Baltimore Harbor and Channels Project are presented in Section 5.

2 1996 Estimate of Dredging Requirements for the Baltimore Harbor and Channels Project are presented in Section 5.

2.2 Other Placement Opportunities

Guidance on resource opportunities with dredged material is found in the USACE's Engineering Manual (EM) 1110-2-5026, *Beneficial Uses of Dredged Material,* (30 June 1987). The manual provides guidance for planning, designing, developing, and managing dredged material for beneficial uses, and for incorporating ecological concepts and engineering designs with biological, economical, and social feasibility.

Resource opportunities for dredged material include wetland, upland, island, and aquatic habitat creation and enhancement; beach nourishment; industrial and commercial uses; and shoreline stabilization.

2.2.1 Alternatives Considered

The critical shortage of dredged material placement sites in the upper Chesapeake Bay has prompted the public and resource agencies to recommend various alternatives be considered. In its 1990 Master Plan (MPA 1990), MPA recommended the following placement sites be used for material dredged from the Federal navigation channels that serve the Port of Baltimore:

- C&D Canal and Approach Channel: Continue to use existing upland sites for the C&D Canal itself. In the Approach Channel, continue to use existing open water sites until they have reached capacity. Once existing open water sites have reached capacity, transport dredged material to the Deep Trough (Figure 2-2). A number of upland sites developed by the USACE (Philadelphia District) exist along the C&D canal. These have sufficient capacity, with further development, to accommodate material dredged from the canal approach channels. However, these sites are located at some distance from the approach channels and sufficient information regarding availability and additional development costs have not been developed.

- Baltimore Harbor Outer Channels: Use the Deep Trough for controlled bottom placement of clean material to gain the advantages of containment that would be provided within this natural structure and low cost.

- Baltimore Harbor Inner Channels: Continue to use Hart-Miller Containment Facility. This will necessitate retaining the dike at the present 28-foot elevation, around the north cell only, but will not require further dike raising. A decision to forego full utilization of available capacity at HMI could necessitate the destruction or disturbance of additional bottom habitat and water column elsewhere. This would be resisted by environmental regulatory authorities and groups.

- To provide cost-effective capacity for small dredging jobs, and to provide additional land area for future port development, initiate a study of the feasibilityof constructing a diked containment facility at Thoms Cove at Hawkins Point (Figure 2-3).

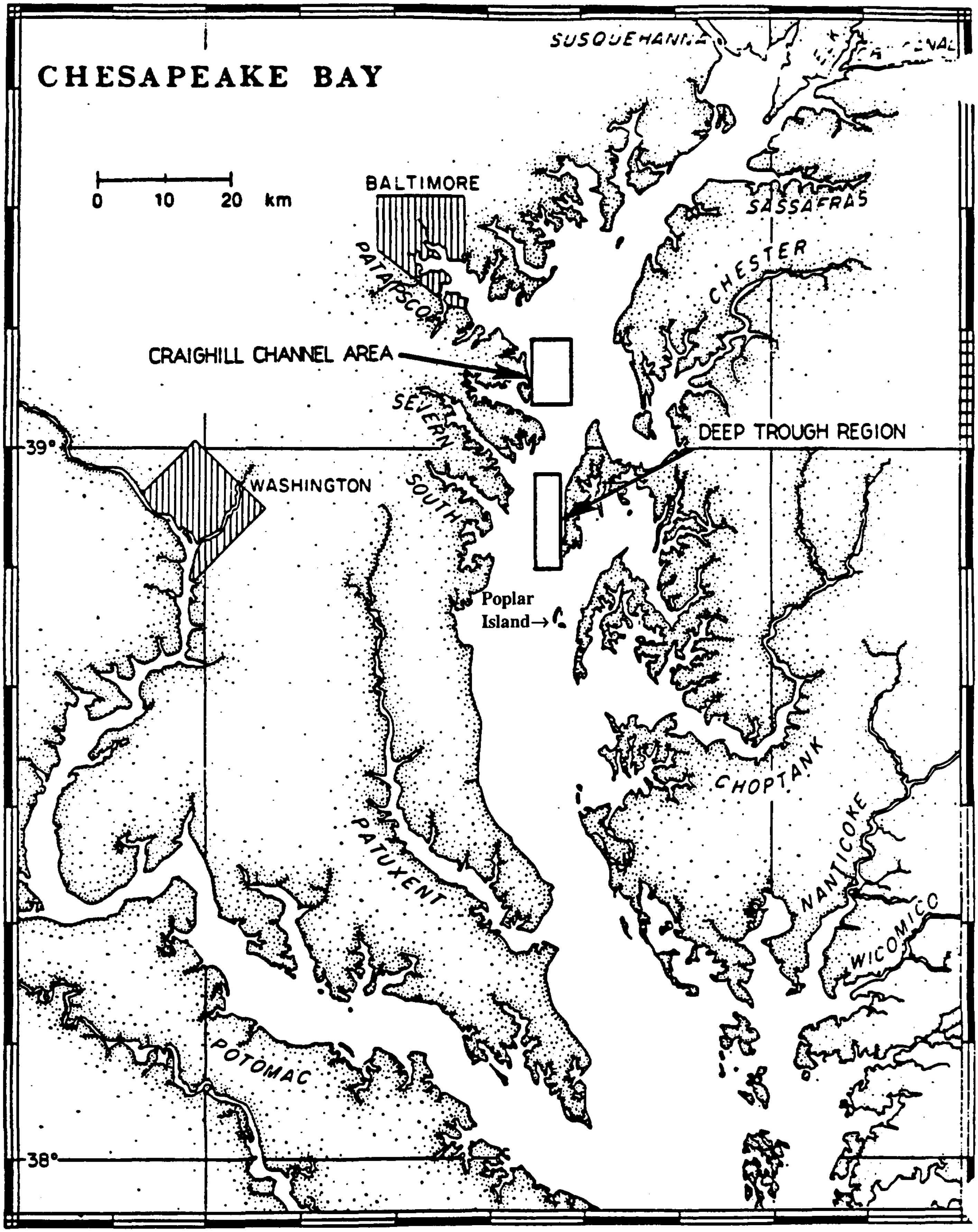

Figure 2-2 Deep Trough Location Map

To meet short-term (1991 to 1993) needs, the Governor's task force recommended three concurrent approaches:

- Undertake three beneficial-use projects: Restorations of Poplar and Bodkin Islands (Figure 2-4), including creation of wetland and wildlife habitats, as well as island restoration and beach renourishment at HMI.

- Continue use of the two existing placement sites, HMI and Pooles Island, both of which have active permits and have been used in the past with acceptable results. HMI is a containment site, whereas Pooles Island (Figure 2-5) is an open-water placement site.

- Use existing upland sites adjacent to the C&D Canal approach channels for material dredged from the Chesapeake Bay. The State and USACE (Philadelphia District) should examine the use of upland placement sites located along the C&D Canal for materials dredged from Maryland portions of the Chesapeake Bay.

For placement sites to meet long-term needs, the task force recommended the following:

- Continue use of the Poplar Island restoration site if sufficient capacity exists.

- Continue use of the Pooles Island site, if necessary, but with extensive monitoring to ensure placement is done in an environmentally acceptable manner.

- Maximize use of HMI by minimizing, if not eliminating, the placement of noncontaminated material.

- Construct a new site for placement of contaminated dredged material.

- Continue to study the feasibility of using new open-water placement sites, emphasizing environmental considerations.

In response to efforts to implement environmental initiatives around the nation and in particular in the Chesapeake Bay, alternative placement options were sought that promoted fish and wildlife enhancement. Several alternative placement methods were considered during initial plan formulation, and included open water placement, shallow water placement, upland placement, and island restoration/creation. The following sections document the results of an analysis that was performed by the MPA. USACE has reviewed the results and accepted the conclusions. The details of the evaluation process (including a discussion of why the various sites were eliminated) is presented in the MPA Master Plan and is not repeated here. While some of the alternatives would meet short-term capacity requirements, only the alternatives that have been retained provide for the long-term capacity required for maintenance dredging needs.

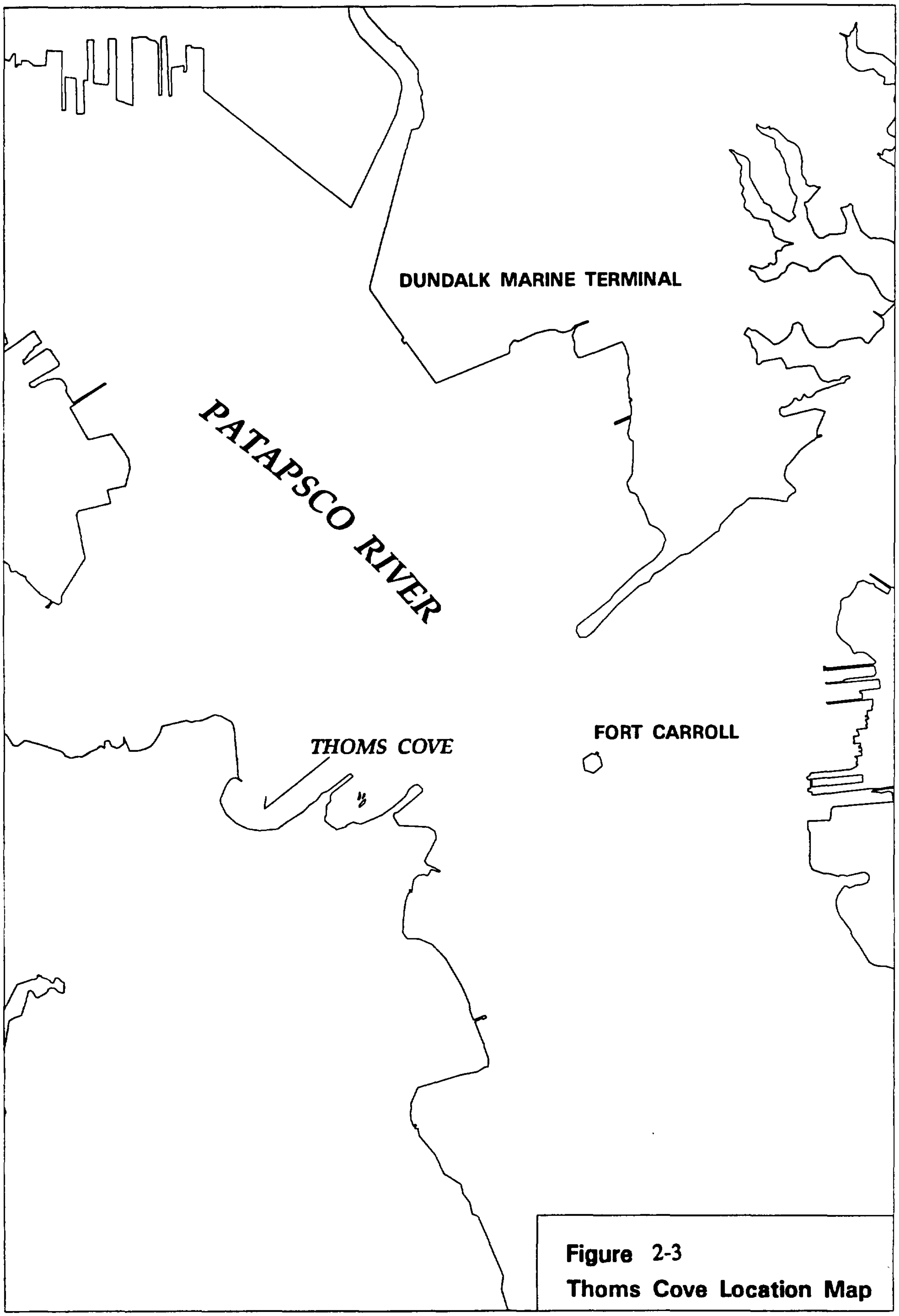

Figure 2-3
Thoms Cove Location Map

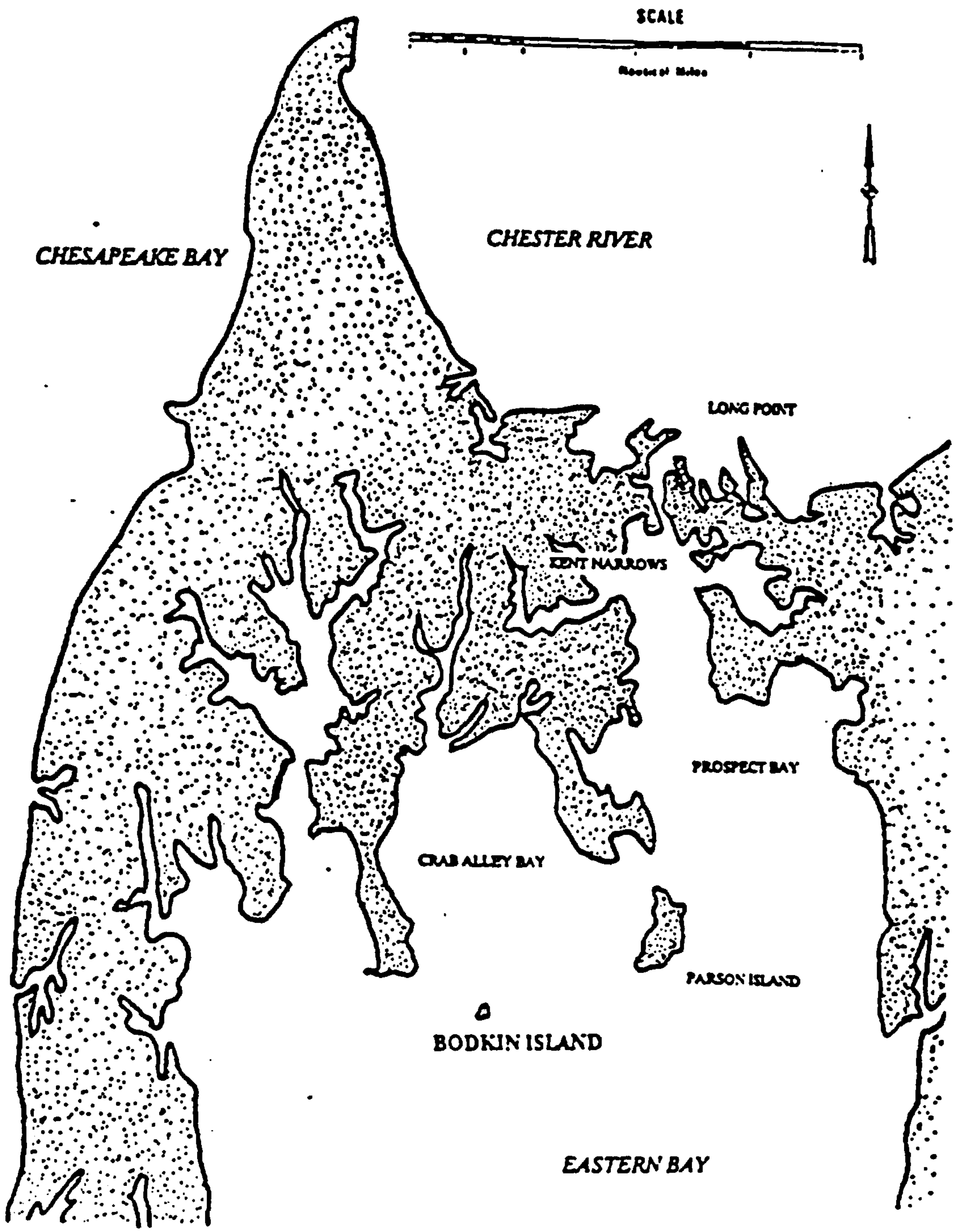

Figure 2-4
Bodkin Island Location Map

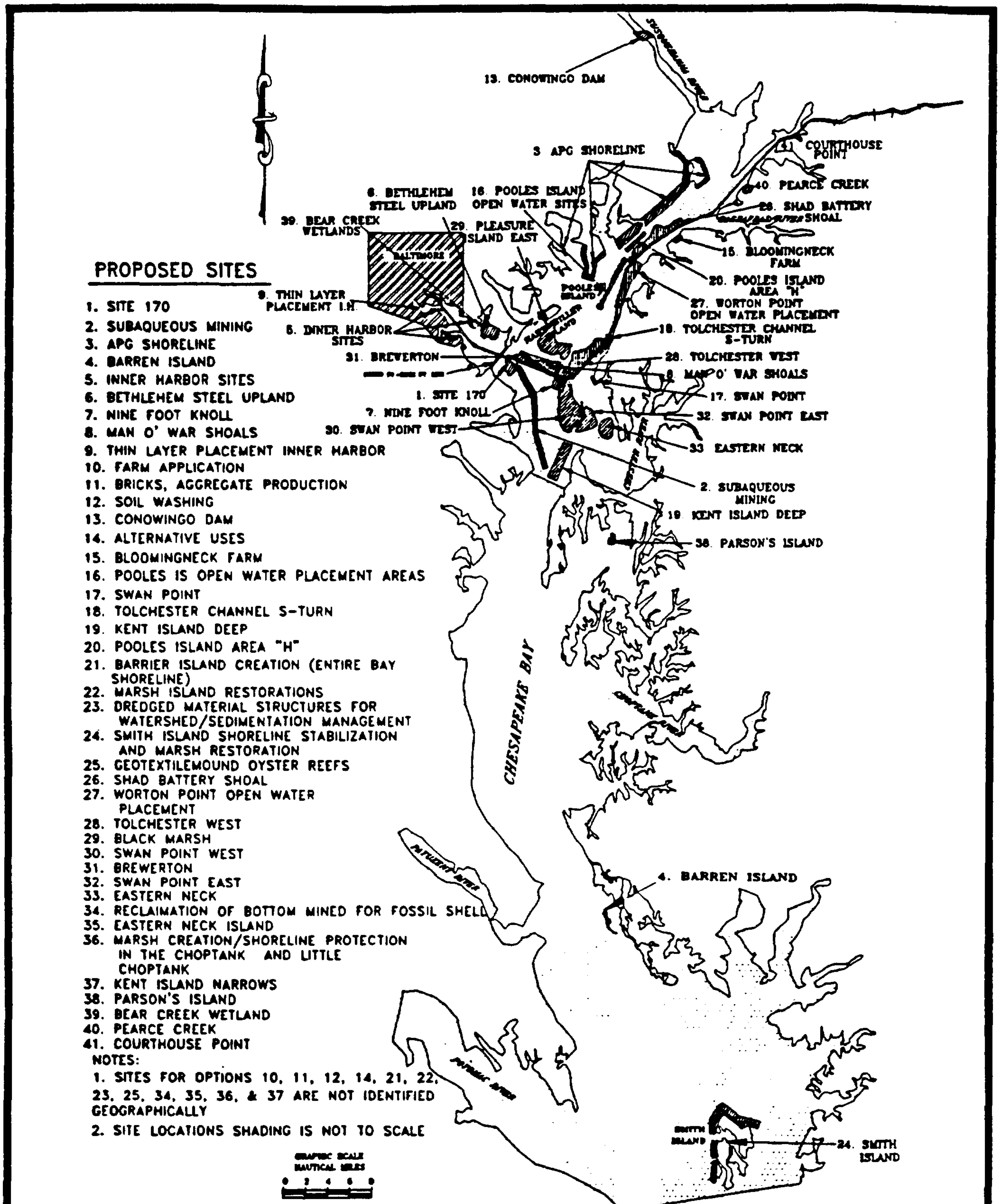

Figure 2-5. Phase II Bay Enhancement Proposed Placement Options Site Location Map

2.2.1.a Open Water Placement. Open water placement of dredged material has been and continues to be an important component of the effort to maintain the navigation channels serving the Port of Baltimore, particularly the approaches to the C&D Canal.

A study conducted in 1989 for MPA identified 27 candidate open water sites, not including existing sites or the Deep Trough (GBA and EA 1989), four of which were retained by the DNPOP for further analysis:

Shad Battery Shoals
Worton Point
Tolchester
Swan Point

The location of these sites is shown in Figure 2-5.

Open water placement of dredged material has been accepted by natural resource management agencies in the past. While open water placement of dredged material does carry some short term and localized impact to benthic habitats, this alternative has been shown to result in a substantial long-term increase in primary productivity in otherwise somewhat depauperate areas. The Wolf Trap and Wolf Trap Alternate placement sites in the Virginia reach of the Chesapeake Bay are good examples of increased productivity resulting from open water placement of dredged material.

The Deep Trough is a large region of deep water, up to 140 feet in depth, along the eastern shore of the Chesapeake Bay. The trough extends approximately 20 miles beginning offshore of Kent Island and extending south to the mouth of the Little Choptank River. The portion of the trough located north of the Bay Bridge is a former dredged material placement site. Because of its potentially enormous capacity (344 million cubic yards [GBA and EA 1989]) and low costs, the site merits consideration for placement of dredged material.

In the past 15 years, two evaluations of the Deep Trough as a potential site for open water placement of dredged material were conducted. A study by DNR considered the environmental effects of placing 32 million cubic yards, which would reduce the water depth a maximum of 6.6 feet (Gucinski and EAI 1984). These evaluations concluded that the ecological value of the Deep Trough is quite limited, particularly at depths greater than 98 feet, because of the lack of dissolved oxygen during the summer months, and that placement of this volume of material would not cause long-term impacts so long as its composition was similar to that of the existing sediments.

In 1990, MPA proposed to place 2.2 million cubic yards of material dredged from the Craighill Channel in a portion of the Deep Trough as a demonstration project. The dredged material was proposed to be released by pumping into the anaerobic zone during the summer at a depth of at least 60 feet, resulting in a deposit of no more than 3 feet. DNR evaluated the environmental effects of the project (Versar 1990). They concluded the following:

1. Anoxia occurs every summer in the deep portions of the Bay completely eliminating the benthic communities. Although the deep sediments are recolonized during the winter, the benthic community never recovers to a point where it would become a consistent resource to organisms that feed on benthic invertebrates.

2. The specific material proposed to be deposited under the demonstration project had a larger particle size and lower levels of nutrients and toxics than the Deep Trough sediments.

3. The demonstration project as proposed "will have no significant direct or indirect ecological impact; it will also have no significant impact on Chesapeake Bay water quality" (Versar 1990).

Despite these findings, the proposal to use the site was withdrawn by MPA due to legislative pressures initiated by opponents of open water placement. In 1991, the state legislature amended Title 8, Section 8-1602, of the Annotated Code of Maryland to prohibit the placement of any material in the Deep Trough. Subsection (d) now reads:

> *(d) Material excavated from Bay. - A person may not dump, deposit, or scatter any earth, rock, soil, waste matter, muck, or other material excavated or dredged from the Chesapeake Bay or its tidal tributaries into or onto the area of the bottomlands or waters of the Chesapeake known as the deep trough.*

Any future proposals to place dredged material in the Deep Trough will be evaluated on a project-by-project basis in accordance with the Clean Water Act (CWA) Section 404(b)(1) Guidelines and other applicable Federal laws and regulations. Although previous reports suggest that placement of dredged material at the Deep Trough site is potentially "environmentally acceptable" and is a cost-effective dredged material placement alternative, the existing state law essentially prohibits the required participation by the local sponsor. Accordingly, there are no active proposals to place dredged material in the Deep Trough at this time, nor are there any pending permit applications to use the site. (See discussion of the Deep Trough as the base plan in Section 5 of this report.)

Placement of dredged material in the Deep Trough will not result in the creation of tidal wetlands or upland habitats. Although recolonization of open water placement sites by aquatic life can achieve pre-placement productivity, the overall contribution of a deep site to the productivity of the ecosystem would likely be less than that of a functioning salt marsh.

2.2.1.b Shallow-Water Placement. To be comparable in capacity to the proposed option, many smaller sites would have to be developed. This alternative would, therefore, require the most construction (overall) since it would require several contractor mobilizations, several episodes of construction, more coordination, and more documentation. Consequently, it would also be the most costly. Some would, however, constitute beneficial use projects.

Poplar Island is not the only shallow water site in the Chesapeake Bay where dredged material might be used beneficially to stabilize eroding shorelines and/or improve habitat for aquatic life and wildlife. This concept has been part of the MPA planning process for nearly a decade.

An internal *Draft Dredged Material Management Master Plan* (GBA and EA 1989) identified 17 potential shoreline stabilization sites in the middle and upper Bay and considered 5 for further evaluation. Criteria appropriate to selecting a shallow water site for beneficial use of dredged material include proximity to the source of dredged material, capacity of the site to contain dredged material, political/legal acceptability, and ecological and social value of the candidate site. These 5 consisted of the following:

Worton Point
Tolchester Beach
Pooles Island
Swan Point
Aberdeen Proving Ground (APG)

The location of these sites is shown in Figure 2-5.

Although any of the sites considered by GBA and EA (1989) could have been a candidate for a demonstration of beneficial use of dredged material, none of these was retained in the final recommendations of the draft master plan because of concerns ranging from potential presence of endangered species to low dredged material capacity relative to the cost of site development, and even unexploded ordnance at APG.

2.2.1.c Upland Placement. An upland containment facility is one built on or adjacent to fastland, and generally involves the erection of dikes to create a basin in which dredged material is placed. There are 17 existing upland sites along the C&D Canal; their use is restricted to material originating from the dredging of the canal. A study prepared in 1989 (GBA and EA) identified 82 potential locations for new upland facilities, only 4 of which were retained for evaluation in the MPA Master Plan:

Grove Neck
Rocky Point
Swan Point
Queenstown

Due to the high cost, including site acquisition, relative to capacity created, and potential environmental impacts of developing sites near the Chesapeake Bay shoreline, new upland sites were not among the options recommended by the study.

Conceptually, dredged material could be used to enhance the value of an upland site as habitat for wildlife or for economic development. This might be applicable in the case where the upland site is a barren area such as a mined-out clay pit. None of the sites listed above falls into this category.

2.2.1.d Island Restoration/Creation. Land creation sites are dredged material containment facilities created by constructing a dike to enclose an area of open water. Examples include three sites in Baltimore County: HMI, Masonville, and the B&O/Kennecott site. In the state of Maryland, the initial purpose of such sites has been for placement of contaminated sediments dredged from Baltimore Harbor.

The MPA Master Plan (GBA and EA 1989) identified 19 potential land creation sites of which 7 were retained for analysis:

Pooles Island
Shad Battery Shoal
Tolchester
Patapsco River Mouth
Swan Point
Sollers Point
Dead Ship Anchorage (Curtis Bay)

The locations of these sites are shown in Figure 2-5.

The Master Plan also applied the land creation approach to the modification or expansion of three existing sites:

HMI
Masonville
Hawkins Point/Thoms Cove

Land creation sites are viable candidates for beneficial use of dredged material. The sites are often used by large bird populations, shortly after or sometimes during construction. HMI has attracted over 235 observed species, including great blue heron, Canada geese, northern pintail, blue-wing teal, northern shoveler, canvasback, scaup, mallard, ruddy duck, and others (Ringler 1992). In addition, the beach on the northwest side of the facility is an extremely popular recreation site. Land creation sites have been put to productive economic use as well—both the Seagirt and Dundalk Marine terminals are former dredged material placement sites.

Desirable attributes of a site relative to potential use as a land creation site include proximity to dredged channels, maximum water depth of approximately 25 feet (to make dike construction cost-effective), location in an open area (to minimize effects on tidal circulation), and minimal value as habitat for aquatic life.

Since Poplar Island, like many islands in the Chesapeake Bay, is currently eroding, it was determined that island restoration/creation could be an ideal solution to the dredged material management problem that the MPA is facing. Offshore islands are a unique ecosystem component in the Chesapeake Bay watershed. Although similar vegetative communities may occur on the mainland, isolation, lack of human disturbance, and fewer predators make islands more desirable as nesting sites for colonial waterbirds and some endangered species.

2.2.1.e No Action. Under the No Action alternative, no efforts would be undertaken to curtail the present rate of erosion of Poplar Island or to restore it to its former configuration. An alternate location would have to be obtained for the placement of the approximately 38 million cubic yards of dredged material that otherwise would be accommodated by the Poplar Island Restoration Project.

Due to the amount of lead time required to develop a placement site, it is doubtful that a suitable placement site could be identified and prepared in time to accommodate the material that must be dredged from the approach channels in the upper Chesapeake Bay that serve the Port of Baltimore. In addition to not providing any environmental benefits, the No Action alternative has the potential to disrupt the constant maintenance that is required to keep the Port of Baltimore operational.

The Port of Baltimore contributes significantly to both the local and national economy. The Port handles approximately 350,000 containers of cargo that move between the Dundalk Marine and Seagirt Terminals and South Locust Point. Currently the Port generates 87,000 jobs, an estimated 45,000 of which are held by Maryland residents. A total of 18,000 are direct jobs; 6,600 are induced jobs, meaning that they support local purchases made by direct jobs; and 62,500 are jobs indirectly related to activities at the Port. Revenue impact from the Port resulted in earnings of $1.3 billion for firms in the maritime sector. The approach channels in the upper Chesapeake Bay that serve the Port of Baltimore must be dredged and maintained to navigable depths in order to maintain this commerce.

2.2.2 Preliminary Screening of Initial Alternatives

As was shown on Figure 2-5, the MPA's DNPOP continues to investigate potential placement options for material dredged from the Port of Baltimore channels. Many of the sites have been discussed in previous sections. Table 2-3 identifies options, capacity, environmental consequences, and reasons for elimination.This initial screening was to determine acceptable sites. It was prior to evaluation of alternate footprints and plans which were later developed for Poplar Island. Alternative Poplar Island plans are discussed in Chapter 5 (Plan Selection and Evaluation).

2.2.2.a Impacts of Deep Trough

The use of the Deep Trough as a placement site would be the most cost-effective option to meet the current maintenance dredging needs, but would provide minimal beneficial use of dredged material. That is, placement of dredged material in the Deep Trough will not result in the creation

Table 2-3
Sample of Alternatives Considered

Alternative	Type of Placement	Total Capacity	Environmental Consequences	Reason for Elimination
Pooles Island	Land Creation	100 Mcy	Wetlands, unexploded ordinance, good water quality year round	Unexploded ordinance, high recreational use area, high cost, limited suitable material for dikes
Shad Battery Shoal	Land Creation	94 Mcy	In fishery, waterfowl concerns	In protected fishery, lack of suitable dike material
Tolchester	Overboard, Land Creation	70-90 Mcy	Close to shellfish area	Near oyster beds, interference with boaters
Tolchester Beach	Shore Stabilization	2 Mcy	Few environmental concerns	Small capacity, large fetch
Patapsco River Mouth	Land Creation	50-100 Mcy	Few environmental concerns	Close to residential areas, small boat traffic
Swan Point	Upland	9 Mcy	Wetlands, forested, archeological concerns	Small capacity, environmental concerns
Sollers Point	Land Creation	4 Mcy	Some loss of wetlands	Small capacity, necessary to remove large quantity of muck before construction
Dead Ship Anchorage	Land Creation	7 Mcy	Wetlands destruction	High cost due to construction of long dikes
HMI Expansion	Modify/Expand	40 Mcy	Potential loss of bottom habitat	Expansion beyond current footprint prohibited by law
Masonville	Modify/Expand Land Creation	3 Mcy	Loss of shallow water habitat	Loss of shallow water habitat, small capacity
Hawkins Point/ Thoms Cove	Modify/Expand Land Creation	5 Mcy	Wetlands, one of last natural areas in Inner Harbor	Environmental concerns, small capacity
Grove Neck	Upland	5 Mcy	Forested areas would need to be cleared	Small capacity, high cost
Rocky Point	Upland	6 Mcy	Wetlands, waterfowl, fish spawning, and archeological concerns	Small capacity, difficult access

Table 2-3 Continued

Queenstown	Upland	9 Mcy	Wetlands, SAV concerns, forested	Not close to channels, environmental concerns
Aberdeen Proving Ground	Shore Stabilization	27 Mcy	Rare species habitat	Federally restricted area, unexploded ordinances present
Worton Point	Overboard	19 Mcy	Fisheries, SAV, wetlands, waterfowl	Small capacity, environmental concerns

of tidal wetlands or upland habitats. Although some seasonal recolonization of the site by aquatic organisms may occur, the overall contribution of a deep site to the productivity of the ecosystem would be significantly less than that of a functioning salt marsh, with none of the associated detrital transport. Previous studies (Gucinski and EAI 1984) concluded that the ecological value of the Deep Trough is quite limited, particularly at depths greater than 98 feet, because of the lack of dissolved oxygen during the summer months, and that placement of material would not cause long-term impacts so long as its composition was similar to that of the existing sediments. No cultural, socioeconomic, or recreational impacts would be associated with this option. The Deep Trough is not a viable placement option for now because existing state law prohibits requisite participation by local project sponsors.

2.2.2.b Impacts of Other Small Sites

There are no single sites currently under consideration that would accommodate the placement capacity that would be provided by construction of the proposed action or the Deep Trough placement. Several smaller facilities would, therefore, have to be developed. Although some may include beneficial uses, each site would require separate existing conditions investigations and impact analyses. Construction costs for developing more than one site would be significantly higher than that of either the Poplar Island or the Deep Trough options. The environmental, cultural, recreational, and socioeconomic impacts of this option would be dependent upon the sites chosen and can not be evaluated at this time.

2.2.2.c Impacts of No Action

The no-action alternative, while appearing to be the most cost-effective option, would not allow regional maintenance dredging needs to be met, which, in the long term, would result in very significant negative socioeconomic ramifications in terms of reduced commerce to the Port of Baltimore. While the no-action alternative would involve no impacts to regional resources, it would also not result in ecological benefits to the Bay or recreational benefits to the region, and is not an acceptable alternative for economic reasons.

Based on these evaluations, only a handful of placement opportunities are currently available. The placement need can be divided into three fairly distinct regions: harbor materials which must be contained by state law; upper-Bay channels of the C&D Canal; and southern approach channels. For the harbor materials, the MPA is investigating options for confined placement close to the channels, including the possible use of the previous CSX/Cox Creek placement site. For the C&D Canal channels, the MPA is pursuing openwater and beneficial use opportunities in the upper Bay. The option currently viable for the southern approaches is island restoration at Poplar Island.

The Maryland Department of Transportation (on behalf of the MPA) requested that a study be conducted to determine whether uncontaminated material dredged from the approach channels to the Baltimore Harbor and Channels project could be used to restore Poplar Island to its approximate size 150 years ago. The District conducted an initial appraisal and received approval for conducting a feasibility study under Section 204 of the Water Resources Development Act of 1992.

2.2.3 Poplar Island

The group of islands known as Poplar Island is located in the upper Chesapeake Bay, about 1 mile northwest of Tilghman, Talbot County, Maryland. The islands are situated on the main stem of the Bay and are subject to severe erosional forces. The original size of Poplar Island in the 1600's is estimated to have been 2,000 acres, based on the outline of the existing sand shoal now surrounding the island. Over time, erosion and submergence have taken their toll, causing this single island to split into a main island and several smaller islands.

In the early 1900's, about 15 families totalling 70 to 100 people lived on the group of islands which comprised Poplar Island. The main island supported the small town of Valliant. The town included a general store, a post office, a school, a church, and a sawmill. The community flourished until the 1920's when erosion became so severe that most inhabitants had to abandon their homes. By 1930, Poplar Island was completely deserted.

The next year, a group of politicians purchased the group of islands. They founded the exclusive Jefferson Island Club in 1931. Many famous politicians, including Presidents Franklin D. Roosevelt and Harry S. Truman, visited the islands for business and pleasure. In 1946 fire destroyed the wooden clubhouse. Due to the continued erosion, the group was forced to relocate their club to an island in the Potomac River.

Land subsidence, rising sea level, and wave action are causing valuable island habitats like Poplar Island to be lost through erosion throughout the Chesapeake Bay. In the last 150 years, it has been estimated that 10,500 acres have been lost in the middle-eastern portion of Chesapeake Bay alone. The island is currently eroding at the rapid rate of more than 13 feet a year. If the present rate of land loss continues unabated, the island will probably disappear by the turn of the century.

There is an opportunity to beneficially use clean dredged material derived from maintenance dredging activities to restore habitat in the middle Chesapeake Bay. The use of material produced as a result of required maintenance of Bay shipping channels is proposed for the restoration of the eroding group of islands known as Poplar Island. In the past, this area was recognized as an important island habitat in this portion of Chesapeake Bay. Erosion has resulted in the almost complete loss of wetland habitat and breeding and feeding habitat for a variety of bird species. To reverse this loss, the restoration of Poplar Island is proposed, beneficially using clean dredged materials generated as a result of navigation channel maintenance to create new island and wetland habitat.

Through the beneficial use of clean dredged material, a new island can be constructed to replace approximately 1,000 acres of wetland and upland habitat. This habitat will afford improved productivity to the surrounding area, while providing an environmentally sound method for the use of dredged material removed from Bay channels.

All construction/reconstruction projects involve some detrimental impacts, albeit short-term ones. The Poplar Island reconstruction project is projected to result in a loss of productive shellfish habitat and the displacement of fisheries activities due to the burial of 1100 acres of shallow water habitat. Other potential impacts include a decrease in recreational activity in the vicinity of the project, short-term increases in water turbidity during construction, and some disturbance of bird and mammal populations on the existing remnants.

The DNR, USFWS, CBP, and other agencies have identified Poplar Island as valuable nesting, foraging and nursery habitat. Poplar Island supports nesting snowy egrets, common egrets, cattle egrets, common terns, double-crested cormorants, great blue herons, little blue herons, green herons, and black ducks. A bald eagle nest is located on Jefferson Island, which is not part of the project area. Diamondback terrapins nest on the beaches, and river otters fish from the island shore.
Wildlife habitat value of the islands has been drastically affected by the severe erosion. Hundreds of acres of forested habitat and tidal marsh have been lost. Prior to erosion, the Poplar Island complex may have supported significantly large numbers of colonial nesting water birds, waterfowl, and songbirds.

The Poplar Island Restoration Project represents a beneficial use of dredged material for many reasons:

- Islands are preferentially selected by many migratory birds, as well as other fish and wildlife species, as nesting/production areas. Even though similar vegetative communities may occur on the mainland, isolation, lack of human disturbance, and fewer predators make islands more productive. The proposed project will protect the existing valuable island habitat and increase the habitat available by more than 1,100 acres.

- Preventing further island erosion should decrease Chesapeake Bay sediment loadings and significantly improve water clarity in the immediate vicinity of the Poplar Island complex. The existing eroding condition of the island complex contributes significant amounts of sediment and causes almost continual water turbidity.

- The project will support the objectives of the North American Waterfowl Management Plan related to increasing habitats for emphasis species of migratory waterfowl, such as black ducks.

- Created wetland and shallow water areas should provide excellent habitat for juvenile and forage fish species, epibenthic invertebrates, and benthic infauna.

- A net gain of approximately 550 wetland acres should significantly increase detrital production and export in relation to the existing energetic potential of the island complex.

- Aquatic habitat to be affected has not recently (post-1984) supported submerged aquatic vegetation (SAV). By creating shallow and protected water areas, habitat suitable for re-establishment of SAV will be developed.

- Approximately 38 million cubic yards of placement capacity will be made available to handle immediate and maintenance dredging needs for approximately 24 years and will avoid impacts associated with other, less beneficial, placement sites.

- Successful completion of the Poplar Island project could encourage the development of similar projects throughout Chesapeake Bay and could extend to other coastal regions of the country.

- Because the historic footprint includes some areas of relatively unproductive hard clay bottom, conversion to other habitats should not cause significant negative impacts or force environmental tradeoffs, such as trading fish for ducks or trading shallow water habitat for uplands and wetlands. Unique and valuable habitat is being gained; the shallow water habitat being lost is more common and plentiful.

- Without the dredged material from the Baltimore Harbor and Channels project, this project could not be constructed. Costs to purchase sand for the project would likely exceed $9 per cyd, including transportation, and identification of a source for 38 million cyds may not be possible.

Section 3

Existing Resources

This section describes the existing conditions within and around the Poplar Island archipelago with respect to environmental, cultural, socioeconomic, and recreational resources. The existing environmental resources are the focus because, in this region, these resources are an integral part of the socioeconomics and most recreational options. This information is necessary for NEPA compliance. Further, a construction project of this magnitude has the potential to influence and be influenced by regional environmental conditions. The description provides a basis for measuring impacts associated with reconstructing Poplar Island using clean dredged material from the Baltimore Harbor and Channels Federal navigation project.

3.1 Environmental Resources

3.1.1 Setting

The group of islands known as Poplar Island is located in the upper middle Chesapeake Bay at latitude 38° 46' N, and longitude 76° 23' W. The site is approximately 32 miles southeast of Baltimore-Washington International (BWI) Airport, 35 miles east of Washington, D.C. National Airport and 32 miles north of Patuxent Naval Air Station (Figures 1-1 and 1-2). The closest point of mainland is GMPT on the eastern shore of Maryland just north of Tilghman Island, approximately 2 miles east of the site. The islands, which are situated on the main stem of the Bay near the confluence of the Chesapeake and Eastern Bays, are subject to severe erosional forces. The northern portion of Poplar Island, which exceeded 1,000 acres in the 1800's, has eroded to less than 5 acres today. The erosion has split the northern portion into four small islands (North Point Island, Middle Poplar Island, South Central Poplar Island, and South Poplar Island) collectively referred to as Poplar Island. Today, there are also two larger parcels: Coaches Island, which in 1847 was part of Poplar Island, and Jefferson Island, which was near, but separate from Poplar Island in 1847. Coaches Island currently has a surface area of approximately 74 acres. Jefferson Island is not part of the project area but has been included in discussions of available resources and impacts, where applicable (Figure 1-3).

3.1.2 Physiography, Geology, and Soils

3.1.2.a Physiography. Poplar Island is located near the eastern shore of the mid portion of the Chesapeake Bay and lies within the Embayed Section of the Atlantic Coastal Plain Physiographic Province (Hunt, 1967). The Coastal Plain is an elevated sea bottom with low topographic relief and extensive marshy tracts. Sloping gradually seaward from its intersection with crystalline rocks of the Piedmont Physiographic Province to the west, the Coastal Plain is characterized by estuarine embayments including the Chesapeake Bay, which divide it into a number of broad and low-lying peninsula tracts. The physiography has controlled both settlement and development in the coastal plain. From Long Island south to Cape Lookout in the Outer Banks of North Carolina, drowned valleys form the bays and harbors that favored early settlement of the Atlantic Coast.

Poplar Island formed over the last 10,000 years (during the Holocene) as rising sea level isolated former topographic highs on the mainland that now constitute the island complex. As inundation progressed, Poplar Island became first a peninsula and then an island. Since 1847, bayside erosion driven by wave action has resulted in the loss of 85 percent of the Poplar Island landmass. The island has been reduced from 1,100 acres in 1847 to about 79 acres today (USACE 1995). The Poplar Island archipelago is low-lying and possesses nearly level topography, as does the nearby mainland of Talbot County. Elevations on South Central and South Poplar Islands reach a maximum of 2 feet Mean Lower Low Water (MLLW). Elevations on Coaches Island reach a maximum of about 10.8 feet MLLW. The substrate is generally flat with slopes on the order of 1:300 to 1:500.

3.1.2.b Geology. Poplar Island is comprised of, and underlain by, Quaternary lowland sedimentary deposits consisting of gravel, sand, silt, and clay. These deposits form the materials of the existing islands and overlie nearby shallows. These deposits are underlain by the Choptank and Calvert Formations, which are Tertiary deposits at a depth of about 200 feet. These formations consist of interbedded brown to yellow fine gravelly sand to gray to bluish-green argillaceous silt, locally indurated to calcareous sandstones and predominant shell beds. These deposits are underlain by older Tertiary and Cretaceous sediments. Late Precambrian and Early Paleozoic crystalline rocks largely comprised of schists, gneiss, and granites, form the basement complex at about 1,000 feet below land surface (Gahagan and Bryant 1995a).

Subsurface borings at the project site provide more details regarding the site-specific subsurface stratigraphy (Gahagan and Bryant 1995a). Soil borings conducted in conjunction with this study indicated that the subsurface conditions consist of four strata. Stratum 1 is a surficial silty sand, generally composed of black, gray, and brown strata. Stratum 1 is absent in some areas, and occurs at a depth of up to 30 feet thick in other areas. Stratum 2 is composed of surficial silty sand underlain by soft to hard, light gray and tan mottled silty clay. Stratum 2 varies in thickness from 0 to 20 feet in the Poplar Island harbor region and varies in depth in the rest of the archipelago. Stratum 3 underlies the entire site at a depth of approximately 4 to 30 feet, and consists of stiff, dark gray, silty clay with pockets of silty sand. This stratum is considered a marine deposit and contains many shell fragments. Stratum 4 occurs sporadically throughout the archipelago, near the surface, and consists of very soft, normally consolidated recent deposits of gray silty clay. This stratum also occurs in channels that were eroded in the older sediments, and then refilled with more recent deposits. The locations of these eroded and refilled channels are unpredictable. Some such channels were encountered to the northeast of the site. This stratum varies in thickness from 5 to 30 feet.

The site is situated in a region that has historically experienced a moderate amount of minor earthquake activity. Although many earthquakes have been reported in the region there since the early 18th century, none have been major or of catastrophic proportion.

3.1.2.c Soils. Due to dynamic coastal processes and continuous erosion of Poplar Island, much of the soil has been disturbed and transported away by erosional forces; however, particularly where vegetative cover exists, some of the original soil profiles remain. The original soils of Poplar Island, as well as those of Talbot County, formed from marine sediments that were deposited during various geologic epochs (U.S. Department of Agriculture 1970).

Soils originally formed on the islands include some from the Mattapex and Matapeake series and consist primarily of deep, moderately well drained, dark-brown soils that are level to gently sloping. These soils developed on silty marine sediments and consist primarily of silt loams that retain moisture and are well suited for vegetative growth. They occur through many other areas in Talbot County where they support cultivated crops, woodlands, and developed areas. These soils are being actively eroded on Poplar Island and replaced by tidal marsh areas that are regularly covered with brackish or salt water on each flood tide. These areas have a silt or very fine sand surface layer containing organic matter; they support marsh vegetation including phragmites, marsh elder, and scrub vegetation.

Since Jefferson and Coaches Islands are not as severely eroded as the Poplar Island remnants, the soil types that occur there are relatively preserved and stabilized by vegetation, including woodlands. Soils on these islands consist primarily of fine sandy loams and silt loams of the Woodstown, Sassafras, Othello, Mattapex, and Barclay series. These generally occur on gentle slopes, are well drained, and are well suited for vegetation. Considerable areas of tidal marsh occur on the edges and periphery of these islands, where they are subject to periodic inundation.

Investigation of the four smallest islands remaining in the Poplar Island archipelago revealed deteriorating remnants of a previously more extensive land mass (EA 1995a). All of the islands are subjected to significant wind and wave effects including bank erosion. North Point Island and South Poplar Island are frequently inundated by tidal waters generated by excessive high tides and storm surges. Middle Poplar Island has received some protection from direct wave exposure by the placement of barges on its western side. Ten barges were towed to the site and sunk in 1993 in an effort to protect the remaining bird colony on Middle Poplar Island by slowing island erosion.

3.1.3 Hydrology/Hydrodynamics

In estuarine systems, hydrodynamics (the movement and cycling of water) influences a variety of factors, including the shape and stability of land masses, water and sediment quality, and the distribution of aquatic organisms. Significant changes in land masses (e.g., bulkheading, dredging, and creation) can alter the hydrodynamics in a region potentially impacting other land masses or resources. To establish the existing hydrodynamic conditions in the vicinity of the project area, hydrographic, topographic, and aerial survey data were collected from areas within and adjacent to the Poplar Island archipelago region. All survey data including site elevations are referenced to MLLW based on the 1960 to 1978 tidal epoch, and the Maryland State Plane, North American Datum 1983.

3.1.3.a Average Depths. A bathymetric map is presented in Figure 3-1. Water depth in and around the Poplar Island archipelago is 1 to 2 feet in waters in between or directly adjacent to the islets. Water depth increases to a depth of 6 to 8 feet over a distance of approximately 4,000 feet to the south, west, and east. North of the archipelago, the 6 to 8 feet depth of water extends 8,000 feet. Beyond this zone, the bottom slopes and depths become about 12 to 14 feet. A report prepared for this study in 1995 indicated that water depth increases to 60 to 100 feet in the shipping channel, which is approximately 12,000 feet west of the archipelago.

3.1.3.b Water Levels. Normal water level variations at Poplar Island are generally dominated by semi-diurnal astronomical tides, although wind effects can be important. Extreme water levels, on the other hand, are dictated by storm tides.

3.1.3.c Astronomical Tides. Astronomical tides dictate the size and length of inundation of the intertidal zone, which is a unique and often highly productive area within an estuary. Astronomical tides at Poplar Island are semi-diurnal. The mean tide level is 0.9 foot above MLLW; the mean tidal range is 1.2 feet and the spring tidal range is 1.8 feet National Ocean Service [NOS 1995]. Tidal datum characteristics for Poplar Island reported from the NOS are presented in Table 3-1. The difference in elevation between MLLW and National Geodetic Vertical Datum (NGVD) has been estimated at 0.35 foot for the project site. MLLW will serve as the datum for this project. An important elevation to be considered for habitat creation is the elevation of Mean Spring High Water (MSHW). MSHW is defined to be 2.4 feet above MLLW and, for this project, will be considered as the boundary between wetland and upland.

3.1.3.d Storm Surge. Design water levels in the study area are dominated by storm effects (i.e. storm surge and wave setup) in combination with astronomical tide. Storm surge is a temporary rise in water level generated either by large-scale extra-tropical storms known as northeasters, or by hurricanes. The rise in water level results from wind action, the low pressure of the storm disturbance, and the Coriolis force. Wave setup is a term used to describe the rise in water level due to wave breaking. Specifically, change in momentum that attends the breaking of waves propagating towards shore results in a surf zone force that raises water levels at the shoreline. A comprehensive evaluation of storm-induced water levels for several Chesapeake Bay locations has been conducted by the Virginia Institute of Marine Science (1978) as part of the Federal Flood Insurance Program. Results of this study are summarized in the water-level versus frequency curves presented in Figure 3-2, which provide water levels in feet above NGVD for various return periods.

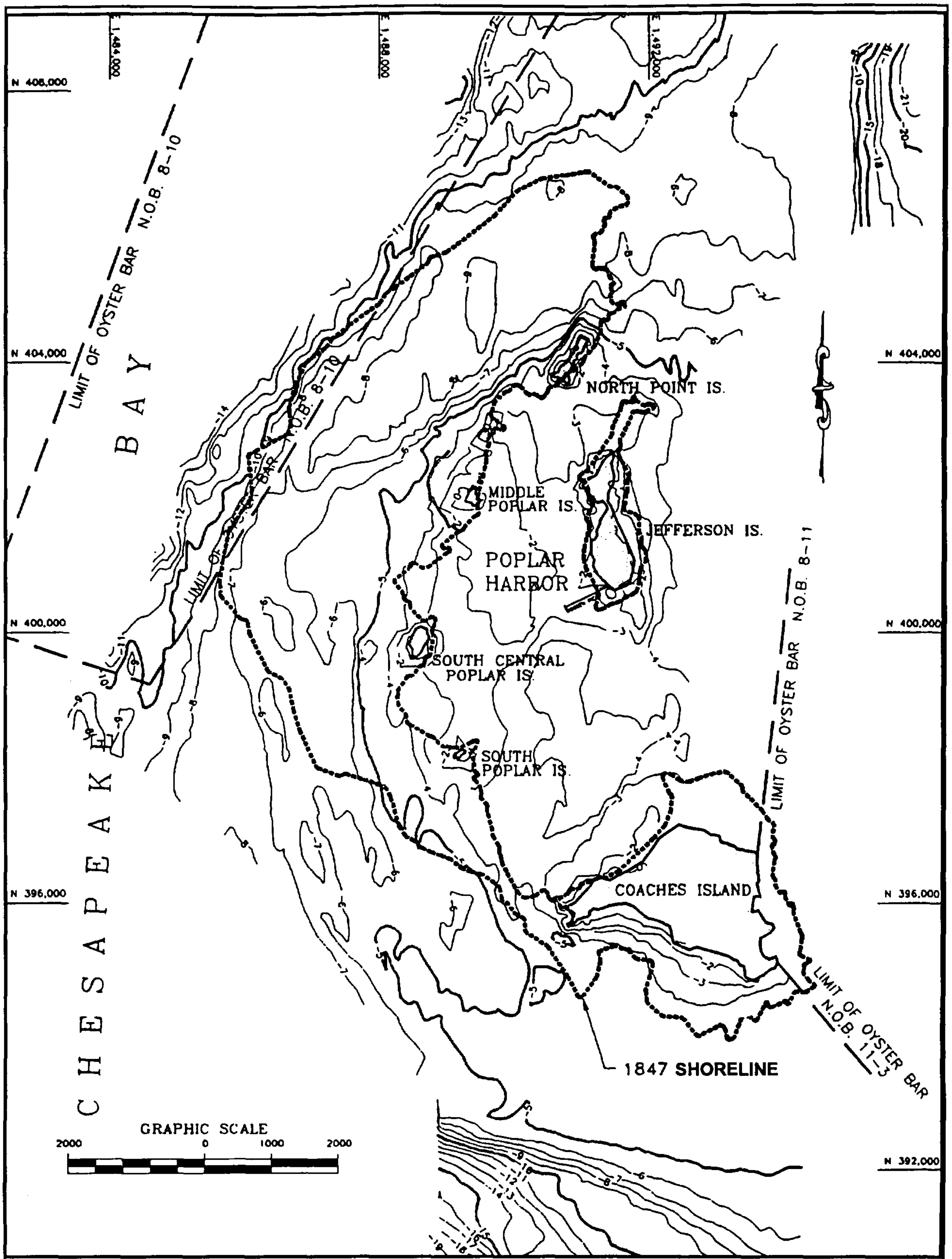

Figure 3-1. Bathymetric map.

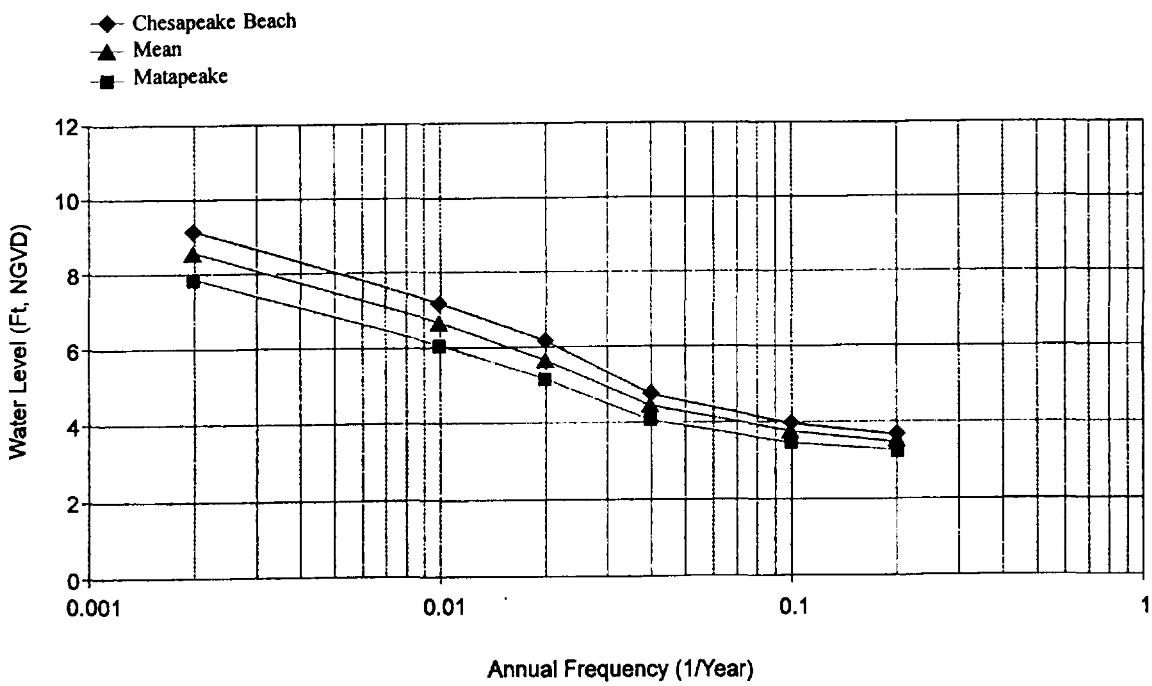

Figure 3-2. Water level versus frequency at selected Chesapeake Bay stations.

Table 3-1
Astronomical Tidal Datum Characteristics at Poplar Island

Tidal Datum	**Ft (MLLW)**
Mean Spring High Water (MSHW)	2.4
Mean Higher High Water (MHHW)	1.8
Mean High Water (MHW)	1.5
Mean Tide Level (MTL)	0.9
National Geodetic Vertical Datum (NGVD)	0.35
Mean Low Water (MLW)	0.3
Mean Lower Low Water (MLLW)	0.0

The closest station locations to Poplar Island are Matapeake on Kent Island, approximately 13 miles due north, and Chesapeake Beach on the western shore of the Bay, approximately 10 miles southwest. In the absence of other data, it has been assumed that the storm tides for Poplar Island are the mean values of the two locations. The mean is presented in Figure 3-2 in terms of water levels above NGVD for various return periods. Figure 3-2 indicates that the storm tide elevation for a 25-year return period is 4.9 feet MLLW (4.5 feet NGVD) and the 100-year water level for the project area is 7.0 feet MLLW (6.6 feet NGVD). For comparison, the 25-year return period elevations for Baltimore and Annapolis are 5.1 and 4.8 feet NGVD, respectively. A tidal gage has been installed at the Jefferson Island pier as part of this study; data collected from this gage will be used to correlate water levels with the above predictions.

3.1.3.e Wind Conditions. Aside from tidal currents, winds are the predominant hydrodynamic force in the Chesapeake Bay. Wind-driven waves are primarily responsible for the current erosion of Poplar Island. Design of any structures for construction within the Chesapeake Bay must consider the strength and prevailing direction of wind for the region. The design wind speeds for a 25-year return period storm range from 47 miles per hour (mph) for the east direction to 70 mph for the southwest direction. The design wind speeds presented in Table 3-2 have been used to estimate design wave conditions for the project site.

3.1.3.f Tidal Currents. Tidal currents are the speed that water flows into (floods) or out of (ebbs) an estuarine system. These velocities are variable within a cycle (flood to ebb or vice versa) and within a lunar cycle (full to half, half to new, etc.). The strength and velocity of these currents influence many factors, particularly sediment transport (e.g., erosion) and movements of some organisms (e.g., fish). Tidal flow patterns for the entire system, which are

Table 3-2
Design Wind Speed per Direction and Return Period
for Baltimore-Washington International (BWI) Airport

Return Period (Years)	Wind Speed and Direction (MPH)							
	N	NE	E	SE	S	SW	W	NW
5	40	37	32	37	36	47	50	54
10	48	44	38	45	43	56	54	59
25	59	55	47	58	54	70	60	67
50	69	65	55	69	63	82	64	73
100	81	76	65	82	74	97	69	81

dictated by bay geometry and the stipulated boundary conditions, are presented in Figures 3-3 and 3-4 by means of velocity vectors for flood and ebb conditions, respectively. Currents within the main bay channel in the vicinity of Poplar Island are on the order of 0.5 to 0.7 foot per second during peak flood and 0.4 to 0.8 foot per second during peak ebb. Detailed flow vector and velocity contour plots for Poplar Island are presented in Figures 3-5 and 3-6 for peak flood and Figures 3-7 and 3-8 for ebb flow conditions, respectively. These figures show that peak flood and ebb velocities east and west of the Poplar Island complex are on the order of 0.6 to 0.9 foot per second. Within the islands, however, the peak currents are on the order of 0.2 to 0.6 foot per second. As would be expected, velocities inside Poplar Harbor are relatively small.

3.1.3.g Sedimentation. Sedimentation can be defined as either filling (accreting) or cutting (erosion). The rates at which these occur within an area dictate the necessary level of protection needed to protect shorelines. Modeled simulations of these processes can be done based upon the predominant sediment types, hydrodynamics, and wind speeds in an area. Hydrodynamic projections based on boundary conditions were used to evaluate sedimentation processes for the project. Wind can play a consequential role in sediment transport. Wind-induced waves increase shear stress at the bottom surface and therefore have enhanced flow ability to suspend sediments that are then transported by currents. Based on wind observations at Patuxent Naval Air Station and BWI Airport, it is judged that the most frequent winds come from the directions of west, northwest, southwest and south. Northwesterly and southerly winds with different speeds were considered in the simulations, since they have relatively longer fetches, thus generating greater waves, especially for winds from the south.

Sediment transport was modeled separately for sand and clay. Physical parameters used in modeling are presented in Tables 3-3 and 3-4 for sand and clay, respectively. A cohesive sediment concentration at the northern boundary was estimated based on the measurements around the Poplar Island area. The southern boundary concentration was determined internally in the model. In the same fashion, an inflow sediment concentration was estimated for noncohesive sediments.

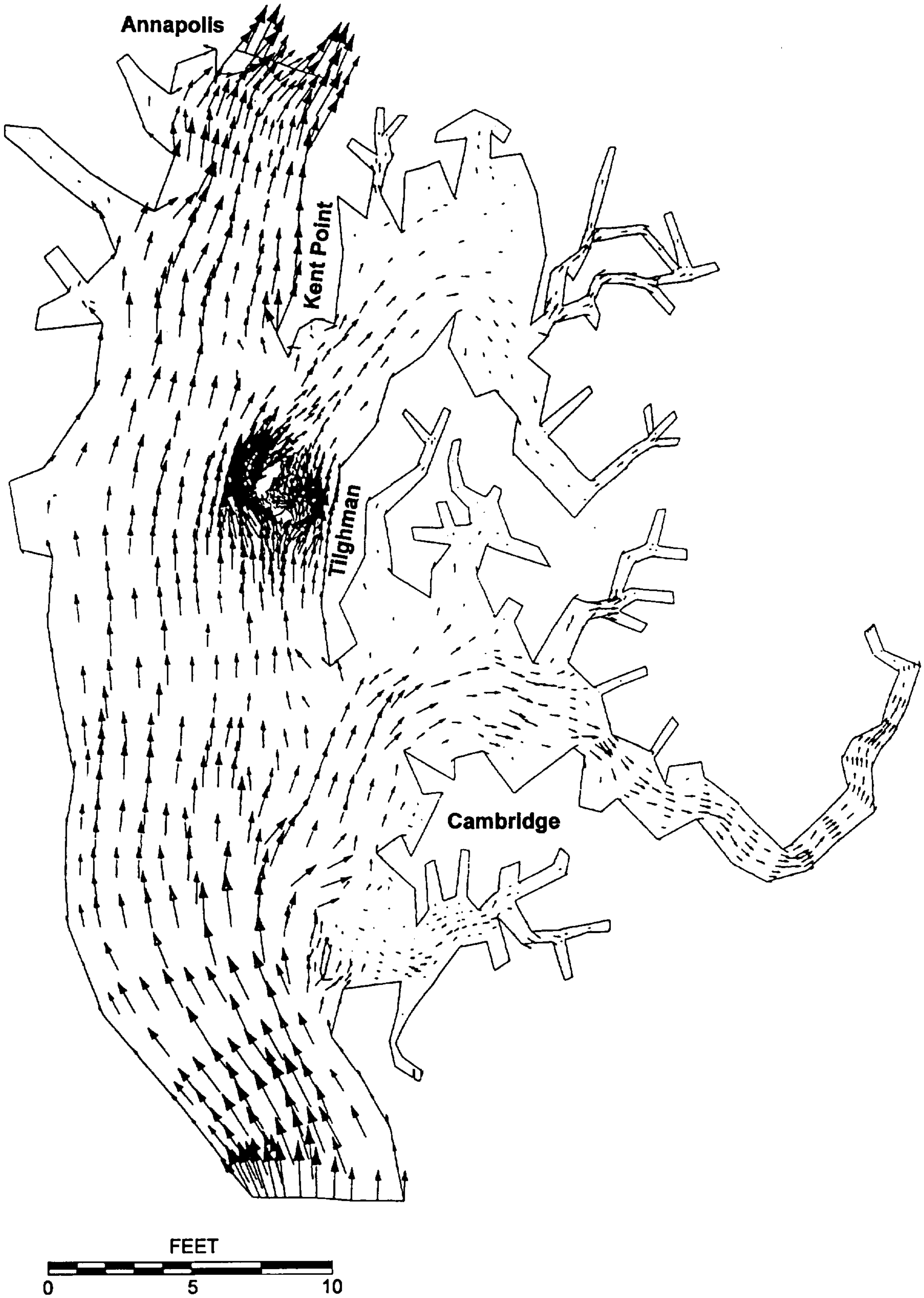

Figure 3-3. Flow velocity vectors for peak flood tide.

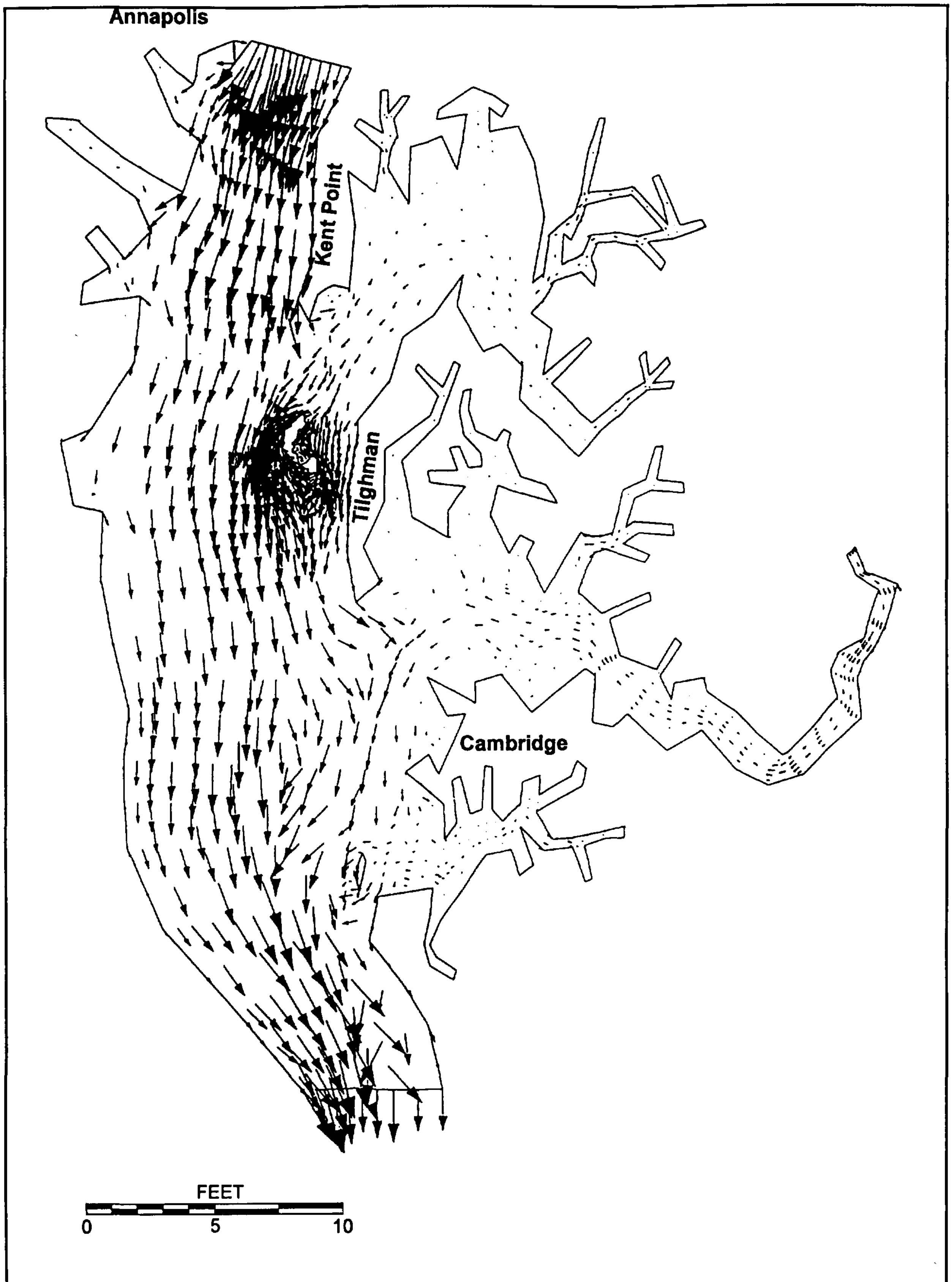

Figure 3-4. Flow velocity vectors for peak ebb tide.

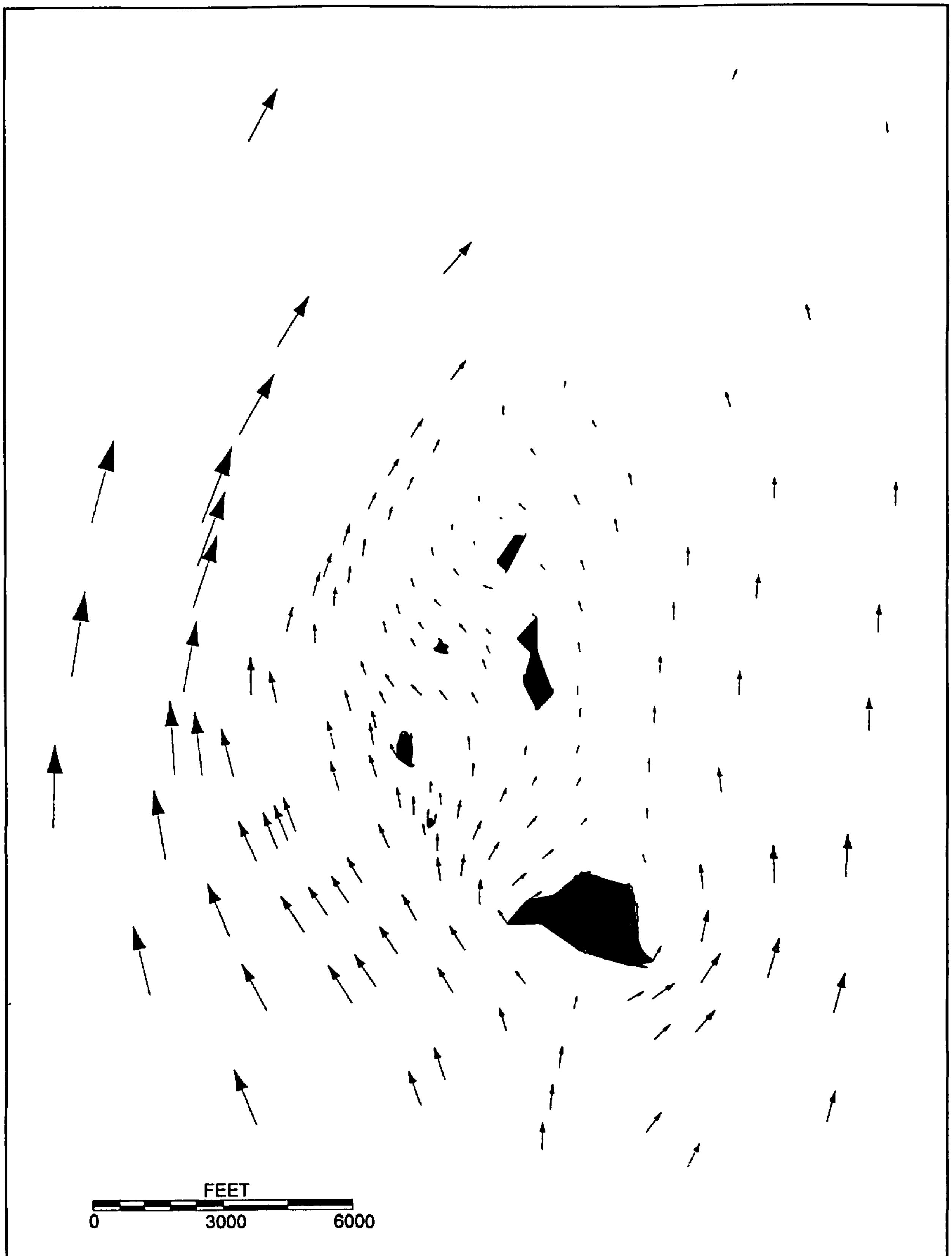

Figure 3-5. Site detail for existing conditions—peak flood.

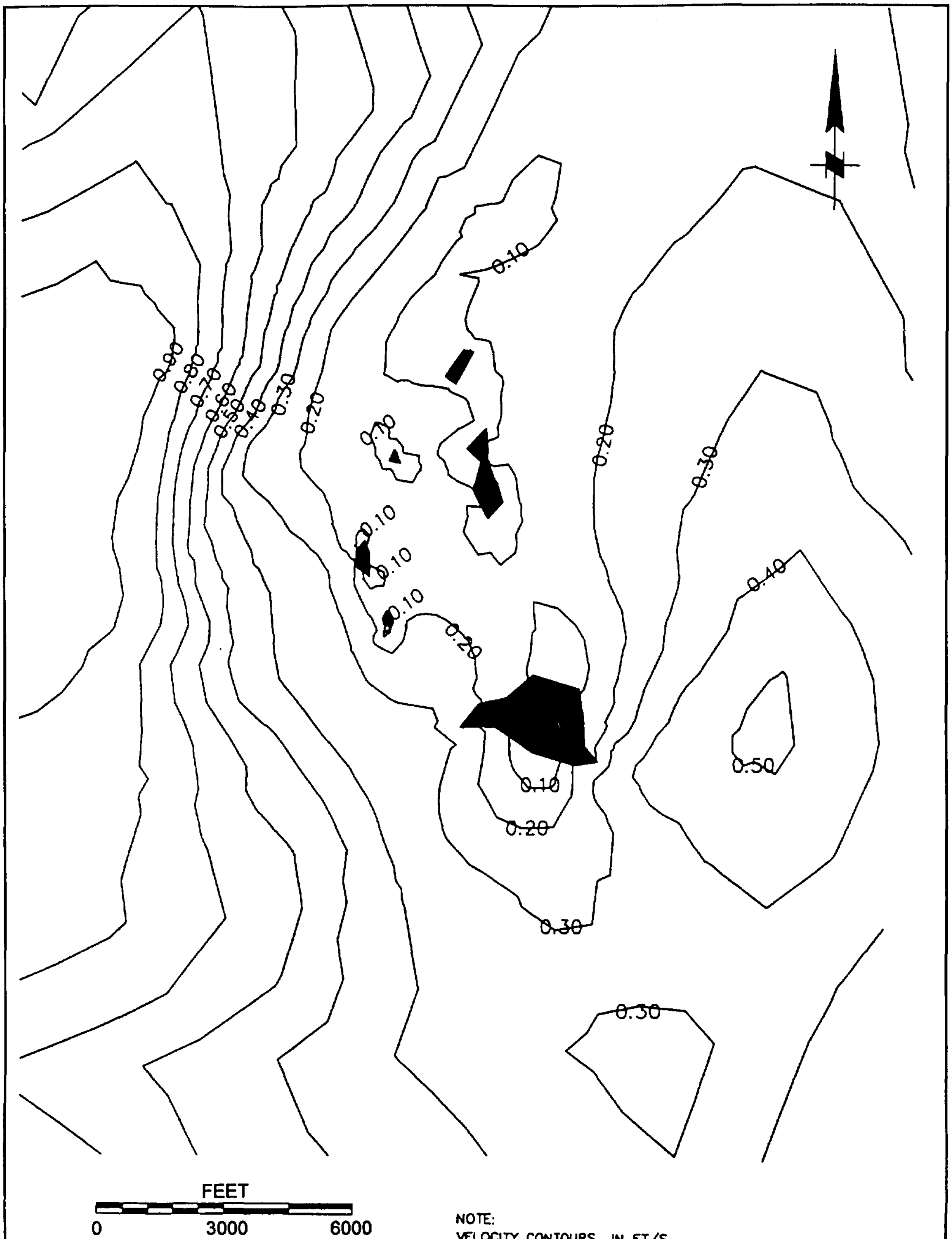

Figure 3-6. Velocity contour plot for existing conditions—flood tide.

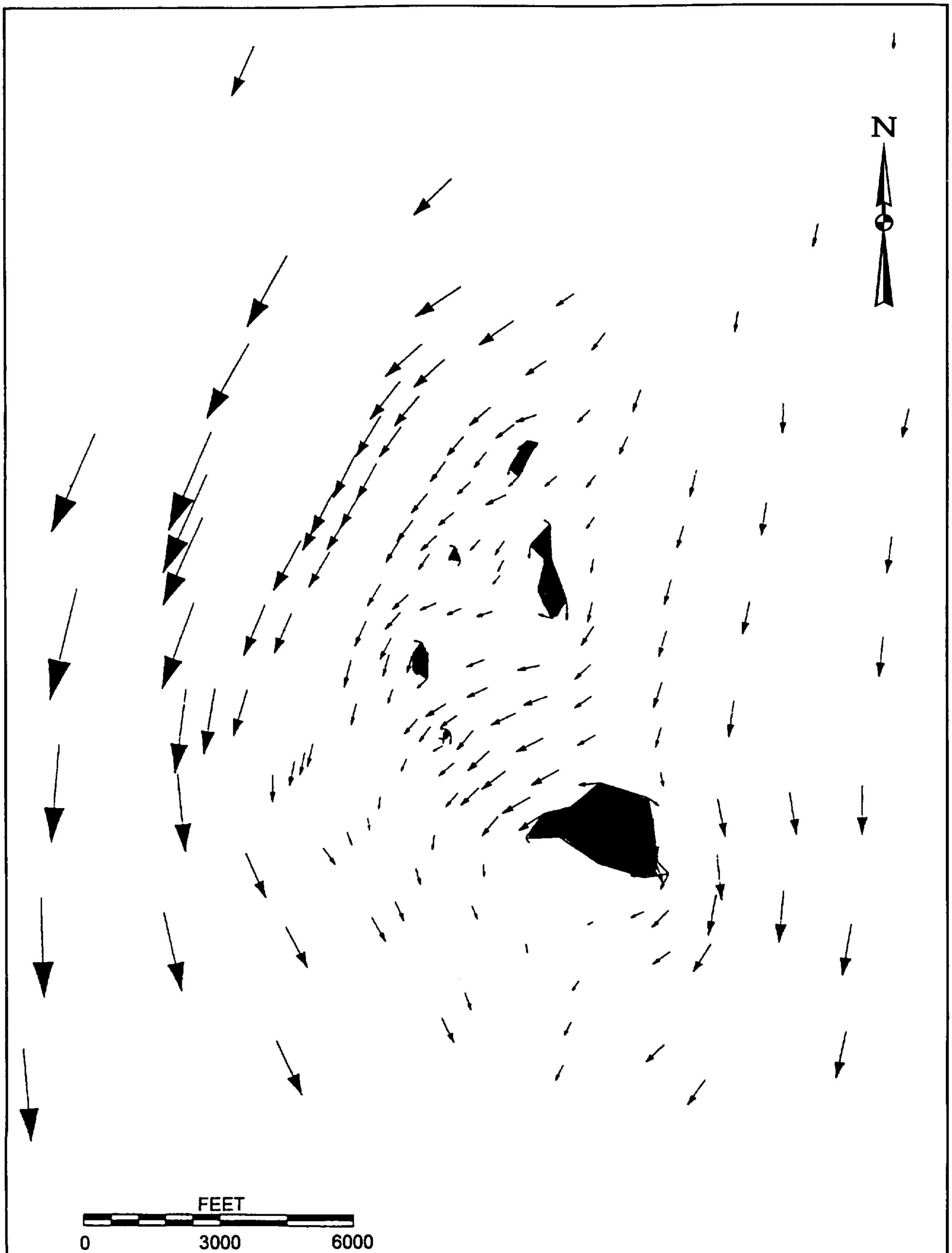

Figure 3-7. Site detail for existing conditions—ebb tide.

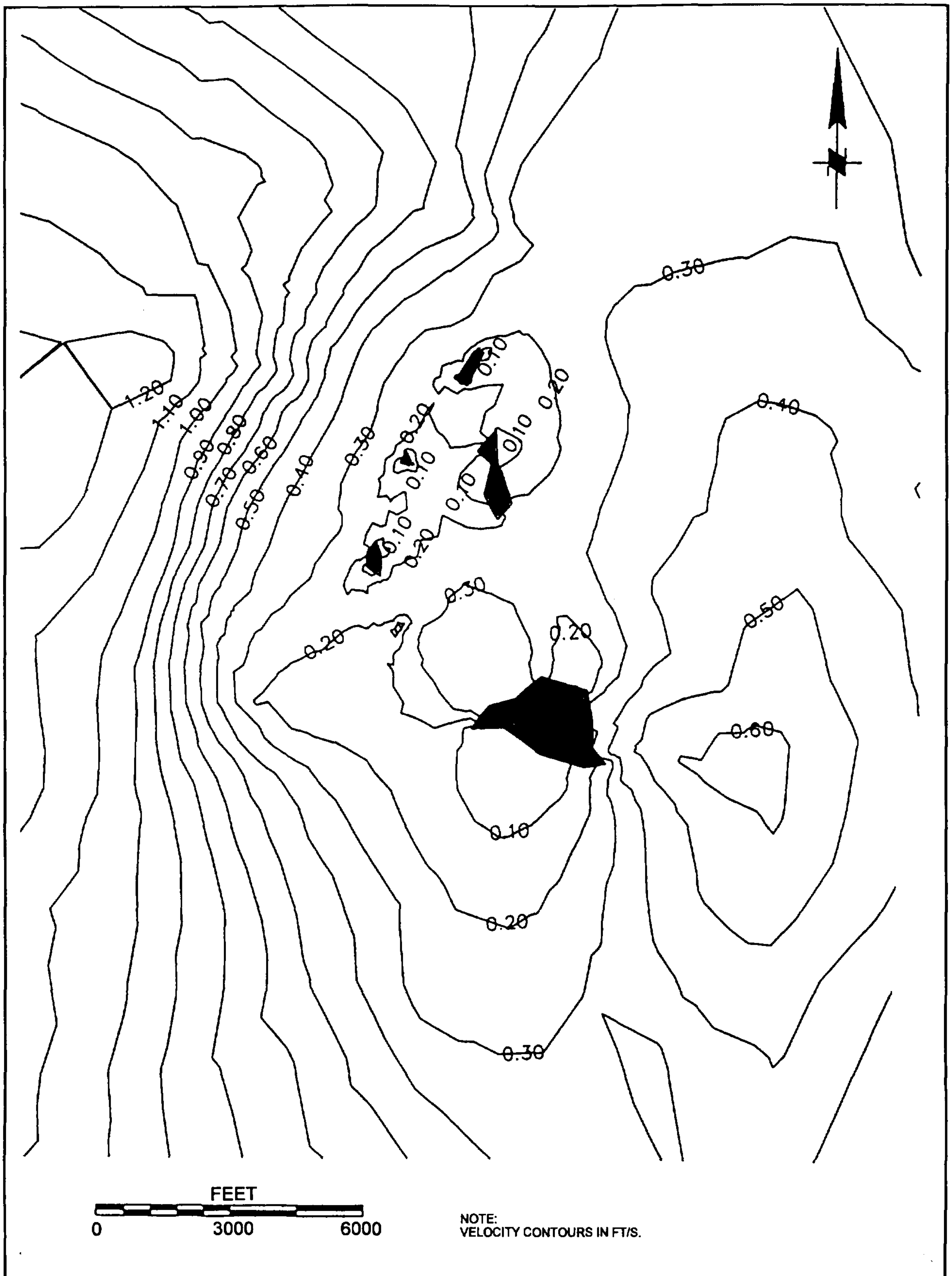

Figure 3-8. Velocity contour plot for existing conditions—ebb tide.

Table 3-3
Cohesive Sedimentation Parameters

Model Parameters	Units	Values
Crank-Nicholson THETA		0.66
Critical shear stress (deposition)	N/m**2	0.05
Critical shear stress (erosion)	N/m**2	0.15
Dry density of freshly deposited sediment	kg/m**3	300
Particle specific gravity		2.65
Erosion rate constant	kg/m**2/sec	0.002
Effective diffusion	m**2/sec	50
Inflow concentration	kg/m**3	0.02
Settling velocity	m/sec	0.0003
Initial concentration	kg/m**3	0.02

Table 3-4
Noncohesive Sedimentation Parameters

Model Parameters	Units	Values
Crank-Nicholson THETA		0.66
Particle shape factor		0.70
Length factor (deposition)		0.50
Length factor (erosion)		10
Particle specific gravity		2.65
Median grain size	mm	0.2
Effective diffusion	m**2/sec	50
Inflow concentration	kg/m**3	0.001
Settling velocity	m/sec	0.005
Manning's n		0.025

For the existing condition, sedimentation modeling of 1-month duration was performed for a northwesterly wind with a speed of 20 mph and a southerly wind with a speed of 15 mph. For a sand bottom, the Poplar Island area experiences erosion while deposition occurs at the area between the island and the main deep channel. Erosion is found for the whole island area when the bottom material is clay. Under the action of a southerly wind, erosion occurs around the Coaches Island area.

3.1.3.h Wave Conditions. Poplar Island is exposed to wind-generated waves approaching from all directions, which are the predominant cause of the current erosion. The longest fetch distances to which the site is exposed correspond to the north and south directions. In accordance with procedures recommended by the Shore Protection Manual (USACE 1984), a radially averaged fetch distance was computed for each direction. The radially averaged fetch distances for the north, northeast, east, southeast, south, southwest, west, and northwest are 18, 10.4, 2.6, 2.9, 24.2, 10.1, 8.4, and 9.3 miles, respectively. Wave conditions were hindcast along each fetch direction for the design winds presented in Table 3-2 (adjusted appropriately for duration) and the water levels presented in Figure 3-2. Specifically, waves were hindcast for eight directional design wind speeds (i.e. the design wind speeds computed for each individual directions using methods published in the Shore Protection Manual (USACE 1984). Wave hindcast results are presented in Figures 3-9 (significant wave height, H_s) and Figure 3-10 (Peak Wave Period, T_p). These figures present a summary of H_s and T_p that provide an immediate understanding of the directions from which the highest waves and longest periods approach Poplar Island.

A sea state is normally composed of a spectrum of waves with varying heights and periods which may range from relatively long waves to short ripples. To summarize the spectral characteristics of a sea state, it is customary to represent that wave spectrum in terms of a distribution of wave energy over a range of wave periods. Having made this distribution, known as a wave spectrum, it is convenient to represent that wave spectrum by a single representative wave height and period. The wave conditions reported in Figures 3-9 and 3-10 are the significant wave height, H_s, and the peak spectral wave period, T_p. The significant wave height, H_s, is defined as the average of the highest one-third of the waves in the spectrum. Depending on the duration of the storm condition represented by the wave spectrum, maximum wave heights may be as high as 1.8 to 2 times the significant wave height. The peak spectral period, T_p, is the wave period that corresponds to the maximum wave energy level in the wave spectrum.

The highest waves are estimated for the north and south fetch directions. The 25-year return period waves for the north direction have a significant height, H_s, of 7.2 feet and a peak spectral wave period, T_p, of 5.2 seconds. The 25-year return period significant wave height, H_s, for the south direction is 7.0 feet and the peak spectral wave period, T_p, is 5.4 seconds.

3.1.4 Water Quality

3.1.4.a Introduction. Water quality can influence the distribution and abundance of the living resources within an aquatic system. Analysis of water quality includes measurement of a variety of physical properties and chemical constituents that are known to be limiting to key species or groups of organisms or that are known to affect the health of an ecosystem to some extent. Physical variables include temperature, pH, conductivity, salinity, dissolved oxygen, turbidity, and water clarity. Chemical variables include elemental nutrients such as nitrogen, phosphorous, and silicon, which are essential constituents of biota.

Water quality varies spatially, temporally, and seasonally in the Chesapeake Bay, and year to year variability due to weather conditions is often significant. Nutrients and sedimentation from both point and non-point sources, physical mixing, and biological processes all influence water quality. Physical components of water quality are often influenced by weather events, daily tidal

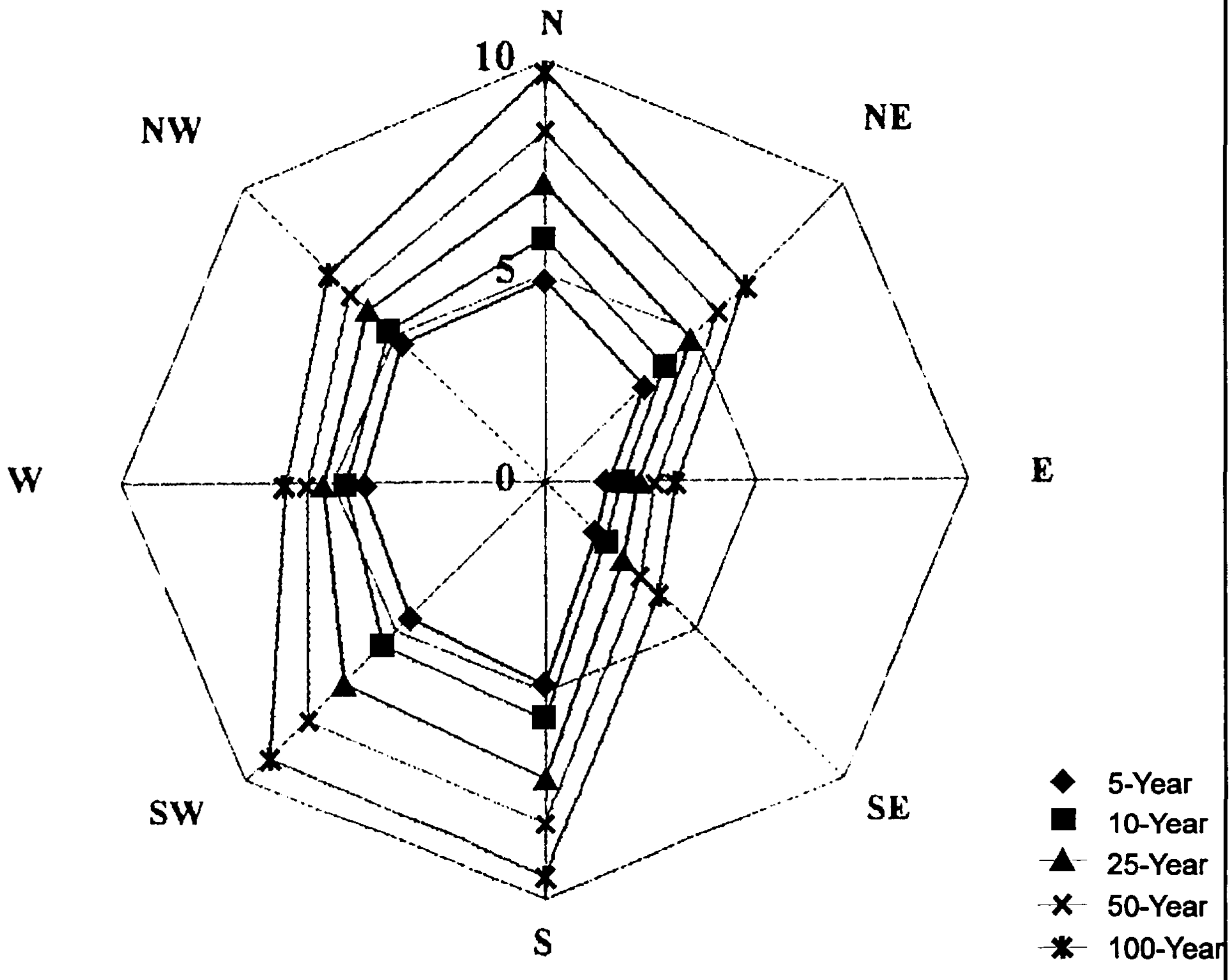

Figure 3-9. Offshore significant wave height (ft).

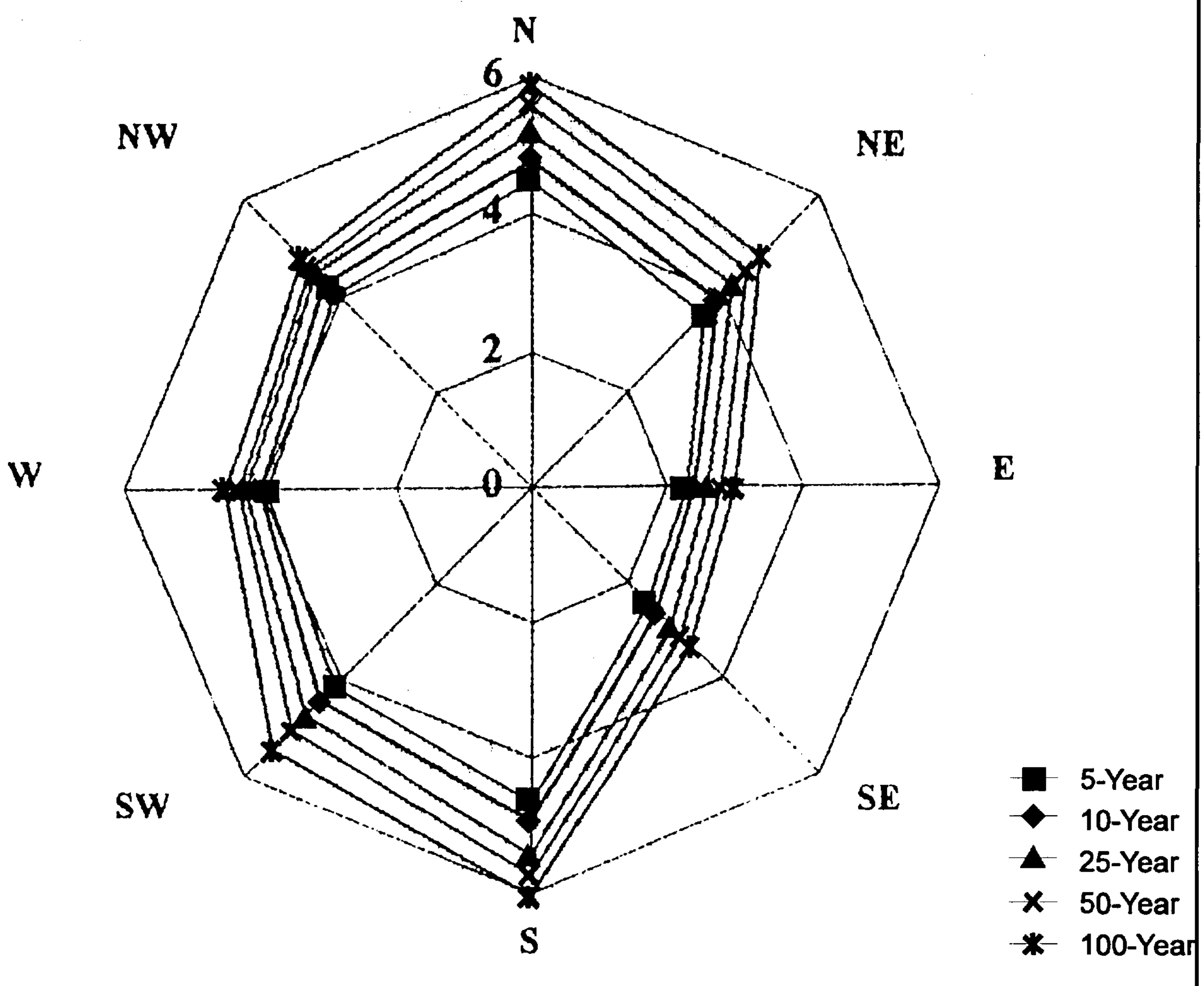

Figure 3-10 Offshore peak wave period (second).

cycles, and seasonal temperatures. Inorganic constituents are influenced by inputs such as atmospheric deposition, land discharge, and sewage treatment outfalls as well as biological processes such as algal photosynthesis.

Quarterly water quality sampling was conducted in the vicinity of the Poplar Island archipelago in October 1994, March 1995, May 1995, and July 1995. The data collected represent the most recent and complete description available for seasonal water quality characteristics in the vicinity of the islands. Other sources of comparable long-term water quality data for the eastern portion of the mainstem Bay from Kent Point to the Choptank River are limited. Maryland's Chesapeake Bay Water-Quality Monitoring Program (CBWQM), funded by the Chesapeake Bay Program since 1984, monitors 22 stations in the mainstem Bay and measures indicators of chemical, physical, and biological quality. This data set provides the only other comparable seasonal information on physical and chemical water quality in the vicinity of the Poplar Island archipelago. MDE has a monitoring station within Poplar Harbor, but the monitoring is restricted to fecal coliform in oyster tissues.

Five years of water quality data (1990-1994) from the CBWQM were summarized for the monitoring station closest to Poplar Island (station MCB4.1E). Station MCB4.1E is located outside the mouth of Eastern Bay off Kent Point (Figure 3-11), approximately 5 miles north of the Poplar Island archipelago. Total depth of the water column in this area is approximately 65 to 75 feet. For comparison, water quality data for the upper 15 to 16 feet of the water column at station MCB4.1E, will be used since this will most closely resemble conditions in the shallow archipelago (3 to 12 feet water column depth). The most recent 5 years of data were chosen for a representative comparison to existing seasonal conditions. Means and ranges for physical parameters and ranges for nutrients in the top 15 to 16 feet of the water column at MCB4.1E are presented in Table 3-5 and Table 3-6 and will be used for comparisons to Poplar Island's existing conditions.

3.1.4.b Existing Seasonal Conditions. Quarterly *in situ* water quality sampling was conducted at 10 stations in the fall and 14 stations in the winter, spring, and summer at the Poplar Island archipelago (Figure 3-12). Chemical constituents were measured at 10 locations in the fall, 14 in winter, and 5 in both spring and summer. Data collection methods were similar to methods employed by the CBWQM. A complete description of sampling locations, dates, methods, and measured constituents are described in the quarterly data reports (EA 1994a, 1995b, 1995c, 1995d). Means and ranges of physical and chemical variables by season are presented in Table 3-7 and Table 3-8, respectively.

The *in situ* seasonal physical water quality variables measured represent typical seasonal conditions for a shallow water area of the middle Chesapeake Bay. Water quality was uniform throughout the water column during all seasons, indicating that the water column was well mixed both vertically and horizontally. Water temperatures in the archipelago exhibited typical seasonal trends. Slight temperature stratification occurred in the spring and summer, with surface water temperatures minimally elevated due to solar heating. Seasonal mean water temperatures recorded during quarterly sampling fell within the range of values reported for MDE station MCB4.1E for 1990 to 1994. Winter water temperatures recorded in the archipelago were slightly lower than mean surface water values recorded in previous years at MCB4.1E. Nearshore areas normally freeze first in cold weather conditions, so these temperatures are not unusual.

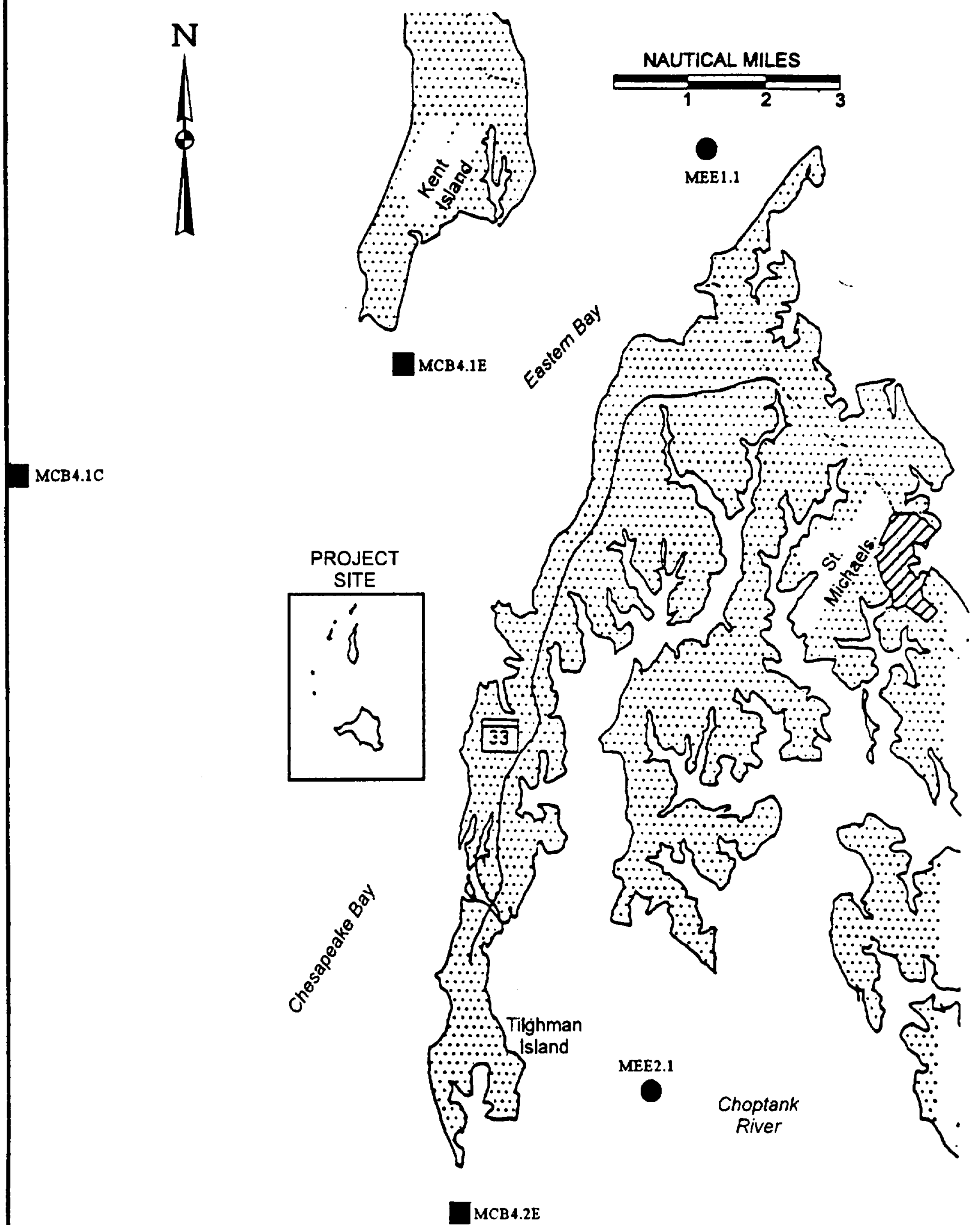

Figure 3-11. State water quality stations in proximity to project site.

Table 3-5 Mean And Range Of Water Quality Variables For The Upper 5m At Maryland's Chesapeake Bay Water Quality Monitoring Program Station MCB4.1e. Means And Ranges (In Parentheses) Were Calculated Using Values From Yearly Seasonal Sampling That Closely Coincided With Dates Of EA Seasonal Sampling In 1994-1995.

Season	Year	Water temp (°C)	pH	DO (mg/l)	Salinity (ppt)
Fall	1990	18.1 (14.7-21.1)	7.8 (7.7-7.9)	8.0 (7.0-8.8)	12.3 (9.3-14.2)
	1991	20.1 (18.6-21.5)	7.8 (7.7-7.8)	8.0 (7.2-8.5)	16.2 (16.0-16.2)
	1992	17.1 (15.6-18.4)	8.0 (7.9-8.0)	8.5 (8.1-8.7)	14.7 (14.5-14.7)
	1993	17.1 (16.5-17.5)	7.8 (7.7-7.9)	8.3 (7.8-9.2)	15.1 (14.7-15.2)
	1994	NA	NA	NA	NA
Winter	1990	7.1 (4.6-9.4)	7.9 (7.0-8.1)	11.1 (10.6-11.7)	8.9 (8.6-9.5)
	1991	7.0 (5.9-8.3)	8.0 (7.6-8.2)	10.9 (9.4-12.2)	9.1 (8.1-10.1)
	1992	6.6 (6.5-6.8)	8.0 (7.9-8.0)	10.9 (10.5-11.5)	14.8 (13.7-15.9)
	1993	4.7 (4.2-5.7)	8.0 (7.8-8.1)	12.1 (11.5-12.8)	12.7 (11.5-13.5)
	1994	4.2 (2.7-5.8)	8.2 (8.0-8.3)	13.2 (11.0-14.2)	10.5 (8.4-12.7)
Spring	1990	13.6 (10.8-16.4)	8.0 (7.8-8.1)	9.4 (8.1-10.7)	9.2 (8.9-9.5)
	1991	13.8 (11.1-16.4)	8.4 (7.8-8.7)	10.1 (7.4-10.9)	8.9 (8.3-10.6)
	1992	13.9 (10.5-16.0)	8.0 (7.4-8.7)	8.3 (4.8-11.4)	12.6 (11.0-14.5)
	1993	14.8 (11.4-18.1)	8.1 (7.8-8.4)	10.1 (9.4-11.1)	4.1 (2.9-5.4)
	1994	13.7 (12.6-15.1)	7.4 (7.1-7.6)	8.4 (6.4-9.7)	2.8 (1.3-4.2)
Summer	1990	24.7 (23.8-25.6)	7.9 (7.7-8.1)	7.4 (6.2-8.2)	9.5 (8.6-10.2)
	1991	27.1 (26.0-28.7)	8.1 (7.9-8.2)	6.4 (5.5-7.3)	13.0 (12.5-13.5)
	1992	25.2 (22.9-27.8)	8.0 (7.7-8.5)	7.6 (5.0-10.0)	13.1 (13.0-13.3)
	1993	27.0 (25.8-28.5)	8.1 (7.2-8.5)	6.4 (2.3-8.6)	10.7 (9.2-11.7)
	1994	27.4 (27.1-27.6)	8.2 (7.9-8.4)	7.6 (5.6-9.7)	7.9 (6.6-8.6)

NA = data not available; turbidity and secchi measurements not taken at station MCB4.1E.
Source: MDE electronic database.

Table 3-6 Summary of Water Quality Conditions at MDE Station MCB4.1E (1990-1994)

Sample Season (n = number of data points)	Nitrite (mg/l)	Nitrogen Ammonia (mg/l)	Ortho-Phosphate (mg/l)	Nitrate - Nitrite (mg/l)	Silica (mg/l)	Total Dissolved Phosphorus (mg/l)	Particulate Phosphorous (mg/l)	Total Phosphorous (mg/l)
Fall (n = 8)	0.004 - 0.023	0.003 - 0.075	0.003 - 0.013	0.036 - 0.359	0.22 - 0.90	0.013 - 0.042	0.009 - 0.019	0.023 - 0.050
Winter (n = 10)	0.006 - 0.016	0.003 - 0.081	0.002 - 0.005	0.305 - 0.930	0.10 - 1.41	0.005 - 0.011	0.010 - 0.025	0.016 - 0.033
Spring (n = 11)	0.003 - 0.025	0.003 - 0.203	0.0006 - 0.035	0.220 - 1.010	0.37 - 2.05	0.005 - 0.018	0.001 - 0.030	0.015 - 0.037
Summer (n = 10)	0.0005 - 0.0175	0.003 - 0.047	0.002 - 0.015	0.003 - 0.232	0.42 - 1.31	0.005 - 0.016	0.013 - 0.038	0.018 - 0.052

Sample Season (n = number of data points)	Total Dissolved Nitrogen (mg/l)	Particulate Nitrogen (mg/l)	Particulate Carbon (mg/l)	Organic Carbon Total (mg/l)	Dissolved Organic Carbon (mg/l)	Chlorophyl *a* (μg/l)	Total Suspended Solids (mg/l)
Fall (n = 8)	0.37 - 0.78	0.093 - 0.200	0.51 - 1.17	3.03 - 3.92	2.42 - 3.06	3.44 - 12.11	2.2 - 6.9 surface 6.7 - 24.6 bottom
Winter (n = 10)	0.61 - 1.28	0.116 - 0.304	0.64 - 1.86	3.13 - 4.77	2.20 - 3.37	1.50 - 21.83	3.9 - 7.3 surface 8.1 - 45.4 bottom
Spring (n = 11)	0.62 - 1.27	0.085 - 0.450	0.64 - 3.75	2.73 - 7.81	1.66 - 6.35	1.68 - 42.02	2.8 - 11.8 surface 3.7 - 21.7 bottom
Summer (n = 10)	0.30 - 0.51	0.143 - 0.342	0.78 - 2.03	3.29 - 4.71	2.34 - 3.15	6.57 - 14.06	2.3 - 7.0 surface 3.7 - 9.6 bottom

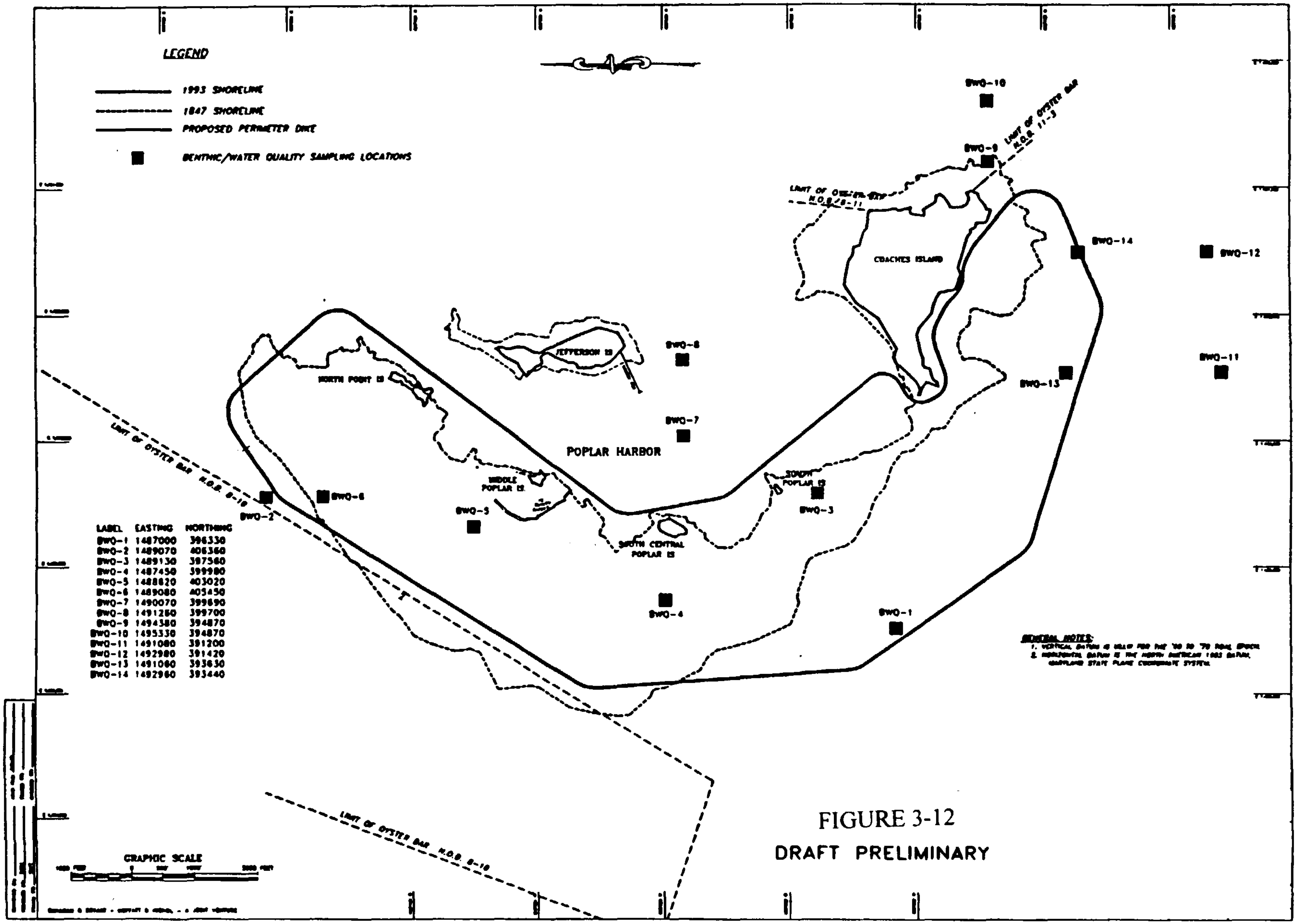

FIGURE 3-12

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Table 3-7 Mean and Range of *In Situ* Water Quality Variables Measured at Stations in the Poplar Island Archipelago, Fall 1994 to Summer 1995

Season	Depth[a]	Water temp (°C)	pH	DO (mg/l)	Salinity (ppt)	Turbidity (NTU)	Secchi (mm)
Fall	Surface	15.9 (14.9-16.4)	8.5[b] (8.4-8.6)	9.3 (9.0-9.8)	14.4 (14.3-14.5)		
	Mid	15.9 (14.9-16.4)	8.5[b] (8.4-8.6)	9.3 (8.9-9.7)	14.4 (14.3-14.5)	---	---
	Bottom	15.9 (14.9-16.4)	8.5[b] (8.4-8.6)	9.2 (8.8-9.6)	14.4 (14.3-14.5)		
Winter	Surface	3.4 (3.1-4.0)	7.9 (7.8-8.0)	12.2 (11.5-13.0)	13.6 (12.9-14.4)	3.1 (2.1-5.2)	1559 (1200-1800)
	Mid	3.4 (3.1-3.9)	7.9 (7.8-8.0)	12.1 (11.5-13.0)	13.6 (13.0-14.5)		
	Bottom	3.4 (3.2-3.9)	7.9 (7.8-8.0)	12.1 (11.4-13.1)	13.6 (13.0-14.5)		
Spring	Surface	14.0 (12.6-15.2)	8.2 (8.0-8.2)	9.8 (9.3-10.5)	12.4 (12.2-12.7)	2.2 (1.1-4.4)	1873 (1190-3200)
	Mid	13.5 (12.6-14.7)	8.2 (8.0-8.2)	10.1 (9.5-13.9)	12.5 (12.2-12.7)		
	Bottom	13.5 (12.6-14.4)	8.1 (7.9-8.2)	10.2 (9.6-13.9)	12.5 (12.2-12.8)		
Summer	Surface	26.2 (24.7-27.2)	8.4 (8.2-8.6)	7.4 (6.2-8.9)	12.7 (12.4-12.8)	4.3 (2.8-6.3)	1088 (920-1400)
	Mid	25.8 (24.7-27.0)	8.4 (8.2-8.6)	7.3 (6.2-8.8)	12.7 (12.5-12.8)		
	Bottom	25.5 (24.7-26.9)	8.4 (8.2-8.6)	7.2 (5.9-8.7)	12.7 (12.5-12.8)		

(a) Water depth ranged from 1.0m to 3.6m.

(b) Reported as read on instrument, but these values are ~0.2 units high based on past sampling recalibration.

TABLE 3-8 Summary of Existing Water Quality Conditions in Poplar Island Archipelago

Sample Season	Nitrite (mg/l)	Nitrogen Ammonia (mg/l)	Ortho-Phosphate (mg/l)	Nitrate - Nitrite (mg/l)	Silica (mg/l)	Total Dissolved Phosphorous (mg/l)
Fall	0.010 (0.006 - 0.012)	0.032 (0.011 - 0.046)	0.007 (0.004 - 0.015)	0.078 (0.048 - 0.099)	0.76 (0.55 - 0.87)	0.012 (0.008 - 0.014)
Winter	0.005 (0.004 - 0.006)	0.004 (0.003 - 0.021)	0.003 (0.002 - 0.007)	0.326 (0.272 - 0.365)	0.37 (0.24 - 0.56)	0.005 (0.004 - 0.007)
Spring	0.005 (0.005 - 0.006)	0.030 (0.030 - 0.040)	0.006 (0.003 - 0.009)	0.361 (0.339 - 0.381)	0.19 (0.14 - 0.28)	0.009 (0.008 - 0.011)
Summer	0.0008 (0.0005 - 0.0018)	0.013 (0.003 - 0.028)	0.004 (0.003 - 0.004)	0.004 (0.003 - 0.008)	0.92 (0.83 - 1.02)	0.010 (0.009 - 0.010)

Sample Season	Particulate Phosphorous (mg/l)	Total Phosphorous (mg/l)	Total Dissolved Nitrogen (mg/l)	Particulate Nitrogen (mg/l)	Particulate Carbon (mg/l)
Fall	0.016 (0.012 - 0.025)	0.028 (0.022 - 0.038)	0.42 (0.34 - 0.49)	0.190 (0.136 - 0.249)	1.13 (0.75 - 0.1.61)
Winter	0.018 (0.013 - 0.041)	0.024 (0.017 - 0.047)	0.57 (0.52 - 0.65)	0.259 (0.208 - 0.536)	1.64 (1.34 - 3.02)
Spring	0.017 (0.015 - 0.020)	0.026 (0.024 - 0.031)	0.63 (0.62 - 0.65)	0.181 (0.128 - 0.212)	1.13 (0.73 - 1.39)
Summer	0.036 (0.033 - 0.040)	0.046 (0.042 - 0.050)	0.27 (0.26 - 0.29)	0.314 (0.265 - 0.352)	1.87 (1.48 - 2.16)

Sample Season	Organic Carbon Total (mg/l)	Dissolved Organic Carbon (mg/l)	Dissolved Inorganic Carbon (mg/l)	Chlorophyl *a* (μg/l)	Total Suspended Solids (mg/l)
Fall	3.51 (3.01 - 4.06)	2.38 (1.93 - 2.59)	19.4 (11.0 - 26.1)	5.36 (2.41 - 6.99)	19.7 (9.2 - 49.6)
Winter	4.00 (3.62 - 5.46)	2.36 (2.28 - 2.44)	21.0 (16.1 - 26.0)	12.61 (9.29 - 16.1)	28.5 (12.5 - 113.1)
Spring	3.62 (3.17 - 3.89)	2.49 (2.44 - 2.55)	19.7 (17.6 - 25.7)	9.48 (2.58 - 16.4)	21.3 (15.2 - 38.0)
Summer	4.07 (3.69 - 4.45)	2.78 (2.71 - 2.86)	17.4 (16.5 - 17.9)	6.87 (5.17 - 9.50)	38.7 (18.0 - 53.2)

Salinity varied 2 to 3 parts per thousand (ppt) between the four seasonal surveys in the archipelago. Highest salinities occurred during the fall, and lowest salinities occurred during the spring. These are normal salinity patterns that are seen throughout the Chesapeake Bay. During the spring, salinities usually decrease, as a result of increased freshwater runoff and precipitation. Winter and spring of 1994 and 1995 salinities in the archipelago differed by only 1 ppt, the result of a dry spring, with less than average precipitation.

Dissolved oxygen (DO) concentrations in the Poplar Island archipelago varied seasonally, with maximum concentrations recorded during the winter survey and minimum concentrations recorded during the summer. DO concentrations normally vary with seasonal water temperatures: oxygen saturation in water decreases as water temperature increases. Overall, DO concentrations within the water column were uniform, and concentrations fell within the range of values reported for surface waters at MCB4.1E. During the summer survey, DO concentrations were slightly elevated at the surface and indicative of photosynthetic activity in or near the surface strata. Phytoplankton blooms were visually noted throughout much of the area.

The seasonal values of pH are normally influenced by algal photosynthesis and salinity (Molinero and Sohn 1992). Measurements of pH in the archipelago were highest during the summer survey, indicative of normal photosynthetic processes that occur in the water column during this season. Overall, pH values fell within the seasonal ranges reported for MCB4.1E.

Water clarity measured by secchi disk (a black and white disk used to determine turbidity in water) also changed seasonally in the archipelago. Water clarity was greatest during the spring, and the secchi disk could be seen on the bottom in several locations. Normally, water is clearest in the winter, with clarity decreasing as water temperatures and phytoplankton populations increase. Chlorophyll-*a* concentrations indicate that spring sampling within the archipelago occurred before phytoplankton populations had significantly influenced water clarity. Phytoplankton blooms in warmer months can substantially reduce water clarity, which was apparent during the summer survey (EA 1995d). The other significant influence on water clarity in the study area is sediment resuspension.

Turbidity measurements were elevated in the archipelago, probably influenced by island erosion. Total suspended solids were higher in the archipelago than at station MCB4.1E during all seasons. Seasonally, mean values of total suspended solids (TSS) in the archipelago were generally greatest in the summer, but the highest single value (113mg/L) was recorded during the winter survey. Phytoplankton density in the water column likely contributed significantly to the high TSS values measured in the summer survey. Sediment resuspension from prevailing northwest winds during the winter and spring surveys likely contributed to TSS, as visible plumes were seen emanating from the island remnants. These plumes originated from clay layers of the eroding remnants. Turbidity due to resuspension of the silty sands that cover most of the bottom was never significant. Plumes were wind driven and were not widely dispersed, forming long narrow ribbons in the water.

Turbidity and water clarity were also measured at two charted oyster bars (NOB 8-10 and NOB 8-11) adjacent to Poplar Island during the winter, spring, and summer surveys (Figure 3-12). Mean turbidity and secchi measurements are presented in Table 3-9.

Table 3-9 Turbidity and Water Clarity in Proximity to the Poplar Island Project

Oyster Bar	Season	Turbidity (NTU)	Secchi (mm)
NOB 8-10	Fall	--	--
	Winter	2.4	1678
	Spring	1.7	2215
	Summer	3.3	1303
NOB 8-11	Fall	--	--
	Winter	1.8	1903
	Spring	3.5	1705
	Summer	3.0	1360

Turbidity values were greatest during the spring and summer surveys at NOB 8-11 and NOB 8-10, respectively. Secchi disk measurements indicated reduced water clarity at both locations during the summer survey. Summer phytoplankton densities significantly reduce water clarity and increase turbidity measurements. Overall, mean nephalometric turbidity unit (NTU) values at both oyster bars were low compared to values recorded in plumes emanating from the island remnants in the spring survey (EA 1995c); NTU values recorded in plumes ranged from 6.5 to 14.7. The plumes generally emanated from Middle Poplar and Jefferson Island and extended for up to 2 miles south. The plumes generally remained at least 2,000 feet from both oyster bars although certain wind conditions (NW) disperse solids from Jefferson Island over the western portions of NOB 8-11. NTU values at NOB 8-10 and 8-11 are typical of areas that are not subjected to sediment resuspension.

Seasonal patterns of chemical constituents and nutrients at the Poplar Island archipelago were similar to seasonal distributions that occur Baywide. Concentrations of nitrate-nitrite were greatest during the winter and spring and were reduced during summer and fall. Thriving phytoplankton populations typically deplete nitrates in the summer and fall, and precipitation and land discharge replenish nitrate concentrations in the spring (Correll 1987). Total phosphorus concentrations were consistent throughout fall, winter, and spring, with concentrations nearly twice as high during the summer. Sometimes a summer phosphorus peak occurs due to benthic regeneration processes, and similar increases in total phosphorus have been recorded for open Bay areas near Annapolis, Maryland (Correll 1987). Minimum water-column concentrations of silica were reported in the archipelago in the spring (Correll 1987). Silica concentrations were highest during the summer survey, indicating the absence of a summer diatom bloom during the sampling period.

Overall, seasonal water quality conditions in the Poplar Island archipelago were similar to and typical of conditions in shallow, Mesohaline (salinity of approximately 5 to 18 ppt) areas of the Bay. Water quality variables were uniform throughout the water column, with no evidence of the seasonal stratification that often occurs in deeper areas. During all seasons, DO values were greater than 5.0 ppt, the concentration necessary to sustain commercially important fish and shellfish species (Funderburk *et al.* 1991). Although values of turbidity and suspended sediment were elevated in the archipelago, TSS did not exceed levels detrimental to life stages of shellfish and finfish (Funderburk *et al.* 1991).

3.1.5 Sediment Quality

The distribution of sediment types in the Bay is controlled by source materials and by hydrodynamic processes that are responsible for sediment transport and deposition. In addition, bottom erosion can be significant and the Susquehanna River is still an important source of material, especially trace metals. In central portions of the Chesapeake Bay, sand and clay eroded from banks and shorelines are the most abundant sediment types. Sand accumulates in areas of high wave energy such as shoals and exposed shorelines. Silty clay, by contrast, settles in quieter (often deeper) areas with low wave energy. Surface sediments in the Poplar Island archipelago, particularly those subjected to prevailing winds, are influenced by wave action and other erosional forces that have reduced Poplar Island to its current configuration. Sediments in the area of the archipelago range from silts to sand to hard clay.

Sediments in mainstem Chesapeake Bay have low concentrations of metals in contrast to sediments in heavily industrialized western shore tributaries. These may be naturally occuring and not contaminants. Other anthropogenic chemical species such as pesticides could be considered contaminants. Sediment data will be available at the District and will be provided to regulatory agencies. Low levels of contamination are expected in the archipelago, because the mainland near the Poplar Island archipelago is rural, with a small population and no history of significant industrial development.

Since 1984, approximately 135 stations throughout the Bay and its tributaries have been sampled for sediment contaminants by various monitoring programs. Data from Maryland Tributary Sediment Contaminant Monitoring Stations indicates that levels of organics are substantially higher in the Deep Trough region of the mainstem Bay (MCB4.1C) in comparison to organics levels in Eastern Bay (MEE1.1) and in the Choptank Embayment (MEE2.1) (Figure 3-11). In addition, metal analyses reveal that levels of aluminum are elevated at CBWQM stations sampled in mainstem Bay (MCB4.1C, MCB4.1E, and MCB4.2E) and in bays on the Eastern shore (MEE1.1 and MEE2.1). Aluminum poses little risk to aquatic organisms because it is mostly bound within clay particles with little probability of dissolution. Overall, regional information from such studies indicates that sediments within the vicinity of the Poplar Island archipelago are of low risk of contamination (CBP 1995; Rich Eskin 1995).

Baseline seasonal studies conducted in the Poplar Island archipelago (1995a,b,c,d) indicate that the area supports a diverse and productive benthic community. Benthic macroinvertebrate assemblages are good indicators of environmental conditions and are often used to describe local ecological status and trends in a wide range of aquatic environments (Dauer *et al.* 1988, 1989; Holland *et al.* 1988, 1989). Sediment contamination poses risks to benthic macroinvertebrates and, therefore, significant levels of contamination are reflected in the benthic community structure when contaminants are present. The productive and diverse benthic community within the Poplar Island archipelago could be indicative of high sediment quality in the area, and no contaminants are present.

3.1.6 Aquatic Resources

3.1.6.a Phytoplankton and Zooplankton. Phytoplankton serve as the base of the aquatic food chain, produce life-sustaining oxygen for aquatic organisms, and assimilate nutrients (nitrogen, phosphorus, and silicon) that flow into the Bay. Light, temperature, nutrients, and zooplankton abundance regulate the distribution of phytoplankton in the Chesapeake Bay (Lippson 1973). Maximum phytoplankton productivity for the Chesapeake Bay generally occurs in the vicinity of the Bay Bridge, where water clarity, nutrient concentrations, and mixing in the water column create optimal conditions (Sellner 1987). Poplar Island is approximately 17 miles south of the Bay Bridge.

Diatoms, dinoflagellates, golden brown algae, green algae, and blue-green algae represent dominant major phytoplankton taxonomic groups found within the Chesapeake estuary. Maximal phytoplankton biomass in the Chesapeake Bay coincides with spring diatom blooms. Primary production by phytoplankton peaks in the spring, (March through May) with a secondary peak during the summer (Sellner 1987). By late summer, dinoflagellates represent a large portion of phytoplankton densities, and in the fall, diatom densities exhibit a slight increase in Mesohaline areas. Overall densities of all species are minimal during the winter months, with the exception of a periodic bloom of diatoms and dinoflagellates (Sellner 1987).

A standing crop (biomass) of phytoplankton is measured indirectly as concentrations of chlorophyll-*a*. Chlorophyll-a has been measured seasonally during 1994 and 1995 in the Poplar Island study area as part of the water quality monitoring program. Mean concentrations of Chlorophyll-*a* (Table 3-8) fell within the range of values observed in the upper 17 feet of the water column at station MCB4.1E (in the mouth of the Choptank River) during the past 5 years (Table 3-6). Chlorophyll-*a* values recorded in the archipelago indicated two biomass peaks, one during the winter survey and a second during the summer. The winter peak may have been indicative of an early spring bloom because the samples were collected in early March.

Zooplankton provide an important pathway by which phytoplankton and bacterial biomass move up through the food web to the higher trophic levels. Grazing by zooplankton regulates phytoplankton and bacteria populations, and excretion by zooplankton transports nutrients to the benthos (Brownlee and Jacobs 1987).

Calanoid copepods dominate zooplankton collections in the Maryland and Virginia portions of the Chesapeake Bay (Brownlee and Jacobs 1987, Lippson 1973). Species distributions vary seasonally and by salinity. In Mesohaline salinities (5 to 18 ppt), *Acartia* spp. dominate zooplankton communities in the summer and fall, *Eurytemora affinis* predominate in the winter months, and *E. affinis* and *Acartia* spp. are codominants in the spring (Brownlee and Jacobs 1987, Lippson 1973). In addition to calanoid copepods, polychaete larvae and barnacle nauplii have been collected in winter and spring Mesohaline collections, respectively (Brownlee and Jacobs 1987, Lippson 1973).

During the summer, comb jellies (ctenophores), such as the sea walnut (*Mnemenopsis leodyi*), are often abundant in the plankton. These organisms were observed in the water column at the Poplar Island archipelago during the summer survey (EA 1995d). Grazing by ctenophores substantially reduces copepod densities in the warmer months (Feigenbawn and Kelly 1984). Copepods are eaten by virtually all larger organisms in the bay except shellfish (Lippson 1973), and some fish species need high copepod densities to survive early stages of development (Chesney 1989).

The American oyster, *Crassostrea virginica*, the soft-shell clam, *Mya arenaria*, and the razor clam, *Tagelus sp.*, represent three commercially important bivalve species, whose planktonic larvae are distributed in Mesohaline areas such as the Poplar Island archipelago. Oysters spawn when water temperatures reach 18-20°C, which typically occurs in May/June and again in mid-October in the vicinity of Poplar Island. Spawning may occur more than once per season, and larvae remain planktonic for 2 to 3 weeks (depending on ambient temperatures) before settling (Kennedy 1991). Soft-shell clams spawn twice a year: mid- to late fall and late spring, when temperatures reach 12-15°C. Soft-clam larvae remain in the plankton for approximately 1 to 3 weeks, depending on temperatures (Baker and Mann 1991). These and other bivalve larvae contribute significantly to the available food at this trophic level during periods of abundances and are heavily preyed upon by many estuarine inhabitants (Kennedy 1991, Baker and Mann 1991).

Zooplankton were qualitatively assessed during ichthyoplankton surveys of the archipelago conducted during 1994 and 1995 (EA 1995a,b,c,d); the results are summarized in Table 3-10. Copepods dominated the plankton during all seasons, although amphipods were abundant in winter and spring collections. Hydromedusae were collected during all seasons, but ctenophores were only taken in abundance in the summer. Isopods and crab larvae were also collected in all seasons but were more abundant in summer. All other zooplankton occurred seasonally. The zooplankton noted within the study area are typical of this region of the Bay and are not indicative of unique habitats or environmental perturbations.

3.1.6.b Fish. Historically, the Chesapeake Bay has been among the most productive estuaries in the world for fish and shellfish, supporting commercial fisheries for as many as 40 species throughout Maryland and Virginia. In the past two decades, populations of some fish species (e.g. American shad and river herring) have declined significantly (Richkus *et al.* 1992), whereas other species such as striped bass are showing signs of recovery after years of record low abundances (EPA 1995).

The Bay supports over 100 species of fish for at least some stage of their lifecycles, and these are distributed primarily based on their tolerance to salinity, available habitat, and annual migratory cycles (Lippson *et al.* 1979; Lippson and Lippson 1984). Poplar Island is located in an area classified as Mesohaline. Salinities around the archipelago vary from 10 to 15 ppt (Section 3.1.4). Fish species that occur in the mainstem Chesapeake Bay can be divided into several classifications, based on their use of an area: resident species that live out their entire lifecycle in an area; anadromous species that spend much of their adult lives at sea but utilize

Table 3-10 Zooplankton Observed During Ichthyoplankton Surveys of Poplar Island 1994-1995

Taxonomic Groups	Fall 1994	Winter 1995	Spring 1995	Summer 1995
Ctenophores and Hydromedusae (Jellyfish)	C	P	C	C
Copepods	C	A	A	A
Amphipods		A	A	P
Isopods	P	P	P	P
Decapod zoea (Crab larve)	P	P	P	A
Polychaetes (segmented worms)			P	
Chaetognathes (Arrow worms)	C			
Mysids (Opossum shrimps)	P	P		
Bivalve (Clams)		C		
Hirudinea (Leeches)			P	
Diptera (Flies)			P	
Coleoptera (Beetles, Weevils)			P	
Palaemonetes (Grass shrimp)				C

P = present (1-20 individuals); C = common (20-200 individuals);A = abundant (200+ individuals) the estuary as juveniles or during migrations; freshwater species that occur only occasionally within this zone, being restricted by salinity; and marine species that spend most of their lives in higher salinities but utilize Mesohaline areas as juveniles or for spawning. This latter group includes both species that regularly (seasonally) utilize the area for some period of their life cycles as well as many that are only occasional components of the fish community at this salinity.

An inventory of fishes known to occur in middle Mesohaline salinity regimes (10 to 15 ppt) in the Bay from the Bay Bridge to the Potomac River was derived from a variety of sources and is included in Table 3-11. Table 3-12 provides a synopsis of general distribution and life history information for these species. Seventy species are known to spend at least some portion of their lifecycle in this salinity regime.

General distribution information does not completely address habitat preferences among species known to occur within a salinity regime. The archipelago formed by the four remnants, Jefferson Island and Coaches Island, represents an area of relatively shallow water (less than 17 feet) that is surrounded by areas of much deeper water (greater than 33 feet). Many of the resident species in this salinity regime are relatively non-mobile and habitat specific. For example, blennies, gobies, and skilletfish prefer shallow areas with abundant cover like that expected in an oyster reef; they are known to remain in specific areas (Schwartz 1961) particularly during the breeding season (Lippson *et al.* 1979). Some species that occasionally occur in shallow areas are more typically found in deeper areas (e.g., sharks). Species more common to fresh water (chain pickerel, gizzard shad) may occur in Mesohaline portions of rivers, but are less likely to occur in offshore areas such as Poplar Island. Listing only those most likely to occur in shallow open areas in this region of the Bay, the estimated number of fish species that could potentially occur within the archipelago is approximately 50.

To identify the fish species actually utilizing the archipelago, a four-season sampling program was conducted from October 1994 through July 1995 (EA 1995a,b,c,d). Collections of shore-zone fishes were made at two stations on the island remnants in the Fall of 1994, plus two additional stations in the other seasons (Figure 3-14). Epibenthic fishes were collected by otter trawl, and ichthyoplankton were sampled with paired plankton nets (mounted on a sled) from two offshore stations in the fall and four stations in each of the other seasons (Figure 3-14). Pelagic fishes were sampled using experimental gillnets set overnight at three locations during the winter, spring, and summer surveys. Summaries of seine, otter trawl, and gillnet collections are presented in Table 3-13. Individual catches by station are detailed in the quarterly data reports (EA 1995a,b,c,d) and included in Appendix B.

Fish collections yielded 20 species representing 14 families (Table 3-13). The life stages of the species collected are indicated on Table 3-12. The most abundant families (in terms of numbers of species) include herring (4 species), drums (3 species), and anchovies (2 species). Shore-zone (seine) collections yielded the most abundant and diverse catches overall, particularly in the summer (Table 3-13). Resident fishes (particularly Atlantic silverside, *Menidia menidia*) dominated shore-zone collections in all seasons, although the summer shore-zone community

Table 3-11 **Scientific and Common Names of Fishes That Occur in Mesohaline Areas of Chesapeake Bay**

Common Name	Scientific Name
Family **Species**	**Family** **Species**
Requiem sharks	Carcharhinidae
Bull shark	*Carcharhinus leucas*
Sandbar shark	*Carcharhinus plumbeus*
Eagle rays	Myliobatidae
Cownose ray	*Rhinoptera bonasus*
Sturgeons	Acipenseridae
Shortnose sturgeon (a)	*Acipenser brevirostrum*
Atlantic sturgeon	*Acipenser oxyrhynchus*
Freshwater eels	Anguillidae
American eel	*Anguilla rostrata*
Herrings	Clupeidae
Blueback herring	*Alosa aestivalis*
Hickory shad	*Alosa mediocris*
Alewife	*Alosa pseudoharengus*
American shad	*Alosa sapidissima*
Atlantic menhaden	*Brevoortia tyrannus*
Atlantic herring	*Clupea harengus*
Gizzard shad	*Dorosoma cepedianum*
Threadfin shad	*Dorosoma petenense*
Anchovies	Engraulidae
Striped anchovy	*Anchoa hepsetus*
Bay anchovy	*Anchoa mitchilli*
Pikes	Esocidae
Chain pickerel	*Esox niger*
Lizardfishes	Synodontidae
Inshore lizardfish	*Synodus foetens*
Toadfishes	Batrachoidae
Oyster toadfish	*Opsanus tau*
Clingfishes	Gobiesocidae
Skilletfish	*Gobiesox strumosus*
Flyingfishes	Exocoetidae
Halfbeak	*Hyporhamphus unifasciatus*
Needlefishes	Belonidae
Atlantic needlefish	*Stongylura marina*
Killifishes	Cyprinodontidae
Sheepshead minnow	*Cyprinodon variegatus*
Banded killifish	*Fundulus diaphanus*
Mummichog	*Fundulus heteroclitus*
Striped killifish	*Fundulus majalis*
Rainwater killifish	*Lucania parva*

Table 3-11 (continued)

Common Name	Scientific Name
Family **Species**	**Family** **Species**
Silversides	Atherinidae
Rough silverside	*Membras martinica*
Inland silverside	*Menidia beryllina*
Atlantic silverside	*Menidia menidia*
Sticklebacks	Gasterosteidae
Fourspine stickleback	*Apeltes quadracus*
Threespine stickleback	*Gasterosteus aculeatus*
Pipefish and seahorses	Syngnathidae
Lined seahorse	*Hippocampus erectus*
Dusky pipefish	*Syngnathus floridae*
Northern pipefish	*Syngnathus fuscus*
Searobins	Triglidae
Northern searobin	*Prionotus carolinus*
Temperate basses	Percichthyidae
White perch	*Morone americana*
Striped bass	*Morone saxatilis*
Sea basses	Serranidae
Black sea bass	*Centropristis striata*
Perches	Percidae
Yellow perch	*Perca flavescens*
Bluefishes	Pomatomidae
Bluefish	*Pomatomus saltatrix*
Cobias	Rachycentridae
Cobia	*Rachycentron canadum*
Jacks	Carangidae
Blue runner	*Caranx crysops*
Crevalle jack	*Caranx hippos*
Lookdown	*Selene vomer*
Florida pompano	*Trachinotus carolinus*
Porgies	Sparidae
Scup	*Stenotomus chrysops*
Drums	Sciaenidae
Silver perch	*Bairdiella chrysoura*
Spotted seatrout	*Cynoscion nebulosus*
Weakfish	*Cynoscion regalis*
Spot	*Leiostomus xanthurus*
Atlantic croaker	*Micropogonias undulatus*
Black drum	*Pogonias cromis*
Red drum	*Sciaenops ocellatus*

Table 3-11 (continued)

Common Name Family Species	Scientific Name Family Species
Mullets	Mugilidae
Striped mullet	*Mugil cephalus*
White mullet	*Mugil curema*
Stargazers	Uranoscopidae
Northern stargazer	*Astroscopus guttatus*
Combtooth blennies	Blenniidae
Striped blenny	*Chasmodes bosquianus*
Feather blenny	*Hypsoblennius hentzi*
Gobies	Gobiidae
Darter goby	*Gobionellus bolesoma*
Naked goby	*Gobiosoma bosci*
Seaboard goby	*Gobiosoma ginsburgi*
Green goby	*Microgobius thalassinus*
Mackerels	Scombridae
Spanish mackerel	*Scomberomorus maculatus*
Lefteye flounders	Bothidae
Summer flounder	*Paralichthys dentatus*
Windowpane	*Scophthalmus aquosus*
Righteye flounders	Pleuronectidae
Winter flounder	*Pleuronectes americanus*
Soles	Soleidae
Hogchoker	*Trinectes maculatus*
Tonguefishes	Cynoglossidae
Blackcheek tonguefish	*Symphurus plagiusa*
Puffers	Tetraodontidae
Northern puffer	*Sphoeroides maculatus*
Porcupinefishes	Diodontidae
Striped burrfish	*Chilomycterus schoepfi*

Sources: Hildebrand and Shroeder 1928; Lippson and Lippson 1984; Lippson 1973; Setzler-Hamilton 1987; White 1989. Dovel 1971; Funderburk *et al.* 1991; Lippson and Moran 1975; MD DNR Juvenile index and commercial landings databases; John Gill, pers. comm., and EPA EMAP database.

(a) NMFS acknowledges the protected status of this species but does not consider it common in the project area and doesn't believe that it will be adversely affected by project operations.

Table 3-12 **Lifestages of Fish Species Commonly Found in Mesohaline Areas of Chesapeake Bay With Reference to Those Collected in 1994-1995 Surveys of the Poplar Island Archipelago**

Species Common Name	General Distribution[a]						Collected or Observed			
	Resident	Seasonal				Occasional				
		F	W	Sp	Su		F	W	Sp	Su
Bull shark						J, A				
Sandbar shark						J				
Cownose ray					J, A					A
Shortnose sturgeon						J, A				
American eel				L, J		A				
Blueback herring		J		J, A	J, A			J		J
Hickory shad						J, A				
Alewife		J		J, A	J, A			A	J,A	J, A
American shad			A	J, A	J, A					
Atlantic menhaden		A, L		E, L, J	J, A			J	E,A	J, A
Atlantic herring					J, A			A	A	
Gizzard shad						J, A				
Threadfin shad						J, A				
Striped anchovy						J, A				J
Bay anchovy		E,L J,A	J,A	E,L J,A	E,L,J, A		A	J	E,J	J, A
Chain pickerel						J, A				
Inshore lizardfish						J, A				
Oyster toadfish	A	L, J			E,L,J					J
Skilletfish	A	E,L,J		E,L J	E,L J					J
Halfbeak						J, A				
Atlantic needlefish		J,A		E,A	E,L J, A					A
Sheepshead minnow	A	J		E,L	E,L J					
Banded killifish						J, A				
Mummichog	A	J		E	E,J					
Striped killifish	A	J		E,L	E,L J		A		J,A	A
Rainwater killifish	A	J		E,L	E,L J					

Resident= non-mobile, habitat specific; Seasonal= pelagic migratory; Occasional= limited by salinity or habitat, occurrence unlikely. Seasons: F=Fall; W=Winter; Sp=Spring; Su=Summer. Lifestages: E=Egg; L=Larvae; J=Juvenile; A=Adult.

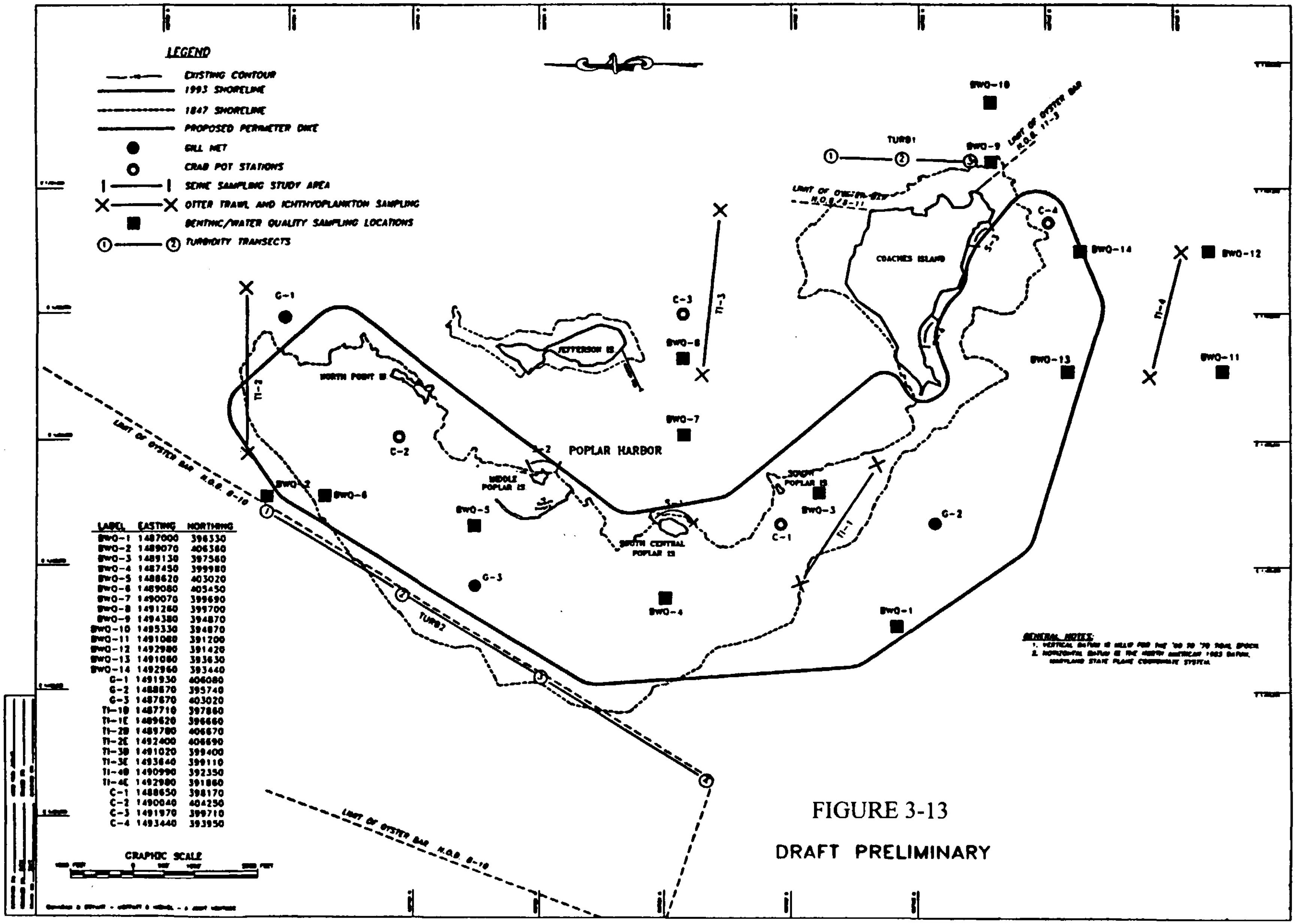
Table 3-12 **(continued)**

Species Common Name	General Distribution[a]						Collected or Observed			
	Resident	Seasonal				Occasional				
		F	W	Sp	Su		F	W	Sp	Su
Rough silverside						J,A				
Inland silverside	A	L,J	J,A	E,LJ	E,L J	J,A				
Atlantic silverside	A	L,J	J,A	E,L J	E,L J		A	A	E,L, J,A	J, A
Fourspine stickleback	A			E,L J	J					
Threespine stickleback	A			E,L J	J					
Lined seahorse	A				E,L J				A	
Dusky pipefish						J, A				
Northern pipefish	A	J		E,L	E,L J				J	J
Northern searobin						J, A				A
White perch						J, A				
Striped bass	J	A		A	A		J	J	J,A	J, A
Black sea bass						J, A				
Yellow perch						A				
Bluefish		J,A		J,A	J,A					J
Cobia						J, A				
Blue runner						J, A				
Crevalle jack						J, A				
Lookdown						J, A				
Florida pompano						J, A				
Scup						J, A				A
Silver perch						J, A				
Spotted seatrout		J		J	J, A					
Weakfish		J		L,J	L, J A					J, A
Spot		J		J	J, A		J		J	J, A
Atlantic croaker		J		J	J, A					A
Black drum		J			J, A					
Red drum		J								
Striped mullet						J, A				
White mullet						J, A				

Table 3-12 **(continued)**

Species Common Name	General Distribution[a]						Collected or Observed			
	Resident	Seasonal				Occasional				
		F	W	Sp	Su		F	W	Sp	Su
Northern stargazer						A				
Striped blenny	A	J		E,L	E,L J					
Feather blenny	A	J		E,L	E,L J					L,J
Darter goby						J, A				
Naked goby	A	E,LJ		E,L	E,L J					L
Seaboard goby						J, A				
Green goby	A	L,J			E,L J					
Spanish mackerel						J, A				
Harvestfish						J, A				
Butterfish						J, A				
Summer flounder		J, A		J, A	J, A					J,A
Windowpane						J, A				
Winter flounder		A	A	L, J	J			L		J
Hogchoker	A	J			E,L J					E
Blackcheek tonguefish						J, A				
Northern puffer						J, A				
Striped burrfish						J, A				

Sources: Hildebrand and Shroeder 1928; Lippson ans Lippson 1984; Lippson 1973; Setzler-Hamilton 1987; White 1989. Dovel 1971; Funderburk *et al.* 1991; Lippson and Moran 1975; MD DNR Juvenile index and commercial landings databases, John Gill, pers. Comm., and EPA EMAP database.



LABEL	EASTING	NORTHING
BWO-1	1487000	398330
BWO-2	1489070	406380
BWO-3	1489130	397560
BWO-4	1487450	399980
BWO-5	1488620	403020
BWO-6	1489080	405450
BWO-7	1490070	399690
BWO-8	1491260	399700
BWO-9	1494380	394870
BWO-10	1495330	394870
BWO-11	1491080	391200
BWO-12	1492980	391420
BWO-13	1491080	393630
BWO-14	1492960	393440
G-1	1491930	406080
G-2	1488670	395740
G-3	1487670	403020
TI-1D	1487710	397880
TI-1E	1489620	396660
TI-2D	1489780	406670
TI-2E	1492400	406690
TI-3D	1491020	399400
TI-3E	1493640	399110
TI-4D	1490990	392350
TI-4E	1492980	391860
C-1	1488650	398170
C-2	1490040	404250
C-3	1491970	399710
C-4	1493440	393950

FIGURE 3-13

DRAFT PRELIMINARY

Table 3-13 Summary of Fish Collections in the Poplar Island Study Area, October 1994 Through July 1995

Species	Seine[e]				Gill nets[f]		
	Fall 1994	Winter 1995	Spring 1995	Summer 1995	Winter 1995 (58.30 hr)	Spring 1995 (48:40)	Summer 1995 (53:45)
Blueback herring		1		2			
Alewife				3	1	6	
Atlantic menhaden				5		149	115
Atlantic herring					4	1	
Striped anchovy				2			
Bay anchovy	119			17			
Oyster toadfish				6			
Atlantic needlefish				3			
Striped killifish	6		14	8			
Atlantic silverside	38	14	365	10,514			
Northern pipefish			2	1			
Northern searobin							1
Striped bass				67	1	8	25
Bluefish							3
Scup							1
Weakfish							5
Spot	2					2	85
Atlantic croaker							18
Summer flounder							1
Winter flounder							
Blue crab	4			6		2	2

(a) 2 trawl stations in fall, 4 stations in each other season; 10 minutes of effort at each station per season (covering approximately 600 total meters of bottom).
(b) 2 crabpot stations in fall, 4 in each other season traps; total seasonal trap hours in parentheses.
(c) 2 seine station in fall, 4 in other seasons; 2 hauls covering approximately 60 m of beach at each station during each season.
(d) Gillnetting only done in three seasons; one experimental gillnet set at each of three sites per season; set time in parentheses.

TABLE 3-13 (continued)

Species	Otter trawl[a]				Crab pots[b]			
	Fall 1994	Winter 1995	Spring 1995	Summer 1995	Fall 1994 (192 hr)	Winter 1995 (384 hr)	Spring 1995 (384 hr)	Summer 1995 (336 hr)
Blueback herring								
Alewife								
Atlantic menhaden								
Atlantic herring								
Striped anchovy				2				
Bay anchovy		1	3	711				
Oyster toadfish								
Atlantic needlefish								
Striped killifish								
Atlantic silverside				4				
Northern pipefish			2	1				
Northern searobin								
Striped bass	1							
Bluefish								
Scup								
Weakfish								
Spot								
Atlantic croaker								
Summer flounder				1				
Winter flounder				13				
Blue crab	5		2	17	7			19

also included the young of several seasonal/anadromous species. Gillnet collections targeted the transient fishes that were moving in and out of the archipelago (presumably to feed). Atlantic menhaden *(Brevoortia tyrranus)* dominated these collections in spring and summer, although summer collections also yielded a variety of commercially/recreationally important species: striped bass (*Morone saxatius*), bluefish (*Pomatomus saltatrix*), weakfish (*Cyoscion regalis*), croaker (*Micropogonias undulatus*), and flounder (*Paralichthys dentatus*). Bay anchovy (*Anchoa mitchelli*) was the most dominant species collected in the trawls. The only other recent surveys identified for the region were the Maryland juvenile finfish survey and the EPA Environmental Monitoring and Assessment Program (EMAP) collections. Although the juvenile surveys are conducted in more riverine areas (e.g., Cambridge), the three closest survey points reported catches very similar in abundance and diversity to the shore-zone collection at Poplar Island. The EPA EMAP program spanned from 1990 to 1994 and involved annual collections at random locations throughout the Bay. A review of the collections from stations from the Bay Bridge to the Potomac River (including Eastern Bay and the Choptank confluence) revealed similar species to those collected during existing conditions surveys at Poplar Island. One notable difference is that harvestfish (*Peprilus alepidotus*) were taken at most locations. This is a fish that is expected to occur in the region, but was not collected during existing conditions surveys, although the larger trawls used by the EPA might be more efficient at capturing this species.

In addition to the fishes collected, two species were observed within the study area but were not caught in any gear. Cownosed rays (*Rhinoptera bonasus*) were observed around the archipelago in abundance, particularly in June. A lined seahorse (*Hippocampus erectus*) was captured during the early summer SAV survey (Section 3.1.6.e). Some species were collected only during their early life history. Summaries of ichthyoplankton collections are presented in Table 3-14 with station-specific collections detailed in Appendix B and the quarterly data reports (EA 1995a,b,c,d). Hogchoker (*Trinectes maculatus*) , feather blenny (*Hysobennius hentzi*), naked goby (*Gobiasoma bosci*), and skilletfish (*Gobiesox strumousus*), all resident species, were collected only as eggs or larvae. With the exception of hogchokers, the adults of these species are associated with shells or other cover items and are not easily captured in conventional survey gears (Schwartz 1961).

Ichthyoplankton densities were notably low in all seasons. Many of the resident species attach their eggs to the substrate or cover items, but the larvae should have been evident in the plankton. Since sampling was performed quarterly, peak planktonic abundance for some species may not have been observed. Other factors that may have influenced ichthyoplankton sampling efficiency were the diurnal (day/night) and tidal timing of collections. Some species are collected at higher abundances during periods of high tidal current (on a spring tide) or are most abundant in night collections. Although ichthyoplankton collections were made on flood tides (near high water), they were not made at night or coordinated with the highest tides of the month. This may have influenced ichthyoplankton abundances and diversities. Winter flounder (*Pleuronectes americanus*) were taken in the plankton as larvae in the winter, then as young in the summer, indicating that much of their development may have taken place near the study area. Multiple lifestages of Atlantic menhaden were also collected in various gears throughout the study period but reflect two different spawning periods (early fall and spring).

Table 3-14 Ichthyoplankton Collected During Fisheries Studies near Poplar Island, July 1995

Species and Lifestage	Fall 1994	Winter 1995	Spring 1995	Summer 1995
Atlantic menhaden juveniles (*Brevoortia tyrranus*)		2		
Atlantic menhaden egg (*Brevoortia tyrannus*)			10	
Bay anchovy egg (*Anchoa mitchelli*)			1	
Bay anchovy juvenile (*Anchoa mitchelli*)				1
Silverside species egg (*Menidia* spp.)			1	
Atlantic silverside metalarvae (*Menidia menidia*)			1	
Skilletfish juvenile (*Gobiesox strumosus*)				1
Northern pipefish juvenile (*Syngnathus fuscus*)				3
Feather blenny mesolarvae (*Hypsoblennius hentzi*)				1
Feather blenny metalarvae				3
Feather blenny juvenile				1
Naked goby mesolarvae (*Gobiosoma bosci*)				3
Winter flounder mesolarvae (*Pleuronectes americanus*)				
Hogchoker egg (*Trinectes marculatus*)				7
Undetermined fish egg			3	
Undetermined fish larvae			1	

All of the fish species collected are common in the region (Table 3-12) and none is indicative of unique habitat. From the composition of the observed fish community, several inferences can be made about the quality of fish habitat and availability of food within the study area. Pipefish (Syngnatus spp.) and seahorses are generally associated with weedbeds or other plant cover (e.g., macro algae) (Lippson and Lippson 1984, Schwartz 1961). Although little evidence of SAV was found within the study area, some algae was found during the spring and summer surveys and may be providing needed cover in the absence of SAV. The presence of cownosed rays in the high abundances noted in the early summer implies that food availability, particularly soft clam abundance (a preferred food item), is probably good within the study area. The occurrence of striped bass of various life stages throughout the year reflects the cover available within the archipelago. The numerous snags along all of the island remnants, created by fallen trees and erosion, are among the best available habitat in the area for large fishes and have been noted as an important refuge area for both adult and juvenile striped bass (Garry 1995). Bay anchovy, Atlantic menhaden, river herring, and juveniles of species such as striped bass and silversides feed predominantly on plankton (Myatt and Myatt 1990, Houde and Zastrow 1991, Setzler-Hamilton and Hall 1991). The abundance of these fish species within the study area during various seasons is very likely a measure of the availability of zooplankton. Similarly, many of the small resident species (e.g., blennies, gobies) and many of the seasonal species (e.g. spot, winter flounder, scup) feed on epibenthic invertebrates such as mysids and sand shrimp (Myatt and Myatt 1990, Homer and Mihursky 1991). These invertebrates were noted in abundance in bottom trawls, particularly in the summer. Species that are generally common in saltmarshes with muddy substrates (e.g. mummichogs, sheepshead minnow) were conspicuously absent from fish collections, although the available saltmarsh habitats within the proposed alignment were sampled.

The Poplar Island archipelago and nearby waters are meeting the food and physical habitat needs of many fish species in the region, supporting a relatively diverse fish community (most notably in the summer). The absence or low abundance of regionally common resident species from fisheries collections (e.g., mummichogs, young gobies) indicate that some fish habitats such as vegetated wetlands and SAV may be scarce within the study area. The depauperate catches in trawl collections throughout the year would tend to support this assumption. Abundance of preferred forage species such as silversides will attract larger seasonally abundant predators to the archipelago.

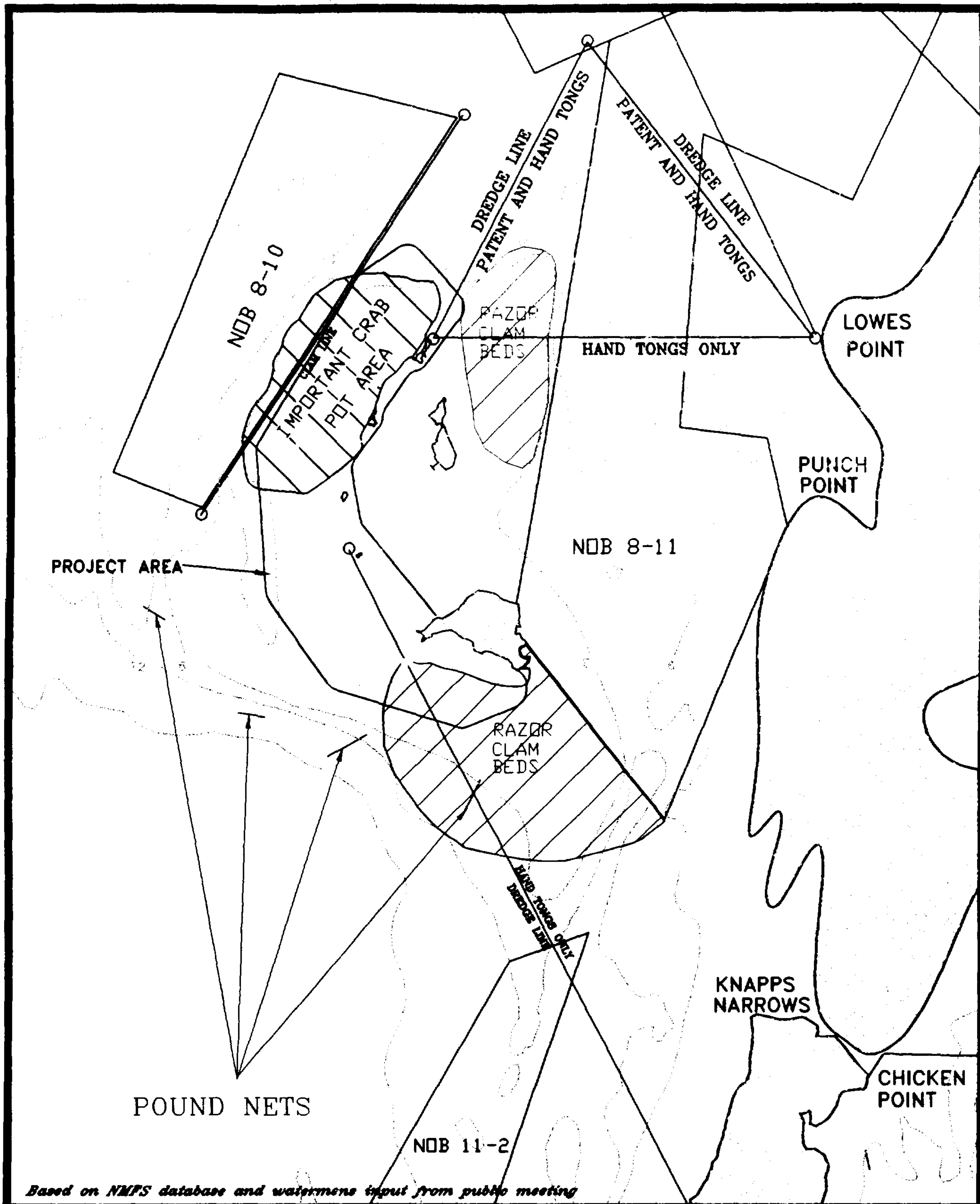
NMFS and DNR identified special concerns regarding habitat preservation for two organisms, Horseshoe crab (*Limulus polyphemus*) and Northern diamondback terrapin (*Malaclemys terrapin terrapin*), that may utilize the remaining islands of the Poplar Island archipelago (Butowski 1995; Carter 1995). Horseshoe crabs have been reported spawning on at least 30 beaches in the Eastern Bay region including Poplar Island (O'Connell 1995). Horseshoe crabs were collected in archipelago waters during the spring survey; however no spawning activity was observed (EA 1995c). Horseshoe crabs require sand beaches for spawning, although some spawning on mud/sand beaches has been reported in the Eastern Bay region. Suitable spawning habitat for this species occurs on all islands of the archipelago but specifically on the south and northwest sides of Coaches Island, the east side of South Central Poplar, and most shores of Jefferson Island. No diamondback terrapins were observed during seasonal surveys (EA 1995a,b,c,d). Terrapins utilize coastal marshes, tidal flats, coves, estuaries, inner edges of barrier beaches or any unpolluted body of salt or brackish water (Conant 1986), and sand is preferred for nesting

(White 1989). All of these habitat types are available within the Poplar Island archipelago both inside and outside of the proposed alignment.

3.1.6.c Commercially Important Species. Five species of fish commonly landed commercially in the area were collected during the seasonal surveys. These include bluefish, summer flounder, Atlantic menhaden, striped bass, and weakfish. Additionally, three species that comprise one commercially important group (herring) were collected: alewife, blueback herring, and Atlantic herring. Although the river herrings are generally targeted for baitfish collections, watermen tend to record all landings (except menhaden) as "herring" regardless of species (Klauda *et al* 1991). Of the commercially important species, striped bass and Atlantic menhaden are the most important in this region of the Bay, both in terms of poundage and dollar value (Section 3.3). Seasonal collections indicate that both of these species utilize the study area for more than one lifestage and season (Table 3-12). Striped bass, bluefish, and weakfish were also the most frequently landed fish on charter cruises from the western half of the Bay from Kent Point to the Choptank River (Nick Carter 1995).

Four invertebrate species of commercial importance occur in abundance within the study area and nearby waters: soft shell clams, oysters, blue crabs, and razor clams. Razor clams are harvested from areas south of Coaches Island and off the north shore of Jefferson Island (Figure 3-14) and are used only for bait (Nichols, 1995). Young razor clams were collected during benthic surveys in the waters surrounding the archipelago, indicating recent recruitment. Peak densities of soft shell clams along the eastern shore of the Chesapeake are found from the Eastern Bay to Pocomoke Sound, particularly at depths of less than 17 feet (Baker and Mann 1991). Anecdotal information of soft clam harvests from the study area indicate that the species has been abundant in the last several decades, with harvests reaching up to 1,000 bushels per acre per recruitment (probably over a 3-year period) (Nichols, 1995). There are some indications that soft clam densities may currently be depressed near the study area (Nichols, 1995). Aside from being among the most important commercial landing in the Talbot County area (Section 3.3), soft clams contribute significantly to the food chain in Mesohaline areas. Soft clam larvae can be abundant in the spring zooplankton, but recruitments are often poor due to predation pressures (Baker and Mann 1991). Juvenile and adult clams are also important food items for a variety of fish and invertebrates (Baker and Mann 1992). Only young soft-shell clams were collected during benthic surveys within the proposed dike alignment. The gear being utilized for benthic collections was insufficient to collect adults, but the occurrence of juveniles indicates that active recruitment is occurring within the proposed dike alignment.

For hundreds of years, eastern oysters were among the most abundant bivalves and the most commercially important fisheries resources in the Bay (Richkus *et al.* 1992). Harvests throughout the Bay have been declining for decades for a variety of reasons, leading to a near collapse of the industry in recent years (CBP 1995). Several oyster bars are in immediate proximity to the study area (Figure 3-14) although the one to the east side of Coaches Island NOB 8-11, which is 200 feet from the western toe of the proposed dike, is currently not very productive (Nichols, 1995). Viable oysters were found in the shore-zone along the south shore of Coaches Island. This was the only confirmed occurrence within the proposed dike alignment, although oyster shells were brought up at several benthic and trawl locations adjacent to NOB 8-10. Like soft shell clams, larval oysters contribute to the



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MARYLAND ENVIRONMENTAL SERVICE

FIGURE 3-14
COMMERCIAL FISHING AREAS IN PROXIMITY TO PROJECT AREA

zooplankton and can be heavily preyed upon in some areas. Oysters also provide the only available hard substrate in many areas of the Bay, and oyster bars provide physical habitat for a wide variety of Bay species (Kennedy 1991).

Since the decline of oyster abundances in the Bay, blue crab harvests have become the most valuable fishery in the region (Richkus 1992). Blue crabs utilize nearly every habitat type in the Bay during some stage of their lifecycles. The area around Poplar Island would typically be utilized by juveniles and adults during the warmer months, when crabs tend to be in the shallows. Shallow water areas, particularly those with SAV or other suitable cover, are important refuges for older juveniles and soft crabs (Van Heukelem 1991). In addition to the incidental catches in seines, trawls, and gillnets, crab pots were fished at two stations within the 1847 footprint alignment in the fall and at these and two others in winter, spring, and summer (Figure 3-13). Two crab pots were set at each station for a minimum of 48 hours per season. During the fall and summer surveys, blue crabs were only collected in crab pots and in the shore-zone, but were collected by trawl and gillnet in all but the winter survey. The overall catches within the study area (even in the summer) were lower than expected even for an area utilized extensively by commercial crabbers. The reasons for the seemingly low catches are unknown. Plausible explanations include a current Baywide slump in crab populations (Buck 1995; Wheeler 1995), a large mesh size that precludes capture of juveniles, or sampling traps being emptied.

3.1.6.d <u>Benthic Invertebrates.</u> Benthic invertebrate communities are some of the most important components of the Chesapeake Bay estuarine ecosystem. They are the major trophic link between primary producers (i.e., phytoplankton and plants) and higher trophic levels including fish, birds, and other wildlife (Carriker 1967; Virnstein 1977; Holland *et al.* 1980, 1989; Dauer *et al.* 1982; Baird and Ulanowicz 1989; Diaz and Schaffner 1990). Benthic invertebrates contribute significantly to the diets of juvenile and adult fish and crabs (Chao and Musik 1977; Homer and Boynton 1978; Virnstein 1979; Homer *et al.* 1980; Holland *et al.* 1989). They are also consumed by man (e.g., crabs, oysters, clams) and are an important commercial industry in the Chesapeake Bay. Estuarine benthos also have important roles in ecological processes that affect water quality and productivity. The feeding and burrowing activities of benthos affect sediment depositional patterns and chemical transformations including oxygen, nutrient, and carbon cycles (Carriker, 1967; Rhoads, 1974; Kemp and Boynton 1981). Feeding activities can also remove planktonic components and the concentration of particles in the water column that can improve water clarity (Cloern 1982; Officer *et al.* 1982; Holland *et al.* 1989).

Benthic collections were made with a standard Ponar grab sampler during the seasonal study conducted in 1994-1995 in order to describe the benthic community near Poplar Island (EA 1995a,b,c,d). The sonar was able to sample a 0.5-square-foot area to a depth of approximately 4 inches. Ten stations were sampled in the fall and four stations were added in the winter that were also sampled in the spring and summer (Figure 3-13). The 14 stations were selected in order to obtain information about the benthic community inside and outside the proposed island alignment. The complete data set including abundance and distribution information by station locations is reported in Appendix B. Comparisons of these data will be made with historical data where possible to put the Poplar Island benthic communities in perspective with other areas in the Mesohaline zone (5 to 18 ppt) of the Chesapeake Bay.

A sediment characterization was conducted at each station location in order to describe these components of the benthic habitat (Table 3-15). Substrate is a major environmental factor controlling the spatial distribution of macrobenthic communities (Sanders 1958, Rhoads and Young 1970, Young and Rhoads 1971; Boesch 1973; Mountford *et al.* 1977), while salinity is the major factor influencing regional distributions (Carriker 1967). Based on the grain size analysis, the substrates were homogeneous throughout most of the study area. The predominant substrate at all but one station was fine sand. Station BWQ-8 (Poplar Harbor) consisted of approximately equal parts of sand and silt. Organic matter content was less than 2 percent at all stations. Other *in situ* water quality measurements (temperature, dissolved oxygen, pH) were within expected ranges (Section 3.1.4). Anoxia, which is common in deeper areas of the Chesapeake Bay, was not evident in the shallow (less than 13 feet) Poplar Island study area.

A total of 50 benthic taxa were collected in the vicinity of Poplar Island during the 4 seasons studied (Table 3-16). This total includes organisms identified to species level and also, in the case of very small or damaged specimens, organisms identified only to a major taxonomic group (i.e., class, family). During a long-term benthic study (1971-1974) conducted in the Calvert Cliffs area along the western shore of the Chesapeake Bay, a total of 74 taxa were collected (Mountford *et al.* 1977). This study was conducted in three habitat types: sandy, muddy sand, and muddy habitat in water depths of less than 17 feet. Salinity ranged from 7 to 18 ppt during the study period. Twenty-seven taxa collected near Poplar Island were also collected in the Calvert Cliffs study. It is assumed that the larger species list at Calvert Cliffs is the result of the longer study period and also the greater variety of substrates sampled.

Comparing only the seasonal (1973-1974) Calvert Cliffs data (Mountford *et al.* 1977) from the shallow 10-foot sandy habitat with the Poplar Island data reveals more similarity in community composition. In both studies, two to three taxa dominated the benthic community during each season as follows: fall and summer, the amphipod *Lepidactylus dytiscus* and the polychaete *Heteromastus filiformis*; winter, the polychaete *Marenzellaria viridis* and the clams *Mya arenaria* and *Macoma balthica*; and in the spring, *M. viridis*, *H. filiformis*, and *M. balthica*. Roberts *et al* (1975) summarized the characteristic dominant macrobenthic organisms in the various estuarine zones of the Chesapeake Bay based on a synthesis of 35 information sources. The dominant taxa in the Mesohaline zone sand bottom habitat included *M. arenaria* and *H. filiformis*, both dominants in the Calvert Cliffs and Poplar Island studies. Other dominants cited by Roberts *et al* (1975) were the amphipod *Leptocheirus plumulosus* and the clam *Macoma mitchelli*, which were also dominants in the Poplar Island study.

The number of taxa collected in the sand habitat in the Calvert Cliffs study (Holland 1976) ranged from 11 to 23 collected at 8 stations compared to 31 to 36 in the present study at Poplar Island (14 stations). The number of taxa collected at individual stations near Poplar Island ranged from 8 at stations BWQ-7 (Poplar Harbor) in the fall to 24 taxa at BWQ-5 (near the ranges) in the summer.

Table 3-15 Percent Composition of Sediment Collected near Poplar Island

Station	Percent Clay	Percent Silt	Percent Fine Sand	Percent Medium Sand	Percent Coarse Sand	Percent Organic Matter
BWQ-1	3.08	1.68	93.07	1.35	0.82	0.73
BWQ-2	1.54	2.32	93.37	2.59	0.18	1.24
BWQ-3	4.62	8.23	85.60	1.55	0.00	0.89
BWQ-4	<1	<1	96.66	1.77	0.22	0.56
BWQ-5	3.08	5.39	84.57	6.54	0.42	0.95
BWQ-6	1.54	1.44	96.75	0.25	0.03	0.59
BWQ-7	3.08	5.82	91.00	0.08	0.02	0.55
BWQ-8-104	6.15	46.75	46.97	0.13	0.00	1.34
BWQ-9	1.54	1.93	96.28	0.25	0.00	0.61
BWQ-10	<1	<1	95.15	2.57	1.05	0.86
BWQ-11	3.00	2.45	93.14	0.91	0.50	1.09
BWQ-12	2.00	6.29	91.52	0.13	0.06	1.09
BWQ-13	3.00	4.28	91.91	0.70	0.11	0.99
BWQ-14	3.00	5.76	90.90	0.22	0.12	1.07

TABLE 3-16 Species List of Benthic Invertebrates Collected near Poplar Island

Platyhelminthes	Oligochaeta
Euplana gracilis	Mollusca
Stylochus ellipticus	Gastropoda
Cnidaria	*Sayella chesapeaka*
Anthozoa	Bivalvia
Diadumene leucolena	Bivalvia sp. *(indeterminate)*
Edwardsia elegans	*Mulinia lateralis*
Nemertinea	*Macoma balthica*
Amphiporus bioculatus	*Macoma* spp.
Carinoma tremaphorus	*Macoma mitchelli*
Micrura leidyi	*Gemma gemma*
Annelida	*Mya arenaria*
Polychaeta	Crustacea
Hypereteone heteropoda	*Balanus improvisus*
Hypereteone foliosa	*Neomysis americana*
Nereididae	*Mysidopsis bigelowi*
Neanthes succinea	*Cyclaspis varians*
Laeonereis culveri	*Cyathura polita*
Glycinde solitaria	*Paracereis caudata*
Leitoscoloplos fragilis	*Edotea triloba*
Leitoscoloplos sp.	*Leptocheirus plumulosus*
Polydora cornuta	*Corophium lacustre*
Spiophanes bombyx	*Gammarus sp. (indeterminate)*
Paraprionospio pinnata	*Melita nitida*
Streblospio benedicti	*Lepidactylus dytiscus*
Marenzellaria viridis	*Monoculodes sp. 1*
Capitellidae	*Mucrogammarus mucronatus*
Heteromastus filiformis	*Rhithropanopeus harrisii*
Pectinaria gouldii	Chelicerata
Tharyx sp. A.	*Limulus polyphemus*

Abundance (density) and diversity (Shannon-Weiner index) data were also comparable between the two areas of the Bay. Density in the sand habitat at Calvert Cliffs (Mountford *et al* 1977) ranged from 79 to 11,460/m^2 compared to 463 to 10,786/m^2 at Poplar Island (Table 3-17). Diversity ranged from 1.6 to 2.8 at Calvert Cliffs and generally were lower, ranging from 0.7 to 2.2 at Poplar Island. In the study summarized by Roberts *et al.* (1975), the range of diversity values was generally higher than at Poplar Island.

A study conducted by the EMAP, a nationwide program initiated by EPA, included stations sampled in the numerous locations in the Mesohaline portion of the Chesapeake Bay. Two station locations, one sampled in 1990 in the mainstem Bay south of the Choptank River and a

Table 3-17 Seasonal Summary of Benthic Data Collected Near Poplar Island

STATIONS	BWQ-1	BWQ-2	BWQ-3	BWQ-4	BWQ-5	BWQ-6	BWQ-7	BWQ-8	BWQ-9	BWQ-10	BWQ-11	BWQ-12	BWQ-13	BWQ-14
FALL														
Total Number of Taxa	18	10	17	15	21	13	8	21	13	18	---	---	---	---
Mean Density of Individuals	850.7	1075.1	1087.3	1305.6	2427.6	1177.1	632.4	2454.1	463.1	1387.2	---	---	---	---
Shannon-Weiner Diversity	2.140	1.460	2.050	1.870	1.700	1.540	1.370	2.010	2.030	1.570	---	---	---	---
Species Richness	3.52	1.78	3.15	2.66	3.40	2.33	1.54	3.40	2.84	3.20	---	---	---	---
Eveness	0.74	0.63	0.73	0.69	0.56	0.60	0.66	0.66	0.79	0.54	---	---	---	---
WINTER														
Total Number of Taxa	15	18	13	15	11	14	19	21	15	16	14	13	16	20
Mean Density of Individuals	4488.0	1381.1	897.6	1515.7	381.5	699.7	6487.2	1836.0	1005.7	1958.4	1401.5	2835.6	1917.6	4412.5
Shannon-Weiner Diversity	1.533	1.816	1.788	1.662	2.168	2.098	1.934	2.166	1.932	2.233	2.076	1.949	2.050	1.949
Simpson's Dominance Index	0.359	0.303	0.240	0.282	0.132	0.169	0.201	0.159	0.248	0.132	0.165	0.197	0.172	0.197
Species Richness	2.16	3.20	2.46	2.59	2.48	2.80	2.62	3.57	2.80	2.65	2.44	1.99	2.66	2.93
Eveness	0.57	0.63	0.70	0.61	0.90	0.79	0.66	0.71	0.71	0.81	0.79	0.76	0.74	0.65
SPRING														
Total Number of Taxa	14	23	15	15	23	16	22	19	15	19	19	16	16	21
Mean Density of Individuals	3325.2	3814.8	3372.1	2841.7	3549.6	2380.7	8017.2	3468.0	2727.5	3555.7	3229.3	3310.9	3106.9	5283.6

TABLE 3-17 (continued)

STATIONS	BWQ-1	BWQ-2	BWQ-3	BWQ-4	BWQ-5	BWQ-6	BWQ-7	BWQ-8	BWQ-9	BWQ-10	BWQ-11	BWQ-12	BWQ-13	BWQ-14
SPRING (continued)														
Shannon-Weiner Diversity	1.540	1.904	1.575	1.667	1.826	1.850	2.038	2.000	1.372	1.715	1.693	1.772	1.604	2.074
Simpson's Dominance Index	0.309	0.229	0.297	0.259	0.224	0.195	0.164	0.200	0.421	0.263	0.281	0.247	0.285	0.161
Species Richness	2.10	3.48	2.26	2.32	3.52	2.56	2.97	2.89	2.34	2.88	2.92	2.42	2.45	3.01
Eveness	0.58	0.61	0.58	0.62	0.58	0.67	0.66	0.68	0.51	0.58	0.58	0.64	0.58	0.68
SUMMER														
Total Number of Taxa	18	19	15	17	24	20	21	17	16	16	17	15	17	15
Mean Density of Individuals	2305.2	3223.2	1209.7	2386.8	6195.5	1931.9	10785.5	2637.7	1556.5	2319.5	5942.5	2352.1	1760.5	1128.1
Shannon-Weiner Diversity	2.130	1.431	2.218	1.719	1.528	1.398	0.671	1.852	1.808	1.987	1.090	1.945	2.176	1.956
Simpson's Dominance Index	0.170	0.452	0.142	0.319	0.397	0.486	0.761	0.217	0.242	0.198	0.591	0.191	0.146	0.194
Species Richness	2.92	2.92	2.70	2.73	3.38	3.36	2.71	2.68	2.76	2.57	2.36	2.39	2.88	2.74
Eveness	0.74	0.49	0.82	0.61	0.48	0.47	0.22	0.65	0.65	0.72	0.38	0.72	0.77	0.72

station sampled in 1992 east of Tilghman's Island in Harris Creek, were selected for comparison based on depth and substrate characteristics (Table 3-18). These were compared to two stations sampled at Poplar Island in summer 1995 that had similar characteristics: one inside the proposed alignment (BWQ-4) another station outside the alignment (BWQ-8). The number of taxa collected at Poplar Island was lower than that at the EMAP stations. The sand substrate station (greater than 90 percent sand), EMAP Station 065, had 30 taxa compared to 17 at BWQ-4 (off South Central Poplar). The sandy/mud stations (approximately 50 percent sand/50 percent mud), EMAP station 501, had 36 taxa compared to 17 taxa collected at BWQ-8. Of the 55 taxa collected at the 2 EMAP stations and the 24 taxa from the 2 Poplar Island stations, only 12 taxa were collected in both studies.

The benthic community in the vicinity of the Poplar Island archipelago is comparable to communities in other areas of the Mesohaline zone of the Chesapeake Bay. One taxon, the polychaete *Leitoscoloplos fragilis*, which is uncommon in the Maryland portion of the Bay, was collected in the spring and summer surveys. It was collected at all but one station in the summer, which included stations both inside and outside the alignment. *L. fragilis* is more common in higher salinities, such as those typical of the Virginia portion of the Bay (Mountford, 1995). The dominant taxa found in the present study are typical of benthic communities in shallow sandy substrate habitats in the Mesohaline portion of the Chesapeake Bay. The abundance of benthic invertebrates is also within the normal range reported elsewhere in the Bay. Diversity and number of taxa per station location is somewhat lower than in other studies. The aquatic environment surrounding the island remnants appears to be highly dynamic. The rapid erosion of Poplar Island over the years has caused constant movement of material from intertidal areas and shifting of substrate in the subtidal area. This was evident during existing condition sampling events, when high winds generated plumes of suspended materials emanating from the islands. Environmental variability is greater in shallow water, and, as a result, the shallow subtidal environment is generally much more stressful than deeper benthic environments. (Day *et al* 1989). The stations sampled near Poplar Island were shallower than in the other studies reported, which probably contributed to some of the difference between the Poplar Island benthic community and other areas in the Mesohaline zone of the Bay.

3.1.6.e Submerged Aquatic Vegetation. Until recently, significant submerged aquatic vegetation (SAV) populations occurred in the Chesapeake Bay; however, during the last few decades, many SAV species have undergone a dramatic decline in the Bay and its tributaries. Estimated historical SAV distributions range upward from 100,000 hectares or more Baywide. Aerial surveys place the approximate current coverage of Chesapeake SAV at 24,296 hectares (Orth 1991).

The cause of this SAV decline is speculative. The decline in SAV is generally believed to be the result of increased nutrient loadings and sedimentation (White 1989). Bacterial and viral diseases are also thought to have contributed to the sudden decline in the early 1970's (Bayley *et al.* 1968, Bean *et al.* 1973). SAV is known to be especially sensitive to increased sedimentation and water turbidity, and the erosion of Poplar Island would increase sedimentation and turbidity in the adjacent shallow water SAV habitat. This erosion results in decreasing water

TABLE 3-18 Benthic Invertebrate Collected During the Summer near Poplar Island and at Other Locations In The Chesapeake Bay

Species	BWQ-4	BWQ-8	Station 065 Main Bay[(a)]	Station 501 Harris Creek[(b)]
Platythelminthes				
Stylochus ellipticus	X			
Turbellaria (unidentified)			X	
Cnidaria				
Anthozoa (unidentified)			X	
Annelida **Polychaeta**				
Cirratulidae (unidentified)			X	
Glycera dibranchiata			X	X
Glycinde solitaria		X	X	X
Goniadidae (unidentified)			X	
Heteromastus filiformis	X	X	X	X
Hypereteone foliosa	X			
Hypereteone heteropda			X	X
Hypereteone spp.			X	
Laeonereis culveri		X		
Leitoscoloplos fragilis	X			
Leitoscoloplos spp.				X
Leitoscoloplos robustus				X
Marenzelleria viridis	X	X		X
Neanthes succinea	X		X	X
Nereidae (unidentified)			X	
Parahesione luteola				X
Paranaitis speciosa				X
Paraprionospio pinnata			X	X
Pectinaria gouldii				X
Podarkeopsis levifuscina			X	

TABLE 3-18 (continued)

Species	BWQ-4	BWQ-8	Station 065 Main Bay[a]	Station 501 Harris Creek[b]
Annelida Polychaeta (cont.)				
Polydora websteri				X
Polydora cornuta		X	X	X
Pseudeurythoe paucibranchiata			X	
Spiophanes bombyx			X	
Streblospio benedicti	X	X	X	X
Tharyx sp. A			X	
Oligochaeta		X	X	X
Arthropoda Crustacea				
Balanus improvisus				X
Balanus spp.				X
Cyclaspis varians	X	X		
Cyathura polita	X	X		X
Edotea triloba	X	X		
Hargeria rapax				X
Lepidactylus dytiscuc	X			
Leptocheirus plumulosus	X	X		
Monoculodes sp. 1	X	X		
Neomysis americana	X	X		
Mollusca Gastropoda				
Acteocina canaliculata			X	
Acteon punctostriatus			X	X
Cratena pilata				X
Haminoea solitaria				X

TABLE 3-18 (continued)

Species	BWQ-4	BWQ-8	Station 065 Main Bay[a]	Station 501 Harris Creek[b]
Mollusca Gastropoda (cont.)				
Odostomia engonia				X
Odostomia spp.			X	
Pyramidellidae (unidentified)				X
Sayella chesapeakea				X
Unidentified gastropod				X
Bivalvia				
Crassostrea virginica				X
Ensis directus			X	
Gemma gemma	X	X	X	
Geukensia demissa				X
Ischadium recurvum				X
Macoma balthica				X
Macoma mitchelli		X		X
Mulinia lateralis	X		X	X
Mytilidae (unidentified)				X
Parvilucina multilineata			X	
Chordata				
Molgula manhattensis				X
Ascidiacea (unidentified)			X	
Hemichordata				
Saccoglossus kowalevskii			X	
Phoronida				
Phoronis spp.			X	

TABLE 3-18 (continued)

Species	BWO-4	BWO-8	Station 065 Main Bay[(a)]	Station 501 Harris Creek[(b)]
Nemertinea				
Carinoma tremaphorus		X		
Micrura leidyi	X	X		
Unidentified			X	X

(a) Station 065 -- approximately 26 feet deep; in mainstem Bay, south of Choptank River; bottom salinity 15.4 ppt; bottom DO 4.1 mg/l; 99% sand, 1% siltclay

(b) Station 501 -- approximately 11 feet deep; east of Tilghman Island in Harris Creek; bottom salinity 14.1 ppt; bottom DO 6.8 mg/l; 49% sand, 51% siltclay

quality and clarity. SAV normally occurs in water depths to 10 feet, the depth to which light penetration generally permits the growth of rooted aquatic plants; however, because of increasedturbidity, most SAV is currently found in water depths of 3 to 5 feet or less in the Bay (Batiuk *et al.* 1992).

The Poplar Island vicinity has historically supported extensive SAV beds (G&B and M&N 1995a). A 1978 DNR Baywide SAV survey documented aquatic plant beds adjacent to all of the six islands in the Poplar Island group (Wolflin 1995). A 1984 survey indicated small SAV beds adjacent to Coaches Island, but not adjacent to the other islands, and those beds have not been documented since 1984. Anecdotal references state that in the past, Poplar Island Harbor, located to the east of the smaller Poplar Island remnants, supported large colonies of grass beds (Blankenship 1994). It is believed that these former SAV beds were primarily composed of sago pondweed (*Potamogeton pectinatus*), redhead grass (*Potamogeton perfoliatus*), widgeon grass (*Ruppia maritima*), and horned pondweed (*Zanichellia palustris*) (Wolflin 1995).

True-color aerial photographs were taken to document potential SAV bed distribution in May and August 1995. The May aerial photographs were taken to detect any potential early-growth SAV beds, primarily those consisting of horned pondweed. Neither May nor August photographs revealed any identifiable SAV beds.

During summer 1995 field investigations, SAV presence within the general Poplar Island area was documented. SAV was observed growing in the sediment of the shallow water of Poplar Harbor, floating in the water, and washing up on the shore of Coaches Island. SAV species found floating throughout the general area include widgeon grass, redhead grass, horned pondweed, and water-milfoil (*Myriophyllum spicatum*). Species found washed up on the shore of Coaches Island include widgeon grass, horned pondweed, and water-milfoil. SAV species found growing in the sediment of Poplar Harbor include widgeon grass, horned pondweed, and sago pondweed (Figure 3-15). During both the June and July 1995 investigations, the SAV beds were observed only in a few small areas and in low density.

3.1.7 Terrestrial Resources

3.1.7.a General Characterization. Investigations of the four remnant islands of the Poplar Island archipelago were conducted during fall, winter, spring, and summer surveys in 1994 and 1995 (EA 1995a, b, c, d). Coaches Island was added to the winter, spring, and summer surveys.

The four remnant islands possess low and high marsh areas; North Point and South Central Poplar Island have saltbush communities. None of the four smaller remnant islands has live woodland tree cover (Figure 3-16). Middle Poplar Island has standing dead trees remaining, with evidence of a previously greater woodland extent (e.g., logs, limbs, and snags in immediate offshore waters) (EA 1995a). The majority of the plants occurring on the four remnant islands are herbaceous plants that are common to brackish marsh, and saltmarsh habitats with few woody shrub and vine species present.

Coaches Island encompasses approximately 74 acres and is the largest remaining tract of land in the Poplar Island archipelago, accounting for approximately 75 percent of the total remaining land mass currently present on the six islands (EA 1995b). Coaches Island contains upland forest areas with wetland inclusions, low and high tidal marshes, man-made impoundments, and maintained lawn areas (Figure 3-17). These lawn areas are primarily associated with the dwelling on the island and with areas around the man-made ponds. A portion of the northern shore of the island, adjacent to Poplar Harbor, is protected by rip-rap.

3.1.7.b Vegetative Community Characterization.

North Point Island

Plant communities present on this island include low marsh, high marsh, and higher high marsh (i.e., saltbush community). The low marsh areas are dominated by smooth cordgrass (*Spartina alterniflora*) in an irregular band that intersperses with high marsh plant species. High marsh areas on this island are dominated by salt meadow cordgrass (*S. patens*) and are generally at slightly higher elevations than the *S. alterniflora*. These higher marsh remnants dominate a broader marsh area at the southern end of the island. *S. patens*-dominated areas also contain lower frequency occurrence of intermingled salt grass (*Distichlis spicata*). Discrete areas on elevated bank remnants contain big cordgrass (*S. cynosuroides*). The northern end of the island and the higher points along its center contain a saltbush community dominated by marsh elder (*Iva frutescens*). Other subdominant plant species present in these areas include saltmarsh fleabane (*Pluchea purpurascens*), saltmarsh aster (*Aster subulatus*), marsh orache (*Atriplex patula*), slender glasswort (*Salicornia europea*), and cordgrasses.

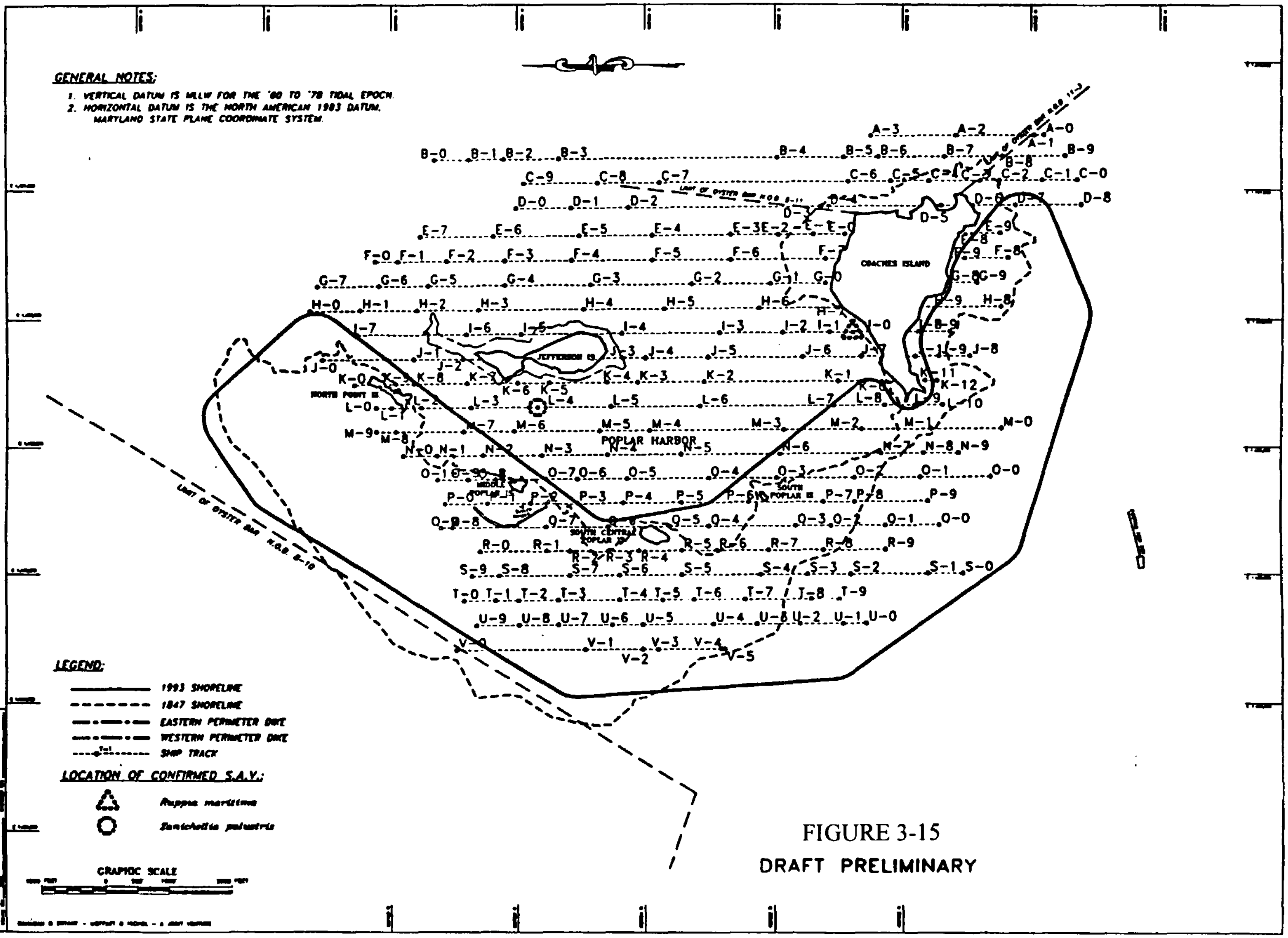
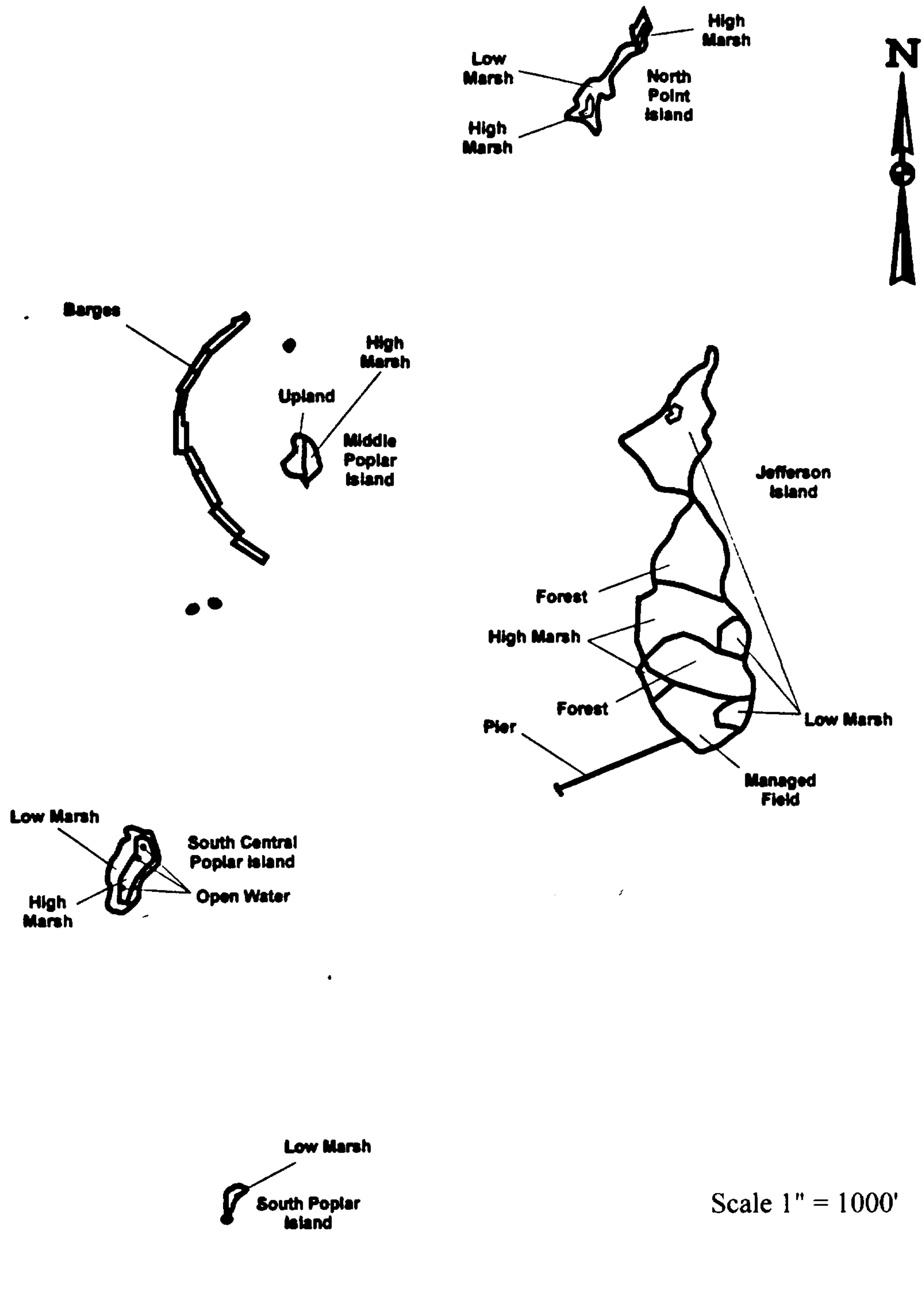


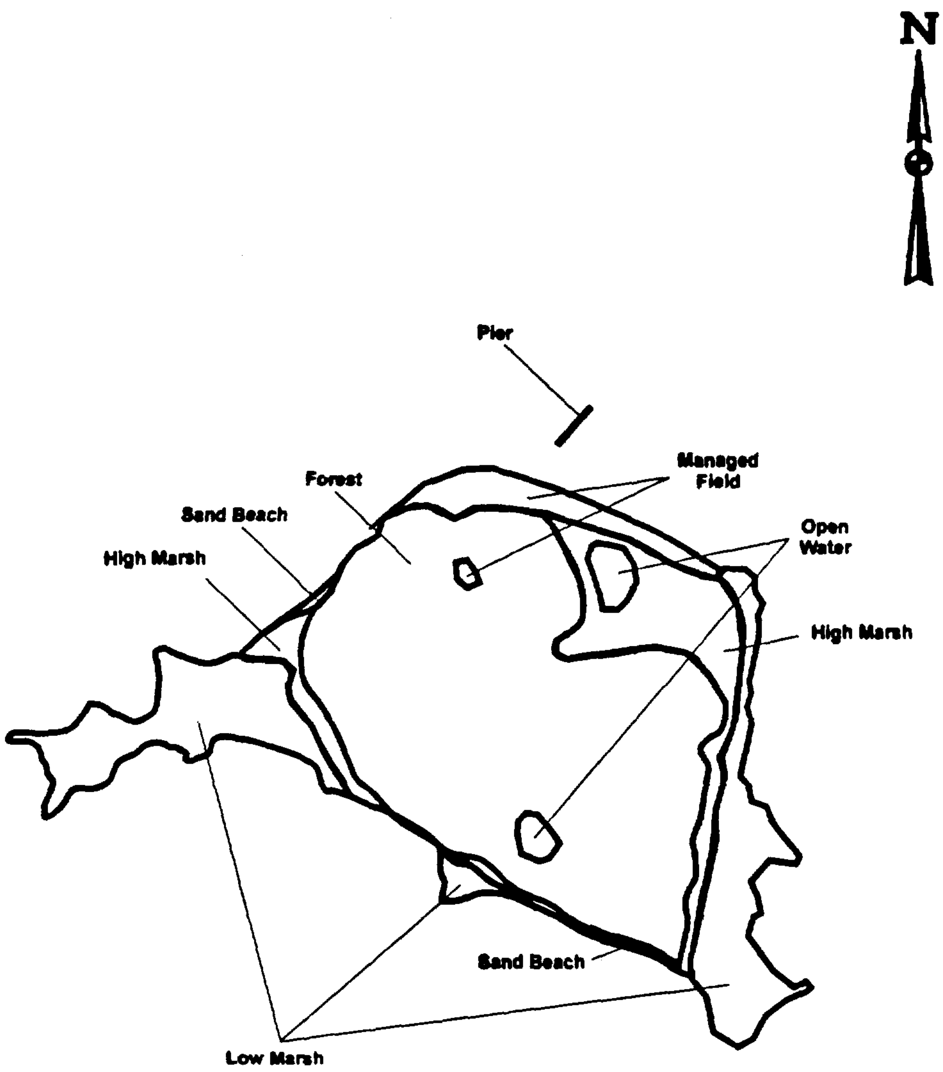
FIGURE 3-15

DRAFT PRELIMINARY



Vegetative communities of the four Poplar Island remnants.

FIGURE 3-16



Scale 1" = 1000'

Vegetative communities of Coaches Island.

FIGURE 3-17

Middle Poplar Island

The dominant vegetation on this island is a stand of common reed (*Phragmites australis*). This stand is interspersed with barnyard grass (*Echinochloa crusgalli*). There are small peripheral stands of smooth cordgrass and saltmeadow cordgrass on the northern and eastern fringes of the island, with minimal occurrence of saltgrass noted. The highest area of the island, central to south and southwest sides, contains remnants of large standing dead trees. Small clumps of field garlic (*Allium vineale*) have been observed near the dead trees, while the remainder of the area under the trees is unvegetated. Vegetation adjacent to the common reed-dominated area include pokeweed (*Phytolacca americana*) and beach grass (*Panicum amarulum*). No significant saltbush community exists on this island. Only a few marsh elder and stunted American elder (*Sambucus canadensis*) shrubs have been noted.

South Central Poplar Island

The shoreline areas of this island contain some stretches of smooth cordgrass in a band, particularly in the low marsh areas on the western side. On the leeward (east) side of the island there is an unvegetated area of sand, shell, and other fragmented materials forming a beach. Above the areas containing smooth cordgrass, common reed exists in larger stands. Interspersed throughout the common reed are areas of smooth cordgrass and saltmeadow cordgrass, with other herbaceous plants present, including field sandbur (*Cenchrus longispinus*). The windward side of the island and portions of the interior and southern end contain a saltbush community dominated by marsh elder, with both seaside goldenrod (*Solidago sempevirens*) and saltmarsh fleabane also present. The high marsh herbaceous plants include saltmeadow cordgrass, marsh fimbry (*Fimbristylis castanea*), and others. An area containing saltmarsh bulrush (*Scirpus robustus*) was identified within the northside interior high marsh center of the island. The remainder of the island contains similar high marsh vegetation with interspersed tidal ponds. One of these features is a small unvegetated salt panne near the center of the island. Another irregularly shaped pond has a restricted tidal channel connection to adjacent open water.

South Poplar Island

This is an approximately 50-foot-wide by 100-foot-long, rapidly eroding island with eroded peat banks. The island appears to be frequently overwashed at high tide, and a segment of the southern end has been separated by a tidal cut. The remnant tidal marsh of this island is dominated by smooth cordgrass, with saltmeadow cordgrass as a subdominant. A few saltgrass and other plants occur, including common reed and seaside goldenrod. No live shrubs are present on this island, although a few dead remains of marsh elder were observed in the fall of 1995 and are evidence of previous, more extensive plant occurrence (EA 1995a).

Coaches Island

Tidal saltmarsh areas on Coaches Island account for approximately 22 acres, or 30 percent of the island's land area (EA 1995b). The high marsh areas are dominated by saltmeadow cordgrass, with saltgrass also present. Other herbaceous plants are also present, with relatively homogeneous stands of black needlerush (*Juncus roemerianus*) occurring in discrete areas. Other plants present and dominant in small localized patches include Olney three-square (*Scirpus americanus*), saltmarsh bulrush (*Scirpus robustus*), and narrow-leaf cattail (*Typha angustifolia*). High elevation areas around the periphery of the saltmarsh meadow support saltbush plants. This community is dominated by marsh elder with southern bayberry (*Myrica cerifera*), Eastern red cedar (*Juniperus virginiana*) and few groundsel individuals (*Baccharis halimifolia*). Frequently the edges of the high marsh areas contain stands of common reed on this island and some tide pool habitat was identified within the high marsh. The primary plant species present in the narrow low marsh bands, which appear to be continuously eroding, is smooth cordgrass with colonization of the upper shore-zone by common reed.

The upland areas of Coaches Island are dominated by a mixed woodland of deciduous and evergreen trees that occupies approximately 42 acres or 57 percent of the island's land cover. Sweet gum (*Liquidambar styraciflua*) and several oak species (*Quercus rubra*, *Q. falcata*, *Q. alba* and *Q. phellos*) dominate the interior of the wooded area that is interspersed with loblolly pine (*Pinus taeda*). The greatest concentrations of pine trees occur along the woodland edge adjacent to the high marsh. Other canopy trees occurring throughout include red maple (*Acer rubrum*), tulip poplar (*Liriodendron tulipifera*), blackgum (*Nyssa sylvatica*), and black cherry (*Prinus serotina*). Midstory trees include American holly (*Ilex opaca*) and flowering dogwood (*Cornus florida*), with Eastern red cedar (*Juniperus virginiana*) towards the periphery. Toward the western side of the island, the canopy of the woodland is more open; the average canopy closure in this area (EA 1995d) was 50.6 percent. This area also shows signs of human management such as cutting of trees and pruning of limbs to maintain open pathways. Another factor in the relatively open nature of this part of the woodland is considerable fallen limb, possibly associated with wind, storm, or ice damage.

Other woody plants that would generally constitute an understory are sparse. This may be due in some cases to the maturity of the stand or to the deer population currently on the island. Shrubs that have been identified in the woodlands on Coaches Island include highbush blueberry (*Vaccinium corymbosum*) and black haw (*Viburnum prunifolium*). Woody vines identified on Coaches Island include greenbrier (*Smilax rotundifolia*), poison ivy (*Toxicodendron radicans*), Virginia creeper (*Parthenocissus quinquefolia*), Japanese honeysuckle (*Lonicera japonica*), and trumpet creeper (*Campsis radicans*). Dense vine cover, primarily common greenbrier, occurs in transitional areas on the edge of the woodlands, where they grade to tidal marsh communities.

Herbaceous plants occurring within the woodlands on Coaches Island include field garlic (*Allium vineale*) and pokeweed (*Phytolacca americana*); in the more open areas, panic grass (*Dichanthelium sabulorum*) dominates. Wetter areas within the woodlands include Pennsylvania smartweed (*Polygonum pensylvanicum*) and marsh fern (*Thelypters palustris var. pubescens*), among others.

Maintained Field Areas

The managed fields occupy approximately 6 acres, or 8 percent of the island, and generally include mowed grasses such as fescues (*Festuca* spp.), broomsedge (*Andropogon virginicus*), and panic grass (*Dichanthelium* sp.). Other herbaceous plants present in these maintained areas include violets (*Viola* spp.), dandelion (*Taraxacum officinale*), and thistle (*Cirsium* sp.), among others.

Interior Ponds

Three impoundments, which appear to be manmade, exist on Coaches Island. The areas around these ponds are maintained by mowing. Plant species identified in and around the edges of these ponds include soft rush (*Juncus effusus*), wool-grass (*Scirpus cyperinus*), taper-tip rush (*Juncus acuminatus*), Pennsylvania smartweed, forked rush (*Juncus dichotomus*), lesser duckweed (*Lemna minor*), water hyacinth (*Eichornia crassipes*), and yellow-fruited sedge (*Carex annectens*).

A comprehensive list of the plant species identified on Coaches Island is provided as Table 3-19.

3.1.7.c Avifauna. A variety of bird species have been identified in the Poplar Island study area during the four quarterly seasonal surveys conducted by EA. These surveys include timed bird observation stations established at two points on each island (EA 1995a,b,c,d). The birds identified included transitory migrants (primarily spring and fall), overwintering birds, and breeding season residents. Many different groups or guilds of birds were observed, including colonial waterbirds (gulls and terns, long-legged, wading, and other water-birds) shore birds and marsh birds, waterfowl, predatory and scavenging birds, and miscellaneous land birds (primarily on Coaches Island). Colonial nesting birds within the study area include the family Ardeidae (herons and bitterns), the family Phalacrecoracidae (cormorants) and the family Laridae (gulls and terns).

Herons observed in the Poplar Island study area include great blue heron (*Ardea herodius*), great egret (*Casmeiodius albus*), snowy egret (*Egretta thula*), little blue heron (*Egretta caerulea*), and cattle egret (*Bubuleus ibis*). Breeding colonies of egrets and herons occur on Coaches Island and Middle Poplar Island. A great blue heron colony occurs on the eastern half of Coaches Island, estimated to be more than 100 nesting pairs, with fewer great egret observed (only about 3 to 5 nesting pairs). During the summer (July 1995), a mixed nesting colony of cattle egret and snowy egret were in the midstory of the woodlands on the northeastern end of the island. Observations from the periphery of this colony revealed an estimated 100 birds, including juveniles that appeared nearly fully feathered (EA 1995d). Small nesting colonies of little blue heron and snowy egret occur on Middle Poplar Island as observed in 1995 (EA 1995c). These birds nested within the common reed-dominated vegetation on the island on the opposite side from the cormorant colony. All but a few individuals were absent from the island during the summer bird observations conducted (EA 1995d).

The double-crested cormorant (*Phalacrocorax auritus*) has a nesting colony on Middle Poplar Island. The cormorant colony occupies the dead snags and barren ground underneath, on which the birds have built their densely clustered nests made of sticks and other vegetation fragments. This colony is estimated to contain as many as 500 nesting pair of cormorants (EA 1995c). The cormorants have also been observed throughout the study area flying to and from foraging areas

Table 3-19 Vegetation Identified on Coaches Island and Surrounding Vicinity, Talbot County, Maryland, 1995

Scientific Name	Common Name	Hydrophytic Status [a]
Trees		
Acer rubrum	Red maple	FAC
Carya tomentosa	Mockernut hickory	UPL
Cornus florida	Flowering dogwood	FACU-
Fagus grandifolia	American beech	FACU
Ilex opaca	American holly	FACU+
Juniperus virginiana	Red cedar	FACU
Liquidambar styraciflua	Sweet gum	FAC
Liriodendron tulipifera	Tulip poplar	FACU
Nyssa sylvatica	Black gum	FAC
Pinus taeda	Loblolly pine	FAC-
Prunus serotina	Black cherry	FACU
Quercus rubra	Northern red oak	FACU-
Quercus falcata	Southern red oak	FACU-
Quercus alba	White oak	FACU-
Quercus phellos	Willow oak	FAC+
Shrubs		
Baccharis halimifolia	Groundsel tree	FACW
Iva frutescens	Marsh elder	FACW+
Myrica cerifera	Southern bayberry	FAC
Vaccinium corymbosum	Highbush blueberry	FACW
Viburnum prunifolium	Black-haw	FACU
Herbs		
Allium vineale	Field garlic	FACU-
Arenaria sepyllifolia	Thyme-leaf sandwort	FAC
Asclepias syriaca	Common butterfly weed	UNK
Aster sp.	Aster	UNK
Chlorophyta sp.	Filamentous green algae	OBL

TABLE 3-19 (continued)

Scientific Name	Common Name	Hydrophytic Status [a]
Herbs (Continued)		
Cirsium sp.	Thistle	UNK
Eichhornia crassipes	Water hyacinth	OBL
Enteromorpha sp.	Green seaweed	OBL
Lemna minor	Lesser duckweed	OBL
Phytolacca americana	Pokeweed	FACU+
Pluchea purpurascens	Saltmarsh camphor weed	OBL
Polygonum pensylvanicum	Pennsylvania smartweed	FACW
Polygonum perslcaria	Lady's thumb	FACW
Ranunculus arbortivus	Kidney-leaved buttercup	FACW-
Solidago sempervirens	Seaside goldenrod	FACW
Stellaria media	Common chickweed	UPL*
Taraxacum officinale	Dandelion	FACU-
Thelypteris palustris var. pubescens	Marsh fern	FACW+
Ulva lactuca	Sea lettuce	OBL
Verbascum sp.	Mullein	UNK
Grasses, Sedges, and Rushes		
Andropogon virginicus	Broom sedge	FACU
Carex annectens	Yellow-fruit sedge	FACW
Cyperus odoratus	Rusty flatsedge	FACW
Dicanthelium acuminatun	Hairy panic grass	FAC
Dicanthelium sphaerocarpon	Round seed panic grass	FACU
Distichlis spicata	Saltgrass	FACW+
Elymus virginicus	Virginia wild-rye	FACW-
Fimbristylis casteanea	Marsh fimbry	OBL
Juncus acuminatus	Taper-tip rush	OBL
Juncus dichotomus	Forked rush	FACW
Juncus effusus	Soft rush	FACW+

TABLE 3-19 (continued)

Scientific Name	Common Name	Hydrophytic Status [a]
Grasses, Sedges, and Rushes (Continued)		
Juncus gerardi	Salt meadow rush	FACW+
Juncus roemerianus	Black needlerush	OBL
Panicum acuminatum	Acuminate panic grass	FAC
Panicum virgatum	Switchgrass	FAC
Phragmites australis	Common reed	FACW
Scirpus americana	Olney's bulrush	OBL
Scirpus cyperinus	Wool-grass	FACW+
Scirpus robustus	Saltmarsh bulrush	OBL
Setaria sp.		UNK
Schizachyrium scoparium	Little bluestem grass	FACU-
Spartina alterniflora	Smooth cordgrass	OBL
Spartina cynosuroides	Big cordgrass	OBL
Spartina patens	Saltmeadow cordgrass	FACW+
Vines		
Campsis radicans	Trumpet creeper vine	FAC
Lonicera japonica	Japanese honeysuckle	FAC-
Parthenocissus quinquefolia	Virginia creeper	FACU
Smilax rotundifolia	Greenbrier	FAC
Toxicodendron radicans	Poison ivy	FAC
Submerged Aquatic Vegetation		
Myriophyllum spicatum	Eurasian water-milfoil	OBL
Ruppia maritima	Widgeongrass	OBL
Zannichellia palustris	Horned pondweed	OBL

(a) Indicator Status Categories are from Reed, P.B. Jr. (1988). The U.S. Fish and Wildlife National List of Plant Species That Occur in Wetlands: Northeast (Region 1), unless indicated otherwise.

Abbreviations:
OBL = Obligate (found in wetlands in more than 99% of all findings)
FACW = Faculative wetland (66-99%)
FAC = Faculative (33-66%)
FACU = Faculative upland (1-33%)
UP = Upland (< 1%)
* Status not listed by the Fish and Wildlife Service, assumed to be UPL (Upland).

and resting on open water. This colony is one of only two nesting colonies for this species in Maryland, and the Poplar Island colony is the larger of the two.

Members of the gull and tern family observed in the study area include common tern (*Sterna hirundo*), least tern (*Sterna antillarum*) and gull-billed tern (*Gelochelidiron nilotica*). The terns observed in the area have been primarily observed in spring, summer, and fall surveys (EA 1995a,c,d), flying and foraging for small fishes. The area between Coaches Island and South Poplar Island has appeared to be an area of significant tern foraging activity. No terns have been observed in breeding colonies in the study area, although an effort has been undertaken by DNR to encourage least tern nesting on one of the barges in front of Middle Poplar Island, including the placement of shell material and least tern decoys, and the playing of least tern vocalization tapes. To date, there are no indications that this effort has been successful. Gulls that have been observed throughout the study area include herring gull (*Larus argentatus*), great black-backed gull (*Larus marinus*), laughing gull (*Larus atricilla*), and ring-billed gull (*Larus delawarensis*). Gulls have been observed in the Poplar Island study area during all seasons. The predominant gull species observed in the area is the herring gull. The barges adjacent to Middle Poplar Island are heavily utilized by gulls as a resting area.

3.1.7.d Waterfowl. Waterfowl observed in the study area include dabbling ducks, diving ducks, sea ducks, geese, swans, loons, and coot. Dabbling ducks observed in the Poplar Island vicinity include mallard (*Anas platyrhynchos*) and American black duck (*Anas rubripes*). Mallards were observed primarily in the areas of the impoundments on Coaches Island, with lesser numbers observed in the estuarine waters of the study area. Black duck were observed in low numbers throughout the study area, including the remnant island habitats and the tidal marsh areas of Coaches Island. Black ducks and probable black ducks, mallard hybrids, were observed nesting in the study area (EA 1995c,d). In June 1995, a black duck hen was flushed from her nest in a high marsh area on the south side of Coaches Island. A black duck hen was also flushed from a nest in a high marsh area on South Central Poplar Island in July 1995, and a black-mallard duck hybrid nest was discovered on North Point Island under a marsh elder shrub. An additional black duck-mallard hybrid hen was flushed from a nest in marsh grasses near the boat slip on Coaches Island. Two additional black ducks were flushed from marsh grass cover, one on Middle Poplar Island and one on South Central Poplar Island, but the potential nest location was not found in either case. The black duck and black duck-mallard hybrid hens that were flushed from active nests were incubating clutches of 10, 7, 8, and 11 eggs ($\bar{x}=9$, $n=4$).

Ducks grouped as "divers" observed in the Poplar Island study area were identified primarily during fall and winter site surveys conducted by EA (1995a, b). These seasonal migrants and winter residents were primarily identified resting and foraging in open water areas and flying throughout the study area. Diving ducks observed include bufflehead (*Bucephala albeola*), greater scaup (*Aythya marila*), canvasback (*Aythya valisineria*), and hooded merganser (*Lophodytes cucullatus*).

Sea ducks, which also have a diving propensity, are often grouped separately from other diving ducks due to their predominantly open Bay and inshore coastal water habitation. Sea ducks identified as present in the Poplar Island vicinity include primarily oldsquaw (*Clangula hyemalis*), with white-winged scoter (*Melanitta fusca*) and common eider (*Somateria mollissima*). These birds were observed flying, foraging, and resting in the relatively deeper open water areas, primarily in winter. Though not observed, Surf Scoter (*Melanitta perspicillata*) and Black Scoter (*Melanitta nigra*) are commonly found around Poplar Island.

Larger waterfowl, specifically mute swan (*Cygnus olor*) and Canada goose (*Branta canadensis*) have been observed in small numbers in the Poplar Island study area. These observations are primarily associated with the island habitats and adjacent near-shore shallow waters. Both Canada geese and mute swan were observed in breeding and nesting attempts on Coaches Island. In fall 1994, a pair of mute swan were observed with one cygnet in the vicinity of Middle Poplar Island (EA 1995a). A nesting pair of mute swan were observed in the east-side marsh on Coaches Island in spring 1995. During the summer survey (EA 1995d), the nest was found to be abandoned, containing two eggs, one whole and one destroyed, with a well-developed swan in it. There have been Canada geese observed in pairs and exhibiting territory defense behavior, particularly near the ponds on Coaches Island, but no goslings were observed during EA surveys.

Other duck-like birds observed in the Poplar Island study area include common loon (*Gavia immer*) and American coot (*Fulica americana*), which were observed in shallow open water areas near the island remnants in fall 1994 (EA 1995a).

Predatory and Scavenging Birds

This group includes the family Pardionidae (ospreys), the family Accipitridae (hawks and eagles), the family Corvidae (jays, magpies and crows), and the family Cathartidae (new world vultures). The bird species in these groups identified in the Poplar Island study area include osprey (*Pantion haliaetus*), bald eagle (*Haliaeetus leucocephalus*), American crow (*Corvus brachyrhynchos*), fish crow (*Corvus ossifragus*), and black vulture (*Coragyps atratus*).

Bald eagles present in the study area vicinity are associated with a nest on Jefferson Island and have been observed flying in the area, sitting on the nest, and perching on snags. The ospreys observed have been associated with nesting attempts on all of the islands in the study area. South Poplar is the only island where a successful nesting attempt was not completed. Ospreys have been observed flying and foraging throughout the open waters of the study area and engaged in nesting activities, including incubating and caring for young. The ospreys and eagles were observed in the study area during spring and summer surveys (EA 1995c,d).

Common crows were observed in low numbers throughout the study area and during all seasons. A few individual fish crow and black vulture were observed.

Shore Birds and Marsh Birds

These groupings of birds represent a variety of bird families, but are lumped here for their habits and areas of occurrence.

Shore birds identified in the Poplar Island study area include willet (*Catopitrophorus semipalmatus*), dunlin (*Calidris alpina*), semi-palmated sandpiper (*Calidris pusila*), and killdeer (*Charadrius vociferus*). Nesting pairs of willet were identified in the study area on Coaches Island and North Point Island. Males in nesting territory defense were observed on Coaches Island and North Point Island in spring and summer 1995. Additionally, a dead juvenile willet was discovered in a tidal marsh area on Coaches Island during the summer survey conducted in July 1995 (EA 1995d).

Marsh birds characterized as those identified in the low and high marsh areas include marsh wren (*Cistothorus palustris*), sharp-tailed sparrow (*Ammodramus caudacutus*), red-winged blackbird (*Agelaius phoeniceus*), and common yellow throat (*Geothlepis trichas*). All of these species are potential breeding birds of the tidal marshes on Coaches Island and the remnant island habitats. Male red-winged blackbirds were observed in territorial displays in marshes throughout the study area.

Miscellaneous Land Birds

This category of birds includes several bird species typically associated with mainland terrestrial habitats, including forests, scrub-shrub, and field habitats. A variety of common migratory songbirds typically associated with adaptation to fragmented human-influenced landscape were observed. These included Northern cardinal (*Cardinalis cardinalis*), mockingbird (*Mimus polyglottos*), brown-headed cowbird (*Molothrus ater*), common grackle (*Quiscalus quiscula*), gray catbird (*Dumetella carolinensis*), and chipping sparrow (*Spizella passerina*).

3.1.7.e Mammals. The only portion of the study area where mammalian presence has been identified is on Coaches Island. The most evident mammal on the island is the white-tailed deer (*Odocoileus virginianus*). Deer were observed throughout the island, including individuals and herds of 5 to 11 members (EA 1995c). Raccoon (*Procyon lotor*) was identified as present on Coaches Island by sign including tracks and scat. By all appearances, raccoon are present on this island in very low numbers, but no direct observations of raccoon were made by EA scientists. Other mammalian carnivores (e.g., red fox) were observed. Another mammalian species noted on Coaches Island is muskrat (*Ondatra zibethicus*), evidenced by lodges, trails, and scat.

3.1.7.f Reptiles and Amphibians. Reptiles and amphibians were identified on Coaches Island only. Observations were made throughout the seasonal investigations and by specific pit fall trapping efforts conducted during the spring and summer surveys (EA 1995c,d). Snakes are the most abundant herptiles observed. These observations include Eastern kingsnake (*Lampropeltis getulus getulus*), which were almost exclusively observed in high marsh areas, particularly under plywood boards. Another commonly occurring snake species observed was the Northern water snake (*Nerodia sipedon*); these were observed particularly along rip-rap areas of the shoreline, sometimes in groups of three or more snakes. Another snake found on Coaches Island was the Eastern garter snake (*Thamnophis sirtalis*). One individual was observed in the woodlands on the eastern side of Coaches Island.

Amphibians found included one frog and one toad species on Coaches Island. These species were Southern leopard frog (*Rana utricularia*) and Fowler's toad (*Bufo woodhousei fowleri*). The frogs were identified near the impoundments on the island, and two were captured at a drift fence location during the summer survey efforts (EA 1995d). A Fowler's toad was also captured and identified in this fashion. Another unidentified frog, *Rana* sp., is believed to be present in the ponds on Coaches Island.

The Eastern mud turtle (*Kinosternon subrubrum*) and Eastern box turtle (*Terrapene carolina*) were identified on the island. These were associated with the impoundments and woodland areas, respectively. Another reptile identified on the island was a single six-lined racerunner (*Cnemidophorus sexilineatus*) found on a dead snag in an open woodland area during the summer environmental survey (EA 1995d).

3.1.8 Rare, Threatened, and Endangered Species (RT&E)

3.1.8.a Introduction. Certain species of plants and animals are protected by Federal and State regulations under the Endangered Species Act (ESA) of 1973 and the Maryland Nongame and Endangered Species Conservation Act of 1975. Under the consistency clause (Section 7[a]) of the ESA, Federal agencies are required to consult with the USFWS and NMFS (where appropriate) if a prospective permit or license applicant has reason to believe that endangered or threatened species may be present in the area affected by a proposed project. The Maryland Nongame and Endangered Species Conservation Act has a similar consultation requirement regarding potentially affected protected species.

In accordance with the Federal and State requirements, consultation was conducted with the USFWS Ecological Services office in Annapolis, Maryland; the Habitat and Protected Resources Division of the NMFS in Oxford, Maryland; and DNR's Fish, Heritage and Wildlife Administration located in Annapolis, Maryland. Information requested from these agencies included Federal- and State-listed threatened and endangered species, designated or proposed critical habitat, and candidate taxa occurring in the project area.

Previous correspondence from the USFWS (Appendix C), however, provided some information regarding RT&E occurrence. This information includes reference to the federally listed endangered bald eagles nesting on Jefferson Island and indicated that, in 1994, no young were fledged from this nest. The USFWS has proposed reclassification of the bald eagle to threatened status. The USFWS letter (Wolflin 1995) also mentioned the least tern as federally endangered for the West Coast and Central Plains populations; the Atlantic Coast breeding population is not federally listed. The summary statement provided by the USFWS indicates that, except for occasional transient individuals, the Poplar Island complex is not known to support any other federally listed, proposed, or candidate species.

The response letter from NMFS (Goodger 1995; Appendix C) provided a list of endangered and threatened aquatic species within this agency's purview. The list included a variety of marine mammals, sea turtles, and Shortnose sturgeon (*Acipenser brevirostrum*). The NMFS response letter (Goodger 1995) pointed out that, except for occasional transient individuals, these species are not likely to occur in the project area. Consequently, no further coordination pursuant to Section 7 of the ESA is required, unless new information becomes available or project conditions change.

The RT&E response sent by DNR (Miller 1995; Appendix B) referenced the bald eagle nest on Jefferson Island and also mentioned the long history of colonial nesting water bird use.

3.1.8.b Federally Protected Species Identified. Bald eagles (*Haliaeetus leucocephalus*) were observed on Jefferson Island in the spring and summer of 1995, including a nesting pair. No fledged offspring from the 1995 nesting season were observed during 1995 field investigations (EA 1995c, 1995d).

No other federally listed animal species or plant species was identified in the Poplar Island study area vicinity.

3.1.8.c State Protected Species Identified. By virtue of being federally listed as "endangered," the bald eagle species is also required to be state-listed as "endangered," and the various comments on bald eagle occurrence apply.

The least tern species is listed as "threatened" in the State of Maryland. It was observed in the fall and summer flying over and foraging in the open water areas of the Poplar Island study area (EA 1995a,b,c,d). No nesting colonies have been identified as occurring within the study area even though resource agency efforts have been directed toward encouraging least tern nesting on one of the grounded barges adjacent to Middle Poplar Island.

The gull-billed tern is also listed as "threatened" by the State of Maryland. It was identified as flying and foraging in the Poplar Island study area, particularly in the area between South Poplar and Coaches Islands in summer 1995 (EA 1995d).

Additional species of concern that lack protected status by the State of Maryland have been identified in the Poplar Island study area. These species are designated as "watchlist" and highly state rare. Two bird species identified in the project vicinity that are state watchlist species are the little blue heron (*Egretta caerulea*) and the sharp-tailed sparrow (*Ammodramus caudacutus*). Two bird species identified in the project vicinity that are listed as" highly state rare" are the laughing gull (*Larus atricilla*) and the hooded merganser (*Lophodytes cucullatus*). These four bird species are designated as "migrants". The state rank refers to the breeding status of the species; there may be a different rank for non-breeding populations.

No state-protected plant species have been identified in the flora of the Poplar Island study area.

3.1.9 Air Quality

Ambient air quality in Maryland is determined by measuring ambient pollutant concentrations and comparing the concentrations to the corresponding standard. The term "ambient air" is defined by the EPA as "that portion of the atmosphere, external to buildings, to which the general public has access." The ambient air quality standards are classified as primary standards, secondary standards, or both.

The primary standards were established with allowance for an adequate margin of safety for protection of public health. The secondary standards were also established with an adequate margin of safety to protect the public welfare from adverse effects associated with pollutants in the ambient air.

In protecting public welfare, air pollution effects on the following are considered: soils, water, crops, vegetation, man-made materials, animals, wildlife, weather, visibility, climate, property, transportation, economy, and personal comfort and well-being. The scientific criteria upon which the standards are based are periodically reviewed by EPA, and the standards are re-established or changed based upon the findings. The status of the national primary and secondary ambient air quality standards is briefly discussed below.

Nitrogen Dioxide Standard Status

The national primary (and secondary) air quality standard for nitrogen dioxide (NO_2) is 0.053 parts per million (0.1 milligram per cubic meter), annual arithmetic mean concentration. The standard is attained when the annual arithmetic mean concentration in a calendar year is less than or equal to 0.053 parts per million, rounded to three decimal places. Talbot County is classified as attainment for NO_2.

Carbon Monoxide Standard Status

EPA has established a primary 8-hour ambient air quality standard for carbon monoxide (CO) of 9 parts per million (10 milligrams per cubic meter), not to be exceeded more than once per year. A very short-term, 1-hour standard of 35 parts per million (40 milligrams per cubic meter), not to be exceeded more than once per year, has also been established. There is no secondary standard for CO in the ambient air.

Areas of non-attainment for CO standard(s) are classified as serious (16.5 parts per million and greater), moderate-2 (12.8 parts per million to 16.4 parts per million), and moderate-1 (9.1 parts per million to 12.7 parts per million). The Talbot County air quality region is in complete attainment with CO standards.

Sulfur Dioxide Standard Status

For sulfur dioxide (SO_2), EPA has established a primary 24-hour ambient air quality standard of 0.14 parts per million (0.365 milligrams per cubic meter), not to be exceeded more than once per year. In addition, a primary annual arithmetic mean concentration of 0.03 parts per million (0.08 milligrams per cubic meter) has also been established by EPA. The secondary standard for SO_2 is 0.5 parts per million (1.3 milligrams per cubic meter) over a 3-hour period, not to be exceeded more than once per year. Talbot County is classified as attainment with respect to SO_2.

Particulate Matter (PM10) Standard Status

The national primary (and secondary) air quality standard for particulate matter is 0.150 milligrams per cubic meter over a 24-hour period, not to be exceeded on more than an average of 1 day per year for a 3-year period. An annual arithmetic mean concentration of 0.05 milligrams per cubic meter has also been established for both the primary and secondary air quality standards. Talbot County is considered to be in attainment for particulate matter.

Ozone Standard Status

The primary and secondary ambient air quality standard for ozone is 0.12 parts per million (0.235 milligrams per cubic meter) over a 1-hour period, not to be exceeded on more than an average of one day per year for a 3-year period. Under the Clean Air Act Amendments (CAA) of 1990, Talbot County is in attainment for ozone; however, the entire State of Maryland is considered to be part of the Northeast Ozone Transport Region.

Lead Standard Status

According to MDE, the Talbot County area is in attainment for lead.

3.1.10 Noise

Uninhabited (or intermittently inhabited) islands have very few noise sources; most noise there is generated by natural occurrences. Noise levels around Poplar Island have not been measured, but background noise can be attributed to natural sources such as wind, waves on shore, and (in summer) bird colonies. The area is generally free of anthropogenic noise sources other than working boats (oyster, clamming, and fishing), occasional recreational boats and airplanes, and intermittent noise from human activities at the seasonal residences on Coaches and Jefferson Islands.

3.1.11 Hazardous, Toxic, and Radioactive Wastes (HTRW)

There are no known issues related to hazardous materials manufacturing, storage, or use on any of the island remnants or Coaches Island. No visual evidence of such materials or clandestine dumping was encountered during the walk-through surveys conducted as part of the field studies. Further, none of the extensive surveys conducted for identification of archaeological and historical sites in the area elicited evidence of hazardous materials, or a history of their use. The Baltimore District, USACE, conducted a search of Federal and state records, and no historical uses were identified that could be related to environmental liability issues. Based upon the findings of the walk-through surveys, the review of available aerial photographs, and the search of Federal and state records, the current and historical uses of the Poplar Island group and Coaches Island properties do not appear to pose a significant environmental liability concern.

3.2 Cultural Resources

Cultural resources within the Poplar Island archipelago have undergone many changes concurrent with the erosion of the island and its history of human habitation. Poplar Island has been populated by Native Americans, European colonists, and farmers. It once supported a resort town that was frequented by politicians, including several presidents. Poplar Island cultural resources have been separated into two categories, archeological and historical. Archaeological resources are categorized as occurring before European discovery. Historical resources are categorized as occurring after European contact. Archival research combined with a Phase I marine and terrestrial archeological survey was conducted for the Poplar Island project (Goodwin and Associates 1995) to assess the potential for both archaeological and historic resources. The project was undertaken in accordance with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended. Phase I marine investigations identified six magnetic anomalies that warranted Phase II evaluation. The results of that Phase I survey and the Phase II investigation are summarized here.

3.2.1 Archaeological Resources

Poplar Island has been inhabited by humans for centuries. Prior to the colonization of the Americas by Europeans, Native American populations likely utilized the island as a food gathering area. Whether they actually lived on the island is unknown. Several investigations have documented archaeological sites on the Poplar Island group, seven of which are prehistoric. Lowery (1992) has recorded four prehistoric sites on Poplar Island, two prehistoric sites on Coaches Island, and one prehistoric site on Jefferson Island. Projectile points and oyster shell middens characteristic of several archeological periods have been discovered. Research conducted in support of this project (Goodwin and Associates 1995) indicated that many of these previously recorded sites have become submerged as the islands have eroded. Consequently, artifacts from these sites may be dispersed over a wide area. The recent survey included the four remnant islands and Coaches Island for a Phase 1A investigation. The following sections review the results of this survey within the context of archaeological resources.

North Point

One archaeological site had been previously recorded for North Point. This site is thought to represent an area of short-term habitation associated with the procurement of littoral resources (Lowery 1992). Pedestrian reconnaissance of the reported location failed to produce any evidence of the site. The recent survey documented North Point to be approximately 2.5 acres in overall size (Goodwin and Associates 1995). Recent observations of the island indicate a further decrease in island size. This reduction resulting from erosional forces increases the difficulty of finding archaeological resources on North Point that may still have integrity.

Middle Poplar Island

Middle Poplar Island, the largest and most physically intact of the smaller Poplar Island remnant islands, has one previously recorded archaeological site. Island reconnaissance during the Phase IA survey identified a previously unrecorded shell midden on Middle Poplar Island associated with this site (Goodwin and Associates 1995). No evidence of the previously identified archaeological site was observed. No other artifacts or observations were recovered during this investigation.

South Central Poplar Island

Three archeological sites had been identified on South Central Poplar Island (Goodwin and Associates 1995). Archaeologically, it is thought this area was used as a food gathering area (Lowery 1992). A pedestrian survey failed to obtain any additional evidence of any of these sites.

South Poplar Island

One prehistoric site had been located on this remnant. At the time of the field investigation, only a very small portion of the island, currently estimated to be less than 0.5 acres, was above water, and no evidence of the previously recorded site was observed.

Coaches Island

Coaches Island, which remains relatively protected from erosional forces, contains two previously recorded prehistoric sites. Due to some difficulty in pinpointing the exact locations of these sites, they were not re-identified. No other evidence of either site was observed during field studies on the island (Goodwin and Associates 1995).

3.2.2 Current Archaeological Setting

Only one site with potential archaeological resources was observed during Phase 1 ground level reconnaissance performed by Goodwin and Associates (1995). This site was a shell midden located on South Central Poplar Island thought to be in association with a previously recorded archeological site on that island remnant. No other previously recorded archeological sites on the Poplar Island archipelago were rediscovered. It is thought that these previously recorded sites may persist in fragmentary condition due to their continuous exposure from the destructive effects of wave action and storm activity of the Chesapeake Bay.

3.2.3 Historical Resources

What is now known as Poplar Island (the four remnants) was first recorded by Captain John Smith as "Winston's Isles" in 1608. The island was settled in 1632 as a result of expansion from Kent Island approximately 3 miles to the north. By 1637, "Popely's Island," as it was called, became a busy and productive plantation. An Indian attack in 1637 killed every resident on the island. By 1654, Poplar Island had again become a thriving plantation and remained so until the 18th century. In 1777, the island was raided by the British, who took all the livestock and burned every residence. Poplar Island figured prominently in both the Revolutionary War and the War of 1812. During the War of 1812, the British Navy took possession of the island as a rendezvous point.

From the early 1800's, Poplar Island supported agricultural production. By 1820, it had a population of 60 residents, and several stores and a school had been established to serve this resident population. By 1870, Poplar Island was beginning to suffer from the serious effects of erosion that would continuously diminish its landmass. By the First World War, the small Poplar Island village of Valliant, with a population of 45, was the last cluster of habitation. The harsh living conditions and dwindling amount of arable land forced the last permanent resident from the island in 1929 (MES 1994).

After the last full-time resident left Poplar Island, it became home to several small hunting shacks and, in the late 1930's, was the vacation home of Presidents Roosevelt and Truman. The presidential retreat house burned in 1946, and the island again supported only small hunting cabins. A 1952 aerial survey indicated that Poplar Island had been reduced to 115 acres. This was just over 11 percent of the 1640 land area, estimated at over 1,000 acres (Figure 1-3). Currently, two part-time residences, one on Jefferson Island and one on Coaches Island, persist despite continued erosion.

3.2.4 Current Historical Resources

In conjunction with the archaeological resource investigations, a Phase 1 investigation of historical resources remaining on 5 of the 6 islands in the archipelago was conducted (Goodwin and Associates 1995). A survey was conducted on the four Poplar Island remnants and Coaches Island to characterize existing conditions.

North Point

Few historical resources were recorded on North Point during the survey (Goodwin and Associates 1995). Anecdotal evidence indicates that North Point was predominately wooded during the historical period. This would seem to indicate that human habitation of this area was limited. Shovel tests were conducted on the North Point remnant, and historic period artifacts were recovered from the island surface. In addition, wooden posts/piers were identified along the shoreline of North Point. It is postulated they represent a pier remnant or bulkheading.

Middle Poplar Island

Field reconnaissance of this remnant island by Goodwin and Associates identified a previously unrecorded historic site at the extreme south/southeast end of the island (1995). An eroding well shaft and hand pump with associated brick architectural elements were noted. Several semiburied brick foundation piers were also noted. In conjunction with these observations, many historic period artifacts were observed, including glass, tableware, a charcoal lens, and an eroding brick floor.

South Central Poplar Island

A pedestrian survey identified post holes and a variety of historic period artifacts including stoneware, bottle glass, and bovine teeth (Goodwin and Associates 1995). In 1987, a wooden structure and associated ceramics were still present on the island, as noted by Lowery (1992). Limited evidence of this site was observed by Goodwin and Associates (1995). Three features and an artifact concentration along the eastern shore are thought to be related to the historic wooden structure noted by Lowery (1992). Brick rubble, submerged brick, ceramics, and glass were all found in close association with the degraded historic site.

South Poplar Island

At the time of the Goodwin and Associates (1995) survey, only a small portion of this remnant was above water. No historical sites or resources were observed in association with pedestrian reconnaissance conducted at the site.

Coaches Island

No historic sites were identified on Coaches Island during the Phase 1A or 1B investigations by Goodwin Associates (Goodwin 1994, 1995). No historic period artifacts were collected during the archeological investigations of this island.

3.2.5 Marine Survey of Archaeological and Historic Resources

The Poplar Island archipelago, as part of the mid-Bay region, has had a long history of shipwrecks. In addition, the history of Poplar Island would indicate that many of is residents may have made their living from area waters. There is potential for submerged vessels with some historic value to be present within the current project alignment. An investigation of the potential for historic maritime resources by conducting a reconnaissance level survey using a magnometer and radio-acoustics in the aquatic portions of the study area (Goodwin and Associates 1995). The survey was conducted utilizing magnetometer and sub-bottom profiling apparatus to identify both ferrous and non-ferrous anomalies. The testing methodology was sufficient to identify all potential cultural resources in the project location. Nineteen magnetic and acoustic anomalies were recorded in this survey: five showed some associated sub-bottom disturbance. Eleven had no accompanying magnetic perturbation and are considered composed of non-ferrous substances.

Phase 2 evaluations were conducted of six marine anomalies identified during earlier underwater investigations for the Poplar Island Restoration project. These investigations were carried out during August and September 1995. This project was conducted in accordance with the NEPA of 1969, with Section 106 of the NHPA of 1966, as amended, and with Article 83B, Sections 5-617 - 618 of the Annotated Code of Maryland.

The Phase 1 investigations identified 28 magnetic and acoustic anomalies. Additional Phase 2 sub-surface testing was recommended for six target areas within or adjacent to the Alternative Alignment No. 1 project area. The submarine survey comprehensively surveyed all portions of the project location with sufficient water depth to permit the successful operation of the remote sensing equipment. However, as shown on Figure 3-18, portions of the project area adjacent to the islands could not be surveyed electronically, due to shallow water depth of less than 3 1/2 feet. In consultation with the State Historic Preservation Office (SHPO), the archeological team tested the near-shore locations with standard sampling methods, consisting of the use of hand-held dredge tests. No additional archeological sites were encountered using this testing method.

These Phase 2 investigations included a combination of visual search, metal detecting, probing, and excavation. Their purpose was to provide data concerning the integrity and National Register potential of submerged cultural resources. The six anomalies to be tested were 10-727, 10-755, 30-1151, 40-665, 48-819, and the cluster of targets at 58-1477, 60-579, and 62-1508. Each is briefly discussed below and is shown in Figure 3-18.

Anomaly 10-727—The initial sub-bottom profile record of this anomaly showed a narrow, very hard, vertical target extending deep into the substrata. The magnetometer registered an anomaly in the same location. Phase 2 investigations involved relocating the target by going over the area with the magnetometer on a 25-foot grid. Three separate circle searches were conducted at 10-foot intervals for a distance of 70 feet from the buoy (140-foot diameter). The divers probed the bottom as they searched. No sign of the target, or of any other cultural material, was located. This anomaly could not be located despite intensive bottom survey, and, therefore, no further work was recommended.

Anomaly 10-755—This target was identified as a small surface mound accompanied by a 32-gamma magnetic anomaly. The target was relocated with the magnetometer, and the bottom was searched. A 6- x 30-foot concentration of amorphous ferrous material was identified. This material may represent either a pile of corroded sheets of very thin metal, or a deposit of bog iron. There was no indication that the material was manmade; no fasteners or fastening holes were identified. This target is not considered potentially eligible for listing in the National Register of Historic Places. No additional investigation is recommended.

Anomaly 30-1151—This sub-bottom profile target showed a hard, reflective surface curving downward from the surface of the Bay floor to about 1 meter below surface. This target was postulated to represent a shell midden. This target was relocated and a bottom search was made. The bottom was sandy and did contain a lens of oyster and clam shells. The shell was scattered throughout the upper 1 1/5 feet of sand. This shell lens overlays hard packed sand. This hard-packed sand layer may have been what caused the initial sub-bottom profile reading.

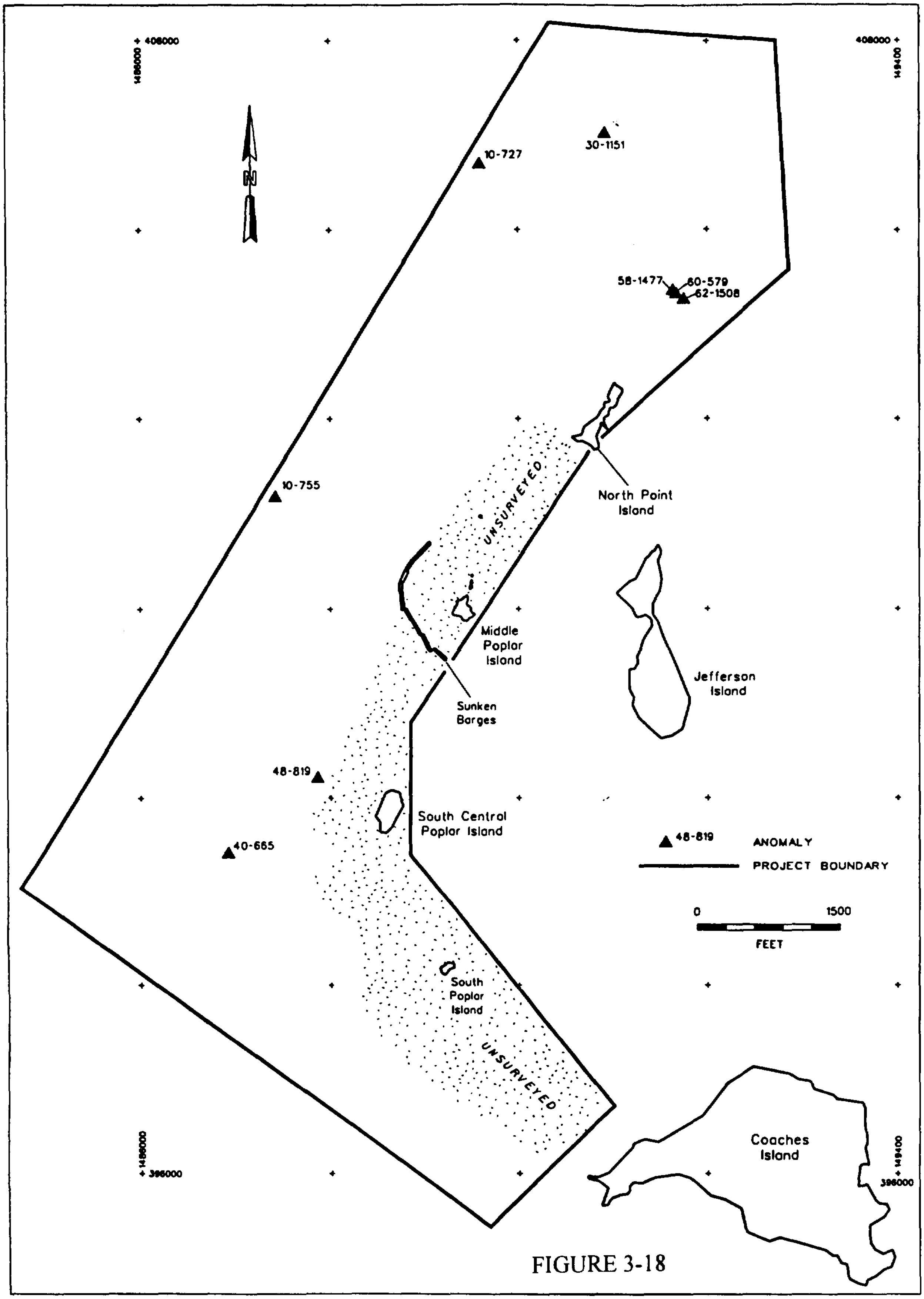


FIGURE 3-18

Location of six target areas recommended for sub-surface investigations.

Four dredge tests were performed in this shell deposit, and the shell was retained for analysis. Preliminary analysis does not suggest that the shell deposit has a human origin. The shell appears to be recent; it was scattered loosely in the sand and did not have the density of a cultural shell midden.

Anomaly 40-665—This anomaly represents a moderately strong (60 g) magnetic target without an accompanying acoustic signature. The anomaly was relocated with the magnetometer, and the bottom was searched. The area was characterized by a 1- to 2-foot sand cap over clay. There was a scattering of stones in the area, blocky quartz stones and flat black sandstone. Some of the stones were large. A piece of rebar also was identified, which may account for the magnetic signature. No archaeological site was identified. No further investigation was recommended.

Anomaly 48-819—This anomaly appeared as a U-shaped target on both the sub-bottom profile and fathometer records. The magnetic record displayed a moderately strong anomaly of significantly long duration and a multicomponent signature. The U-shaped signature commonly is associated with sunken vessels and the target was postulated to represent a small watercraft.

The target was relocated with the magnetometer, and two 70-foot circle surveys were conducted. The area was characterized by a clay bottom; however, sand had collected around two objects: an iron furnace remnant and a dead tree that had collected miscellaneous debris (a brick fragment, a piece of iron pipe) in its branches. The tree branch had a crescent shape, which may account for the U-shaped signature on the original sub-bottom profile and fathometer records. No other cultural material was identified. This collection of debris did not represent a coherent site. No further work was recommended.

Anomalies 58-1477, 60-579, and 62-1508—This was a cluster of acoustic and magnetic targets which included an acoustic target that resembled an open-topped box with straight vertical sides and a flat bottom. This was surrounded by a large area of disturbed surface and a hard reflective layer approximately 1 meter below the bottom. The size of the anomaly suggested the potential for a buried structure. The targets were relocated, and diving searches were conducted on all three anomalies. The area was probed as it was searched. Nothing was found in the area except a flat, featureless clay bottom. It is possible that the hard, reflective layer identified in the Phase 1 survey was the hard clay bottom. Perhaps the rectilinear feature was a crab pot that since has been removed. In any case, there was no evidence for the postulated structure; no cultural material of any kind was identified. No additional investigation was recommended.

3.3 Socioeconomic Resources

The Poplar Island region is considered a productive and integral part of the socioeconomic framework of Talbot County. The socioeconomics of the Poplar Island region are closely tied to commercial and recreational activities associated with the Chesapeake Bay. Land and water use, demographics, employment, and industry are discussed in the following sections.

3.3.1 Land and Water Use

The area surrounding the archipelago provides a suitable natural environment for individuals who crab, fish, or collect shellfish. Each of these resources contributes significantly to the economic well-being of the region. As a result of the seasonal nature of these species, these waters are utilized virtually year round. Another commercial use of the waters surrounding the archipelago is transportation and commercial shipping. The main shipping channel in this reach of the Bay passes approximately 2 miles from the archipelago. This navigation network is a critical component of the regional economy in the mid-Atlantic area. Finally, this region contains monitoring stations that provide regional data on biotic and chemical constituents of Bay waters. This information is utilized in various projects researching the health of the Bay system.

Land use of the Poplar Island archipelago itself is limited. Historically, Poplar Island supported agrarian and livestock farming operations (Goodwin and Associates 1995). Due to the erosion of the island, the existing archipelago no longer supports these human activities. Coaches and Jefferson Islands, the two largest of the six remnant islands, are inhabited occasionally but provide little socioeconomic value. Other than providing limited blue crab habitat in the salt marshes, the four remnants have no socioeconomic value.

3.3.2 Demographics

The project area and Talbot County are rural in nature with a low density population relative to other urban centers such as Annapolis and Baltimore. In 1990, approximately 30,549 individuals resided in Talbot County (U.S. Bureau of Census). Projections of population growth indicate the 1995 population to be 32,100 (Maryland Department of Employment and Economic Development [MDEED] 1995). In 1990, approximately 1,915 individuals resided in the Bay Hundred election district, which encompasses the Tilghman Island peninsula (Figure 3-19). This amounts to 6.3 percent of the total Talbot County 1990 population, but reflects a population decline of 5.3 percent (Table 3-20). The largest population center in closest proximity to Poplar Island is St. Michaels, with a 1990 population of 1,301 (U.S. Bureau of Census 1990). There are no permanent residents on Poplar Island. Two part-time residences exist: one on Coaches Island (the largest remnant) and one on nearby Jefferson Island.

It is important to note that Bayside towns of Talbot County are popular destinations for tourists. Many towns, such as St. Michaels and Oxford, experience significant seasonal increases in population. Recreational activities associated with sailing and power boating contribute significantly to the local economy in these areas.

It is assumed that low income or minority populations use the project area, although the exact number of users is unknown. One of the reasons this number is difficult to determine is that some users probably do not reside in Talbot County. It is assumed that some area commercial fishermen are members of low income populations.

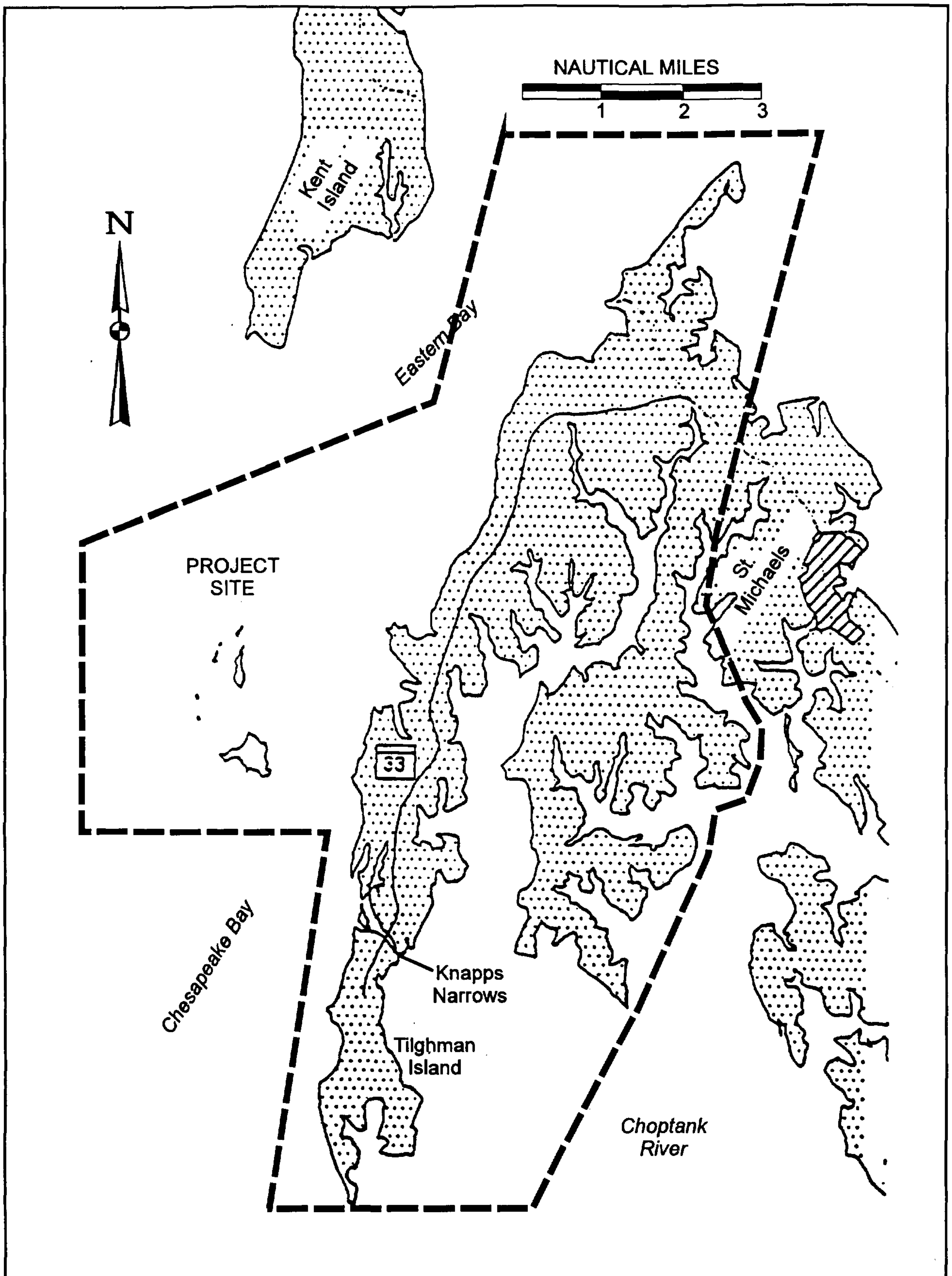


Figure 3-19 Map of Bay Hundred Region.

Table 3-20 Talbot County Regional Population Growth By Jurisdiction, 1970-1990

	1970	% of Count	1980	% of Count	1990	% of Count	Change	% of Change
Talbot County								
(Election Districts)	23,682	100.0%	25,604	100.0%	20,549	100.0%	6,867	29.0%
Easton	11,167	47.2%	12,172	47.5%	15,470	50.6%	4,303	38.5%
St. Michaels	4,431	18.7%	4,639	18.1%	5,298	17.3%	867	19.6%
Trappe	3,366	14.2%	3,495	13.7%	4,111	13.5%	745	22.1%
Chapel	2,751	24.6%	3,337	13.0%	3,755	12.3%	1,004	36.5%
Bay Hundred	1,975	8.3%	1,961	7.7%	1,915	6.3%	(60)	-3.0%
Incorporated Towns								
(Total)	9,592	40.5%	10,371	40.5%	12,457	40.8%	2,865	29.9%
Easton	6,809	28.8%	7,536	29.4%	9,372	30.7%	2,563	37.6%
St. Michaels	1,456	6.1%	1,301	5.1%	1,301	4.3%	(155)	-10.6%
Oxford	750	3.2%	754	2.9%	726	2.4%	(24)	3.2%
Trappe	426	1.8%	739	2.9%	947	3.1%	521	122.3%
Queen Anne (pt)	151	0.6%	50	0.2%	111	0.4%	(40)	-26.5%

3.3.3 Employment and Industry

The majority of individuals in Talbot County (26 percent) are employed in manufacturing, trade, or distribution industries. Other major industries include professional and technical (15 percent) and government (8 percent) based on MDEED 1995 data. A further breakdown of the employment statistics reveal that 892 individuals, or 5 percent of the work force, are employed in trades associated with farming, fishing, or forestry. The number of individuals actively engaging in fishing activities is not provided for Talbot County. However, in 1995, there were 7,806 commercial fishing licenses granted in the State of Maryland.

Commercial fishing in the Chesapeake Bay is primarily the work of small-scale operators. In the entire Chesapeake Bay in 1985, approximately 60 percent of the fishermen held crab-pot licenses and 44 percent of fishermen were licensed to fish with a gillnet (Kirkley 1987). In 1995, 73 percent of commercial fisherman (Maryland waters only) held crab-pot licenses, and 13 percent were licensed oyster harvesters.

Table 3-21 presents weight and dollar value of selected commercial fisheries landings for the Maryland portion of the Chesapeake Bay, by year, from 1980 to 1993 (Carter 1995, DNR 1995). The portion of income derived from Poplar Island waters cannot be extracted from these data. Currently, the area surrounding the archipelago contains two licensed oyster bars (NOB 8-11 and NOB 8-10). Additionally, razor clam beds, soft-shell clam beds, pound nets, and crab line areas exist either directly within or adjacent to the Poplar Island archipelago (Figure 3-15). Anecdotal evidence indicates that a substantial soft clam harvest has occurred within archipelago waters in past years. The area has been harvested since the 1940's, with harvests reaching levels of 1,000 bushels per acre (over a 3-year time frame) (Nichols 1995). However, population levels of soft clams vary considerably from year to year, and recent information indicates this species is not abundant (Outten 1995).

Oyster bars in the area have not been extensively harvested in recent years; however, both have the potential to be productive. Razor clams (used for bait) have been harvested in the southern part of the archipelago (Nichols 1995). It is not known how this shellfish species has contributed to the overall catch and income of watermen in the region.

Menhaden and striped bass are actively fished in and around the Poplar Island archipelago. Currently, 74 striped bass collection permits have been issued for the Tilghman Island region. It is unknown how many permit holders actually fish for striped bass and how many of these fish are collected from archipelago waters. There is some indication that a fishery for various species occurs during seasonal migration periods. At least one actively fished pound net was present in waters adjacent to the proposed dike alignment in the summer of 1995, and additional nets were observed during seasonal studies (EA 1995a,d). Landing data from the pound net fishery over the last 5 years (Table 3-22) indicate that several species have been collected from pound nets located either on or within the greater Tilghman Island region. The primary species captured during this period are striped bass and menhaden. Fishing was also concentrated during the summer, spring, and fall. Little or no catch was recorded during the winter. The

Table 3-21 **Weight And Dockside Values Of Selected Commercial Fisheries Landings From Noaa Code Area 027 Of Maryland Chesapeake Bay, By Year, 1980-1993**

	Species											
	Blue Crab (sum of hard and soft)		Soft Clam		Oysters		Bluefish		Summer Flounder		Herring	
Year	Pounds	$ Value	Pounds	$ Value	Pounds	$ Value	Pounds	$ Value	Pounds	$ Value	Pounds	$ Value
1980	9,843,321	2,458,455.51	133,323	293,728.25	431,744	614,722.88	18,739	1,761.32	2,496	1,169.54	4,733	384.37
1981	13,009,180	3,690,383.45	240,930	444,015.00	219,171.20	318,697.00	31,172	3,960.43	1,391	948.66	1,741	170.33
1982	6,845,002	2,498,498.62	34,878	73,956.00	382,697.60	637,989.00	35,930	5,840.22	1,118	742.33	980	218.47
1983	14,625,777.39	5,527,785.31	54,840	115,886.00	139,789.95	239,468.75	25,276	3,996.38	4,861	2,944.70	5,358	886.60
1984	9,757,738.11	3,015,833.77	108,294	265,780.45	337,558.80	844,881.00	26,228	3,391.16	2,420	1,661.00	933	122.84
1985	10,250,923.44	3,547,991.51	565,821	1,561,590.95	365,795.14	687,432.85	95,555	15,656.57	280	274.83	2,048	346.67
1986	11,229,840.33	3,985,591.64	65,322	229,613.50	300,606.53	719,071.10	82,712	11,551.88	937	1,109.65	7,800	1,106.43
1987	7,395,634.07	3,633,006.93	695,538	1,219,445.50	140,302.40	464,002.50	112,917	23,613.02	3,304	5,219.69	4,496	1,054.85
1988	7,406,461.73	3,056,211.95	1,609,056	3,242,374.30	82,800	260,191.00	298,090	40,023.20	3,432	4,986.24	9,143	1,863.67
1989	7,299,058.93	3,614,613.22	638,619	1,441,682.45	75,281.60	273,218.00	56,904	12,910.05	743	1,624.96	10,103	1,258.03
1990	8,037,494.22	3,594,004.45	299,598.12	1,342,934.70	69,014.40	269,291.00	64,070	13,974.88	691	1,689.26	2,709	762.30
1991	8,069,785.81	3,255,227.10	387,315	1,228,138.25	217,379.20	694,981.70	38,722	8,652.45	376	461.99	2,711	512.04
1992	4,527,207.69	2,595,812.56	41,031	116,929.00	109,019.20	360,756.00	9,272	2,477.29	2,486	3,696.58	840	185.754
1993	12,169,370.11	6,415,688.02	501,954	2,085,606.70	8,568	29,689.50	3,415	1,628.99	1,078	1,464.29	291	60.64

Table 3-21 (continued)

	Species							
	Menhaden		Striped Bass (sum of large, medium, and small)		White Perch		Sea Trout, Grey	
Year	Pounds	$ Value	Pounds	$ Value	Pounds	$ Value	Pounds	$ Value
1980	667,484	36,128.66	439,909	381,622.27	28,624	10,183.69	1,968	463.42
1981	937,953	55,398.03	93,086	116,265.89	8,188	3,254.45	4,313	1928.71
1982	781,558	46,464.91	36,034	52,770.93	8,574	4,432.45	14,517	8561.70
1983	784,670	30,781.32	24,857	63,316.29	4,196	2,502.95	4,599	3248.56
1984	304,002	15,264.70	135,261	332,572.95	9,713	4,782.02	3,737	2053.39
1985	348,625	18,045.95	29	-0-	522	201.24	6,229	4204.53
1986	156,317	10,300.17	3,125	3,125	340	185.28	12,161	7050.16
1987	510,910	33,478.78	13,113	-0-	955	557.89	16,217	12423.82
1988	335,822	22,366.64	18,062	-0-	1,098	513.83	6,502	5681.22
1989	2,154,805	151,384.24	9,188	-0-	2,254	1,551.48	1,4156	14424.82
1990	769,070	72,414.94	8,710	12,802.38	4,666	2,904.30	2,853	3320.93
1991	1,286,594	704,322.11	71,171	132,540.56	11,054	7,210.35	544	481.43
1992	831,237	80,835.38	110,204	176,243.24	6,926	6,667.05	685	672.21
1993	794,026	80,282.37	288,137	463,639.81	20,602	16,991.02	95	113.07

monetary value of this catch is difficult to ascertain. Information related to the pounds of fish landed (Table 3-21) indicates that this region is productive and contributes economically to the region. No other records exist for other pound net sets within the archipelago. At least one other site has been recorded and is currently being fished. Records indicate that as many as four sites either adjacent to or within the archipelago have contributed to the pound net fishery in the area (MES 1994). Other gear (e.g., gill nets) are not utilized to the extent of pound nets. Records indicate that gillnets, fyke nets, and fish pots have been used successfully to collect various fish species within the Poplar Island region (Goshorn 1995).

Crabs and crabbing also contribute significantly to the economic setting of Talbot County and support commercial harvests in other Bay communities. Crabbing is ubiquitous throughout the Bay region. Nearly every productive bottom from the mouth of the Bay to its confluence with the Susquehanna River is actively fished for crabs (at some point during a season). Seasonally, locations of crab pots are changed to reflect movement of the species. During the spring and fall, deeper locations are often fished. This would include only the fringes of the archipelago. During the summer months, shallow water areas are fished, including most all of the Poplar Island archipelago. Observations from the summer quarterly report indicate that crab lines were placed in all sections of the archipelago including Poplar Island Harbor (EA 1995c). The percentage of crabs taken from this region is difficult to estimate, although the extensive area fished indicates this is a productive region.

3.4 Aesthetics and Recreational Resources

The middle Chesapeake Bay, which encompasses the Poplar Island region, is a widely used recreational and aesthetic resource enjoyed by many different individuals in a variety of pursuits. Consequently, a high value is placed on these resources in the mid-Chesapeake Bay region. The Poplar Island archipelago helps to maintain the current high quality of these resources. Recreational and aesthetic resources in the archipelago are typical of most mid-Bay areas. This region supports a high number of seasonal recreational activities including water sports (i.e. boating, sail-boating, fishing, and hunting). One common theme associated with all these recreational activities is that an aesthetically pleasing environment is integral to most.

3.4.1 Aesthetics

The mid-Bay region is considered to have a high aesthetic value. This region of the Bay, sometimes called the Bay Hundred, has a limited amount of shoreline development and many natural features such as coves, rivers, and protected areas that provide scenic vistas to both the shoreline observer and the boater. The Poplar Island archipelago, which is located in this region (Figure 1-2), contains many similar natural features. Very little development exists on the islands, and there is little visible evidence of human presence.

Few island environments still exist in the middle portions of the Chesapeake Bay. In general, islands help to diversify the landscape and add to the aesthetic appeal of the region. Historically, islands played a much larger role in the natural setting of the Chesapeake Bay than they do today. Erosional forces have greatly reduced the land area of most islands throughout the Bay region.

Table 3-22 Commercially Reported Pound Net Catch (1990-1994) in the Vicinity of Poplar Island

Year	Species	Catch (lbs)
1990	Menhaden	521,416
	Striped bass	153
	Bluefish	2,440
	Summer Flounder	25
1991	Menhaden	800,700
	Striped bass	775
1992	Menhaden	457,422
	Striped bass	10,665
1993	Menhaden	703,801
	Common eel	3,200
	Black Drum	3,404
	Bluefish	815
	Striped bass	11,141
1994	Menhaden	356,259
	Striped bass	6,593

The existing six islands that comprise the Poplar Island archipelago are subject to severe erosional forces (MES 1994). These same erosional forces have reduced the relief of the archipelago to the point where the majority of the islands (excluding Coaches and Jefferson) are not visible from a distance (e.g., from Poplar Channel). Coaches and Jefferson Islands provide the only appreciable topographic relief at this time.

The four smaller remnants of the Poplar archipelago are dominated by marsh grasses, and they experience partial to complete inundation during high tide events. It is estimated that maximum relief above MSL for these islets is no more than 4 feet. The two larger parcels (Coaches and Jefferson Islands) are wooded in the center with a periphery composed of marsh grasses, intertidal ponds, and other wetland features. The wooded areas are dominated by deciduous trees interspersed with loblolly pine. It is estimated that at its highest point, the maximum relief above MSL is approximately 8 feet for the two wooded islands.

Close inspection of the six remnants reveals the influence of nearby human activities. Due to the island's location, refuse from boaters and other shoreline areas washes ashore and accumulates. On the more exposed areas of the archipelago, especially those within the high tide range, debris associated with Bay activities (crab floats and pots, fishing lines, and boating items) is visible at close range.

A very low level of human activity has been observed on the remnants. Two residences, one on Coaches Island and one on Jefferson Island, are occupied on an infrequent basis. Because most of the surrounding waters are shallow and the area is some distance from the closest mainland port, there are few visitors other than seasonal residents. Private property warning signs on Coaches and Jefferson islands likely deter intruders from using these remnants. During baseline biological and water quality surveys (EA 1995a,b,c,d), an inspection of the shoreline areas in conjunction with other survey components indicated little evidence of human disturbance (e.g., fire rings, ashes, camping remains) on the other existing remnants.

The continued erosion of the archipelago has had a detrimental effect on the aesthetic value of these islands. Continued erosion of the shoreline has reduced the areal extent of the islands, rendering many of them barely visible during high tide. Sediment plumes from erosion of the islands occur throughout all seasons and under most conditions. The reduced visibility in the area hinders fishing and other water sports, which require clear visibility, and the mud banks associated with the erosion limit access to the islets.

In general, the Poplar Island archipelago can be considered a region with a high quality aesthetic environment; however, reduction in the island landmass due to extreme erosional forces has diminished the visual and aesthetic diversity that historically enhanced this area of the Chesapeake Bay.

3.4.2 Recreation

A variety of recreational activities occur within the Poplar Island archipelago depending on season and weather conditions. The most popular recreational activity in the area is fishing. In 1993, in the south-central portion of the Chesapeake Bay, 254 charter boats recorded 7,234 trips involving 42,758 people. Tilghman Island has a large charter fishing fleet that operates during the spring through fall period. During the winter months, sea duck hunting is a popular activity, and many licensed gunning rigs operate in the area.

Fishing

Fishing is likely the most common recreational activity that occurs within the Poplar Island archipelago. Placement of barges some years ago prevented the erosion of a portion of Middle Poplar Island and promoted fishing within the area between the barges and the islet. This area contains many snags, the submerged remnants of a forest that provide cover for fish. The region known as Poplar Island Harbor also contains many stumps and logs that provide cover and habitat. Fishing for several species, including striped bass and sea trout, is especially popular during seasonal migration periods. Fishing in other areas of the archipelago is limited because of the shallow, open water and the lack of suitable habitat.

Boating

Boating is central to many Bay activities, including recreational pursuits. In the Chesapeake Bay, power boaters, waterskiiers, and sailboaters all utilize portions of the Bay waters. St. Michaels, near Tilghman Island (Figure 3-20) is a popular destination for boaters in this region. The waters surrounding Poplar Island often preclude boating for all but the shallowest draft vessels. Consequently, except as a navigational landmark, most boating activities bypass the project area.

Hunting

Historically, the island was considered an excellent waterfowl hunting area. Hunting camps were established on the island during the 1940's and 1950's (MES 1994). The decline in waterfowl populations followed by restrictive hunting seasons contributed to the decline of this activity Baywide, including on Poplar Island. The current status of hunting activities within the archipelago are unknown. Some evidence of recently spent shell casings and decoys were observed on Coaches Island during seasonal baseline surveys. No operational waterfowl blinds were observed during existing conditions surveys. It is likely that hunting for sea duck species (e.g., elders, scoters, buffleheads) occurs within the 1847 footprint. Concentrations of these species were observed during the winter survey (EA 1995b). Generally, hunting locations for these species are well offshore and change with the seasonal patterns of the ducks hunted. A small population of whitetail deer, which is exposed to some hunting pressure, exists on Coaches Island. However, because of the small size of the herd, only a limited amount of hunting could occur before the herd would be reduced to levels unable to support a harvest.

Other Recreational Activities

The Poplar Island archipelago is a well-known bird rookery and bird watching area. Herons, egrets, cormorants, and other species utilize the archipelago during the nesting season. This activity attracts bird watchers to the area. This activity is highest during the spring and fall migration periods.

Sightseeing is another recreational activity that occurs near the Poplar Island archipelago. Poplar Island has a long history that attracts people who want to view the island. Interest in the island has been stimulated by a number of books, articles, and television programs that have featured Poplar Island. This contributes to the number of sightseers who visit the archipelago.

3.5 Most Probable Future Without-Project Conditions

The without-project condition is defined as the most likely condition expected to prevail over the length of the planning period (in this case, 20 years) in the absence of the Federal government implementing a plan of improvement. The without-project condition provides the baseline condition for any impacts associated with any improvements.

Without this project, the four separate islands, which now comprise just over 5 acres and which are eroding at the rate of more than 13 feet a year, will disappear completely just as 10,500 acres of other island habitat has in the Chesapeake Bay over the past 150 years. When the islands disappear, so too will the nesting snowy egrets, cormorants, little blue herons, black ducks, willet and osprey that the islands currently support. In addition, the continued erosion of the islands will continue to contribute to the Chesapeake Bay sediment loadings and have a negative impact on the water clarity in the immediate vicinity of the islands. This will result in a continuation of the persistent turbidity that is currently present.

If this project is not undertaken, the MPA will need to locate a suitable placement site in order to accommodate the approximately 38 million cubic yards of material that would be dredged from the approach channels in the upper Chesapeake Bay and placed at Poplar Island. Current MPA projections are that there will be a 34-million cubic yards shortfall in dredged material placement volume over the next twenty years. This shortfall is based only on the annual maintenance that will be required for the upper Chesapeake Bay approach channels, since this is the only material that is being considered for placement at Poplar Island. Due to the amount of time required to identify and develop a placement site, the material dredged as a result of any required maintenance dredging would be taken to HMI as long as there is sufficient capacity. HMI is expected to be filled by 1998; this action would result in the deferral of both maintenance dredging and any identified new work dredging until an alternative site is developed.

Section 4

Plan Formulation

This section documents the feasibility phase plan formulation that was conducted for the Poplar Island habitat restoration project. Prior to initiation of the feasibility study, an intense evaluation of potential dredged material management options has been ongoing, conducted by a multi-agency group representing Federal, State, and local governments, members of the academic community, groups concerned with protection of the environment, parties involved in maritime commerce, and parties whose livelihood is dependent upon the quality of Bay waters (Section 2). This effort has included a Governor's Task Force on Dredged Material and the MPA's Dredging Needs and Placement Options Program. Over the past several years, an extensive list of potential alternatives have been developed and, subsequently, refined based on cost, engineering feasibility, and environmental concerns. These options included identifying potential placement sites that would promote fish and wildlife enhancement. In order to meet the short-term dredged material placement needs, three beneficial-use projects were identified: 1. restorations of Poplar and Bodkin Islands, including creation of wetland and wildlife habitats, 2. island restoration, and 3. beach renourishment at HMI. However, of these, only the restoration of Poplar Island remains as a viable alternative. Subsequent to the identification of Poplar Island as a potential project, the MPA contacted USACE, and this feasibility study was initiated. The details of the plan formulation process conducted as part of this study follow.

4.1 Federal Objective

The Federal objective of water and related land resources project planning is to contribute to the national economic development (NED) consistent with protecting the nation's environment pursuant to national environmental statutes, applicable executive orders, and other Federal planning requirements. This objective was established by the U.S. Water Resources Council's *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies* dated 10 March 1983.

Water and related land resources project plans are to be formulated to alleviate problems and take advantage of opportunities that contribute to this objective. Contributions to NED increase the net value of the national output of goods and services expressed in monetary units (that is, benefits exceed costs). These contributions are the direct net benefits that accrue in the study area and in the rest of the nation. They include increases in the net value of goods and services that are marketed (vendible) and also of those that may not be marketed.

The USACE maintains the 126 miles of Federal navigation channels that serve the Port of Baltimore. Demands for placement areas and funding constraints have caused the existing HMI placement facility to be filled in less time and with a mixture of clean and contaminated material. As a result, the site is expected to reach its capacity, be capped with clean material, and unavailable for use by the year 1998. A disruption in the maintenance of the Federal project due to lack of placement capacity would result in significant adverse effects to both the local and national economy. The Port handles approximately 350,000 containers of cargo and generates 87,000 jobs. Revenue impact from the Port resulted in earnings of $1.3 billion for firms in the maritime sector, contributes nearly $3 billion in business, and represents one-tenth of Maryland's gross state product. The Poplar Island restoration project represents a cost-effective and environmentally beneficial solution to the dredged material placement problems facing the MPA.

Since benefits of fish and wildlife habitat restoration and creation are not amenable to traditional NED benefit analyses, criteria contained in Policy Guidance Letter No. 24, CECW-PA, March 27, 1991; Engineering Circular (EC) 1105-2-209, CECW-P, March 20, 1995; and Institute of Water Resources Report #95-R-1, May 1995, were used to define the Federal objective. Those criteria include the following:

> *1. Project outputs will be primarily for the benefit of fish and wildlife habitat.*
>
> *2. Implementation of projects for ecosystem restoration must be in connection with dredging for construction, operation, or maintenance by the Corps of Engineers of an authorized Federal navigation project including harbors, inland harbors, and inland waterways.*
>
> *3. Project outputs must address significant resources (based on public, scientific, and institutional considerations). Incremental analysis techniques should be used to optimize return on investment.*
>
> *4. Habitat outputs will be documented with qualitative and quantitative procedures such as the Habitat Evaluation Procedure (HEP).*

The Federal objective of restoring fish and wildlife habitat is based on the 31 August 1995, ER entitled *Implementing Ecosystem Restoration Projects in Connection with Dredging*, as well as numerous other Federal laws, regulations, and executive orders.

The problem that has been evaluated in this study is the restoration of fish and wildlife habitat using dredged material from an authorized Federal navigation project. Efforts were undertaken to evaluate opportunities either to restore habitat or to construct new habitat in areas that would provide an appropriate setting for fish and wildlife habitat.

Unlike traditional Civil Works water resource projects, environmental restoration projects need not contribute to national economic development. The Federal objective of environmental restoration for the Corps of Engineers is to restore significant fish and wildlife habitat. As defined by Engineering Regulation (ER) 1105-2-100, significance is based on institutional, public, and technical recognition.

The significance of the fish and wildlife resources of the Chesapeake Bay is widely recognized by the institutional, public, and technical sectors, both within the Chesapeake Bay watershed and also in a larger regional context as evidenced by the new emphasis on the tributary strategies to restore the Chesapeake Bay. Over the past 20 years, extensive efforts have been expended to support natural resources management and restoration plans in the Chesapeake Bay region.

Wetland and island habitats support a number of nationally significant species such as anadromous fishes and waterfowl. Island habitats are significant because they provide isolated areas devoid of human disturbance and they have fewer predators than mainland habitats. Significance based on institutional recognition means that the importance of an ecological resource is acknowledged in the laws or policy statements of public agencies or private organizations. From an institutional focus, the significance of wetland functions is nationally recognized, and wetlands are now protected by various executive orders and Federal, state, and local laws and regulations.

Some of the numerous Federal laws, regulations, and executive orders that recognize the significance of aquatic, bottomland, and wetland habitats and their related species include the following:

- Anadromous Fish Conservation Act
- Emergency Wetlands Resources Act of 1986
- Fish and Wildlife Coordination Act of 1958
- Migratory Bird Conservation Act
- Migratory Bird Treaty Act of 1969
- National Environmental Policy Act of 1969
- Executive Order 11990 Protection of Wetlands (1977)
- Watershed Protection and Flood Prevention Act (as amended, 1986)
- Federal Water Pollution Control Act of 1987 (Clean Water Act)
- Land and Water Conservation Act of 1987
- Coastal Zone Management Act of 1990
- President's Initiative - Protecting America's Wetlands: A Fair, Flexible and Effective Approach, August 24, 1993

There are also a broad range of regulations that reflect the significance of aquatic, bottomland, and wetland ecosystems on the regional and local level. Some of these include the following:

- State of Maryland Critical Areas Law (1989)
- State of Maryland Title 8, Subtitle 05, Chapter 9 Wetlands Regulations (1990)
- State of Maryland Nontidal Wetlands Protection Act (1990)

In addition, the charters, by-laws, and formal policy statements from private groups also indicate intense interest from citizens. Some of these groups are listed below:

- Alliance for the Chesapeake Bay
- Chesapeake Bay Foundation
- Ducks Unlimited, Inc.
- Save our Streams
- Trust for the Public Lands

These lists demonstrate the substantial Federal, regional, local, and private significance placed on the restoration, enhancement, and preservation of these types of habitats.

Significance based on public recognition means that some segment of the general public recognizes the importance of an ecological resource. Public recognition of the significance of the resources within the study area is demonstrated in the formation of local citizens groups and in the willingness of the public to be involved in activities designed to restore or enhance environmental resources. Non-profit organizations such as Save the Bay have organized programs to educate citizens on ways to protect and improve the Chesapeake Bay. Through this program, volunteers have participated in activities such as storm drain stenciling, reminding everyone that the drains ultimately connect with the Chesapeake Bay. Public support for the restoration of the Chesapeake Bay is very strong today and continues to grow each year.

Maryland's participation in the Chesapeake Bay Partnership Agreement is further evidence of the importance the state attaches to the restoration of the living resources of the Chesapeake Bay. This agreement has resulted in the development of the State Tributary Strategies, which has as its goal a 40-percent reduction in the amount of nitrogen and phosphorous entering the Bay by the year 2000. On the Federal level, the development of the Federal Agency Ecosystem Agreement is evidence that a Federal interest exists in successfully restoring ecosystems. This agreement, which has been signed by numerous Federal agencies, has as its goal the development of cross-agency ecosystem planning and management in order to restore and protect the ecological integrity, the productivity, and the beneficial uses of the Chesapeake Bay system.

Further evidence of the significance of this project is provided by the wide support it has received from various public agencies and groups: the Alliance for the Chesapeake Bay, the Chesapeake Bay Foundation, the Chesapeake Bay Program, DNR, EPA, the Maryland Charter Boat Association, MDE, MES, MPA, the Maryland Saltwater Sportfishermens Association, the Maryland Watermen's Association, NMFS, NOAA, the Talbot County Council, and USFWS.

The technical significance of wetland, bottomland, and aquatic functions are nationally recognized and are now protected by various executive orders and by Federal, state, and local laws and regulations, as shown above. Significance based on technical recognition means that the importance of an ecological resource is based on scientific or technical knowledge or on critical resources characteristics. The scientific community has documented the importance of the restoration of wetlands, streams, and riparian corridors through research conducted to develop the goals of the Chesapeake Bay Agreement.

Scarcity, a measure of a resource's relative abundance within a specified area, is one of the many criteria that may assist in determining technical significance. Offshore islands are a unique ecosystem component in the Chesapeake Bay watershed. These valuable island habitats are becoming more and more scarce throughout the Chesapeake Bay. In the last 150 years, it has been estimated that 10,500 acres have been lost in the middle eastern portion of the Chesapeake Bay alone. Uplands are very significant for migratory birds, waterfowl, and shorebirds. These species need both uplands and wetlands. Within the study area, islands and wetlands are rapidly becoming scarce.

The concepts of scarcity and significance also play important roles in determining whether or not it is in the Federal interest to undertake a project, and what priority a particular project will have. Recommendations for USACE environmental restoration actions are based on the scarcity and the significance of the environmental resources impacted, as well as on the feasibility of restoring or creating the affected resource.

4.2 Planning Objectives and Constraints

Planning objectives and constraints are expressions of public and professional concerns about the use of water and land-related resources in a particular study area. These planning objectives and constraints result from the analyses of existing and future conditions within the context of the physical, environmental, economic, and social characteristics of the study area. They are used to guide the formulation of alternatives and to evaluate the effectiveness of those alternatives.

The planning objective of the Poplar Island Restoration Study is to use clean dredged material to protect, restore, and create aquatic and ecologically related habitat at Poplar Island, Maryland. The project proposes to use approximately 38 million cubic yards of clean dredged materials beneficially to recreate fish and wildlife habitat.

The main constraint on the study was the requirement to utilize sediments dredged from the Baltimore Harbor and Channels Federal navigation project. Only "clean material" from these channels (i.e., the southern approach channels) is to be used for this restoration project. Due to the shortage of placement site capacity for the Baltimore Harbor and Channels project, as well as other channels serving the Port of Baltimore, there is a lot of pressure to maximize capacity with this project. However, the objective is to maximize the quality and quantity of fish and wildlife habitat being created, and any additional capacity gained by the plan that maximizes outputs is incidental. In weighing the environmental outputs of alternative plans, it was also necessary to balance the type of habitat being created against the type of habitat being lost as a result of the construction of this project. The involvement of the multi-agency DNPOP working group helped to ensure that objectives and constraints were fully considered during the plan formulation process.

4.2.1 Environmental Objectives and Constraints

The primary environmental objective for this project is to restore remote island habitat. Not only is this type of habitat scarce and significant, but so is the opportunity to restore and protect this type of habitat. At least thirteen remote islands have been lost in their entirety to erosion and only seven or so that remain, all further from the target channels than Poplar Island. Opportunities for establishment of remote island habitat in the Bay are rare. The capability of the created upland to interact with the substantial adjacent wetlands acreage increases the value of this opportunity.

Several environmental goals were identified for the restoration: (1) creating bare or sparsely vegetated islands as nesting habitat for colonial waterbirds such as terns, (2) creating vegetated islands for waterbirds such as egrets and herons, (3) creating tidal marsh to provide habitat for fish and wildlife and to provide food web support for the Chesapeake Bay ecosystem; (4) create a diversity of habitats to benefit a wide range of fish and wildlife; (5) creating quiescent conditions for SAV recovery; and (6) minimize and offset loss of benthic habitat.

4.2.2 Engineering Objectives and Constraints

The primary engineering objective is to protect and enhance the remnant islands of the archipelago that have waterbird colonies. An initial assumption was that the project would consider restoration of Poplar Island to approximately its 1847 footprint.

4.2.3 Economic Objectives and Constraints

The primary economic objective is to ensure that the recommended plan is the most cost-effective at accomplishing the other objectives. Selection of the preferred alternative weighs the environmental benefits to be derived versus the need to minimize the cost.

4.3 Formulation and Evaluation Criteria

The formulation process used to develop and evaluate alternatives is based on the consideration of measures with the potential for addressing the planning objective and meeting technical, environmental, and socio-economic criteria. These included the following:

4.3.1 Formulation Criteria

<u>Engineering and Design Criteria</u>

- Ensure that alternative plans are complete, efficient, safe, and feasible.
- Ensure that alternatives are designed in a cost-effective manner.
- Coordinate designs and layout of alternatives with the MPA and the environmental community.

Environmental Criteria

- Avoid detrimental impacts to the environment and/or include features to mitigate any adverse effects.
- Minimize impacts to recreation.
- Minimize aesthetic impacts.
- Provide alternatives that are acceptable to other Federal, state, and local environmental agencies.

Socio-Economic Criteria

- Protect public health, safety, and well being.
- Respond to sponsor concerns and desires.
- Identify alternatives preferred by the Baltimore maritime and environmental community.
- Identify alternatives that maximize placement capacity and minimize placement costs.

Specific solutions were selected and analyzed based on the measure most likely to demonstrate that a feasible plan of improvement exists. In addition, the District evaluated potential base plans for maintenance dredging in order to define the incremental project costs.

Alternatives were formulated and evaluated on the basis of technical, economic, and environmental criteria. These criteria allow for the development of options that best respond to the planning objective. In order to evaluate the technical benefits of the various alternatives formulated, a detailed field investigation and modeling analysis was performed. In order to evaluate the economic benefits of the various alternatives formulated, a cost comparison was made.

4.3.2 Evaluation Criteria

To evaluate the alternatives formulated, a list of species and species associations as indicators of the Chesapeake Bay's ecological condition was considered. Alternative restoration configurations and habitat to be produced by each alternative were defined and details regarding specific attributes for each habitat type (e.g., low marsh characteristics) and a comprehensive list of species expected to utilize each habitat type were prepared. Selection of the preferred alternative weighs the environmental benefits to be derived versus the need to minimize the cost. In order to evaluate how well each alternative met these environmental objectives, it was necessary to quantify or rank the value of the environmental outputs that would be produced by each configuration. A cost-effective analysis was completed with the above information.

The Chesapeake Bay Program initially identified an extensive list of species to represent all aquatic habitats, salinity and depth zones, and trophic levels. They then selected indicator species from the larger list based upon commercial, recreational, ecological and aesthetic significance. The indicator species were selected to characterize all habitat types and trophic levels in the Chesapeake Bay with a manageable subset of representative species. Not all species are meant as indicators of recovery; rather, the abundance of some species reflect the habitat quality, quantity or diversity of the area. Therefore, the species on the list may have commercial and/or recreational importance and due to abundance, productivity or distribution, are important in the flow and accumulation of energy through various trophic levels of the Chesapeake Bay ecosystem. The species are intended to be surrogates for the larger bay ecosystem through their habitat and food chain requirements and ecological associations. Maintenance of these indicator species should help ensure the ecological "wellness" and diversity of the Chesapeake Bay ecosystem.

A subset of the Chesapeake Bay Program's species indicator list, which will benefit from the proposed Poplar Island restoration, was provided. These species require the types of aquatic, forest/shrub, and/or wetland habitat that are proposed in this study. The key indicator species are as follows:

Birds

Nesting

American Black Duck *(Anas rubripes)*
Snowy Egret *(Egretta thula)*
Little Blue Heron *(Egretta caerulea)*
Least Tern *(Sterna antillarum)*
Common Tern (*Sterna hirundo)*
Bald Eagle *(Haliaeetus leucocephalus)*

Feeding and Roosting

American Black Duck *(Anas rubripes)*
Snowy Egret *(Egretta thula)*
Little Blue Heron *(Egretta caerulea)*
Dowitchers *(Limnódromus* spp.*)*
Whimbrels *(Numénius phaéopus)*

Reptiles

Nesting

Diamondback Terrapin *(Malaclemys terrapin)*

Fish

Open Water

Spot *(Leiostomus xanthurus)*
Black Drum *(Pogonias cromis)*
Weakfish *(Cynoscion regalis)*
Spotted Sea Trout *(Cynoscion nebulosus)*
Blue Fish *(Pomatomus salatrix)*
Striped Bass *(Morone saxatilis)*
Summer Flounder *(Paralichthys dentatus)*
Winter Flounder *(Pleuronectes americanus)*

Low Marsh

Spot*(Leiostomus xanthurus)*
Killifish *(Fundulus* spp.*)*

High Marsh

Mummichog *(Fundulus heteroclitus)*
Rainwater Killifish (*Lucania parva*)
Sheepshead Minnow *(Cyprinodon variegatus)*

Jetties

Bluefish *(Pomatomus saltatrix)*
Striped Bass *(Morone saxatilis)*

Invertebrates

Low Marsh	High Marsh
Palaemonid Shrimp	Palaemonid Shrimp
Penaid Shrimp	
Blue Crab (*Callinectes sapidus*)	

All the species potentially can use or are using the Chesapeake Bay watershed at some point in their life histories. The restoration of Poplar Island will benefit these significant indicator species. Therefore, if these species will benefit, the Chesapeake Bay ecosystem should be improved. The following is a brief description of several of these species and their habitat requirements, taken from *Habitat Requirements for Chesapeake Bay Living Resources* (Funderburk, *et al*, 1991) and various U.S. Department of the Interior, Fish and Wildlife Service, Biological Reports.

American Black Duck *(Anas rubripes)*

The black duck is a dabbling duck that inhabits inland and emergent wetlands throughout Chesapeake Bay to migrate, breed, and winter, principally around the mid-Eastern Shore and Western Shore of Virginia. Black ducks are omnivores, consuming small fish, mollusks, and a variety of vegetation, including SAV and agricultural crops. SAV is extremely important to black duck nesting in brackish and salt marshes. Black ducks provide a valuable link between herbaceous plants and invertebrates and higher predators, including bald eagles, foxes, and great horned owls. During the 1950's, a large portion (20 percent) of the continental population of black ducks wintered on Chesapeake Bay. Up to 224,000 birds used the Bay then, whereas now the annual wintering population averages about 30,000. In order to replenish the population of black duck, refuges should be expanded and SAV restored.

Colonial Wading Birds (Herons and Egrets)

Six species of colonial nesting wading birds -- the great blue heron, great egret, snowy egret, little blue heron, green-backed heron, and black-crowned night heron -- are prominent avian residents of the Chesapeake Bay region. Colonial wading birds are extremely predaceous, feeding mostly on small fish, amphibians, crustaceans, and aquatic insects in a variety of aquatic habitats. All six species breed in the Chesapeake Bay and migrate south in the winter, although some are year-round residents. Most birds begin to arrive on the Chesapeake breeding grounds from mid-March to mid-June. Nesting habitat common to all six species includes the presence of woody vegetation and isolation from human and animal predators. Great blue herons prefer tall trees (7-10 m), either live or dead, inhabit both hardwoods and evergreens, and avoid areas with human activity. The largest colonies are found in the upper reaches of the Bay in woodland swamps adjacent to large tributaries. Black-crowned night herons, great and snowy egrets, and little blue herons tend to nest on islands with shrubby vegetation, often in mixed-species colonies. Green-backed herons are the most solitary nesters of the group, but at times can be found with other herons and egrets. They use both shrubs and small trees and can often be found nesting on duck blinds. Populations of these species appear to be stable, with the exception of the little blue heron, which has declined. Numbers of great blue herons may actually be increasing, although higher population counts may be attributable to expanded inventory areas. The Bay region contains the five largest Atlantic Coast colonies of great blue herons. There are several factors of concern for this population. These include (1) loss of water quality necessary to support SAV beds (hence loss of good nursery areas for fish and crabs); (2) loss of wetlands due to siltation, agriculture, and sea level rise; (3) disturbance at islands or other colony sites by boaters and other types of human activity.

Least and Common Tern *(Sterna antillarum* and *Sterna hirundo)*

These terns breed along coastal and freshwater habitats of North America. Breeding habitat is generally characterized as open sand, soil, or dried mud in the proximity of a lagoon, estuary, or river. Terns in marine environments nest on islands, peninsulas, beaches, sandbars, and isolated sandpits, usually between the high tide line and the area of dune formation. On the Atlantic coast, terns commonly nest on dredged material. The terns have suffered a significant loss of nesting and feeding habitat from human activities, including recreational use and habitat modification due to development. Development of island habitat would help to offset this loss.

Bald Eagle *(Haliaeetus leucocephalus)*

Bald eagles are predators known for their fish-eating habits. They are also opportunistic scavengers, consuming a variety of species. In the Chesapeake Bay, adult eagles generally remain in their nesting territories throughout the year. They nest along the undeveloped shorelines of the Bay, usually within 1 km of the water. Nesting densities are greatest along the Potomac and Rappahannock Rivers and in Dorchester County, Maryland. The habitat required by eagles can be described as shoreline with minimal human disturbance, having large old-growth forest stands with large (50 cm diameter) trees adjacent to undisturbed waters that harbor abundant fish and waterfowl. Chesapeake Bay may once have provided habitat for as many as 3,000 pairs of bald eagles but due to habitat destruction, shooting, and contamination by chemicals, the population declined to a low of 80 to 90 breeding pairs in 1970. Following a ban on the use of dichloro-diphenyl-trichloro-ethane (DDT), the population increased to 185 pairs in Maryland and Virginia by 1989. The greatest threat to the Chesapeake eagle today is the loss of shoreline forests that they need for nesting, roosting, and perching. These forests are rapidly being developed for human use.

Diamondback Terrapin *(Malaclemys terrapin)*

The diamondback terrapin occurs in a narrow strip of salt and brackish water habitats along the Atlantic and gulf coasts of the United States from Cape Cod, Massachusetts, to Corpus Christi Bay, Texas. Diamondback terrapins along the Atlantic coast have been reported in brackish estuarine environments including salt marshes, tidal flats, and creeks, sounds behind barrier islands, and brackish lagoons and impoundments. Terrapins live in coastal marshes, tidal creeks and channels, coves, estuaries, and lagoons behind barrier beaches. Marsh grass or cord grass *(Spartina alterniflora)* is the typical vegetation associated with the aquatic habitats of diamondback terrapins along the Atlantic coast. The alteration of estuarine areas, however, poses an imminent threat to many populations today.

Spot ***(Leiostomus xanthurus)***

Spot is an abundant marine and estuarine bottom-foraging species. These fish occupy all areas of the Bay except in winter, when they migrate to coastal waters or concentrate in deep-water refuges in the Bay. Spot are tolerant of a range of environmental conditions, generally preferring brackish to saline waters above mud substrates in the Bay, although they can be found at all water depths. They are short-lived coastal spawners with excellent reproductive capacity; major predators of shallow benthic invertebrate communities in the Bay; and important prey to a host of predatory fish. The larvae consume zooplankton. Spot support a modest commercial fishery.

Weakfish ***(Cynoscion regalis)***

Weakfish occur along the Atlantic coast of the United States from southern Florida to Massachusetts Bay. They are one of the most abundant fishes in the estuarine and nearshore waters of the Atlantic coast. It is a valuable recreational species and a major component of the gill-net, pound-net, haul-seine, and trawl fisheries along the coast. The Chesapeake Bay region (Maryland and Virginia) contributed most to the coasts total weakfish landings in the 1940's. However, total weakfish landings have dropped off significantly since that time.

Spotted Seatrout ***(Cynoscion nebulosus)***

Spotted seatrout are distributed mainly in coastal estuaries of the western Atlantic Ocean from New York to Florida. The species is commercially valuable from Virginia to Mexico. The following are important habitat suitability factors for spotted seatrout: (1) the presence of large areas of shallow, quiet, brackish water; (2) the absence of predators; (3) the absence of competitors; (4) the presence of large areas of SAV; and (5) an abundance of grazing crustaceans and fishes. Spotted seatrout prefer water of low turbidity. High turbidity has been attributed to increased mortality.

Bluefish ***(Pomatomus salatrix)***

The bluefish is abundant in estuarine and continental shelf waters of the east coast of North America from Nova Scotia southward to Florida. The bluefish is an important recreational and commercial fish along the Atlantic seaboard. Due to their abundance and high trophic level, bluefish play a major ecological role in estuarine and continental shelf waters and are dependent on these habitats for spawning and nursery areas. No other Atlantic coast species is as abundant throughout such a wide range and variety of habitats.

Striped Bass ***(Morone saxatilis)***

The striped bass or rockfish is a large anadromous fish that is found along the entire East Coast of North America. Most of the Atlantic coastal migratory stock originates in the Chesapeake Bay. Striped bass are voracious predators who feed on a variety of fish. Early life stages are important prey for other species. Striped bass previously supported a major fishery throughout the Atlantic Coast states, although declining populations have forced restrictive harvest regulations in the Chesapeake Bay. The decline in striped bass stocks began in the mid-1970's, primarily because of overfishing. Recently, increased stocks and stronger recruitment have resulted in the limited commercial and recreational fisheries being reopened. Suggested measures to assist in the continued repopulation of the species include increasing DO, reducing turbidity, and improving water quality habitat in spawning habitats.

Summer and Winter Flounder *(Paralichthys dentatus* and *Pleuronectes americanus)*

The summer flounder is found along the Atlantic coast from Cape Cod, Massachusetts, to Cape Hatteras, North Carolina, while the winter flounder is most common in estuaries between the Gulf of St. Lawrence and the Chesapeake Bay. Both types of flounder are an important commercial and recreational species along the Atlantic seaboard of the United States.

Killifish and Mummichog *(Fundulus* spp. and *Fundulus heteroclitus*)

Killifish and mummichog are found the entire length of the Mid-Atlantic region close to shore. Although they are not valued as commercial or sport fishes, they are important in the food chain because of their distribution and abundance. These fish are the major prey for wading birds, piscivorous ducks, and many predatory fishes. These predators include herons, egrets, terns, striped bass, and bluefish.

Section 5 describes in more detail how the various formulation and evaluation criteria outlined above were applied.

Section 5

Plan Selection and Evaluation

This section documents the process by which the various plans for using clean dredged material from the Baltimore Harbor and Channels Federal navigation project to restore Poplar Island were developed and evaluated. The various plans were designed through the collaborative efforts of the multi-agency group, which consisted of USACE, MPA, MES, DNR, MDE, EPA, NMFS, and USFWS.

5.1 Site Selection Process

The process of selecting sites for this feasibility study proceeded through a number of iterative steps. Prior to initiation of this study, these steps were used to identify project sites. Once the project site was identified, various alternatives for the specific project site were developed. The following is a description of the process that was used to arrive at the alternatives evaluated in order to arrive at the recommended plan.

In July 1990, Maryland Governor William Donald Schaefer convened a task force to review dredged material management options. After examining a wide range of alternatives, the task force recommended that an effort be made to beneficially use dredged material. Poplar Island was identified as one of the sites at which this could be accomplished.

In May 1994, MES prepared a prefeasibility report (PFR) for the MPA on the Poplar Island Habitat Restoration Project. The purpose of the PFR was to assess the feasibility of utilizing dredged material for the restoration of Poplar Island, to produce a concept design for the project, to develop a plan for the next phase, and to formulate cost estimates on the major project components for use in comparison and budget planning activities.

During the study, a coastal engineering assessment was made, hydrographic and topographic surveys were performed, and geotechnical and archeological investigations were conducted. Based on the results of these analyses, three potential site footprints were developed that encompassed the 1847 footprint of Poplar Island. Footprint A, which would have enclosed the main body of the old footprint to the west of the four remnant islands, was the smallest with an estimated volume of 9 million cubic yards, covering an area of approximately 776 acres. Footprint B, which would have been the largest with an area of approximately 965 acres, would envelope over 90 percent of the old footprint and would exclude only the portions around Jefferson Island and to the north of Coaches Island. Footprint C would incorporate attributes of the larger and the smaller footprints. It would encompass the old footprint and would have almost the same acreage as Footprint B. However, Footprint C would provide an additional 5 percent capacity with an almost 10 percent reduction in dike. Since Footprint C had the largest capacity with 11 million cubic yards, avoided the oyster bars, and excluded Coaches Island (which is privately owned), it became the PFR plan. Figures 5-1 through 5-3 show the various footprints developed during the PFR.

The PFR recommended using dikes and breakwaters to contain the dredged materials necessary for the wetlands vegetation and to protect the facility from the severe wave activity in that region of the Bay. Several types of dikes and dike materials were evaluated during the prefeasibility study. The recommendation of the study was that a low-crested stone dike with an impermeable clay core would be most appropriate. The study found that the dikes would need to be constructed to a height of 7 feet MLW along the eastern perimeter, 8 feet MLW along the western perimeter, and 9 feet MLW along the northern and southern perimeters. The PFR recommended that mechanical methods be used to construct the dikes, which would have side slopes of 2H:1V. Typical dike sections are shown in Figures 5-4 and 5-5.

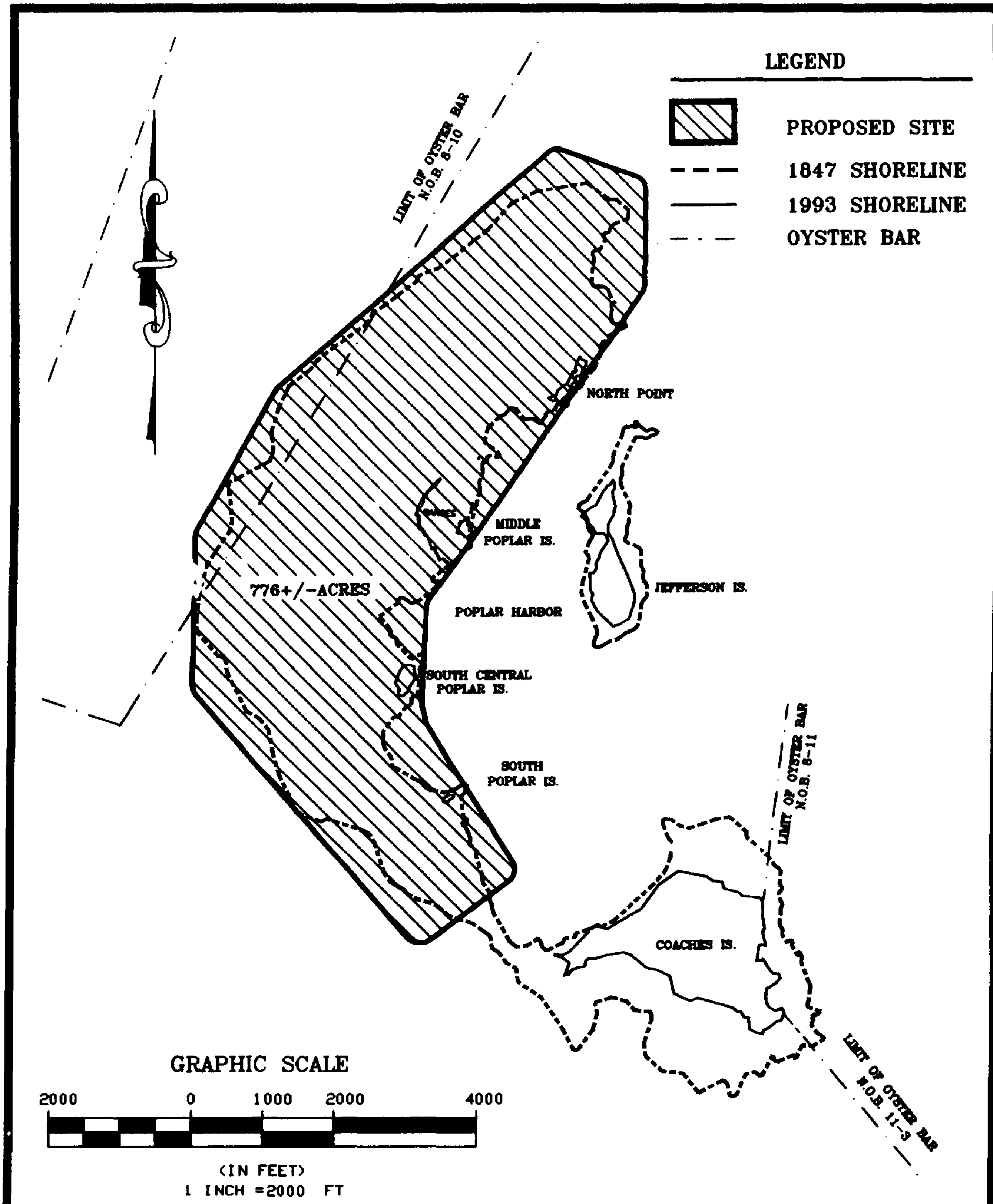
The total project would result in the creation of 1,000 acres of habitat of which 70 percent would be wetlands. Consequently, in order to establish habitat areas as early as possible, the report recommended constructing the project in phases, providing dredged material placement capacity of 3 to 4 million cubic yards per phase. The estimated construction cost for Footprint C, the PFR plan, was estimated to be approximately $58 million excluding transportation costs. Based on the results of the PFR, it was recommended that a detailed feasibility study be initiated for the Poplar Island Restoration Project.

By letter dated May 3, 1994, the Maryland Department of Transportation (MDOT) requested that the USACE, in accordance with the provisions of Section 204 of the Water Resources Development Act of 1992, conduct a study to evaluate the feasibility of beneficially using dredged material from the Baltimore Harbor and Channels navigation project to restore Poplar Island. In response to that letter, the USACE prepared an initial appraisal report to evaluate the feasibility of the proposed project. Based upon a favorable review of the initial appraisal report, the current feasibility study was initiated.

5.2 Base Plan

The USACE's base plan for navigation purposes is to accomplish the placement of dredged material associated with the construction or maintenance of navigation projects in the least costly manner that is consistent with sound engineering practice and that meets all applicable Federal environmental laws. This plan is referred to as the "base plan" and serves as a reference point for measuring the incremental costs of the ecosystem restoration project that are attributable to the environmental purpose if the ecosystem restoration project is not part of the base plan for the navigation purpose.

Material dredged from the Baltimore Harbor and Channels Federal navigation project is currently placed at HMI. A previously used upland site, CSX/Cox Creek, is being prepared to come on line in state fiscal year 1997, which begins in July 1996.



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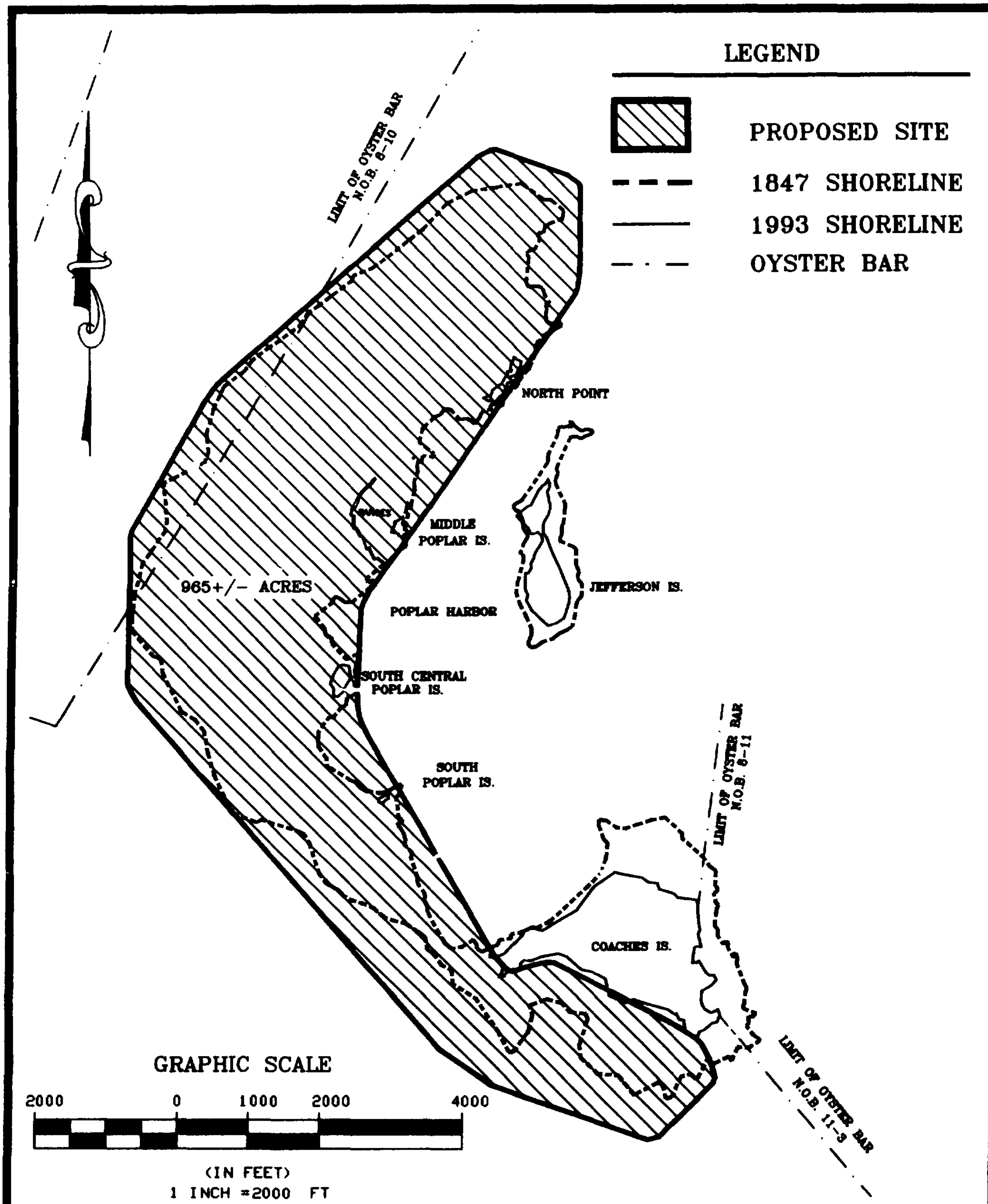
MARYLAND ENVIRONMENTAL SERVICE

FOOTPRINT A

FIGURE 5-1



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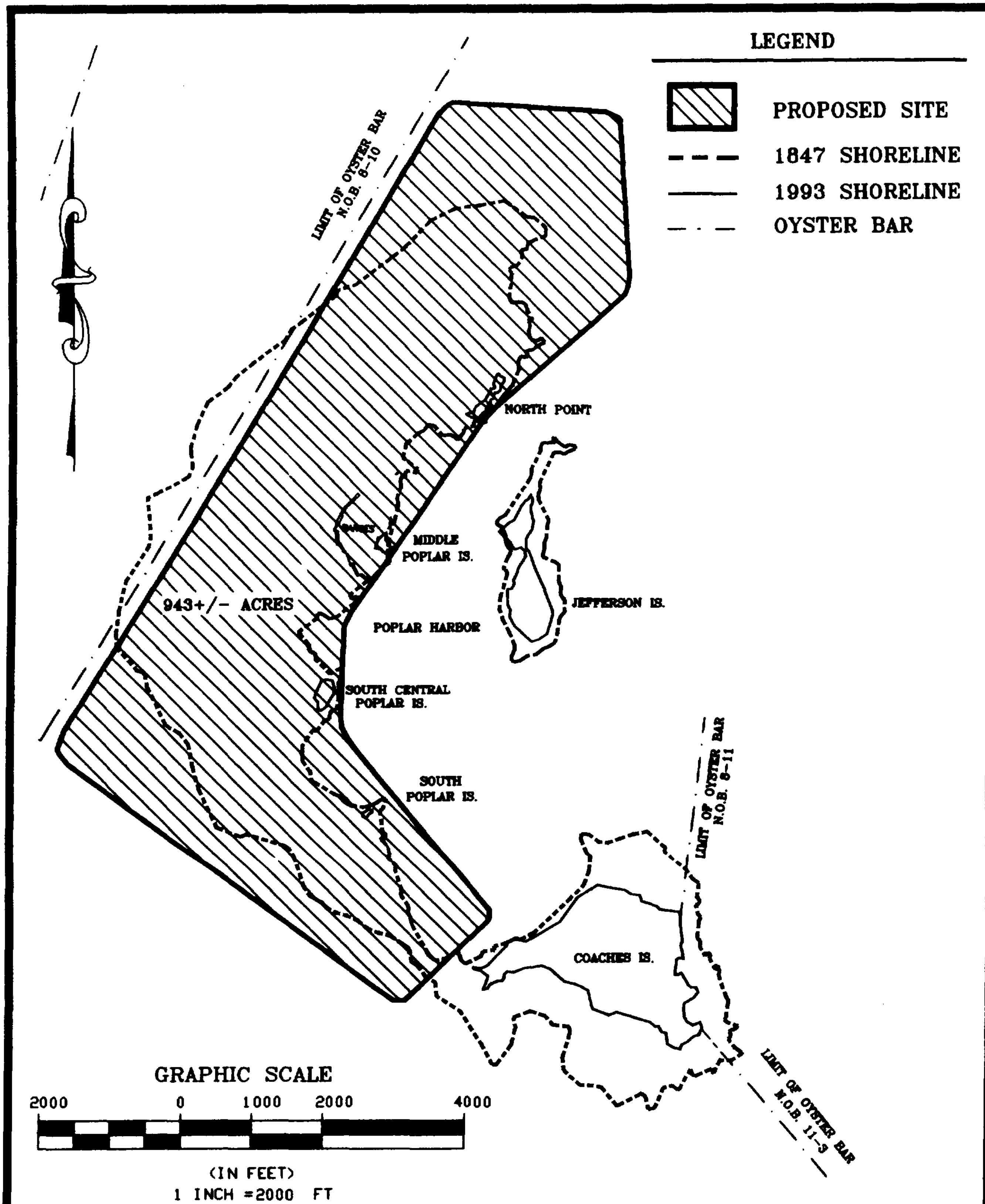
MARYLAND ENVIRONMENTAL SERVICE

FOOTPRINT B

FIGURE 5-2



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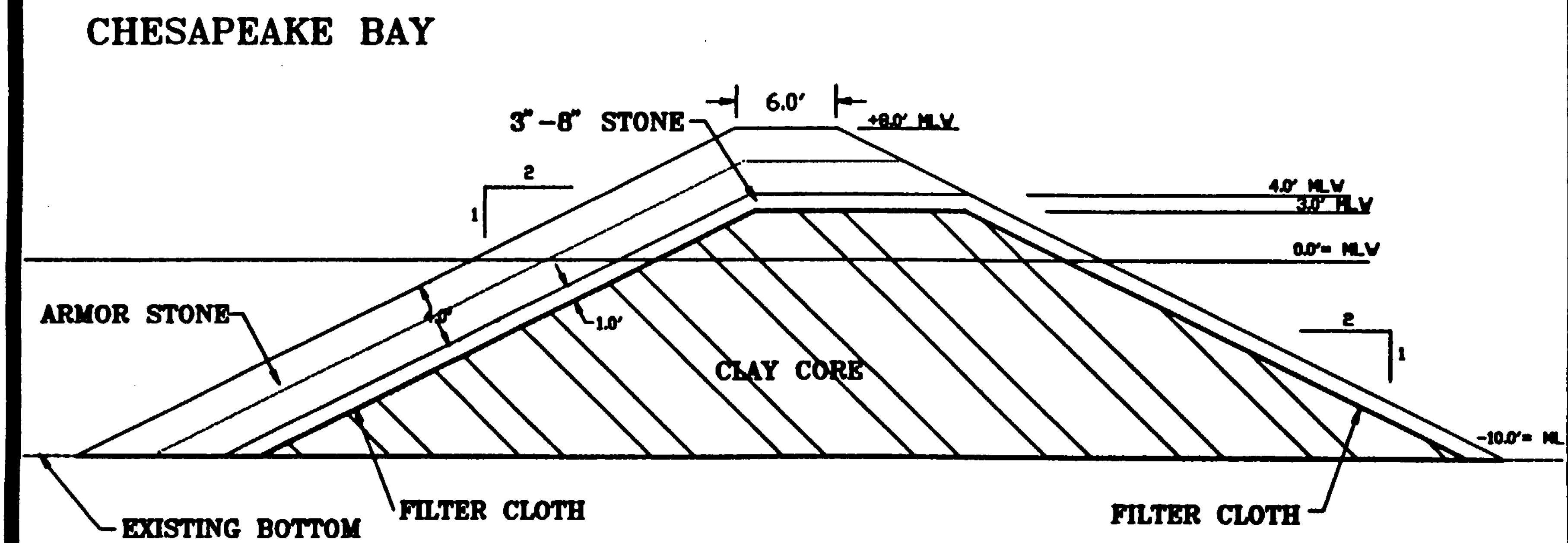
MARYLAND ENVIRONMENTAL SERVICE

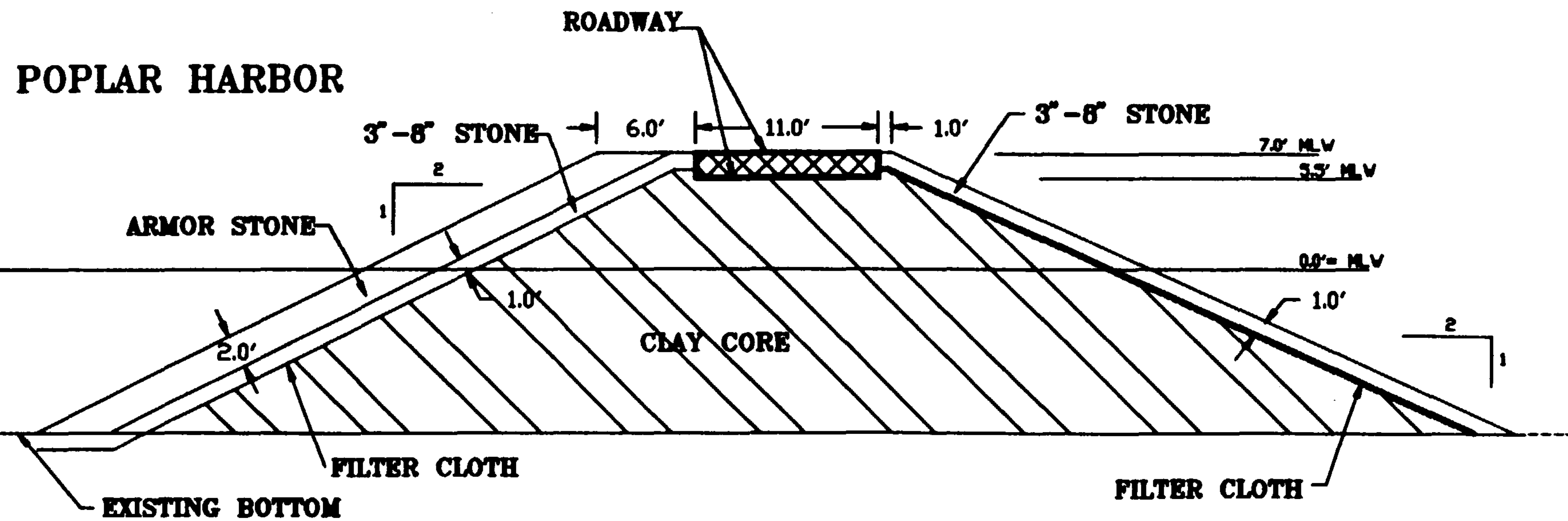
FOOTPRINT C
FIGURE 5-3



SCALE: 1" = 10'

HIGH ENERGY DIKE SECTION

FIGURE 5-4



SCALE: 1"=10'

LOW ENERGY DIKE SECTION

FIGURE 5-5

HMI currently has capacity in FY96 and 97 for about 4.1 mcy of dredged material. No material is scheduled to be placed in the site in FY98, but between FY99 and FY00, 2.4 mcy is scheduled to be placed at the site to cap and close it. The MPA has not yet designated what material will be used to cap the site. HMI is currently used for the placement of material from the Harbor channels and the Bay channels. The permit for HMI currently expires in the year 2000. The MPA expects to have the site off line by then. Even if the permit were to be modified, the site would be filled to capacity by then and would require structural improvements such as dike raising in order to handle more material. Such a move would likely meet with strong public opposition and require a modification to the existing permit, which limits the dike elevation to 28 ft and requires that the dikes be returned to the original 18-ft elevation.

The DNPOP has identified CSX/Cox Creek as a replacement for HMI to handle "contaminated" material. The site is currently expected to provide about 0.5 mcy of capacity per year, 6.0 mcy total, between state FY97 and 07. Due to the cost of developing a new containment facility and the lack of potential alternatives to this site, it is crucial that the site be restricted to only the Harbor's dredged materials. Even with this alternative, the capacity shortfall for Harbor channels will likely be about 0.2 mcy over the next 6 years and 4.0 mcy total over the next 20 years.

The currently used Pooles Island open water site has about 2.9 mcy of capacity over FY96, 97, and 98. After that, another option will be required. The Pooles Island site is currently dedicated to material dredged from the C&D approaches that are currently maintained by the USACE (Philadelphia District). While a severe problem for the MPA is identification of placement sites for material dredged from the C&D approach channels, the Philadelphia District is working with the MPA to identify solutions. Consequently, this site will not be discussed further in this report.

Hart-Miller Island was designated by the MPA and was included in the Baltimore Harbor and Channels 50-foot project Local Cooperation Agreement even though it is not considered the least-cost environmentally acceptable placement alternative [Base Plan] for clean dredged material. It is the only placement site available for maintenance material at this time.

The base plan for dredged material from the following reaches of the Baltimore Harbor and Channels Project - the Craighill Entrance Channel, the Craighill Channel, the Craighill Angle, the Craighill Upper Range, the Cutoff Angle, the Brewerton Channel Eastern Extension, the Tolchester Channel, and the Swan Point Channel - is placement at the Deep Trough. This is not to say that placing dredged material in the Deep Trough results in the least environmental impacts, but rather, based on existing information, that this alternative is the least costly and is unlikely to have unacceptable impacts. Dredged material from these channels has been placed in open waters of the Chesapeake Bay without unacceptable impacts in the past.

Dredged material is placed at open water sites in the upper and lower reaches of the Bay and in near coastal waters off the mouth of the Chesapeake. The impacts of the placement activities have been determined to be acceptable. By extension, even though the ecology of the region is distinct from these other regions, we cannot assume that placement of dredged material at an open water site in the middle reaches of the Bay would be unacceptable.

The Baltimore District is currently conducting a Dredged Material Management Plan (DMMP) Study for the Baltimore Harbor and Channels Project. This effort is expected to reaffirm that placement of dredged material from the approach channels in the central Bay at the Deep Trough site is the Base Plan for cost sharing. Capacity in the Deep Trough could be more than 100 million cubic yards, which would more than necessary to satisfy placement needs for sediment from the Bay channels for the next 50 years.

The Deep Trough is a deep water ravine in the central Bay adjacent to Kent Island. Bottom waters in the Deep Trough become anoxic every summer and organisms in the sediments or in the water column near the bottom are either killed or forced from the area. Some recolonization is expected when oxygenated waters return, but overall richness of the habitat is greatly diminished by the annual kills. In the winter, the side slopes and the deeper waters of the Bay may provide refugia for some species during the coldest periods, but the channels that are dredged, especially the margins of the channels, also provides refugia for many of the same species.

There have been several studies of the Deep Trough as a potential placement site. Investigations conducted by the MPA, DNR, and MES and coordinated with MDE, concluded that placement of dredged material at the site would have no significant direct or indirect ecological impact or impact on water quality. In 1990, MPA proposed to place 2.2 million cubic yards of sediment dredged from the Craighill Channel in a portion of the Deep Trough as a demonstration project. The specific proposal called for pumping the dredged material into the anaerobic zone (at a depth of at least -60 feet MLLW) during the summer months.

In order to evaluate the Deep Trough placement site, literature reviews, water quality sampling, sediment sampling, biological surveys, and modeling exercises were conducted to determine the impacts to the following:

- Hydrodynamics
- Biological Resources
- Commercial/Sport Fisheries
- Nutrient loading
- Toxic loading
- Sediment transport
- Cultural resources
- Recreation

The results of these studies are summarized as follows:

- The Deep Trough is an area of net deposition and, therefore, is not subjected to forces of erosion or scouring.

- Anoxic (i.e., without oxygen) conditions occur in the proposed placement area each summer, generally from 15 June to 15 September, although the magnitude, timing, and duration vary.

- Communities of benthic (i.e., bottom-dwelling) organisms are completely eliminated during summer anoxia.

- Benthic communities do not recolonize to a level that is sufficient to support bottom-feeding organisms during oxygenated periods of the year.

- Decreasing the bottom depths by 3 to 6 feet will not affect the temperature regime of the area.

- Slightly uneven bottom topography (i.e., clumping) is expected to result from the test because the dredged material was predominantly sand.

- Anoxic conditions in the Deep Trough may enhance the release of nutrients in sediments removed from an oxygenated environment.

Based on the results of the site investigation and coordination with the other resource agencies, and drawing on the results of monitoring placement of dredged material at numerous other aquatic sites, it was determined that the Deep Trough was an acceptable placement site for clean dredged material. However, the MPA had proposed pumping the dredged material out of the barges at the site and shunting the material to -60 feet MLLW. This proposed timing and placement method was viewed by the EPA and the District as exacerbating potential nutrient release from the dredged material[1] and potentially contributing to low DO conditions in the Deep Trough. The District and other resource agencies held that the proposed placement should be limited to mechanically dredged sediment, released from split hull scows, at times when anoxic conditions did not exist in the Deep Trough.

The draft environmental assessment recommended that a formal "finding of no significant impact" (FONSI) be prepared for the proposed placement. However, before the final environmental assessment [incorporating the alternate placement methods recommended by the

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1 Under oxygen deprived conditions, the naturally occurring sulfur in the sediment dredged from the Bay has its oxygen atoms stripped away, converting it from sulfates to sulfides. Hydrogen sulfide is a strong reducing agent which reacts with the metal compounds in a sediment (e.g., ferrous oxides are reduced to ferrous sulfides). The nutrients which have mineralized with the metallic compounds in the sediment are released by this action. Not all the nutrients so affected make it into the water column and the process is reversed when the water column returns to aerobic conditions. However, if the dredged material is introduced into the anoxic/sulfitic condition as a slurry (the proposal called for pumping the slurried material to a depth of -60 feet MLLW), there is a very rapid and complete transfer of nutrients into the water phase of the slurry (Stigall 1995).

District and other resource agencies] and the FONSI could be prepared and released, the proposal to use the site was withdrawn by the MPA.

The District will continue to utilize the remaining capacity at Hart-Miller Island. The Deep Trough will be the base plan for all project sediments (that have been determined to be suitable for open water placement in accordance with Section 404 Guidelines) from the Craighill Entrance Channel, the Craighill Channel, the Craighill Angle, the Craighill Upper Range, the Cutoff Angle, the Brewerton Channel Eastern Extension, the Tolchester Channel, and the Swan Point Channel. The Federal Operation and Maintenance (O&M) Program will be responsible for the costs that normally would be associated with channel maintenance and for the transport and placement of the dredged material at the Deep Trough. The incremental cost of using the Poplar Island site would be the additional transportation costs; the dredged material placement costs; the construction costs of the habitat restoration project; dredged material dewatering, shaping, and planting; and site O&M. The transport distance from the Deep Trough to Poplar Island is about 10.5 miles, one way. The incremental transportation and off-loading costs are approximately $151.2 million. A summary of the anticipated costs of placement at the Deep Trough is shown in Table 5-1.

5.3 Poplar Island Configuration Assessment

At the onset of the feasibility study, an extensive field investigation study was undertaken. Hydrographic surveys, geotechnical subsurface investigations, archeological investigations, and hydrodynamic studies were performed to establish the design parameters. These parameters were then utilized to develop various alternative dike alignments that were then evaluated from an economic, technical, and environmental perspective.

5.3.1 Dike Alignment Alternatives

Beginning with the alignment developed in the PFR plan, three additional alternative alignments were developed for consideration. The four alignments are shown in Figure 5-6. Alignment Number One is a variation of the PFR plan. It was developed when geotechnical subsurface investigations revealed that the northern end of the site needed to be avoided due to an area of soft foundation materials. Figure 5-7 shows the location of these soft foundation materials. The northwestern and eastern portions of the dike are the same for the PFR plan and for Alignment Number One. Unlike the PFR plan, Alignment Number One ties into the western side of Coaches Island. Alignment Number One has a nominal site area of 820 acres (Figure 5-7).

Alignment Number 2 is an extension of Alignment Number 1 to the south and east and fronts on the southern shoreline of Coaches Island. The southeastern and southern segments of the perimeter dike generally follow the 8-foot MLLW contour. This alignment was developed upon the realization that the water depths in this area would be suitable for creating additional wetland habitat, thereby potentially increasing the project's environmental outputs and placement capacity. This alignment is the largest, with a nominal site area of 1,340 acres.

TABLE 5-1
BASE PLAN COSTS

	1st year dredging	2nd year dredging	3rd year dredging	4th year dredging	5th year dredging	6th year dredging	7th year dredging	8th year dredging	9th year dredging
Mob/Demob & prep	508,000	508,000	508,000	508,000	508,000	508,000	508,000	508,000	508,000
Mechanical dredging	5,359,000	5,359,000	5,359,000	5,359,000	5,359,000	5,359,000	5,359,000	5,359,000	5,359,000
Engineering, planning, and design	111,000	111,000	111,000	111,000	111,000	111,000	111,000	111,000	111,000
Construction Management	245,000	245,000	245000	245,000	245000	245,000	245,000	245,000	245,000
Total	6,223,000	6,223,000	6,223,000	6,223,000	6,223,000	6,223,000	6,223,000	6,223,000	6,223,000

	10th year dredging	11th year dredging	12th year dredging	13th year dredging	14th year dredging	15th year dredging	16th year dredging	17th year dredging	18th year dredging
Mob/Demob & prep	508,000	508,000	508,000	508,000	513,000	513,000	517,000	517,000	522,000
Mechanical dredging	5,359,000	5,359,000	5,359,000	5,359,000	5,406,000	5,406,000	5,452,000	5,452,000	5,499,000
Engineering, planning, and design	111,000	111,000	111,000	111,000	111,000	111,000	112,000	112,000	113,000
Construction Management	245,000	245,000	245,000	245,000	247,000	247,000	249,000	249,000	251,000
Total	6,223,000	6,223,000	6,223,000	6,223,000	6,277,000	6,277,000	6,331,000	6,331,000	6,385,000

	19th year dredging	20th year dredging	21st year dredging	22nd year dredging	23rd year dredging	24th year dredging	TOTAL
Mob/Demob & prep	522,000	526,000	526,000	530,000	530,000	530,000	12,350,000
Mechanical dredging	5,499,000	5,545,000	5,545,000	5,592,000	5,592,000	5,592,000	130,247,000
Engineering, planning, and design	113,000	114,000	114,000	115,000	115,000	115,000	2,688,000
Construction Management	251,000	253,000	253,000	256,000	256,000	256,000	5,953,000
Total	6,385,000	6,439,000	6,439,000	6,493,000	6,493,000	6,493,000	151,241,000

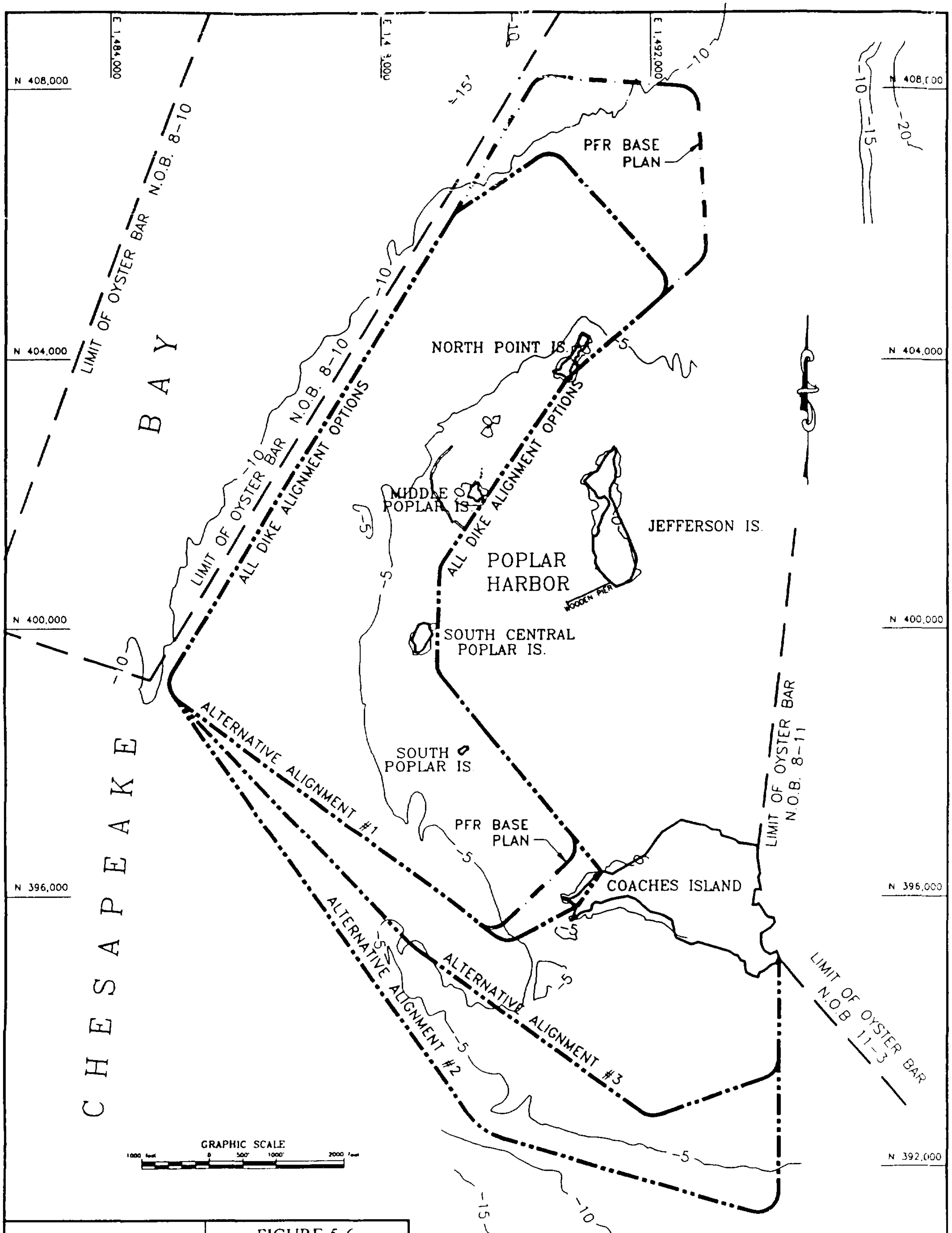

FIGURE 5-6
ALTERNATIVE ALIGNMENTS

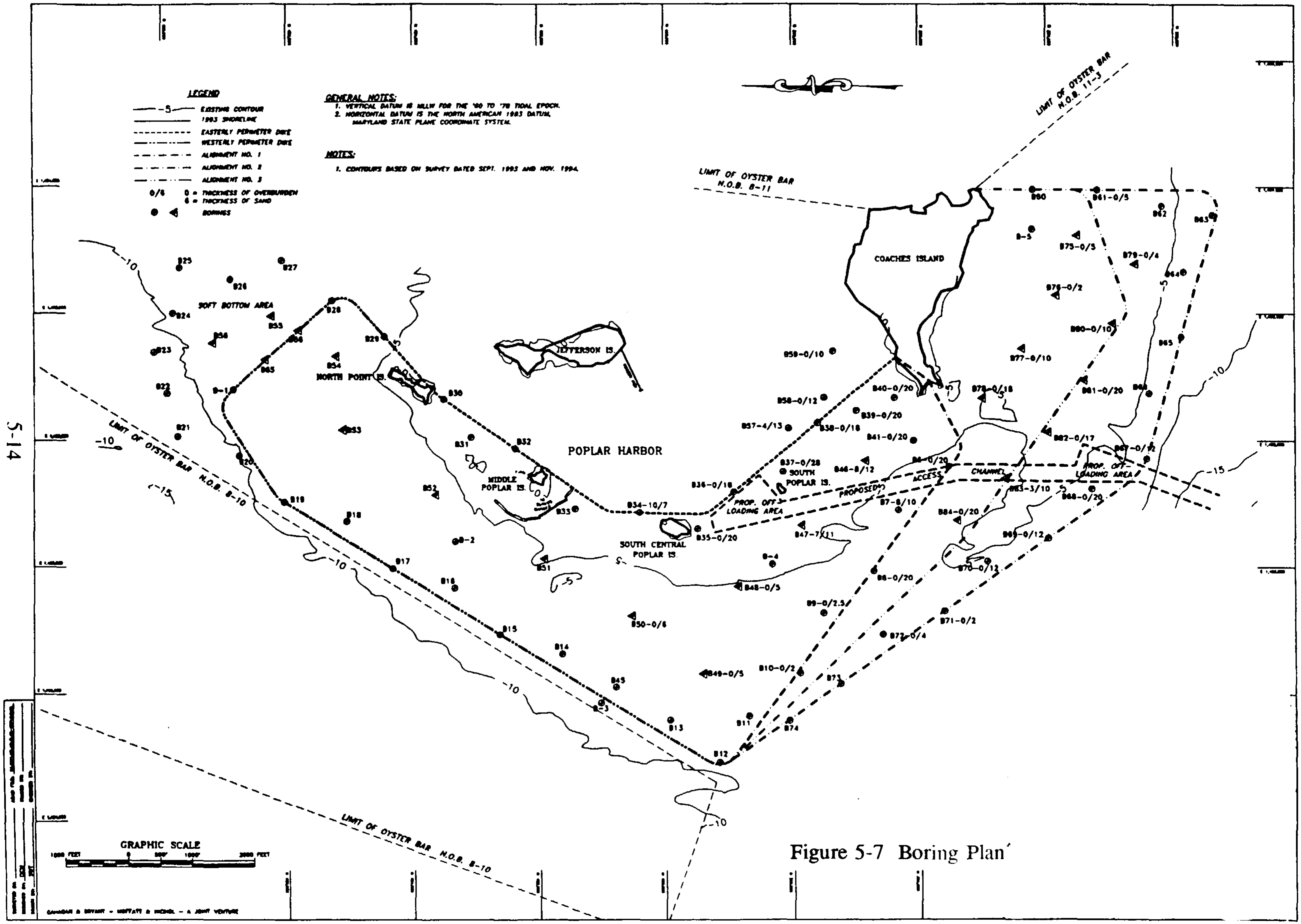

Figure 5-7 Boring Plan

Alignment Number 3 was selected as an intermediate alignment alternative between the smallest and largest alignment alternatives. It has an area of 1,110 acres, which just exceeds the average areas of the other two alignment alternatives. It also fronts on the southern shoreline of Coaches Island and would also allow more wetland habitat than the PFR plan alignment or Alignment Number One. The PFR recommended constructing the containment dikes of clay because preliminary borings indicated that the clay was the only material available in sufficient quantity on-site. However, geotechnical investigations conducted for the feasibility study disclosed that a sufficient quantity of fine sand, which is preferable to clay, is also available for construction of the dikes. Since clay dikes could not have been constructed to 2H:1V slopes under water, and settlement of clay under the immediate placement of armor stone would have presented costly problems, the dike cores will be constructed with the fine sands located within the project area.

5.3.2 Wetland/Upland Ratios

In addition to the various alternative alignments presented above, several different wetland/upland ratios were also considered. Because the project objective is to provide the most productive fish and wildlife habitat possible, restoring a mix and interspersion of habitat types will recreate the type of island ecosystem endemic to the middle, eastern portion of Chesapeake Bay. Three different wetland/upland ratios were examined: 50-percent wetland/50-percent upland, 70-percent wetland/30-percent upland, and 100-percent wetland. Since the project purpose is to restore wetland and island habitat and realizing that the various resource agencies would not support a site entirely composed of uplands, the 100-percent upland ratio was not considered. The 100-percent wetland option was included in the analysis strictly for comparison purposes since all of the agencies involved realized that it would not be cost effective to develop a dredged material placement site that had no uplands. Also, it was recognized that to recreate the productive remote island habitat that is becoming so scarce in the Bay, some upland component to the project was necessary. This is because migratory waterbirds and shorebirds require the uplands for nesting and other life requirements. In addition to balancing the wetland/upland ratios, upland elevations of 10 feet and 20 feet were proposed for each of the plans.

5.3.3 Selection of the Agency-Supported Plan

At a Working Group meeting on 29 June 1995, the various alternative alignments were presented for the resource and regulatory agencies to review. The group was asked to identify the alignment(s) and the wetland/upland ratio(s) they would be able to support in a final design. Prior to the meeting, the agencies had been provided with a summary table of the alternatives and costs for the various plans (Table 5-2).

The MPA presented a comparison of the site capacity and habitat percentages associated with the various options. The MPA's recommendation was for Alternative Alignment Number 2 (1,340 acres), with 50 percent wetlands and with an upland elevation of 20 feet. The MPA's rationale for recommending this plan was that it had the most economical initial construction

TABLE 5-2

Alternatives Matrix

Align-ment No.	Site Area (Acre)	Percent Tidal Wetlands	Upland Elevation (ft)	Site Capacity (mcy)	Site Operational Life (yr)	Initial Construction Cost ($mil)	Initial Construction Cost ($/cy)	Total Site Development Cost ($mil)	Total Site Development Cost ($/cy)
1	820	50%	10	18.8	11.1	$40.4	$2.15	$78.0	$4.15
1	820	70%	10	14.7	8.6	$41.6	$2.83	$74.9	$5.10
1	820	100%	--	9.9	5.8	$33.9	$3.42	$59.1	$5.97
3	1110	50%	10	24.5	14.4	$49.6	$2.02	$104.7	$4.27
3	1110	70%	10	20.0	11.8	$50.5	$2.53	$100.0	$5.00
3	1110	100%	--	13.0	7.6	$40.7	$3.13	$76.3	$5.87
2	1340	50%	10	30.5	17.9	$54.1	$1.77	$124.7	$4.09
2	1340	70%	10	24.1	14.2	$55.0	$2.28	$116.9	$4.85
2	1340	100%	--	16.0	9.4	$44.7	$2.79	$89.4	$5.59
1	820	50%	20	28.7	16.9	$40.4	$1.41	$88.6	$3.09
1	820	70%	20	20.6	12.2	$41.6	$2.02	$81.6	$3.96
3	1110	50%	20	37.9	22.3	$49.6	$1.31	$122.1	$3.22
3	1110	70%	20	28.0	16.5	$50.5	$1.80	$110.8	$3.96
2	1340	50%	20	46.7	27.4	$54.1	$1.16	$147.3	$3.15
2	1340	70%	20	33.8	19.9	$55.0	$1.63	$131.0	$3.88

Source: GBA

Note that the costs shown in the table are estimated mid-1995 construction and site development costs. The estimated initial site construction costs are more tangible than the other site development costs. No present value of future costs are estimated. The future costs of channel maintenance (dredging, transport and placement) are not included in the above values.

cost and would result in the development of approximately the same number of acres of wetlands as the PFR plan (670 acres). Members of the Working Group pointed out to the MPA that although that was the case, the group was less interested in obtaining a certain number of wetland acres and more interested in having a habitat restoration project that was comprised of a certain percentage (70 percent) of wetland habitat.

The MPA responded that while it supports the habitat issues, it is most important to produce a project that economically provides dredged material capacity. Given the current and anticipated future Federal and state funding constraints, it is important to recommend an alternative that balances capacity and costs.

Initially, the majority of the Working Group members were more in favor of supporting an alternative that would provide 70 percent wetland habitat regardless of the upland elevation. DNR presented some preliminary information that they had developed on the change in primary production of phytoplankton, benthic organisms, and fisheries at the site for different options. According to the calculations presented, all of the wetland options resulted in a net loss of primary productivity. Consequently, DNR's recommendation was for Alternative Alignment Number 1 (820 acres) with 70 percent wetlands to minimize the loss.

MDE's recommendation was for Alternative Alignment Number 2 with 50 percent wetlands. The rationale for this recommendation was that the efforts associated with bringing a dredged material site on-line are tremendous. Since a site has been identified that everyone supports, action should be taken to maximize its use and minimize the number of additional sites that must be developed. MDE also pointed out in response to DNR's productivity analysis that the wetlands should increase the productivity of other species and that the uplands habitat also would provide a contribution that needed to be taken into account.

EPA agreed with MDE's logic and pointed out that, realistically speaking, Federal funds are more likely to be provided for those projects that have the longest operational life (i.e. those projects that will be used for the longest period of time). It was EPA's feeling that, in order for Poplar Island to successfully compete for dwindling Federal funds, the project must provide the MPA with a long-term solution to the dredged material placement problem.

NMFS, NBS, and USFWS all supported Alternative Alignment Number 3 (1,110 acres) with 70 percent wetlands. Both NMFS and NBS said that it was always known that there would be tradeoffs associated with this project. Additional loss of bottom habitat over the PFR plan, while of concern, is supportable in light of the very real economic and capacity issues. It was the feeling of these agencies that this option presented an acceptable tradeoff, since it provided the best balance of gains and losses.

Additional discussions about how the operational life might influence the project's possibility of obtaining funding were held. DNR expressed the opinion that Alternative Alignment Number 3 would be better than no project at all. MPA acknowledged that Alternative Alignment Number 3 could provide a viable project, but that from an economics point of view, it would need to contain 50 percent wetlands instead of 70 percent. DNR, USFWS, and NMFS agreed to support the 50 percent wetlands option if (1) 80 percent of the wetlands would be designated as low marsh, and (2) stone habitat enhancement structures were incorporated into the design to offset the habitat's being lost as a result of the displacement of the existing snags that surround the remnant islands. The other agencies (USFWS and NMFS) represented at the meeting agreed with these conditions, and this became the agency-supported plan.

The recommendation of the Working Group to make the agency-supported plan Alternative Alignment Number 3 with an upland elevation of 20 feet and with 50 percent wetland habitat, 80 percent of which would be low marsh, and with a number of stone habitat enhancement structures to offset the habitat's being lost, was presented to the Management Committee of the DNPOP on August 2, 1995. The Management Committee voted to accept the recommendation of the Working Group.

5.4 Environmental Impacts

One requirement of the NEPA process is to evaluate the potential impacts of a project to area resources. The following section analyzes the impacts of the reconstruction of Poplar Island on the various resources identified previously in Section 3. The impacts of three alternatives (Deep Trough, Other Smaller Sites, and No Action) are summarized in Section 2.2.2.

5.4.1 Setting

High rates of erosion have reduced Poplar Island from 1,000 acres to approximately 79 acres during the past 150 years. Over the long term, this project will restore approximately 1,100 acres to Poplar Island, changing the physiographic features of the site from a fragmented series of islands to one intact, protected island environment. When the entire Poplar Island restoration project is complete and the dikes are armored, movement of sand from the dikes should be negligible.

The island will be comprised of approximately 555 acres each of upland and wetland habitat. Because elevations on the island will range from -0.6 up to 20 feet MLLW, it is anticipated that wetland- and upland-type soils will develop over time to support a variety of habitats. These soils will develop as a top layer over the base of clean, fine-grained silt and clay materials dredged from Chesapeake Bay channels (EA 1995f) placed at the site.

Although approximately 1000 acres of shallow water habitat will be lost due to dike construction, approximately 300 acres of the restored island will be comprised of inter-tidal habitat. Therefore, the net loss of shallow water habitat in the project area will be 700-800 acres.

Short-term (construction phase) impacts are expected to some resources, particularly aquatic organisms within the proposed dike alignment. The restoration of a stable island with the development of associated habitats is expected to be a long-term beneficial change to the region.

5.4.2 Physiography, Geology, and Soils

Construction of the project will have primarily minimal and short-term impacts on environmental resources in the project area. On-site borrow areas located in the south-central project area will serve as the source area for sand required to construct the initial interior dikes and the core of initial perimeter dikes (Figure 5-8). Other materials will be transported to the site from off-site quarries. Approximately 2.6 million cubic yards of material occupying approximately 250 acres of bottom area will be dredged from the borrow areas. Sand thickness in these areas ranges from approximately 4 to 20+feet (E2SI 1995). The residual substrate in the depression formed from the removal of sand materials will consist primarily of fine sands transported from and consistent with adjacent bottom areas. The potential impacts associated with turbidity and water quality from the movement of sediment after placement of these materials are discussed in Section 5.4.5. Armor stone needed to protect the slopes of the exposed dike sections (Figure 5-9) will originate from off-site locations. Quarry run stone will be required for the core of the rock toe dike.

A channel will be dredged to provide access to the south end of the project site. During construction, an 8,700-foot long by 300 to 400-foot wide access channel will be dredged to a depth of approximately 25 feet to facilitate project operations. The access channel will serve as a source of sand used as borrow material for dike construction. In addition to providing equipment access, the 25-foot dredging depth will reduce the need for frequent dredging caused by siltation. Approximately 2.0 million cubic yards of primarily sandy material will be dredged from this area and used for dike construction (Figure 5-10).

5.4.3 Hydrology and Hydrodynamics

5.4.3.a Hydrodynamics. It is anticipated that the proposed restoration of Poplar Island will have little effect on natural circulation or sedimentation patterns. Overall tidal currents in the vicinity of Poplar Island are relatively weak, and the area occupied by the restored island is insignificant when compared to the wide expanse of the Chesapeake Bay. Moreover, the proposed project tends to return the Poplar Island area to a condition similar to that of its historical past.

Hydrodynamic modeling was used to support this judgement and to assess trends relative to preconstruction and postconstruction conditions within the project area. Models of tidal hydrodynamics, constituent transport, and sedimentation were developed to assess relative changes to tidal flows, residence times, and sedimentation in the vicinity of Poplar Island.

Although modeling was not verified to the extent normally done in high-current regimes, it is believed that the model was sufficient to support the original conclusion that project impacts will be minimal.

Figures 5-11 and 5-12 present the peak flood-flow velocity vectors and velocity contours in the vicinity of Poplar Island for the final dike alignment. Figures 5-13 and 5-14 present the same information for peak ebb flow. Several hydrodynamic impacts will result from restoration of the island. First, the waters presently flowing through the island complex will

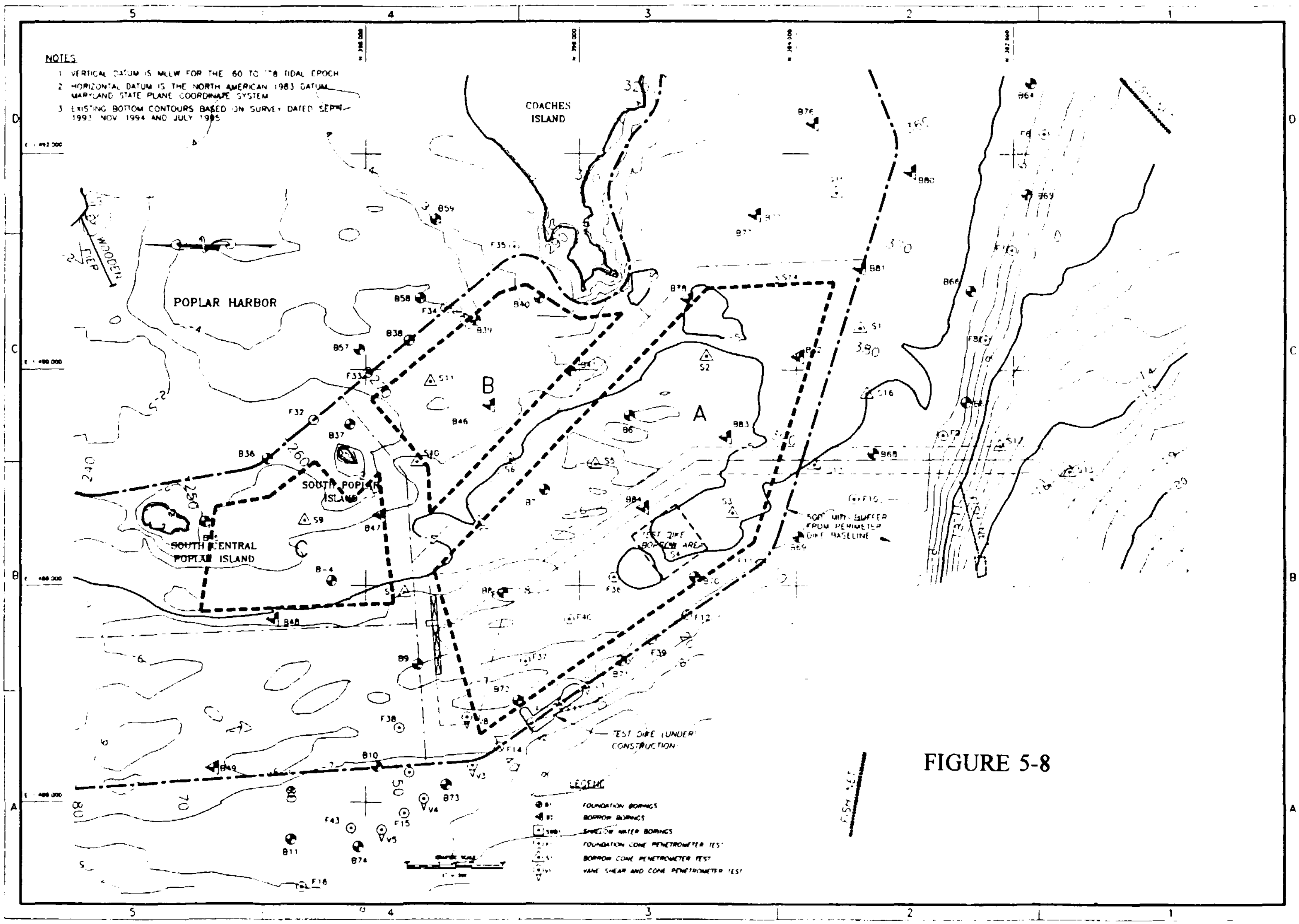
NOTES
2 HORIZONTAL DATUM IS THE NORTH AMERICAN 1983 DATUM MARYLAND STATE PLANE COORDINATE SYSTEM
COACHES ISLAND
POPLAR HARBOR
A
B
C
SOUTH POPLAR ISLAND
SOUTH CENTRAL POPLAR ISLAND
TEST DIKE BORROW AREA
500' MIN. BUFFER FROM PERIMETER DIKE BASELINE
CONSTRUCTION
LEGEND
FOUNDATION BORINGS
BORROW BORINGS
FOUNDATION CONE PENETROMETER TEST
BORROW CONE PENETROMETER TEST
VANE SHEAR AND CONE PENETROMETER TEST

FIGURE 5-8

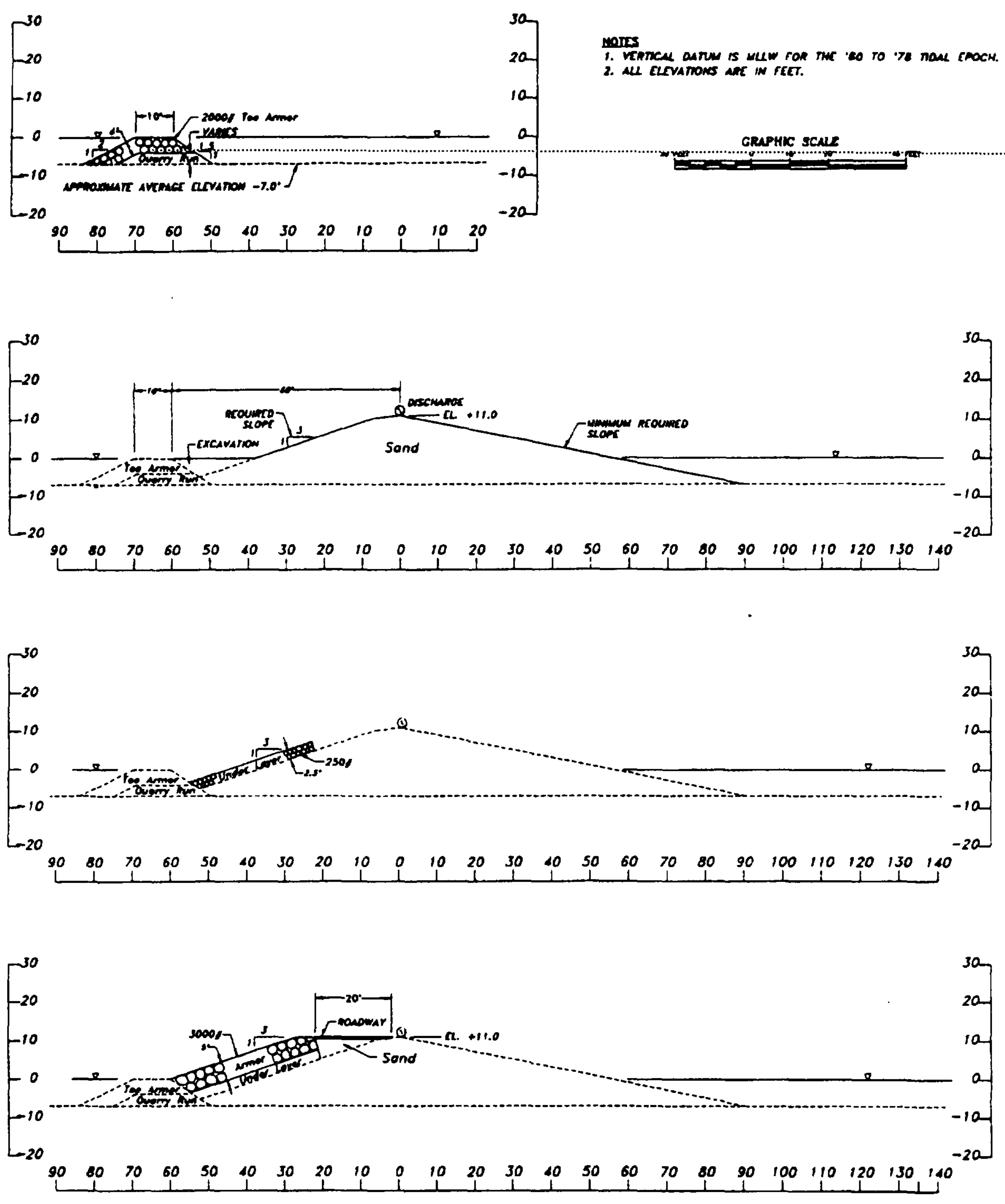

Figure 5-9. Western perimeter dike construction staging.

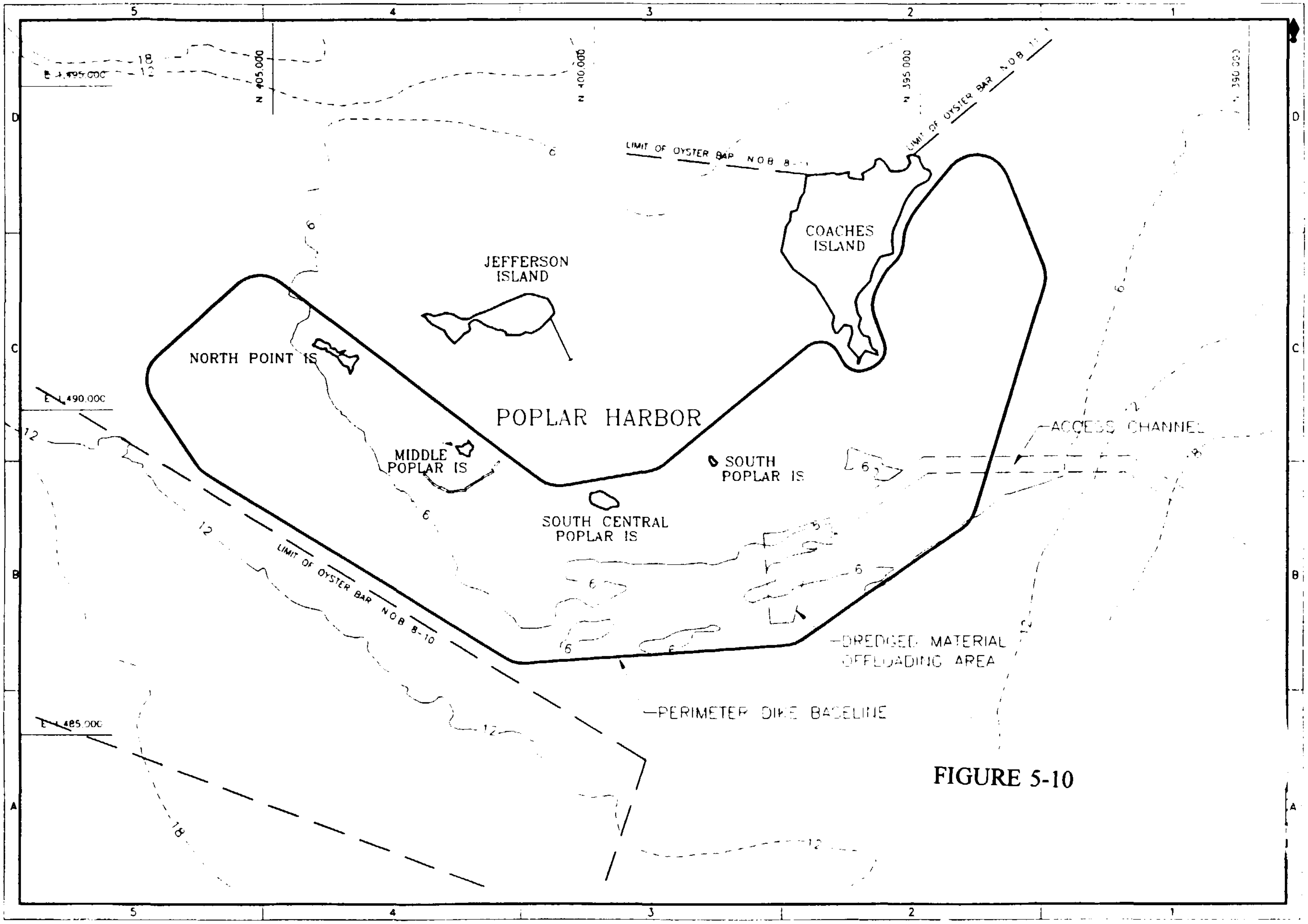
POPLAR HARBOR
JEFFERSON ISLAND
COACHES ISLAND
NORTH POINT IS
MIDDLE POPLAR IS
SOUTH POPLAR IS
SOUTH CENTRAL POPLAR IS
LIMIT OF OYSTER BAR NOB 8-10
ACCESS CHANNEL
DREDGED MATERIAL OFFLOADING AREA
PERIMETER DIKE BASELINE
N 405,000
N 400,000
N 395,000
E 1,490,000
E 1,485,000

FIGURE 5-10

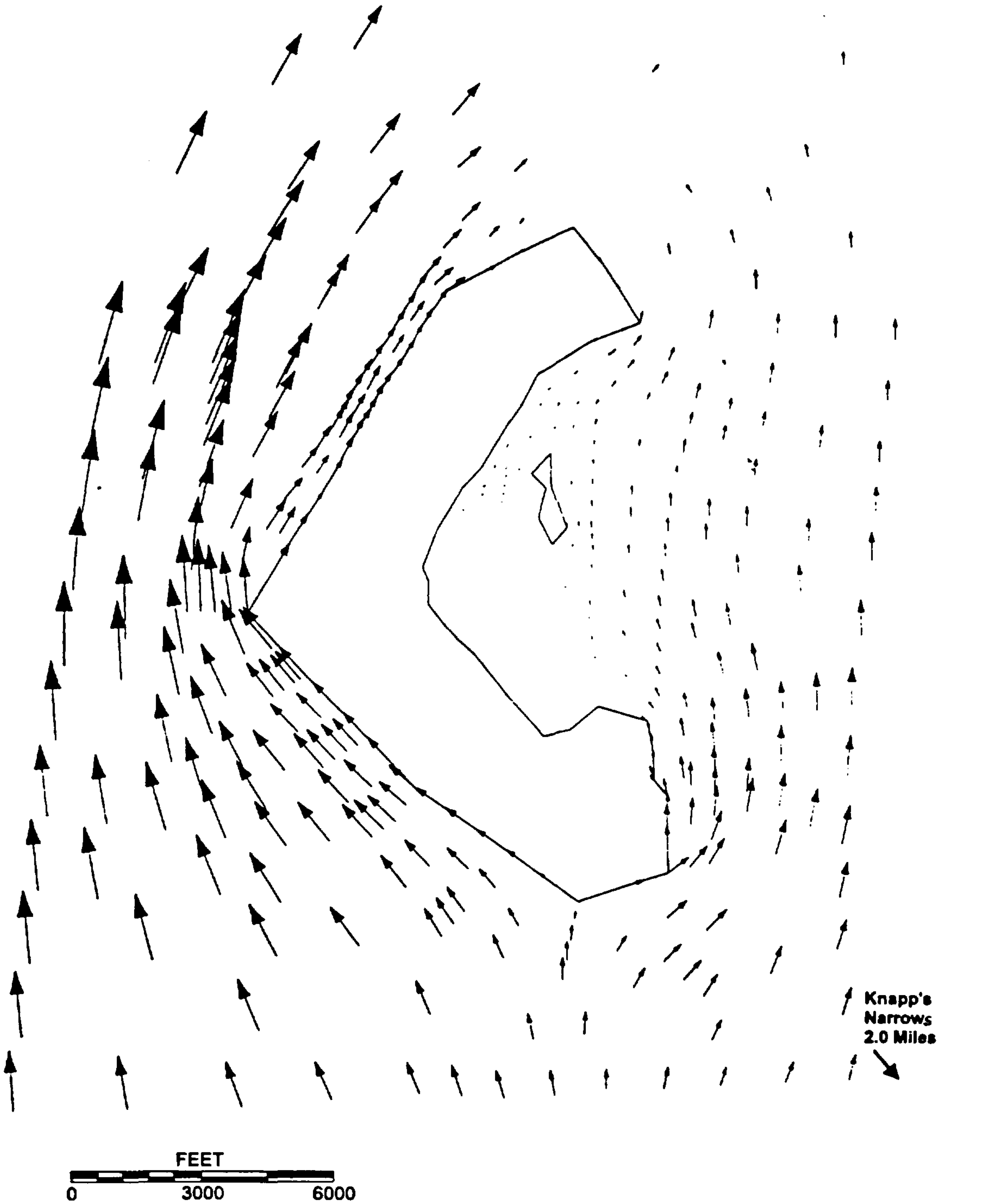

Figure 5-11. Peak flood velocity vectors for project.

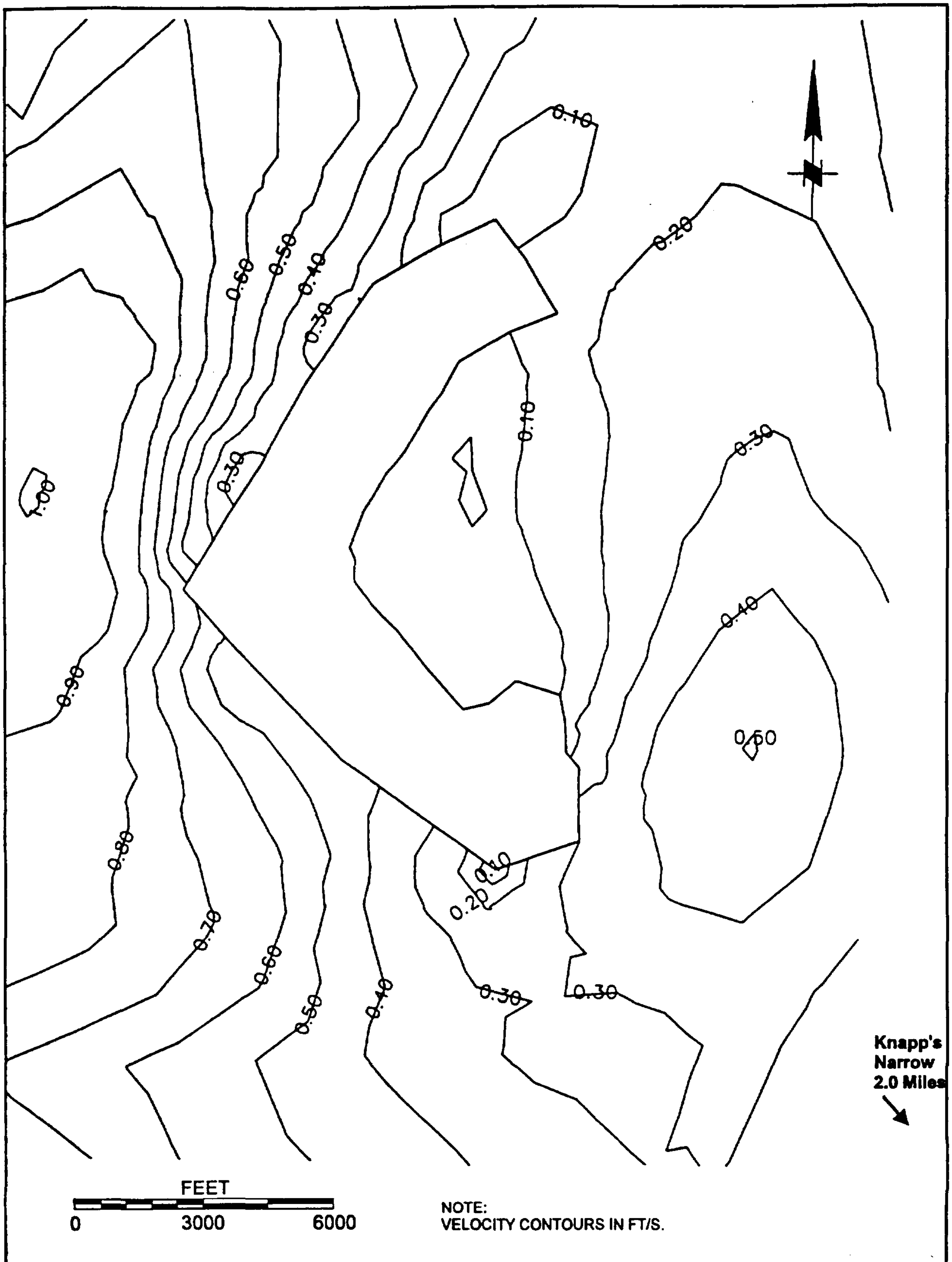

Figure 5-12. Peak flood velocitv contour plot for project.

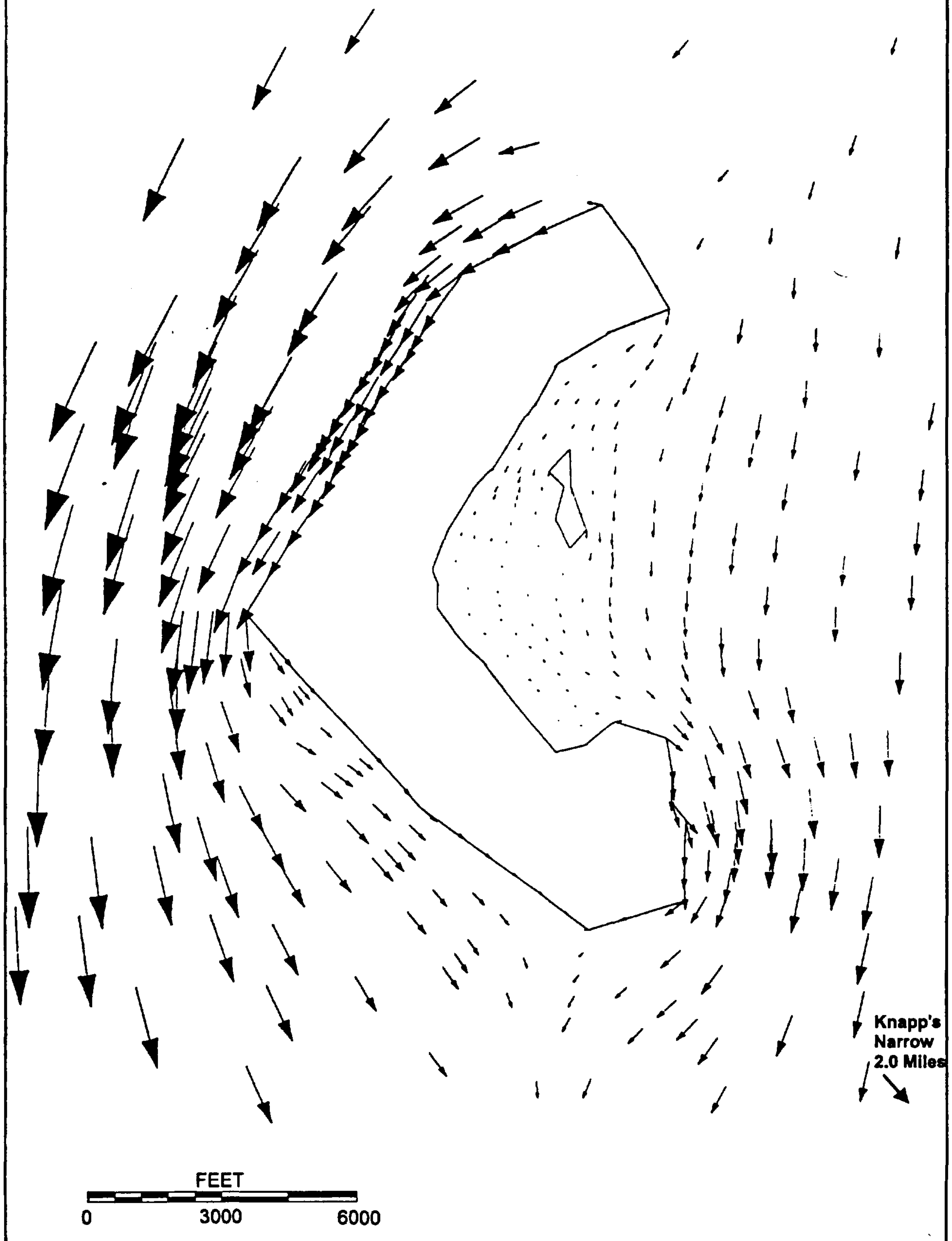

Figure 5-13. Peak ebb velocity vector plot for project.

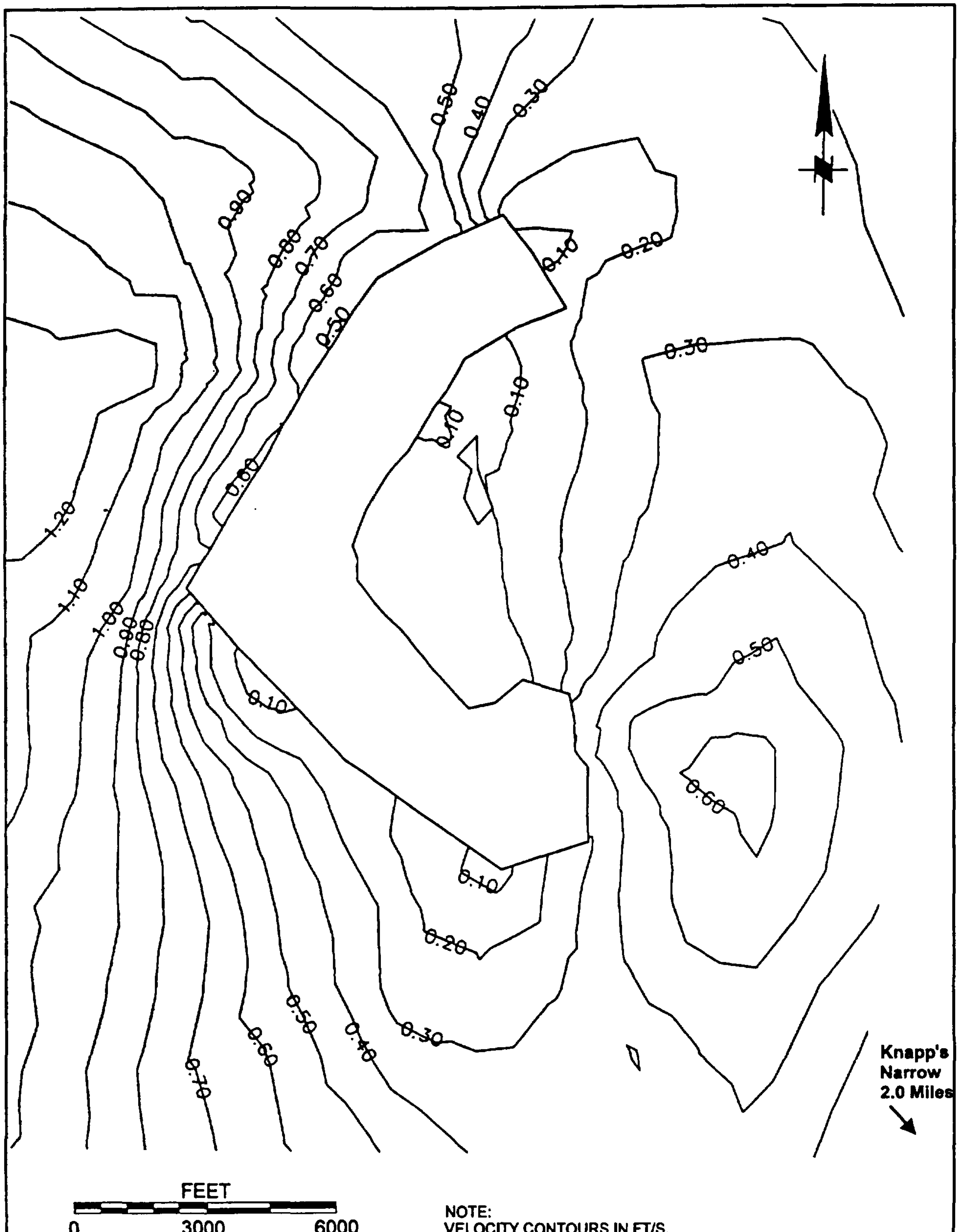

Figure 5-14. Peak ebb velocity contour for project.

be forced to travel around the new island. As a result, existing flow will be reduced within Poplar Harbor and will increase on the exterior edges of the constructed island and Coaches Island.

Under existing conditions, during flood flow, water that passes through Poplar Harbor splits in the vicinity of the point where the proposed dike alignment connects to Coaches Island. After construction, the split flow will train along the southwest dike and the southern and eastern shorelines of Coaches Island. The increase in flow velocity relative to existing conditions will be relatively small, on the order of 0.1 foot per second.

Water flow during ebb will split at the northern end of the proposed alignment and train along the northwest dike and the eastern portion of Coaches Island. Ebb flows fronting the northwest dike will increase about 0.1 foot per second relative to existing conditions. Flow velocities on the eastern shoreline of Coaches Island will increase very slightly, ranging between 0.0 and 0.1 foot per second, relative to existing conditions.

The original mesh used in modeling these flows was refined and expanded to include the Knapps Narrows channel, approximately 2.5 nautical miles southeast of Poplar Island, to evaluate the possible impact on far field areas. Knapps Narrows was chosen as a comparison site because of its proximity to the project and because of the potential impacts to the watermen and recreational boaters who use the channel. Changes in velocity caused by the project will be minimal (G&B and M&N 1995a). According to the specific predictive models used, velocities will slightly increase at Knapps Narrows, and will likely reduce channel shoaling. These changes in velocity are considered insignificant in terms of impacts to navigation because the associated changes in the modeled water depths in Knapps Narrows will be negligible compared to daily tidal fluctuations. The differences in hydrodynamic conditions for the proposed project and those associated with the 1847 condition have been examined. The modeled flow contour patterns that will result from the dike of the proposed restoration project and the flow patterns modeled using the 1847 footprint are similar, assuming that bottom bathymetry over the model mesh are the same for both time periods. This is a reasonable assumption, since only minor changes have taken place in the near field areas around the islands.

5.4.3.b Residence Times. Residence time distributions (average length of time that water particles reside in a basin) for the proposed project and the circa 1847 footprint are given in Figures 5-15 and 5-16. In general, average residence time for existing conditions in the Chesapeake Bay at the latitude of the island are on the order of 5 to 7 days (G&B and M&N 1995a). Residence time distributions over the entire project area (with few exceptions) are not affected by island restoration. However, the residence time in Poplar Harbor will increase slightly, on the order of approximately 0.1 to 0.2 day, relative to the existing conditions. This represents a range of 1 to 4 percent increase, which is not expected to result in any significant impact to water quality. There is significant overall variability in residence times depending upon meteorological conditions, tidal cycle variations, and seasonal influences. Comparisons between the conditions with the restored island and the circa 1847footprint indicate minimal differences between average residence times, which is consistent with the minimal difference between flow patterns (G&B and M&N 1995a).

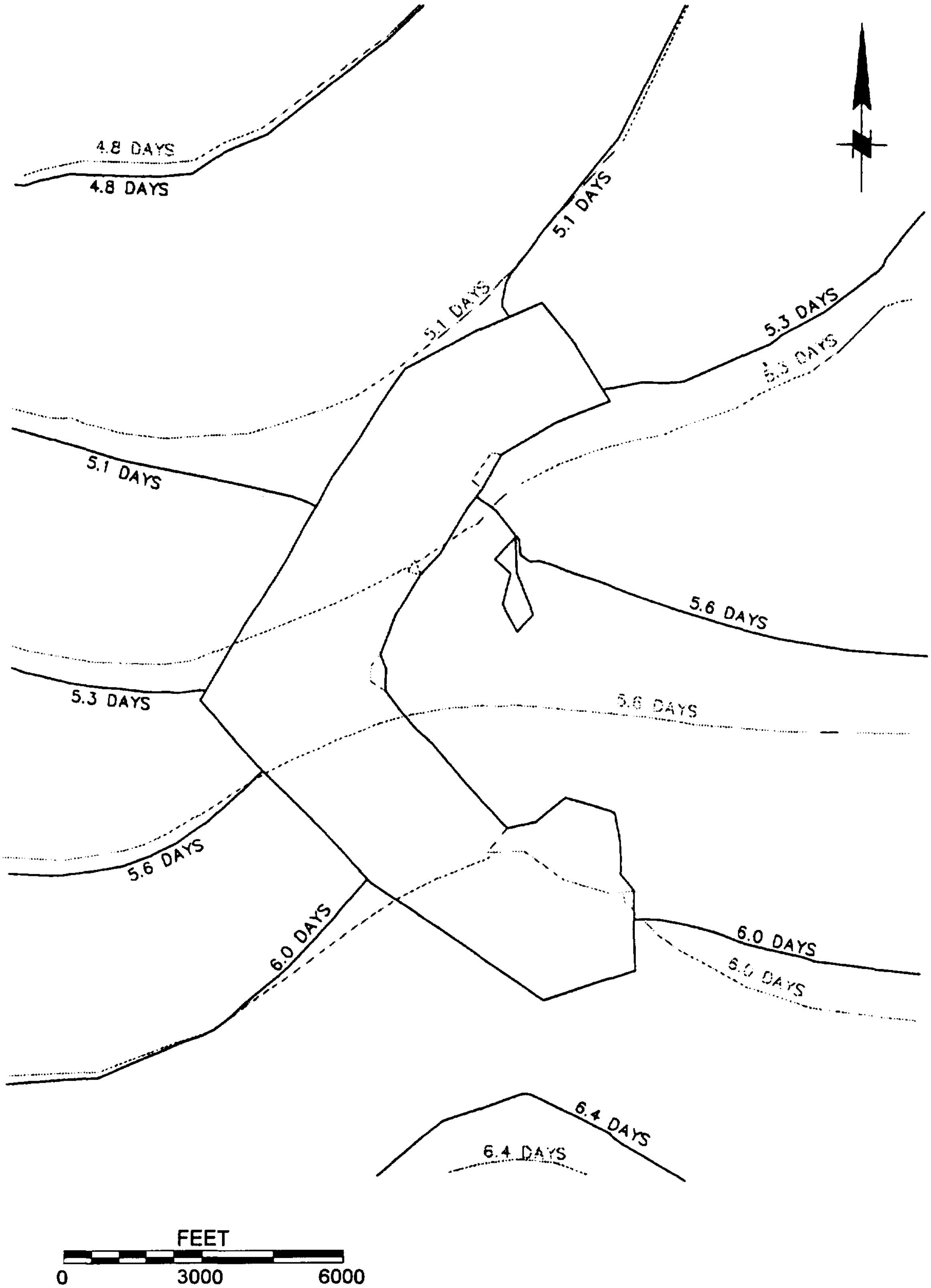

Figure 5-15. Residence time - Alt. no. 3 vs. existing condition.

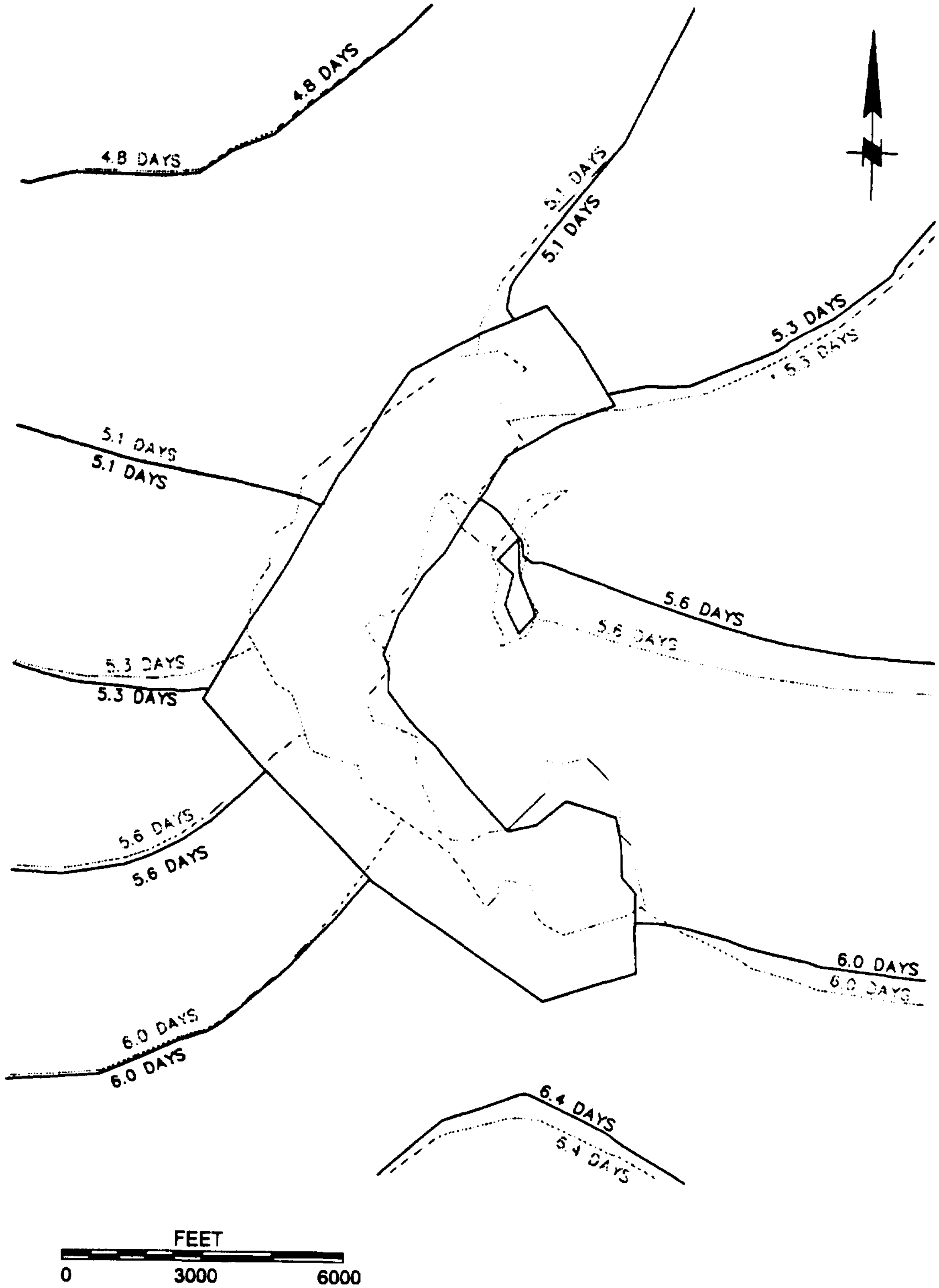

Figure 5-16. Residence time - Alt. no. 3 vs. 1847 condition.

5.4.3.c Sedimentation. Sediment transport with the proposed project was evaluated using models for three wind speeds (10, 15, and 20 mph) from both northwesterly and southerly directions over a sand bottom. When the modeled wind speed was less than 10 mph for both south and northwest directions, neither erosion nor deposition was found to occur at the Poplar Island area. However, for wind speeds of 15 and 20 mph, erosion will likely occur around the western portions of the dikes with a northwesterly wind, and along the eastern side of Coaches Island with a southerly wind. In comparison with the existing conditions, the erosion along the eastern shore of Coaches Island may be very slightly increased because of the flow trained in that direction by the perimeter dike.

As a result of model limitations, constant wind speeds have been used for all simulations. In reality, however, both magnitude and direction of wind change with time. Therefore, a weighted statistical approach, in combination with Monte Carlo simulation, was employed to represent the random nature of wind and to assess possible ranges of erosion around the western dikes and Coaches Island. A Monte Carlo simulation is a randomization test that is used to solve complex mathematical and statistical problems by sampling randomly from a simulated population on a computer.

Based on the probability of wind occurrence computed from measured wind data, Weibull distributions were assumed for both the southerly and northwesterly winds. As shown in the Hydrodynamic and Coastal Engineering reports prepared for this study (G&B and M&N 1995a), mean erosion rates around the eastern side of Coaches Island and western dikes will be 0.023 foot per month and 0.013 foot per month, respectively. These erosional rates are generalized and hypothetical. Erosional rates are expected to slow over time as banks stabilize. Current erosional rates (1846 to 1994) along the proposed alignment average 0.62 foot per month for all points with a range of 1.38 feet per month along the northwest side to 0.023 foot per month in parts of the harbor. Within Poplar Harbor, some areas (close to North Point Island) are actually accreting material, although slowly (0.01 foot per month). Erosional rates for the western dikes expected after construction are, therefore, less than the current average even though the eastern shore of Coaches Island may experience a slightly higher rate than normal. The armoring on the western dikes is expected to protect the structure from significant erosional damage, although some migration of fines will occur over time. The erosion predicted for the east side of Coaches Island is more significant because that area of the island is unprotected. Without protection, the marshes along the eastern shore of Coaches Island are expected to continue to erode. The western shore of Coaches Island will be protected by the project.

5.4.4 Water Quality

5.4.4.a Short-Term Impacts From Site Construction. Short-term water quality impacts will occur from dredging of the access channel and borrow area and from construction of the initial dike. Quarry stone for armoring the initial dike and specific-sized gravel for the dike core will be brought in for dike construction; other construction materials will consist of local sediment, which is currently available from on-site or near-site sources.

The primary short-term water quality impact is expected to be an increase in turbidity in the dredging and construction areas. It is estimated that up to 25 percent of the material dredged from the bottom area could be lost as suspended sediment during placement at the dike (MES 1994, USACE 1995). This loss will be highly variable depending upon the specific locations being dredged, but the losses are expected to be much lower than this maximum. Generally, less than 5 percent loss is expected to occur based on percent fines found during grain-size analyses (Section 3.1.3). It is expected that most of the suspended sediment will drop out of suspension within a 4-hour period. Within this 4-hour period, turbidity produced by dredging the borrow area and placement of fill at the dike may move typically as much as 5,000 feet to the north and south of the work station and less than 1,000 feet to the east and west of each station under prevailing winds and currents. On a daily basis, as winds and currents change, the orientation and size of the turbidity plumes will vary. These plume dimensions are based upon the allowable mixing zone established for preconstruction design testing of the dike segment.

Preliminary studies of the turbidity resulting from dredging in the project area were made during construction of a test dike at the site. This test dike, encompassing several construction techniques, was constructed on the southwest edge of the proposed alignment (Figure 5-17) during August and September 1995. The 2.2-acre test dike included sections of protected (stone armored) and unprotected sand placed via suction dredge, and a section constructed of geotextile materials backfilled with sand. The mixing zone allowed for this construction effort was defined by USACE and MDE. The actual mixing zone as measured during dike construction was significantly smaller. Background turbidity was measured from two locations outside the influence of the plume during plume monitoring and was used as a basis for comparison to plume turbidities. Turbidities at the boundary of the allowable mixing zone were well within the regulatory limits and most of the placement material was found to drop out of solution immediately. Summary data for the monitoring is presented in Table 5.3.

A rough approximation of the locations that could possibly be exposed to the sedimentation caused by project construction can be illustrated by moving the ellipse (representing the allowable mixing zone) around the perimeter of the proposed dike centerline as shown in Figure 5-17. This (calculated) zone could begin overlapping the oyster bar to the west during outer perimeter dike construction from a point approximately 400 feet northwest of the test dike section to approximately the middle of the dike section across the northeast end of the proposed constructed island, a total distance of approximately 10,000 feet. The maximum overlap is indicated during construction of the northwest dike, when approximately half the mixing zone ellipse is expected to lie over the oyster bar. The "water quality mixing zone" could also overlap the oyster bar to the east during outer perimeter dike construction from Coaches Island to a point just west of the southernmost corner of the dike. Maximum overlap is indicated during construction close to Coaches Island when approximately half the mixing zone ellipse is within the oyster bar area. A smaller overlap is also indicated during construction of the first few hundred feet of dike to the northwest of Coaches Island.

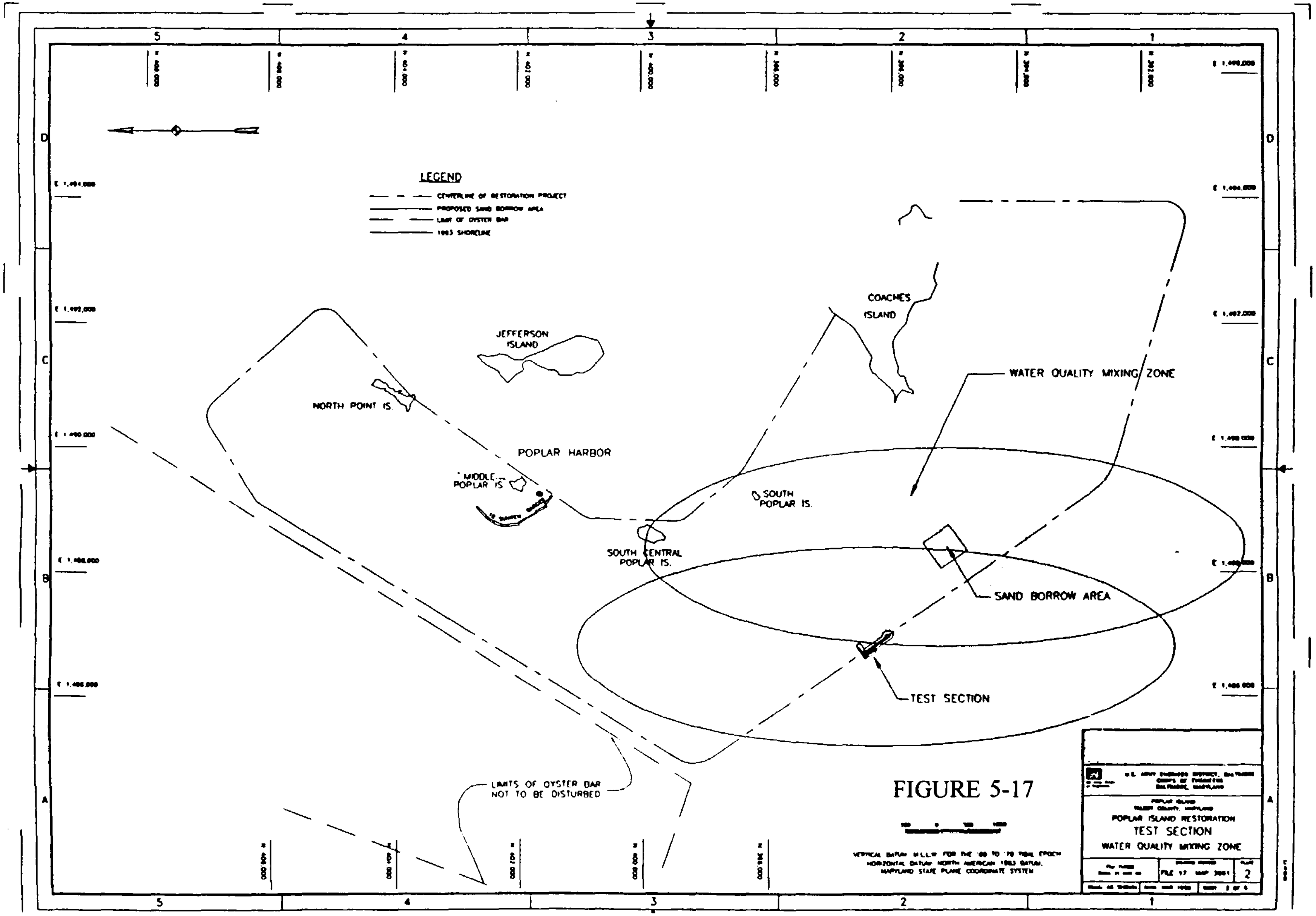
LEGEND
CENTERLINE OF RESTORATION PROJECT
PROPOSED SAND BORROW AREA
LIMIT OF OYSTER BAR
1993 SHORELINE
COACHES ISLAND
JEFFERSON ISLAND
NORTH POINT IS.
POPLAR HARBOR
MIDDLE POPLAR IS.
SOUTH POPLAR IS.
SOUTH CENTRAL POPLAR IS.
WATER QUALITY MIXING ZONE
SAND BORROW AREA
TEST SECTION
LIMITS OF OYSTER BAR NOT TO BE DISTURBED
POPLAR ISLAND RESTORATION
TEST SECTION
WATER QUALITY MIXING ZONE

FIGURE 5-17

Table 5-3 - Range of values for water clarity (secchi), turbidity (NTU), and total suspended solids (TSS) at Poplar Island Test Dike, 13 August - 4 October 1995.

Station	Secchi Depth (cm)	NTU	TSS (mg/L)
BG-1	135 - 384	1.3 - 4.3	37 - 94
BG-2	104 - 187	2.2 - 10.5	33 - 83
TD-1	80 - 208	2.0 - 11.9	39 - 92
TD-2	93 - 244	1.9 - 12.6	<5 - 93
TD-3	97 - 264	1.6 - 9.7	40 - 100
TD-4	106 - 294	2.0 - 12.0	43 - 98
TD-5	113 - 297	1.4 - 10.2	42 - 107
TD-6	109 - 263	1.8 - 10.4	38 - 95
TD-7	108 - 326	1.5 - 9.6	39 - 94
TD-8	996 - 355	1.5 - 12.9	33 - 115
TD-9	119 - 324	1.4 - 12.4	34 - 121
TD-10	114 - 385	1.4 - 13.1	37 - 108

The turbidity that actually occurs within the water quality mixing zone will be highly variable due to tides, currents, wind, and borrow material. The actual plume would rarely reach the outer edge of the regulated ellipse at any time and even then, would be within regulatory limits. It is expected that the plume would be long and thin in the direction of the maximum tidal current (approximately 5,000 by 500 feet), and, as the tide turned, would become shorter and reach maximum width (approximately 500 by 1,000 feet), then elongate in the opposite direction as the tidal current increased. Therefore, it is expected that only areas very close to the point of construction would experience significantly elevated turbidity within the plume discharge point and would remain elevated for an hour or two during each tidal cycle. These areas in the immediate vicinity of the discharge point would experience this periodic elevation in turbidity for a matter of weeks as construction progressed along the dike length. There is an oyster bar approximately 200 feet from the site; however, oyster bar communities are adapted to natural turbidity fluctuations in this shallow water area, and would not be expected to suffer significant long-term adverse effects due to short-term turbidity from dike construction. The maximum distance of identifiable sediment deposition (as measured by sediment profile imaging) was only approximately 450 feet from the placement point (EA 1996a). It is expected, therefore, that only 200-300 feet within NOB 8-10 will be affected by sedimentation. Regulatory restrictions within the Bay may preclude dredging operations during the periods when the most sensitive lifestages are abundant or during specific periods when metabolic rates are lower (Table 5-3). Monitoring of dredged material placement in the area of the test dike has indicated that plume densities diminish quickly. Within 1,000 feet of the outflow pipe, NTU values were within the range of background levels (EA 1996a). While some minor turbidity has been noted in the area surrounding the cutter head of the dredge, this is unlikely to have significant impact upon local resources.

Due to the low organic content of the local sediments, the grain size of most on-site sediments, and the excavation method, release of measurable amounts of ammonia is expected to be minimal. There may be some release of ammonia if anoxic sediments are used in dike construction. If ammonia releases do occur, the elevated concentrations would be expected to generally follow the spatial distribution discussed above for suspended sediments. The ammonia would tend to be diluted and ionized relatively rapidly, and, therefore, would not be expected to result in significant long-term adverse effects, such as biological toxicity or nutrification (nutrient enrichment). The most toxic form, un-ionized ammonia, is not expected to occur in biologically significant concentrations.

No other water quality impacts are expected from the material dredging and placement associated with construction of the site. Impacts from toxic substances are not expected, because the sediments to be moved are local in origin, primarily original substrate and remnant erosional materials from Poplar Island, and there are no known local sources of toxic substances. Impacts from nutrients are also not expected, because the sandy sediments would not be expected, to have significant concentrations of nutrient-rich material. Biological and chemical oxygen demand is also not expected to be significant. Dissolved oxygen reductions may occur locally, but vertical mixing is complete throughout much of the area, and stratification is not expected to occur.

5.4.4.b Long-Term Impacts. It is expected that some long-term water quality impacts will result from the operation of the dredged-material placement site and from the effects of the restored island and wetlands.

During operation of the placement facility, water will be displaced from the interior of the diked area as new dredged material is added. This water will consist initially of Bay water and rainwater trapped within the dike as it is constructed. As operations continue, this Bay water will be mixed with water transported with the dredged material, additional Bay water used to pump dredged material into the site, and with rainfall. Water will be discharged to the Bay through several adjustable weirs along the eastern, northern and southern perimeter dikes. Internal diversions will be designed and constructed to ensure adequate settling of suspended sediment prior to discharge into Bay waters. The large volume of water returned to the harbor and Bay will cause periodic hydrodynamic changes in the harbor. These changes will be more noticed because the project will effectively block strong tidal flows between the islands. No long term impacts are expected.

Rainwater inputs to the upland cells will, by necessity, have to discharge through developing wetlands as construction progresses. Salinity of these discharges is expected to fluctuate widely due to the salt content of the dredged materials and the freshwater inputs from rainwater. To avoid potential impacts to the developing wetlands, discharge channels will be constructed to temporarily divert water around the wetlands.

The project requires that only clean sediment from the outer approach channels to Baltimore Harbor be used for fill. Significant water quality impacts from sediment placement operations are not expected because of the uncontaminated nature of the source material. Within the diked area, the primary water quality impact is estimated to be increased turbidity. However, the diked area will serve as a settling pond and treatment basin. The shallow pond and long travel path between placement area and discharge weir will promote settling of all but the finest material. The weirs will be controlled during placement operations in order to minimize the release of suspended solids. Turbidity in the discharge is expected to be near ambient background levels.

Ammonia can affect water quality because of its oxygen demand, its availability as an algae nutrient, and its toxicity at high concentrations. Due to the high ratio of surface area to water depth within the diked area, it is expected that natural aeration, coupled with the maintenance of proper pH and the expected presence of nitrifying bacteria will be adequate to convert much of the ammonia to nitrate, thereby substantially reducing the oxygen demand of the discharge to the Bay. Whether as ammonia or nitrate, however, nutrient concentrations in the discharge may be higher than ambient concentrations. During the fall and winter months, the middle Chesapeake Bay can be nitrogen-limited, so that the addition of nitrogen as ammonia or nitrate during those seasons may cause local increases in algae biomass in the embayment east of Poplar Island. There will be no placement of dredged material in the summer which will be used for crust management and de-watering. Water discharged from the site will be aerated and oxidized and must meet water quality standards. Water quality will be monitored closely and the project managed to minimize deleterious water quality impacts.

As each wetland cell of the placement area is completed, its exterior dikes will be breached to allow normal tidal flushing of the new wetland habitat. Long-term impacts on water quality in the project area are expected to be beneficial. The wetlands will generally serve to convert soluble nutrients in tidal water into organic detritus that will be exported back to the embayment east of Poplar Island. This detrital material will provide substrate for bacterial growth and benthic community enhancements in the shallow waters of Poplar Harbor.

5.4.5 Sediment Quality

Since the project is specifically proposed to contain only clean sediment from project channels in the central Bay leading to Baltimore Harbor[2], no significant sediment quality impacts are expected. Both the proposed construction site and the project channels that would be dredged to provide material for the wetland and upland habitats are removed from known sources of

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2 Specific channel reaches include the Craighill Entrance Channel, the Craighill Channel, the Craighill Angle, the Craighill Upper Range, the Cutoff Angle, the Brewerton Channel Eastern Extension, the Tolchester Channel, and the Swan Point Channel.

anthropogenic contamination. Subsequently, we do not expect contaminant related impacts to result from project construction.

Confirmatory testing of project sediments is currently underway and will be repeated at intervals not to exceed three years during the life of the project. Testing and evaluation will conform to guidance provided in *Evaluation of Dredged Material Proposed for Discharge in Waters of the U. S. - Testing Manual* [Inland Testing Manual] (EPA/USACE 1994). Contaminant levels in channel sediments will be compared to reference sediments collected near the Poplar Island site. For the most part, analyses will focus on the Priority Pollutant List less the volatile compounds which are seldom present in dredged material and which would necessitate specialized sampling procedures. Results from the analyses currently underway and from future confirmatory testing episodes will be available for inspection at the Baltimore District office and will be appended to Poplar Island Monitoring Reports.

Dredged materials that are placed in upland cells are exposed to the atmosphere and weathering. Exposure of sulfidic marine sediments sets off a chemical reaction that tends to lower sediment/soil pH. This reaction and the exposure to rainfall (which also has a low pH) causes some metals that are bound to the sediment to dissolve into the water. Dissolved metals can be toxic to aquatic organisms, if present at sufficient concentrations, and could constitute a negative impact to the local biota, particularly in Poplar Harbor in the short term. This potential impact is lessened by the placement of clean material. In addition, upland soils will be conditioned periodically to maintain a neutral pH, which will keep metals bound to the sediments/soils. Water quality at the weir will also be continuously monitored so incidences of low pH and high metals can be identified to minimize impacts to local water quality. The reconstructed salt marsh will act as a filter for potential release of metals; therefore, no water quality perturbations are expected in the long term.

5.4.6 Aquatic Resources

Impacts to the aquatic resources of the Poplar Island area can be categorized as short-term construction impacts (less than or approximately 2 years) and as long-term impacts (2 - 30 years) of material placement and marsh creation. Construction of the initial dike will include dredging an 8000 ft long access channel from deep water south of the proposed alignment to a staging area near Poplar Harbor (Figure 5-10). The channel will be dredged to a width of 300 to 400 feet and a depth of 25 feet, and approximately 2 mcy of material will be removed. Approximately one half (4000 ft) of this channel will be located within the containment area and one half (4000ft) will be located outside of the containment area. In addition, borrow material will be dredged from the project site for placement along the dike alignment. These activities will disturb the bottom in the dredged channel and borrow areas, as well as locally elevate turbidity and possibly nutrients during dike material placement. Dike construction will bury existing areas of the bottom along the proposed alignment and may affect adjacent areas of the bottom through drift and settling of finer particulates.

After initial dike construction, dredged material from other areas of the Bay will periodically be placed within the diked area. Short-term localized elevations in turbidity will likely be associated with placement of material due to the operation of tug and barge traffic in the relatively shallow waters surrounding the proposed dike alignment, and in the access channel. The most significant impacts to the aquatic resources of the area will be burial of 1,110 acres of Bay bottom in a relatively shallow area within the dike, with subsequent construction of tidal marsh and uplands over the area. Other potential impacts include sediment, nutrient, and possibly ammonia releases from the contained area. Long-term impacts are expected to be positive. The wetlands will mature and provide high quality detritus to adjacent waters of Poplar Harbor. The new habitats, both wetland and upland, and significant transitional edge areas will provide a wide range of diversity in bird and fish populations in the tidal channels and adjacent waters.

5.4.6.a Phytoplankton and Zooplankton. In the short term, the turbidity associated with dredging and dredged material placement is likely to suppress light penetration into the water column and could locally depress the phytoplankton community. Significant increases in nutrient concentrations due to dredging activities are not expected, except in the immediate area of the discharge. These localized increases would tend to elevate phytoplankton concentrations, but this is not expected to be significant because of the small amounts of nutrients released. Since the project is in an exposed area, tidal currents and wave action are expected to lessen localized effects on the phytoplankton through exchange with nearby waters. Phytoplankton and zooplankton will be entrained in sediment slurry at the borrow site during construction; the impact will be localized and not significant in the long term. The short-term effects on the phytoplankton are, therefore, expected to be negligible. As a result, zooplankton communities that are dependent on phytoplankton densities are not expected to be limited by food availability. Effects on photosensitive zooplankton species due to localized light penetration are expected to be short lived due to current exchanges and rapid settling of most of the materials. Placement activities in the project area will continue over the life of the project, resulting in a relatively consistent area of higher turbidity within a specific distance of the discharge point. The affected area, however, will be small relative to the overall area of the archipelago. It is also important to note that the Poplar Island area already experiences significant turbidity events daily due to island erosion. Based on the chlorophyll concentrations and zooplankton densities noted during the summer survey (EA 1994d) versus those observed at state monitoring stations (Section 3.1.3.), there are no indications that events have had even a negligible effect on the plankton.

Dredged material placement within the proposed dike is not expected to measurably affect plankton communities outside of the dike. Reconstruction of the island communities, especially the salt marsh, is expected to have a stabilizing influence on the plankton communities in the immediate vicinity of the archipelago. It is expected that the development of salt marshes on the east side of the restored island will particularly benefit Poplar Harbor. Salt marshes are known to filter nutrients from the water, moderating the availability of free nutrients that can cause rapid phytoplankton blooms followed by oxygen-depleting decay. Moderation of phytoplankton blooms will not only stabilize dissolved oxygen within the system, but will also improve light attenuation during key periods in the development of photosensitive organisms such as SAV.

5.4.6.b Fisheries Resources. Construction activities are expected to affect the fish community in several distinct ways. Dredging of the access channel and borrow area and subsequent placement along the dike alignment will disturb less than 100 acres of bottom. Pelagic fishes (e.g., menhaden, striped bass) and more mobile members of the demersal fish community (e.g., flounders) are expected to easily move out of or generally avoid the area during dredging. The fishes most affected would be smaller, mostly resident species of limited mobility (e.g., gobies, blennies) and the young of fish utilizing the area as a nursery. Those within influence of the suction head will be entrained with the material being moved, and some of those along the alignment may be trapped and destroyed as the material is placed. This is expected to be a very small portion of the local fish community, and the action is not predicted to have lasting impacts on any species.

The short-term elevated suspended solids levels associated with dredging within the project area are expected to have a negligible effect on larger members of the fish community that will likely avoid the areas of highest turbidity. Early lifestages are expected to be most affected: eggs and larvae/juveniles of many fish species are sensitive to high turbidity. Many fish eggs are adhesive and readily accumulate particulates, making them less buoyant (in the case of pelagic eggs) or smothering them (in the case of demersal eggs). Some larval fish are similarly affected by high concentrations of particulates. Suspended solids are also known to influence the feeding abilities of some larvae/juveniles, particularly those most dependent on vision to detect prey (e.g., young striped bass). The extent of impacts to fishes in the area during early life stages is speculative because so few fish eggs/larvae were collected during existing conditions surveys (Section 3.1.6.c). Because the reasons for poor ichthyoplankton abundances cannot be determined from the existing conditions surveys (collection methods vs. organism distributions), project impacts cannot be determined. The fish species most at risk to perturbations of early life stages are those with demersal eggs (e.g., silversides, gobies, blennies). These species are, however, all very common regionally, and any impacts to the populations would be short term.

When construction is completed, any fish walled within the proposed dike will likely be lost. Existing conditions surveys confirmed that all species currently using the area are common in the Chesapeake Bay and typical of the mid-Bay region. The loss of fish habitat within the diked area is considered the more significant impact. Existing conditions surveys indicated that much of the open water in the vicinity of the archipelago was bereft of cover items, particularly SAV and viable oyster bars (although some occur nearby). The most significant cover found within the study area was provided by the submerged trees and snags, remains of the forests that formerly covered the remnant islands (Figure 5-18). The snags occupy an estimated 27.2 acres, or 2.5 percent of the containment area. These have been noted as important habitat for striped bass (among other species) and would be buried within the containment area. The loss of the snag fields is of some importance, because a structure of

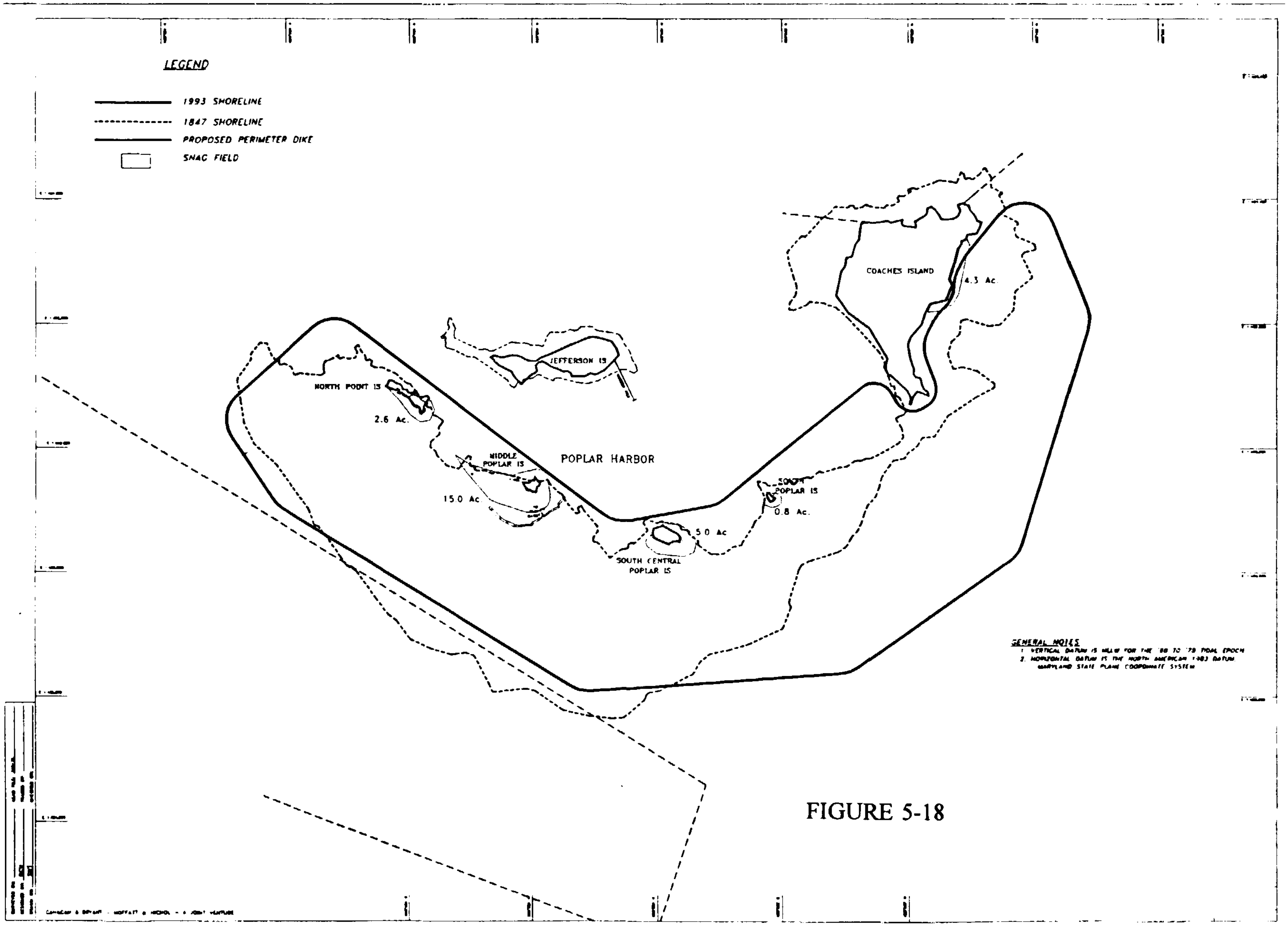

LEGEND
1993 SHORELINE
1847 SHORELINE
PROPOSED PERIMETER DIKE
SNAG FIELD
COACHES ISLAND
4.3 Ac.
JEFFERSON IS
NORTH POINT IS
2.6 Ac.
MIDDLE POPLAR IS
POPLAR HARBOR
15.0 Ac.
SOUTH POPLAR IS
0.8 Ac.
5.0 Ac
SOUTH CENTRAL POPLAR IS
GENERAL NOTES

FIGURE 5-18

this type provides "reef" habitat within the relatively open homogenous sand flats of the mid-Bay region. The snags are, however, short-term structures that will disintegrate with time and are not unique to Poplar Island, but which exist throughout the Bay. Moreover, the protected cove created by Poplar Island may create conditions conducive to the recruitment and growth of SAV, a habitat type that is currently areally restricted in Poplar Harbor. The stone armor that will protect the dike in many areas is also expected to provide cover for some species, although utilization of these structures is often limited. In addition, the stone armor will provide a food source upon colonization of the rocks by epibenthic species. Construction of groins or rock piles along the dike wall to provide bottom diversity/cover is expected to increase the value of the rock walls as refugia (reefs).

An important habitat feature of an archipelago is the shoreline. Shallow near-shore areas have been noted as being among the most productive habitat of some estuaries, second only to tidal marshes (Ayvanzian *et al.* 1992). The presence of this habitat (within the archipelago) is not unique to the region, but it is unique in its occurrence so far from the mainland (surrounded by areas of much deeper water). Approximately 1,000 acres of shoreline and near-shore habitat will be buried within the containment area, including the four Poplar Island remnants and their associated shorelines. This, however, constitutes only a minimal loss of shallow open water areas regionally, less than 1 percent within the mainstem Bay from the Bay Bridge to the mouth of the Potomac River. Although a large shoreline will eventually be constructed, there will be a period of time during which the shore of the proposed island will be predominantly rip-rap, which does not have the same habitat value as a natural sand beach. Some of this loss will eventually be ameliorated by the construction of the salt marsh on the eastern shore of the proposed island, but this will be a shift in habitat types with a net loss of shallow sandy-bottomed open water and sand beach habitat currently within the proposed dike alignment. However, over time, it is also expected that some additional shallow sand beach will develop through accretion along Poplar Harbor portions of the dike and along any finger dikes constructed as reef areas. The tidal gut that will remain open between the proposed island and Coaches Island is also expected to provide some additional shoreline habitat.

This shift in the predominant aquatic habitat is expected to manifest fundamental changes within the fish community utilizing the area during the transition period following dike completion, particularly within and directly adjacent to the proposed dike alignment. The most significant change is that the only open water within the proposed alignment will be marsh creeks and ponds. This will preclude use of the area by adults of some of the larger species that utilize the deeper areas around the archipelago, which were found during existing conditions investigations. The usage is expected to shift to earlier lifestages and to smaller species that commonly utilize marsh creeks and ponds. Species composition in the waters surrounding the proposed island is not expected to change significantly in the long term. Monitoring studies of similar beneficial usage projects in northern and southern estuaries have revealed nearly identical species compositions before and after marsh creation (Landin *et al.* 1989, Newling and Landin 1985).

5.4.6.c Commercially Important Species. Existing conditions studies in the project area found that five commercially important finfish species and three species constituting the "herring" group utilize the area at various times of the year. Of these, the most important in terms of poundage landed and dollar value were striped bass and Atlantic menhaden; several lifestages of each of these species were collected. As stated previously, the composition of the adult finfish community in the waters surrounding the proposed alignment is not expected to be impacted significantly in the long term (Section 3.1.6.b). However, construction impacts such as bottom disturbance or turbidity may deter short-term usage by the adults and young of some commercially important species (e.g., flounder). In addition, burial of available cover items such as snags would remove preferred habitat for species such as striped bass. Pelagic species (e.g., herrings) may avoid the area completely during construction activities, but the young (particularly the planktonic stages) may not be able to. It is not anticipated that any long-term impacts to commercially important finfish will be significant, and, once the construction phase is completed, finfish are expected to move back into the area quickly.

Two commercially important bivalve species, soft clams and razor clams, occur within the proposed dike alignment. Dredging and construction of the containment facility is expected to permanently eliminate the bivalve community that currently inhabits the bottom within the dike alignment. Moreover, there would be no potential for reestablishing that portion of the former Bay bottom shell fishery because the area would be completely covered with dredged material when the island was constructed. Since both of these clam species occur inside and outside the proposed alignment, populations are expected to reestablish adjacent to the proposed island after construction. The soft clam beds in areas adjacent to the proposed island have been historically productive, and soft clams typically produce thousands of young per spawn. Soft clams, therefore, are expected to repopulate adjacent areas within two or three years, post-construction. The timing of this recovery is, however, speculative and may depend upon the timing of construction activities relative to peak spawning and recruitment for these species and also upon regional population trends for the species. For example, soft clam harvests (one gauge of population density of adults) are currently in a decline (Section 3.1.6.c); fewer numbers of adults may affect the numbers of young produced to repopulate various areas over the next several years. However, the soft clam beds in areas adjacent to the proposed island have historically been very productive and recent surveys indicate active recruitment of young both inside and outside of the proposed alignment indicating a potentially healthy parent stock within the next several years. Additionally, individual clams produce millions of eggs and larvae and the planktonic stages can remain in the water column for long periods, adding to the possibility of recruitment from area outside of the influence of the project.

Suspended sediments from initial dike construction activities may also depress recruitments in the near-field during construction activities. Although not expected to drift more than 500 feet from the site (EA 1996a), particulates settling over bivalves may suffocate the young within the area of influence, postponing recruitment in these affected areas until construction activities are completed. It is anticipated, however, that construction of the salt marsh will increase productivity of the shellfish populations once the marsh is established and functioning by localized moderating of available nutrients which is expected to enhance productivity of bivalve food sources (phytoplankton and zooplankton).

Two charted oyster bars are located adjacent to the proposed dike alignment. NOB 8-10 is located adjacent to the dike on the northwest side of the proposed alignment. NOB 8-11 is located along the eastern side of the archipelago (Figure 3-14). Only NOB 8-10 is currently believed to be productive (Section 3.1.6.c, Figure 3-14). The proposed dike alignment is configured such that no dredging, construction, or filling activities will occur over any oyster harvesting areas. The staging area for material placement will be sufficiently far from NOB 8-10 to prevent impacts from resuspension of material due to barge traffic. No long-term impacts from the project on the adjacent oyster bars are, therefore, expected. Short-term impacts to these bars from the project could result from suspended sediment drift during dike construction, particularly to the planktonic larvae and spat (newly settled young). Dredging restrictions within the Bay in the summer (June through August) are designed to avoid entrainment of and provide protection for these lifestages. These restrictions will be closely adhered to during construction. A second dredging restriction time occurs during periods of low metabolic rates when oysters are more susceptible to smothering by suspended sediments (December to March). These beds and the nearby clam beds are currently exposed periodically to higher than background levels of natural turbidity due to island erosion. Stabilization of the islands is expected to eliminate this source of turbidity and protect the remaining beds from impacts related to suspended sediment in the future.

Table 5-4: Inland Dredging Restrictions for Chesapeake Bay

Period	**Agency**	**Protected Resource**	**Conditions**
February 1-April 15	National Marine Fisheries Service	Anadromous Fish (Migrations)	Unconditional
June 1 - August 31	MD Dept of Natural Resources-- Shellfish Division	Oysters--Spawning, larval development and early spat (newly settled)	Dredging within 1500 feet of a viable bed
December - March	MD Dept. of Natural Resources-- Shellfish Division	Oysters--Adults during the fattening period	Dredging within 1500 of a viable bed

from: (GBA and M&N, 1995c)

The waters surrounding the archipelago had been identified as a regionally important area for harvesting of blue crabs. This was confirmed during summer existing conditions surveys through observations of substantial commercial crabbing efforts in the area (EA 1995d). Short-term impacts to blue crabs are expected to be similar to those of the finfish resources. During dike construction, there will be a period of lowered usage of the archipelago by blue crabs, and those trapped within the dike at completion will be lost. These losses are expected to be minimal, particularly if dike construction is completed when the crabs are in deeper waters (October through April). The most significant impact to this resource will be the loss of 1,110 acres of prime summer blue crab habitat to burial and island construction. The snag areas and the relatively protected Poplar Harbor are valuable habitat for juvenile and molting stages. The shallows surrounding the remnant islands provide habitat (cover and food sources) sought by juvenile and adult crabs in the summer. The marsh creeks and protected harbor formed by the restored island construction are expected to provide excellent crab habitat in the future (particularly for young lifestages and peelers/soft crabs), but island construction represents a net loss of currently productive blue crab habitat.

5.4.6.d Benthic Invertebrates. Benthic invertebrates, especially infaunal components, are strongly dependent upon biological, physical, and chemical characteristics of the surrounding substrate. This dependence, combined with low mobility, makes benthic infaunal organisms, such as clams, particularly sensitive to the disruption associated with dredging and dredged material placement (McCauley *et al.* 1977). Because of the engineering design of Poplar Island, measurable impact would be expected to be restricted to the area within the diked perimeter and beneath the dike itself.

Short-term impact to the benthos will result from dike construction, dredging of the access channel, material placement activities, and ship movement in the area. Recovery of benthic resources will occur outside of the reconstructed island after cessation of disruptive activities in a specific area.

Dredging of the access channel and the sand borrow area for dike construction will completely disrupt the indigenous benthos living in the material that will be moved and within the influence of the sediment plume associated with the operation. This is dependent upon sediment type and wind/current conditions in the area. Actual disturbances from this construction were measured to within 5000 feet of the test dike (EA 1996a, in progress).

The effects of dike construction on the benthic community are expected to be restricted to the placement area and to an area adjacent to the dike within 500 feet of the proposed alignment. The benthic resources buried under the base of the dike will be lost, but the impacts outside of the alignment are expected to be of short duration. Many benthic infaunal organisms can survive a moderate silt layer covering by burrowing upward, and the community can also recolonize a disturbed area through recruitment and immigration.

The impact of dredged material placed within the containment area will depend on the extent of particulate dispersion from the site. Disturbance may occur before containment is completed and fine sediment is deposited on surrounding benthic communities. Many infaunal organisms can move rapidly enough to avoid being covered by particulates. This has been documented, for example, in bivalves by Shulenberger (1970). Some components of the benthic community (e.g., filter feeders) are sensitive to high turbidities, particularly over protracted periods when turbidity may influence long-term feeding effectiveness. Duration and distance of particulate drift from the dike will determine the overall effect on the benthic community.

Maintenance of the access channel and construction activity in the area will result in periodic disturbance to the adjacent benthic communities until all placement of dredged material is completed. Vessels operating in shallow waters can cause considerable sediment disruption.

Some taxa are able to cope with persistent sediment instability, but community alteration will continue until construction and fill activities are completed. Once dredging and disturbance has ceased, recovery of the benthic community should occur within 1 to 2 years (Pfitzenmeyer 1970), although some opportunistic species, particularly polychaetes, will recolonize an area within weeks after a disturbance (Sanders *et al.* 1980, Grassle and Grassle 1974).

The most significant long-term effect will be the elimination of most of the existing benthic community in the 1,110-acre area to be covered with dredged material. Existing conditions surveys have indicated that the area to be filled is not a unique habitat and that the area is not inhabited by a unique benthic community when compared to other shallow areas in the Mesohaline portion of the Chesapeake Bay. The similarity of community composition (including soft clam distributions) inside and outside the proposed alignment can be attributed to the relatively homogenous substrate composition (85 percent to 99 percent fine sand) throughout most of the archipelago (Section 3.1.6.d).

Construction of marsh creeks will reestablish some benthic habitat within the proposed alignment; however, re-establishment may require a time period of several years. This new habitat is expected to be markedly different from the existing habitat since it will be shallower and will consist of finer substrate composition. The shallow, better protected environment of Poplar Harbor that will result from island restoration is expected to eventually produce a productive benthic invertebrate community that will attract fish and wildlife to that area. Recolonization may be facilitated quickly due to the presence of "seed" organisms occurring in the sediments of the current wetlands which will be incorporated into the reconstructed marsh. The current benthic community within Poplar Harbor will also provide "seed" organisms for benthic recruitment.

Some nutrient export is expected from the containment area following material placement, dewatering, and marsh construction. This may enhance benthic productivity periodically during project development due to short-term increases in planktonic food sources. Marsh creation, however, is expected to eventually moderate nutrient fluxes in the waters surrounding the proposed island and to have a stabilizing effect on the nutrient cycle.

Horseshoe crab spawning has not been confirmed in the archipelago. If spawning does occur, short-term impacts include elimination of suitable spawning habitat on the four island remnants. The dike alignment will not abut the south shore of Coaches Island, and will not impact this habitat, which is potentially suitable for horseshoe crab spawning. Over the long term, the reconstructed island will create suitable spawning habitat (protected from waves and surf) within Poplar Harbor.

5.4.6.e Submerged Aquatic Vegetation. The waters surrounding the Poplar Island archipelago provide many of the physical habitat characteristics key to SAV growth and success. These characteristics include shallow water protected from wave action, with relatively good water quality and clarity. However, recent SAV surveys of the waters surrounding the Poplar Island archipelago revealed that the presence of SAV species was minimal (EA 1995c,d). Site-specific degradation of habitat quality, particularly wave action and the associated turbidity from erosion of the remaining land masses, is believed to be the primary cause of the Poplar Island SAV decline in recent years (Section 3.1.6.e).

The area of greatest SAV density identified during the existing conditions surveys was outside the proposed dike alignment adjacent to the point where the easterly perimeter dike will abut Coaches Island (Figure 3-16). No SAV was found inside of the proposed alignment, and only one other potential occurrence (near Jefferson's Island) was found, although root stocks were not located.

No short-term impacts to SAV due to access channel dredging are expected because the channel does not cut through any known areas of root stock occurrence. The proposed channel is far enough from the confirmed bed adjacent to Coaches Island to prevent significant increases in suspended solids during channel dredging from affecting the bed. The perimeter dike, however, will come within approximately 300 feet of the bed. Dredged material placement may cause turbidities near the SAV bed to be elevated during construction of that portion of dike, which may result in some short-term impacts. However, timing material placement in that location to coincide with a dormant period of the dominant species (October through April), would minimize potential impacts to this remaining bed. This bed may be the only root stock available adjacent to the project area and may be key to the recolonization of Poplar Harbor after construction. Precautions, therefore, will be taken to minimize construction impacts to the bed.

Longer-term impacts of material placement activities and turbidity due to barge positioning are not expected to impact the SAV resources because these activities will be conducted sufficiently far from the bed. The project will bury approximately 700 acres of shallow open water (<6 feet) that could potentially support SAV within the area of the proposed dike alignment. Current erosional patterns prevent this area from supporting SAV, and further loss of protective islands will rapidly decrease the potential habitat area. Portions of the shallow water areas associated with the Poplar Island archipelago that have historically supported SAV will be converted to an island/marsh complex. However, the restoration of Poplar Island will eliminate the wave action and turbidity currently associated with erosion of the existing land masses within the proposed dike alignment and will provide added protection to Jefferson Island and portions of Coaches Island outside the dike. This elimination/reduction of existing sources of suspended solids is expected to enhance the suitability of the area for future SAV growth. The dike will also afford greater protection to Poplar Harbor, which is expected to promote SAV recolonization due to lessening of wave action.

Once the dike is breached to allow tidal flushing of the completed marsh areas, resuspended material may migrate into Poplar Harbor. The material migration could potentially alter the particle size distribution of the harbor substrate. The effect of substrate alteration on future SAV occurrence or distribution is speculative, because future sediment composition cannot be predicted, and because recolonization will be dependent upon a variety of factors such as water quality, clarity, and the distribution potential of nearby seed stocks. It is anticipated, however, that finer sediments will predominate in the harbor. This will shift eventual SAV dominance to plants typical of muddy substrates like those of salt marsh creeks/channels (e.g., redhead and widgeon grass). The salt marsh is expected to have a long-term positive effect on the existing SAV by moderating turbidity, nutrient fluxes, and phytoplankton blooms within Poplar Harbor.

5.4.7 Terrestrial Resources

5.4.7.a Vegetation Resources. The loss of vegetation on Poplar Island has been a historically occurring pattern over the past 150 years. Poplar Island has been reduced in size and cut into several islands, first fragmenting and then eliminating forested areas on the island. Three of the remnants now possess primarily tidal marsh areas that show continual signs of erosion of the marsh peat banks. South Poplar Island has been reduced to the point where it is frequently overwashed by tidal water and is being further reduced in size and elevation. In 1995, only marsh grasses remained on South Poplar Island with evidence suggesting that shrub growth has recently disappeared from the island.

Impacts to vegetation community resources will be minimal. The proposed alignment is far enough away from the four western remnants that little disturbance should occur during dike construction. Since the proposed alignment will not abut Coaches Island, vegetative communities on the island will not be disturbed by reconstruction. Further, dredged materials will be placed within the contained cells such that the remaining islands will not be buried. Vegetative communities remaining on the four western remnant islands will be preserved and used to seed and populate newly constructed areas surrounding the four remnant islands.

A major component of the proposed project will be the creation of tidal marsh and upland habitats that will restore the wildlife habitat of the Poplar Island area (Section 6.3). The dredged material placement and tidal marsh development are designed to result in minimal impacts to the existing tidal marsh on Coaches Island. The south side of Coaches Island will be protected by a sand dune, and a tidal gut will provide tidal water inflow to the remnants. The remainder of the dike alignment interface along Coaches Island will be constructed adjacent to unvegetated beach.

5.4.7.b Avifauna. Most bird species are characterized as terrestrial primarily because of their nesting habits. Species include waterfowl, wading birds, other colonial waterbirds, and shore birds. Many of these birds, however, rely upon aquatic habitats, including wetlands, beaches, intertidal areas, and transition zones between land and water to satisfy their life requirements.

Since the proposed dike construction and creation of a dredged material placement island may occur in phases, the associated impacts to avifauna will vary depending upon timing and location of construction activities. The basic impacts of construction to birds in the Poplar Island area will be disturbance of habitat. The 20 ft dike elevation will provide gradual slopes and should not be difficult for animals to traverse.

Where construction activities occur, the behavior of birds utilizing the area will be influenced by human activities, including equipment use, movement, and noise. This may likely displace birds utilizing discrete areas such as areas of shallow water habitat in the immediate vicinity of dike segments. As the proposed construction sequence occurs, areas from north to south within the project area will experience disturbances. These are expected to be localized, and a certain amount of habituation to construction activities is likely. Habituation may also occur toward water-based transportation in and out of the project area through the established access channel. Disturbance of avian resources, including bald eagles *(Haliaeetus leucocephalus)* on Jefferson Island and colonial birds on Coaches Island, will be minimized by the distance between the dike alignment and these areas.

Although the remnant islands will remain intact, the area surrounding the remnants will be filled, reducing shoreline nesting habitat and shallow water foraging and resting areas. Birds utilizing these habitats will be forced to utilize other areas in the vicinity of Jefferson and Coaches Islands. They will also likely follow mobile forage fish and seek areas providing floating or submerged aquatic vegetation or accessible shellfish beds.

Colonial Waterbirds

Colonial waterbird colonies on Middle Poplar Island, including the large colony of double-crested cormorants and the smaller colonies of little blue heron *(Egretta caerulea)* and snowy egrets *(Egretta thula)*, will be disturbed by construction activity in areas surrounding the island. It is assumed that an unquantifiable component of these colonies may move and seek other nesting colony locations in the area including Coaches Island or Jefferson Island during island construction. The USFWS recommends dredged material placement volumes per lift which do not inundate the cormorant rookery on Middle Poplar Island. If this is not possible, the Service recommends artificial nesting structures be erected adjacent to Middle Poplar Island prior to initial inflow to mitigate the loss. Double-crested cormorants are known to readily utilize artificial structures. In addition, the Service indicates that the colony could be impacted by construction activities occuring within 500 feet. The USFWS and DNR have requested that we take precautions to limit disturbance to the area within 500 feet from March 1through July 15.

The colonial bird colonies on Coaches Island will likely remain unaffected by the proposed action. The periphery of the colony may be temporarily affected by human disturbances, including noise and general activity in the vicinity. The colony edge is approximately 500 feet from the proposed alignment, and the majority of the colony is insulated by its interior woodland location. The most distant point in the colony is approximately 1,500 feet from the proposed alignment. The USFWS has recommended time-of-year restrictions for construction of the containment berm and human activities along the entire forested portion of the southern shoreline, where that construction or human activity will occur within 660 feet. The time-of-year restriction for this portion of Coaches Island is recommended by the Service to be 15 February through 15 July, and will not be required for inflow operations.

It is anticipated that in the long term, the island to be created, which will have upland and lowland habitat, will ultimately favor colonization by a variety of colonial birds, including all of those currently using the area.

Gulls and Terns

The elimination of shallow water foraging and resting areas and the concentrated resting area afforded by the Middle Poplar Island barges will affect gulls. Gulls, particularly herring gulls *(Larus argentatus)*, are very common in the region and have demonstrated adaptability to human presence. They will likely be able to adapt to other foraging areas and will quickly take to new structural features such as dikes or pilings.

Terns (*Sterna* spp.) will be affected by the proposed action because of the conversion of shallow water and open water foraging areas to the dredged material island. Those birds will be forced to seek foraging areas elsewhere and will follow the forage fish stocks.

There will be more potential nesting sites on the new island to support these birds. It is possible that there will eventually be good nesting habitat for the Least Tern, a Maryland protected species.

5.4.7.c Waterfowl. The most significant impacts to local native breeding waterfowl are likely those associated with American black duck (*Anas rubripes*) nesting. This species has suffered significant long-term population declines resulting from loss of habitat and from competition and hybridization with expanding breeding mallard populations. Nesting black ducks were observed in very low densities during the Poplar Island quarterly surveys (1.0 nesting hens per acre [EA 1995c,d]). It is anticipated, however, that creation of marsh and woodland cover as part of the restoration effort will benefit this species, at least locally.

Other potential impacts to waterfowl include the elimination of shallow water foraging and resting areas. This would primarily affect overwintering waterfowl, including sea ducks and diving ducks such as oldsquaw *(Clangula hyemalis)*, scoters (*Melanitta* spp.), redhead *(Aythya americana)*, canvasback *(Aythya valisneria)*, scaup (*Aytha* spp.), and bufflehead *(Bucephala clangula)*.

The sea ducks, particularly oldsquaw, are relatively common and abundant inhabitants of the Bay and should readily shift to other areas to forage. Once Poplar Harbor becomes better protected by the dike, and the SAV colonizes extensive areas, there would be a significant positive benefit to a wide variety of waterfowl species. Furthermore, the creation of tidal marsh interspersed with tidal creeks will create foraging areas and resting locations for waterfowl in the future.

Raptors and Scavenging Birds

The primary raptor affected by the proposed action is the osprey *(Pandion haliaetus)*. Osprey nest and have been observed fledging young on all of the remnant islands with the exception of South Poplar Island. Following the recovery from effects of chlorinated pesticides, osprey populations have expanded dramatically in the Chesapeake Bay region. This species will opportunistically nest on a variety of elevated structures, including pilings, channel markers, building roofs, and piers. Artificial nesting platform structures can also be erected to facilitate osprey nesting. Overall, osprey populations in the area are not expected to be adversely impacted.

Another raptor in the study area vicinity, the bald eagle, has been observed only with the active nest site located on Jefferson Island. The potential effects of the proposed action on the bald eagle is further discussed in Section 5.4.8, "Rare, Threatened, and Endangered Species."

Shore Birds

Shore birds such as willet *(Catotrophorus semipalmatus)*, dunlin *(Calidris alpina)* and semi-palmated sandpiper *(Calidris pusilla)* may potentially be negatively affected by disturbance surrounding the remnant island habitats. Although the willet has been observed in breeding and nesting behavior on the four remnant islands, this species is not imperiled and is not listed as threatened or endangered by state or Federal agencies. Willets have also been observed nesting on Coaches Island. Other shore birds potentially affected by this proposed action may lose some minor forage areas such as beaches and intertidal zones along the remnant islands and along a portion of the beach where the proposed alignment will border Coaches Island. The tidal marsh nesting habitat for willet and other shore birds on Coaches Island is not expected to be adversely impacted.

The creation of a restored Poplar Island, including tidal marshes, tidal flats, and beach areas, will benefit nesting willets and other seasonal migratory shore birds by providing a much larger area for nesting and feeding.

5.4.7.d Mammals, Reptiles, and Amphibians. No significant impacts are likely to occur to reptiles, amphibians, or mammals due to the proposed action because no members of these groups were found on the four remnant islands during seasonal surveys (EA 1995a,b,c,d). However, diamondback terrapins *(Malaclemmys terrapin)* are known to utilize sandy tidal habitats for nesting. A short-term impact for this species includes the elimination of shoreline nesting habitat on the remnants. None of the terrestrial upland or wetland habitats where reptiles, amphibians, and mammals have been observed on Coaches Island will be destroyed by the proposed action. Coaches Island will likely act as a potential source of animals from which the new island can be colonized. In addition, the construction of a sand dune along the south shore of Coaches Island, which will leave a tidal gut open between the islands, will sustain suitable long-term nesting habitat for diamondback terrapins.

5.4.8 Rare, Threatened, and Endangered Species

No state or Federal threatened or endangered species are expected to be significantly impacted by the restoration of Poplar Island. The single nesting pair of bald eagles on Jefferson Island is not likely to be negatively impacted by the proposed action. Construction activities that occur on the northeastern side of the proposed dike alignment would be the most likely component of the project to affect bald eagles on Jefferson Island. These effects would be manifested by localized short-term disturbances during construction of the dike segment nearest to Jefferson Island. This segment is approximately one-quarter mile from the eagle's nest on the island which is the established restricted distance for the bald eagle's nest. Precautions would be taken during construction to avoid working within this area during the restricted periods. The proposed dike off-loading area is approximately 3,500 feet from the eagle's nest. These distances would be expected to provide sufficient buffer to prevent abandonment of the nest. Still, a time-of-year restriction from 15 January through 15 June prohibiting construction and human activities within the quarter mile bald eagle protection zone surrounding the nest has been recommended by USFWS. If the eagles fail to nest or produce young, the recommended time-of-year restriction can be reconsidered.

The nest tree is in an area of the island where woodland cover has been greatly diminished by erosion and wave damage. This may soon eliminate the current nest's tree. The creation of the dike and northern cells for the restored Poplar Island will afford protection by reducing the rate of erosion of Jefferson Island, and will likely prolong the time the tree will remain in place.

The state endangered tern species identified in the project vicinity, Least Tern *(Sterna antillarum)* and gull-billed tern *(Gelochelidiron nilotica)*, are not expected to be negatively impacted by the proposed action. Breeding colonies of these two species have not been identified in the project area; therefore, elimination of nesting areas is not assumed to be a consequence of project implementation. The effects that the proposed action will have on these two species relates to disturbance of forage activities during construction. Furthermore, the existing area of shallow water within the proposed dike alignment would be eliminated as a potential foraging area for these and other tern species under the proposed action. This reduction in foraging habitat will require terns to shift to other areas where forage fish congregate. In the larger (regional) context, the elimination of approximately 1,100 acres of open water habitat involves a less than 1 percent loss of the open water foraging habitat available in adjacent areas of the Chesapeake Bay. Further, enhancement of Poplar Harbor as a foraging area will afford good habitat; beach areas within the alignment along tidal channels may provide increased nesting habitat.

5.4.9 Air Quality

The reconstructed island will contain no fossil-fueled equipment or other sources of emissions. Construction and placement activities may cause some elevated emissions from boat activity and use of other gas-powered equipment. Some potential for suspension of particulates exists during filling/grading activities. As the dredged material dries and is subjected to wind, lighter materials may become airborne. These are expected to be short-lived events with no significant impact on air quality. Once the island is revegetated and the soils stabilize, the potential for airborne particulate will be minimized. Impacts to air quality from dike construction and material placement are, therefore, expected to be localized and short term. The project will have no long-term impacts on air quality.

5.4.10 Noise

Noise levels around Poplar Island will increase during construction of the dike, pumping of the dredged material to the diked area, and construction of the habitat areas. The potential effects of this noise on the heron rookery on Coaches Island and the bald eagle nest on Jefferson Island are discussed in Section 5.4.7. The seasonal human residents of Coaches Island and Jefferson Island will also experience some increase in noise levels, primarily during construction. The greatest noise effects will be experienced by the residents of Coaches Island during dredging and placement of the dike material and the dune wall adjacent to the island. In the long term, after completion of the project, the area will return to noise levels natural to an uninhabited bay island.

The project area is approximately 1 to 1.5 miles offshore of the mainland. Experience from the HMI placement site indicates that the only noise disturbances that were considered noticeable were the back-up beepers on construction equipment and an inadequately muffled crew boat. Both were corrected or adjusted to acceptable levels. The major noise sources will occur during construction, with some intermittent sources during filling/placement operations. These sources will be from dredging operations, cranes, bulldozers, and crew boats. Only the crew boats will operate to and from Tilghman Island, Lowes Wharf or Kent Point (4 miles north). Noise levels (decibels) will be below 55 DbA at the mainland, the nearest sensitive receptor other than Jefferson and Coaches Island. Only sharp sounds of relatively high frequency such as back-up warning beepers are likely to be noticeable. These types of noises can be easily modified to below nuisance levels. Work boat noises are a common occurrence in Knapps Narrows and adjacent waters and would not be perceived as unusual.

Noises will be intermittent during filling/placement operations. Due to the distance between Poplar Island and the areas targeted for dredging (Baltimore Harbor Approach Channels).

Throughout the construction and filling operations, best management practices will be used to minimize noise emissions.

5.4.11 Hazardous, Toxic, and Radioactive Wastes

The proposed Poplar Island restoration project will not involve the use, storage, or transport of hazardous materials during or after construction. Neither the materials to be used in the construction of the dikes nor the dredged materials to be placed there are contaminated. The restored island will remain a wildlife sanctuary, and no other uses besides passive recreation will occur. Based upon these conditions, the construction and use of the area will not pose any significant environmental liability concern.

5.5 Impacts to Cultural and Archeological Resources

The Poplar Island Restoration Project, clearly a Federal undertaking, falls within the review requirements of the National Historic Preservation Act of 1966, as amended, and its implementing regulations 36 CFR, Part 800. These regulations require the agency to identify, evaluate, and mitigate impacts to National Register-eligible or listed cultural resources prior to project initiation. Further, these efforts are to be conducted in consultations with the appropriate State Historic Preservation Officer (SHPO) and, at times, the Advisory Council on Historic Preservation (ACHP).

As part of the prefeasibility study conducted by the state for the Poplar Island Project, an initial Phase 1A study was conducted in 1994. This study identified the potential for locating both significant prehistoric and historic sites and structures within the Poplar Island Complex. Following these investigations, it was recommended that further investigations be conducted.

Phase 1 terrestrial and marine surveys were conducted for the project in 1995. Prior to the initiation of the study, the study team consulted with the Maryland SHPO to design the investigative strategy. For terrestrial investigations, a standard testing program was designed in areas impacted by the project. For marine investigations, a combination of electronic survey techniques, mechanical sampling, and submarine survey were designed.

The Phase 1 investigations documented the presence of a single terrestrial site that would be impacted and six submarine anomalies. The terrestrial site, 18TA237, was rapidly eroding, and therefore, USACE recommended that Phase 2 investigations be conducted on an accelerated schedule. It was found that the historic remains did not retain sufficient integrity to qualify for listing on the National Register.

The marine investigations initially identified 27 magnetic anomalies, and recommended 6 sites for further investigations. In consultation with the Maryland SHPO, the USACE conducted these further investigations with a verbal acceptance of the results of Phase 1. The marine investigations documented that all six anomalies were either modern, natural, or too fragmented to qualify for National Register consideration.

The SHPO agreed with the results of the Phase 1 and 2 investigations that there were no significant cultural resources that would be affected by the Poplar Island project. Since the SHPO and USACE agree on the determination of no effect, no further work is necessary, and USACE has completed its responsibilities under NHPA. Formal concurrence from the SHPO is included in Annex C.

5.6 Impacts to Socioeconomic Resources

Impacts on the socioeconomic resources of the existing Poplar Island archipelago will depend, in part, on the scope of the project alignment and the timing of project construction. Impacts are also related to access, area closures, effects on income-producing aquatic organisms adjacent to the project, and public perception of the health and safety of harvestable resources within the affected environment.

Under the proposed project design, biologically productive areas of Chesapeake Bay waters within the dike alignment would be eliminated, adversely affecting some of the socioeconomic resources in the project area and region. The extent to which the conversion of these productive waters to marsh and upland habitats would impact socioeconomic resources is evaluated in the following sections.

The potential for employment of area residents is expected during dike construction, habitat development, and monitoring activities. Dike construction is projected to occur over a 2-year period. To meet such a deadline, support will be needed from the local workforce. Because some of the construction contractors may not be local residents, the potential for year-round utilization of local motels and restaurants also exists. Habitat development and monitoring will occur intermittently throughout the life of the project but will involve periods of intensive activity (ex. marsh planting) that may require support from the local workforce and area businesses.

The project will have no significant impact on minority or low-income populations in the project area. Members of the project team met with the Tidal Fish Commission to request that fishery areas that are currently closed be reopened. This action was requested to replace those areas lost to the project. The commission agreed to make recommendations to the DNR, with the caveat that watermen respect the marked boundaries.

5.6.1 Scope of the Project

The project construction schedule is an important consideration in determining socioeconomic impacts to the project area and the region. Barge traffic, dredging activities, and access operations would potentially impact the local residences on Jefferson and Coaches Islands, although these residences are used infrequently, predominantly during summer and hunting season. The associated commercial and recreational activities within and outside the proposed alignment would be affected by these activities as well. If construction occurs quickly and best management practices (i.e., stabilizing dredged materials quickly, limiting the area of access, quickly completing activities that cause disturbances, such as dredging) are utilized during construction, impacts to aquatic resources and, consequently, socioeconomic resources could be larger in scale but would last a significantly shorter period.

5.6.2 Economic Impact to Aquatic Resources

The current project alignment would impact approximately 1,110 acres of land and water currently within the 1847 island footprint. Upon completion, the project will shift 1,100 acres from shallow open water to salt marsh and upland habitats. Currently, this area contributes a portion of the total landings for finfish, shellfish, and blue crab fisheries in the Chesapeake Bay, which, in turn, contributes to the economic well-being of Talbot County and communities elsewhere. The economic value of aquatic resources obtained from within the waters surrounding the current archipelago are difficult to estimate because of the way that landings are tracked by DNR. Landings are reported as sales from specific sub-regions. The Poplar Island sub-region is considered to contain waters from the Bay Bridge to the mouth of the Choptank. Because of this, no attempt was made to obtain data for specific locations such as the Poplar Island archipelago. Moreover, impacts to nonharvestable life stages of aquatic resources that contribute to overall recruitment in a much larger area are difficult to assign a monetary value. Studies have been conducted to determine the monetary value of destroyed early life stages in association with power plant projects throughout the East Coast. However, these studies involve estimates of impingement and entrainment that can be more directly correlated. Losses from dredging and island creation activities have never been calculated nor correlated with impacts to sensitive life stages. Unlike power plant operations, dredging and construction activities can be controlled by timing construction to coincide with periods in which sensitive life stages are not present. In addition, the long-term habitat benefits are expected to translate to economic benefits.

Harvestable resources in the Chesapeake Bay region are reported on an annual basis to the DNR. Prices for harvestable resources fluctuate on a yearly and seasonal basis. Assigning a value to any one resource is difficult because of the many factors that play into the market price. Information on the monetary value of harvestable resources collected from the mid-Chesapeake Bay (Bay Bridge to mouth of the Choptank River) is discussed below. It should be noted that past prices often have no correlation with future market prices for any harvestable resource. For these reasons, predicting the socioeconomic value of future harvestable resources in the archipelago region cannot be calculated with any precision and could be significantly different in any given year. However, qualitative analysis suggests that the net contribution of the Poplar Island area to fish and shellfish resources of the mid-Bay will be enhanced in the long term, after island restoration.

5.6.2.a Soft Clam Fishery. Over the last 5 years, soft clam prices per bushel have fluctuated widely. A 5-year (1989 to 1994) mean of $55 per bushel for the region from the Bay Bridge to Cove Point was determined by the DNR (Table 3-22). A fluctuating soft clam population is partially responsible for the varying price levels. Soft clam populations fluctuate on a yearly basis, depending on reproductive success. In the region analyzed, soft clam catches have contributed significantly to the Maryland total in recent years. In 1993, over half of the Maryland total landings of soft clams came from this region. For reasons already indicated, it is difficult to determine what percentage of the soft clam harvest came from archipelago waters. Anecdotal information has indicated that in past years, a substantial harvest of soft clams has come from there. In recent years, a reduction in recruitment has limited the harvest Baywide, and current levels indicate it is unlikely soft clams are being harvested from archipelago waters. To offset potential economic impacts of reduced soft clam harvesting opportunities due to island reconstruction the Maryland DNR has agreed to open some previously closed beds for soft-clam harvesting. A minimum of 800 acres of Nelson Island Shoal in the Choptank River will be reopened for soft clam harvesting. Recruitment to harvestable size takes several years. If the completion of the project is protracted over many years, it is possible that a portion of the construction phase could coincide with an increase in the harvestable soft clam population in the area. Should both of these factors coincide, some socioeconomic impacts could occur. However, creation of wetland areas and increased SAV densities associated with the project could have positive long-term effects on the recruitment of future generations of soft clams by locally moderating available nutrients which may ultimately enhance production of bivalve food sources (plankton). This could enable local populations to recover quickly from any short-term impacts caused by construction/dredging activities.

5.6.2.b Oyster Fishery. Data from DNR indicated that the 5-year (1989 to 1994) mean price for oysters from the area (Region 027; Bay Bridge to the Choptank River) was $20 per bushel. As previously discussed, it is not possible to determine which portion of this total catch came from the Poplar Island archipelago and its adjacent waters. However, the percentage of the total Maryland catch captured in the cited region over the last 5 years has been compiled and indicates only a small portion of the total state catch comes from this region. However, several oyster bars are known to exist adjacent to archipelago waters. NOB 10, located to the west of the islands, has two small viable beds resulting from recent seeding. NOB 11, adjacent to Coaches Island, is not currently believed to be productive. Any oysters collected from this region have constituted an insignificant portion of the state total. This would indicate that the current economic value of oysters in the region, and in the project area, is minimal. Construction of wetland areas associated with the project and reduction in turbidity from island erosion could, however, serve to enhance oyster recruitment and habitat in the archipelago region by providing areas in which recolonization could occur. Consequently, construction of the project could improve oyster bars in the area over the long term. Any short-term impacts from construction would be expected to be minimal, but precautions would be taken to minimize impacts to the remnant oyster populations to ensure survival for future growth and expansion of the viable beds on the bar.

5.6.2.c Finfish Fishery. Landings and associated dollar value for several fish species have been compiled on a yearly basis by the DNR for Section 027 (surrounding Poplar Island) beginning in 1980 (Table 3-22). Menhaden were caught in the greatest quantity (1,167,146 pound average yearly catch between 1989 and 1993), and striped bass have been the most monetarily important species ($463,639 in 1993). More recent data for striped bass was unavailable; however, an increase in both landings and dollar value would be expected because of the easing of restrictions associated with a 5-year moratorium that limited or completely restricted harvest of striped bass in an effort to replenish reproductive stocks. Other important commercial fish species caught within this region of the Chesapeake Bay include white perch, grey sea trout, herring, summer flounder, and bluefish. The total monetary contribution of each of these species, however, is significantly less than striped bass and menhaden. It is important to note that seasonal abundances and market conditions can affect the monetary value of any species on a seasonal or yearly basis.

Short-term impacts from project-related activities on local finfish landings may result due to localized effects on spawning and rearing habitat important during the early life stages of commercially important species. Impacts to these important lifestages can be minimized by timing those activities that cause disruption to habitat to coincide with time periods less critical for these lifestages. Moreover, once wetland habitats have been constructed, important nursery areas would be increased and could contribute to a higher recruitment of commercially important species. Further, the armor stone utilized in dike construction as well as rock piles may function as a reef structure for some juveniles and young. Harvestable resources would likely be impacted secondarily and only by a disruption in habitat utilization. It is difficult to determine direct impacts from a loss of habitat. Survey results of existing conditions indicated that fish utilization of the archipelago is greatest during the summer months (EA 1995d). Some impacts on harvestable fish could be minimized by timing major construction efforts to occur during periods of lower fish activity.

5.6.2.d Blue Crab Fishery. Blue crabs provide the most significant income-producing resource for most Chesapeake Bay regions. Landings and the monetary value associated with those landings exceed every other harvestable resource within Chesapeake Bay waters. In addition, total crab catches exceed catches of every other commercially important species combined (Table 3-22). In recent years, increasing pressure has been placed on the blue crab fishery as catches increase with the introduction of more efficient gear and an increasing demand. Stricter regulations on commercial and recreational crabbing have recently been instituted. For example, commercial crabbers must obey area closures and undetermined waiting periods for licenses. Recreational crabbers may only harvest on Fridays, Saturdays, and Sundays. In addition, the 1995 season will be closed early (15 November), compared to the normal season closing (31 December). As in most areas, the crab catch dominates the landings of commercially important species within Poplar Island archipelago waters. Observations made during the summer seasonal survey indicated that all portions of archipelago waters were actively fished for crabs by commercial watermen. Since archipelago waters are so shallow, this region is extensively fished during the summer months. In addition, island waters likely provide habitats from which soft crabs can be collected, especially along shoreline areas, that provide protection from predators.

Impacts of the project on the socioeconomic resources associated with the crabbing industry would likely be related to the timing and scope of the project. However, regardless of the project configuration and timing, resources in terms of waters available to be fished would be lost. Due to the intensive nature of the fishery, it is possible that the individual watermen fishing these waters would experience temporary impacts, including reduction in catch and income, during the construction phase. In this region of the Bay, moving crab traps elsewhere is difficult without impacting commercial fisherman in other locations. Opening of additional clamming areas in the Choptank River as negotiated between MDNR and the Waterman's Association is expected to offset the potential economic impacts brought about by curtailed harvest of blue crabs and soft clams within the Project Area. This would allow some relief to individuals currently crabbing in the Poplar Island area. With the completion of the project, waters that once supported commercial and recreational crabbing will have been converted to marsh and upland habitat. The loss of these waters will be minimized by the increase in important nursery habitats in the region and in Poplar Harbor specifically. This increase in available habitat for nonharvestable lifestages should eventually increase recruitment to harvestable lifestages and enhance remaining waters within the region.

In summary, socioeconomic impacts resulting from the project are closely related to impacts on commercially important species that are harvested from the area. In general, some short-term impacts can be expected within the project area as a result of the project. Long-term adverse impacts are not anticipated and, in fact, some enhancement of resources could occur. A minimization of short-term impacts by timing disruptive activities to occur within periods of low utilization by commercially important species will be instituted during project construction. This action will limit disruption to the aquatic environment and to the local economy. If construction of the island is protracted over a longer period, impacts to resources could change, and a reevaluation of impacts may be necessary.

5.7 Impacts to Aesthetics and Recreational Resources

Negative impacts to aesthetics and recreational resources as a result of the Poplar Island project can be characterized as being short term in nature and primarily associated with the construction phase of the project. Upon completion of the project, both aesthetic values and recreational use is expected to increase in the area.

Short-term impacts to the aesthetic value of the island are related to construction and dredging activities. These include presence of construction equipment, exposure of unvegetated portions of the island, inaccessibility of the island area, and displacement of existing visual resources of the current island remnants.

Short-term impacts to recreational resources are related to a restriction of access that the project will require. During the construction phase, it is anticipated that the archipelago region will be closed because of dangers associated with construction activities. Moreover, the high level of activity in the area will likely reduce the existing recreational value in the short term. Those activities that are enhanced by limited human disturbance (e.g., duck hunting, bird watching, and fishing) will be impacted during the construction phase.

5.7.1 Aesthetics

Creation of a large island within the middle Chesapeake Bay region will increase the aesthetic value of the area by restoring an historically significant feature to the current landscape/ waterscape. More so than the existing archipelago, the reconstructed island will dramatically increase the visibility of the area to area users. The creation of a large Chesapeake Bay island will change the scenic vista within a relatively short distance, but will create very little visual impact from a distance of 1 mile or more. In addition, without reconstruction, the islands would continue to erode and would eventually disappear.

Once reconstructed, the island will provide an additional scenic backdrop to a region already considered to have a high aesthetic value. Construction activities would impact the area aesthetically.

5.7.2 Recreation

Recreational activities will be impacted in two ways during project construction. Some activities will have to be excluded from the region. These activities are primarily island-based activities and include bird watching, picnicking, and some recreational boating. Other activities may also have to be relocated away from the project area, including fishing, sightseeing, and hunting.

5.7.2.a Fishing. Within the current island configuration, fishing activities are concentrated in areas with an abundance of snag cover or areas with sharp drop-offs to deeper water. Impacts to recreational fishing are expected to occur during project construction due to limitations on access to current fishing areas. Many areas that are currently fished (e.g. snag field) will either be buried or otherwise inaccessible during island reconstruction, which will further limit this type of recreation within the immediate area.

Upon project completion fishing opportunities within and adjacent to the archipelago are expected to increase due to improvements to the adjacent shallow water habitats from saltmarsh and reef habitat creation and increased SAV densities. The containment dike will also provide some new structure within the region which may attract some sportfish species. The additional habitats are expected to enhance the recreational fishery in the long-term by improving the rearing and nursery areas, ultimately enhancing recruitment of popular sportfish species within and adjacent to the archipelago.

5.7.2.b Boating. Existing levels of boating within the current configuration of the Poplar Island archipelago is limited by shallow depths in the area. For that reason, impacts to recreational boating from the project are expected to be minimal. Creation of the island may increase recreational boating opportunities around the island by stabilizing erosion along the west side, making it safer for passage of deeper draft boats to cruise near the site. Access to the entire island will be restricted, however, to prevent disturbance to natural areas and bird populations.

Barge traffic will increase in the project aarea which may cause some disturbance to recreational boating. No information on barge traffic with respect to recreational boating is available from HMI. Most recreational activities in and around Poplar Island are related to sport fishing, much of which occurs in and around the existing snag fields in the vicinity of the island remnants. Reef structures (rock piles) are proposed for construction adjacent to the north corners of the dike to mitigate losses of these snag fields buried during construction. It is anticipated that much of the recreational boating in the immediate vicinity of Poplar Island will be diverted to the north end of the project area, away from the active barge traffic area. During dike construction, the proposed access channels and off loading areas will be in the south, and barge traffic is expected to pose minimal disturbance to or safety concerns for recreational fishermen. Barge channels and active approaches will be clearly marked and information will be provided to the Coast Guard regarding all activities. During island construction all recreational and commercial boating activities will be restricted within the project area which will further minmize safety concerns with respect to barge traffic. After construction of the dike, barge traffic is expected to be sporadic, occurring only when dredged material is transported to the site. Recreation and commercial traffic will also be restricted adjacent to the proposed island after construction which is expected to limit safety issues to the access channel area south of the project. Danger to recreational boaters in this area is expected to be minmal due to the sporadic barge schedule, public awareness of the project, marked channels and approaches, and the predominantly seasonal (recreational) boating use. To date, there have been no recreational boating accidents in the vicinity of HMI that can be attributed to barge/construction activity.

5.7.2.c Hunting. Impacts to hunting activities in response to construction activities are expected to be minimal. Currently only a low level of hunting activities occur within the archipelago region. Only those areas immediately offshore likely experience any significant hunting activity. Due to the abundance of suitable sea duck habitat in the region, it is expected that hunting activities that focus on the species will move elsewhere during project construction activities. Upon completion of the project, sea duck hunting could resume within close proximity of the reconfigured archipelago.

5.7.2.d Other Recreational Activities. Other recreational activities within the existing archipelago include bird watching and general sightseeing. Project construction activities would have a short-term impact on these activities, but time-of-year restrictions should avoid displacement of nesting waterbird colonies. However, if the no-action alternative were selected as the best course of action, the further erosion of the remnant islands would also cause the displacement of nesting colonies and waterfowl populations. It is expected that these species will take up residence in suitable habitats elsewhere in the mid-Bay region. Upon completion of the project, the creation of new habitat would increase the value of bird watching and sightseeing in the region.

It is also important to note that activities that occur on Jefferson and Coaches Islands would be only minimally impacted by island construction and could be expected to continue throughout the construction phase of the project. No significant long-term negative impacts are expected with respect to these two islands. Island reconstruction is expected to improve recreational activities on Coaches Island, and (to a lesser extent) Jefferson Island by protecting the remaining land masses from further erosion.

5.8 Environmental Benefits

5.8.1 Beneficial Use of Dredged Material

Clean dredged material is a potentially valuable natural resource with substantial benefits if properly used. Under existing USACE policy, dredging projects are to be conducted to maximize public benefits, and beneficial uses of the dredged material are an integral component of that policy (USACE 1992).

According to USACE, there are at least nine categories of potential beneficial uses for dredged material (1992). Five of these uses are applicable to the Poplar Island project:

- **Habitat restoration**—A key objective at Poplar Island is to employ dredged material to restore upland and wetland habitat lost to aggressive erosional forces over the last century.

- **Shoreline nourishment**—To support the habitat restoration and provide the foundation for emergent ecosystems, material dredged from the navigational channels will be emplaced and reinforced to provide an effective, long-term erosion barrier.

- **Recreation**—It is anticipated that Poplar Island, once restored, will again become a focal point for passive recreational activities in the central Bay.

- **Upland resource support**—A proportion of the area of Poplar Island will be restored to upland habitat. This component of the restoration will be crucial to wildlife, especially wading birds requiring woody vegetation for breeding rookeries.

- **Multipurpose land uses**—Restored areas of Poplar Island could accommodate and support recreational, educational, and research opportunities. If present erosional losses are allowed to continue, these use categories will vanish or be supported only by the existing open water habitat.

One key to beneficial use is timing. For the Poplar Island project, the navigational dredging and habitat restoration components of the program are both of great importance (also in keeping with Federal policy under the Water Resources Act of 1992). The need for placement of dredged material to restore the island ecosystems is imminent (because loss of the island remnants is proceeding), but not immediate. Coordination between these aspects of the program will maximize the value of this large-scale environmental restoration project.

Details of the cumulative beneficial effects of the use of dredged material for the Poplar Island Restoration Project are provided in Section 5.4.3. The overall beneficial use components of this navigational dredging project are summarized as follows: (1) Poplar Island was a valuable estuarine resource, now essentially lost to the Chesapeake Bay; (2) material dredged from navigational channels can be employed to restore Poplar Island; and (3) this restoration will provide substantial habitat and productivity to the Bay ecosystem,

Table 5-5: **Projected Annual Dredged Material Quantities 1998-2018, Bay Channels; Baltimore Harbor and Channels Project, Maryland and Virginia.**

Channel Section	Recent. Annual O&M [Avg.]	Projected Annual O&M	Esimated New Work	Total 20-yr. Estimate
Virginia Channels				
Cape Henry Channel	236,300	250,000		5,000,000
York Spit Channel	45,900	50,000		1,000,000
Rappahannock Shoal Channel	0	5,000		100,000
Total Bay Dredging - VA	**281,200**	**305,000**		**6,100,000**
Southern Approach Channels				
Craighill Entrance Channel	166,300	200,000		4,000,000
Craighill Channel	38,900	50,000		1,000,000
Craighill Angle	475,000	500,000		10,000,000
Craighill Upper Range	47,700	60,000		1,200,000
Cutoff Angle	196,000	250,000		5,000,000
Subtotal	*923,900*	*1,060,000*		*21,200,000*
Northern Approach Channels				
Brewerton Extension	392,200	400,000	2,500,000	10,500,000
Tolchester Channel	213,500	250,000	3,000,000	8,000,000
Swan Point Channel	41,300	50,000		1,000,000
Subtotal	*646,000*	*700,000*	*5,500,000*	*19,500,000*
Total Bay Dredging - MD	**1,569,900**	**1,760,000**		**40,700,000**
Total Project Dredging - Bay	**1,851,100**	**2,065,000**		**46,800,000**

offering significant benefits to passive recreation, to commercial harvest of fish and shellfish, to education, and to research.

5.8.2 Attainment of Maintenance Dredging Needs

The Port of Baltimore is one of Maryland's most important economic assets. The port generates approximately 87,000 jobs, contributes nearly $3 billion dollars in business, and represents one-tenth of Maryland's gross state product. The approach channels to the Port of Baltimore provide shipping access to and from the Ports of Norfolk, Philadelphia, New York, and the rest of the world. Maryland depends on regular depth maintenance and improvements to the channels of the upper Bay to maintain Port commerce. Table 5-5 presents the dredging needs for the central bay channels of the Baltimore Harbor and Channels Project for the next 20 years.

Immediate development of new placement options is imperative to keep up with future placement needs. Open water placement in deep areas of the Bay provides high volume placement at low cost, but does not provide a clear beneficial use of dredged material.

Development of small capacity beneficial use projects would solve the immediate placement problems, and meet beneficial-use goals of habitat creation, but would not fulfill the long-term placement needs of the Port of Baltimore and would be a more costly option.

The Poplar Island restoration project, due to its large capacity (38 million cubic yards), would provide placement capacity for clean dredged materials from the central Bay channels for approximately 24 years, longer than any other beneficial use projects currently under consideration. The project is designed to recreate highly productive habitat in the region while providing cost-effective attainment of maintenance dredging needs for the Port of Baltimore.

5.9 Irretrievable Uses of Resources

During island construction, some resources will be either expended in construction activities or impacted by those activities. If the resource is not renewable (e.g., something that reproduces), it may be irretrievable. Irretrievable resources come from both on-site and off-site sources. The most significant off-site resource will be the stone (gravel and armor) required for dike construction. This will be quarried from off-site locations and, once placed, will become a permanent component of the Bay bottom in that area. The sand required for dike construction will be borrowed from on-site locations, although it will no longer be available for alternate uses. Since open water sand mining has never been likely here, this use would be considered insignificant.

The most significant on-site irretrievable loss will be the covering over of approximately 1,100 acres of shallow water habitat and the burial of 27.2 acres of cover items (snag fields). These losses have been considered among the impacts of construction and will be offset, in the long term, by the increased productivity associated with functioning salt marshes, the addition of rock jetties, and the increased habitat value of SAV beds in Poplar Harbor. Although this is a reallocation of habitat, the long-term effects to aquatic resources are expected to be positive.

5.10 Environmental Justification

Traditional Corps projects for flood control, navigation, shoreline protection, and other purposes rely on a benefit-cost analysis to provide the best plan for project implementation. The difference between the monetary cost of the plan and the value of plan benefits describes the plan's net benefits. Typically, the plan that provides the greatest net benefits becomes the recommended plan.

Like the traditional projects described above, ecosystem restoration projects beneficially using dredged material must also be justified. The value of the ecological resources being protected, restored, or created must be established through legal or institutional recognition, scientific recognition, and public perception of value. Justification is typically demonstrated when the monetary and non-monetary outputs of the restoration project justify its incremental costs above the base plan. However, unlike traditional projects, there is no accepted method for quantifying environmental outputs in monetary terms. Because the benefits of restoration projects usually are not measured in currency, cost-effectiveness and incremental cost analyses are more appropriate benchmarks of a project's value. Though these analyses may not highlight the optimum solution, they will offer a tool for decision makers that is not totally divorced from cost considerations. Their results, displayed as graphs of outputs versus costs, allow a progressive comparison of alternative levels of environmental output.

Procedures for conducting cost-effectiveness and incremental analyses are based upon the conceptual framework of the U.S. Water Resources Council's *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies*. While the *Principles and Guidelines* places emphasis on plans to achieve NED benefits, it also gives reference to allowing cost-effective plans to achieve other benefits, such as environmental benefits. The Corps' planning regulation 1105-2-100, *Guidance for Conducting Civil Works Planning Studies*, directed that incremental cost analyses be performed to discover and display variation in costs and to identify the least-cost plan. This direction was extended to the restoration of fish and wildlife habitat by Policy Guidance Letter #24. Engineering Circular 1105-2-210, *Ecosystem Restoration in the Civil Works Program*, further underscores the importance of cost effectiveness and incremental analysis.

Cost effectiveness and incremental cost analyses require three types of data: a list of solutions and, for each, estimates of the cost and the output. The plan formulation process should result in a range of independent and mutually exclusive plans. As discussed earlier, the formulation of plans for the restoration of Poplar Island was a true team effort involving not only the District's interdisciplinary team, but also representatives of resource agencies, the sponsor, and the public.

The initial assumption was that the project would consider restoration of Poplar Island to approximately its 1847 footprint. Several existing conditions were instrumental in arriving at potential project footprints: (1) poor foundation conditions to the north in the project area; (2) charted NOB to the west and east of the project area; (3) increased water depths to the south of the project area. These conditions yielded three potential project footprints: 820 acres, 1,100 acres, and 1,340 acres. In addition to protecting and enhancing remnant islands of the archipelago that have waterbird colonies, several environmental goals were identified for the restoration: (1) creating bare or sparsely vegetated islands as nesting habitat for colonial waterbirds such as terns, (2) creating vegetated islands for waterbirds such as egrets and herons, (3) creating tidal marsh to provide habitat for fish and wildlife and to provide food web support for the Chesapeake Bay ecosystem; (4) creating a diversity of habitats to benefit a wide range of fish and wildlife; (5) creating quiescent conditions for SAV recovery; and (6) minimizing loss of benthic habitat.

In addition to balancing the costs and benefits of habitat outputs, it was recognized that balance between upland habitat and wetland habitat was important. Three wetland-to-upland ratios were developed for each footprint: 100 percent wetlands, 70 percent wetlands, and 50 percent wetlands. Two upland elevations were also considered: +10 and +20. While trade-offs were being developed and discussed for the different footprints and layouts, project designers were developing the make-up of the habitat, based in part on the target species identified by the Working Group.

Much of the decision process was based on a desire to restore remote island habitat. Not only is this type of habitat scarce and significant, but so is the opportunity to restore and protect this type of habitat. At least thirteen remote islands have been lost in their entirety to erosion. Of the seven or so that remain, the two with the largest landmass (Bloodsworth Island and Smith Island) are predominantly marsh. The next largest is Hoopers Island which is the most developed of the group and could not be considered remote. The remaining islands comprise less than 500 acres, as surveyed in 1990, and probably are significantly smaller today. Opportunities for establishment of remote island habitat in the Bay are rare. The capability of the created upland to interact with the substantial adjacent wetlands acreage increases the value of this opportunity.

Recognizing this opportunity, and the regional benefit to balancing the upland and wetland habitat, it was determined that a more proportionate distribution of wetlands and uplands was desired. Evaluating the alternatives from a Chesapeake Bay ecosystem approach, a combination of 50 percent wetlands and 50 percent uplands would result in optimal environmental outputs, since for many waterbirds and most songbirds a greater percentage of uplands are required for nesting and other life requirements. This distribution would likely mirror the historic condition at Poplar Island. Currently Coaches Island is approximately two-thirds upland and one-third wetland. In addition to protecting and enhancing remnant islands of the archipelago that have waterbird colonies, this distribution would also promote four of the six environmental goals discussed earlier: (1) creating bare or sparsely vegetated islands as nesting habitat for colonial waterbirds such as terns, (2) creating vegetated islands for waterbirds such as egrets and herons, (3) creating a diversity of habitats to benefit a wide range of fish and wildlife; and (4) creating quiescent conditions for SAV recovery.

MPA has requested that upland elevations be constructed to +20 feet MLLW in order to provide more placement capacity for dredged material. The highest current elevation of Coaches Island is about +10 feet. While there is no increased habitat value on-site of the uplands at +20 feet compared to uplands at +10 feet, the increased elevation allows for placement of millions of cubic yards of dredged material with almost no adverse impacts. This is a regional benefit because no additional shallow water habitat will be lost, whereas another placement site may require even more shallow water habitat to be converted to wetlands or uplands. Compared to construction of a new site at a similar distance from the project channels, where an armored facility will be required, raising the dikes is a less expensive alternative. In addition, should island restoration be the method of accounting for this additional dredged material, potential sites would be even further from the channels than Poplar Island.

The many discussions about the island size and configuration, and the proportions of wetland and upland habitats were resolved at a meeting at which resource experts from the Poplar Island Working Group met to offer their respective agencies' preferences for the site layout. Benefits, impacts, and trade-offs were argued, and a consensus was reached for restoring the island to 1,100 acres with 50 percent wetlands (80 percent of which is low marsh) and an upland elevation of +20.

IWR Report #95-R-1 describes this approach as "plans of others" and "ask an expert." In both approaches, the analysts are not directly concerned with how plans were formulated, but only in performing the cost analyses on the plans. In the first approach, plans are introduced from outside of the planning team; in this case, by the MPA. In the latter case, plan formulation utilizes the professional judgement and informed personal intuition of experts in appropriate disciplines, i.e., the Working Group. Plans chosen by either of these processes can be evaluated using the cost-effectiveness and incremental cost analyses procedures.

5.10.1 Relationships Among Management Measures

Once the site specifics were agreed upon, it was possible to evaluate the management measures required to develop the desired habitat. Management measures are the individual, separable actions that can be taken to affect environmental variables and produce environmental outputs. A management measure is typically made up of one or more features (structural elements) or activities (non-structural) at a particular site. They can be considered in different sizes, such as varying upland heights. The Poplar Island study team considered a number of variables including upland heights; the numbers and sizes of cells to be filled; numbers and sizes of wetland and upland ponds to be constructed; numbers, sizes, locations, and vegetative covers of nesting islands; and types of wetland drainage channels to construct.

In evaluating plans, it is important to understand the relationship of specific management measures to one another. Planning objectives can be used to identify management measures, and the resulting measures can then be used to develop alternative plans. Determining the configurations of management measures that can be combined into plans requires an understanding of the relationships between those measures.

It is important to have an understanding of which of the management measures under consideration can be combined with specific other measures. For a management measure, or combination of measures to be considered a plan, it must be able to stand alone and must not be functionally dependent on the implementation of any other plan or measure. Dependency can be described as "mutually dependent," where two or measures must be implemented in combination or not at all, or "path dependent," where some measure(s) are dependent upon other measure(s), but the relationship is not reciprocal.

5.10.2 Cost and Output Estimation

When estimating the cost and output effects of solutions, all cost and output estimates need to be measured over the same period of time and in the same unit of measurement. Outputs and costs can be estimated either on an average annual output and cost basis, or on a total output and total cost basis, so long as the outputs and costs are comparable.

For ease of comparison, it is desirable that the environmental outputs of all alternatives be measured in like units (e.g., habitat units for a single species). While this operating assumption holds true for habitat created with a single species in mind, it may not be applicable when a more diversified habitat with several target species or habitat types is desired. Unfortunately, comparisons of different outputs (e.g., habitat units to acres) and habitat units for different species (e.g., American Black Duck and diamondback terrapin) are subjective and typically less meaningful than comparisons of like output units. At Poplar Island, this problem is magnified by the construction of different habitat types (upland and wetland) targeted to different species. It would be difficult, if not impossible, to select a single species to represent the diversity of outputs desired. As such, it was necessary to come to an agreement among the project team and Corps and resource agency experts as to acceptable formulas tailored to this specific project.

5.10.3 Site Specific Analysis

The alternative layouts included a variety of sizes and locations for the restored island. Table 5-6 summarizes alternative restoration configurations, types of habitat to be created, and the acres of each type of habitat produced by each alternative. Details regarding specific attributes for each habitat type (e.g., low marsh characteristics) and a comprehensive list of species expected to utilize each habitat type can be found in the Habitat Development Report. The interagency working group established a series of environmental restoration objectives. These objectives included (1) creating bare or sparsely vegetated islands as nesting habitat for colonial waterbirds such as terns, (2) creating vegetated islands for waterbirds such as egrets and herons, (3) creating tidal wetlands, (4) creating a diversity of habitats to attract and support a diversity of species, and (5) creating quiescent conditions for SAV growth. In addition, it was desired to protect existing valuable island habitat which is otherwise expected to be lost to erosion in about 35 years. The objectives summarized in Table 5-7 were developed to facilitate the selection of a final preferred project alternative. The alternatives were ranked by their environmental outputs, their capacities, and their costs. Methods of evaluating the alternatives are discussed in the following sections.

Table 5-6: Alternative project configurations and habitat created by each

Alignment No.	Site area (acres)	Percent tidal wetlands	Upland elevation (ft)	Low marsh (acres) (incl. open water within marsh)	High marsh (acres)	Upland forest (acres) (not incl. small islands)	Upland scrub/ shrub (acres) (not incl. small islands)	No. of bare substrate islands created	Bare substrate islands (acres)	No. of vegetated islands added to existing islands	Vegetated island area added to Poplar Island remnants (acres)	Finger groins (linear ft)	Open water area within tidal marsh (creeks, ponds, moats & entrance gut) (acres)
1	820	50	10	328	82	205	205	3	6	3	6	3000	21
1	820	70	10	459	115	123	123	3	6	3	6	3000	23
1	820	100		656	164	0	0	3	6	3	6	3000	24
3	1110	50	10	444	111	278	278	4	8	4	8	4000	28
3	1110	70	10	622	155	167	167	4	8	4	8	4000	30
3	1110	100		888	222	0	0	4	8	4	8	4000	33
2	1340	50	10	536	134	335	335	5	10	5	10	5000	35
2	1340	70	10	750	188	201	201	5	10	5	10	5000	38
2	1340	100		1072	268	0	0	5	10	5	10	5000	41
1	820	50	20	328	82	205	205	3	6	3	6	3000	21
1	820	70	20	459	115	123	123	3	6	3	6	3000	23
3	1110	50	20	444	111	278	278	4	8	4	8	4000	28
3	1110	70	20	622	155	167	167	4	8	4	8	4000	30
2	1340	50	20	536	134	335	335	5	10	5	10	5000	35
2	1340	70	20	750	188	201	201	5	10	5	10	5000	38

Table 5-7: Environmental Restoration Objectives and Measurement Parameters

Environmental Restoration Objectives	Measurement Parameter
Create bare/sparsely vegetated islands to provide nesting habitat for colonial waterbirds such as terns	Habitat Units produced for a representative species of this guild
Create/enhance vegetated islands to increase/provide nesting habitat for colonial waterbirds such as egrets and herons	Habitat Units produced for a representative species of this guild
Create tidal wetlands to provide habitat for fish and wildlife, and to provide food web support for Chesapeake Bay ecosystem	Habitat Units produced for community of fish and wildlife that utilize coastal wetlands, and total primary productivity output
Create a diversity of habitats to support a wide diversity of plant and animal species	An index of habitat diversity
Restore quiescent water habitat in Poplar Harbor to promote SAV recovery	All alternatives produce same output; no measure will serve to discriminate between alternatives

5.10.4 Project Alternatives Analysis Methods

Measures that can be used to quantify environmental outputs include analysis of impact to energy flow, populations, and habitat quality. Given the diverse objectives of the project, no single approach was deemed adequate for this purpose. Distinct evaluation criteria were selected for each environmental restoration objective to allow for an objective comparison of the benefits expected to be produced by each alternative.

Energy flow analyses are appropriate to evaluate objectives focused on ecosystem processes (e.g., the flow of energy through the food web). Energy flow analyses are based on the assumptions that the laws of thermodynamics hold for plants and animals, and that plants and animals can be arranged into feeding groups or trophic levels. An analysis of the net change in primary productivity that will result from the various alternatives is included, since analysis of the value of coastal wetlands is often linked to their production of organic matter. Energy flow analyses are appealing from a scientific standpoint, but knowledge of energy flow in ecosystems is fragmentary, and interpretation of data is often difficult. Population estimation techniques provide a direct appraisal of the impact of a project to animals (or plants). However, accurate estimates of existing populations of animals are difficult and may require several years of data to quantify the birth, death, immigration, and emigration rates that determine population growth. In addition, numbers of a particular species that a particular habitat type can support (for example, how many striped bass 10 linear feet of a finger groin can support) are often unknown.

Habitat-based evaluation techniques offer a sound ecological basis for impact assessments without the constraints inherent in energy flow and population analyses. A variety of Habitat Evaluation Procedures (HEP) have been utilized to quantify and evaluate the environmental impacts produced by water resources projects. HEP can be either species or community focused. Species-oriented Habitat Suitability Index (HSI) models produced by the U.S. Fish and Wildlife Service were utilized in an effort to quantify the environmental outputs of this restoration for the waterbirds. For the restoration objectives that focused upon colonial waterbirds, a representative species from each guild was first selected for analysis. A guild is defined as a group of species that utilize a common habitat resource. A community-oriented model was utilized to quantify benefits produced by the coastal wetlands for fish and wildlife, since no species-specific model was considered adequate to represent the range of habitat needs of these species.

The HSI models utilize an equation to quantify habitat suitability for a particular species or community. Each equation incorporates a series of variables representing environmental attributes known to be critical for the success of a particular species or community.

The number of variables differs from model to model. It is often possible to eliminate many of the variables in the models and set them to constant values if the alternatives are equivalent with regard to these conditions. Each variable is used to determine a suitability index (SI) of the habitat for that variable. The value for each SI variable ranges from 0 to 1. Zero represents no habitat suitability; 1.0 represents optimum habitat suitability. Each SI value is determined independently. The model utilizes an equation incorporating the individual SI's to calculate a habitat suitability index (HSI) that ranges from 0 to 1. The HSI's are then used to calculate habitat units (HU's) for each alternative. HU's are defined as the area of a particular habitat type created multiplied by the HSI for that alternative. HU's are presented only to the nearest whole number, since acreage was generally determined only to an accuracy of the nearest acre.

Results from application of HEP for different species can not be added directly. One unit of habitat for one species does not equal one unit of habitat for another. Each model incorporates variables specific to the species focus of the model, and the models do not consider the same factors. In the case where different units of output are produced, the analysis may proceed either by creating an index that ranks the relative value of the habitats created (e.g., according to the relative scarcity/significance of the resource); or by considering each output separately. The diverse objectives of the project make independent consideration of each output important.

This project is considered to be a permanent feature; thus, the differences in development time for the component habitats and their respective environmental outputs are considered to be of minimal importance from a longer term (such as decades) perspective, although wetlands planting for some cells are planned to provide early environmental benefits. In order to fairly evaluate the long-term benefits of the project, environmental outputs produced by each alternative are determined after habitat development is complete. It is estimated that this would occur sometime after year 55. By year 25, all the wetland and upland cells should be filled to design capacity with dredged material, and planted. Habitat development should be complete with regard to vegetation establishment within 30 years after all cells are filled and planted. However, full ecological functioning of the habitats will not begin for an undetermined period of time.

5.10.5 Discussion of Methods Utilized for each Environmental Objective

5.10.5.a Objective: Create nesting habitat for ground-nesting colonial waterbirds that nest on isolated bare or sparsely vegetated islands

This guild includes a variety of tern, gull, and skimmer species whose nests are very vulnerable to predators and human disturbance. Nesting success occurs when and where predator access and human disturbance are minimal. This guild has suffered a significant loss of nesting habitat on a regional scale due to loss of habitat to human development and activity, as well as to erosion. Foraging habitat is abundant, however. The project is expected to create both nesting and foraging habitat for this guild. Nesting habitat that will be created by the project is a highly significant contribution to the Chesapeake Bay ecosystem, whereas increased feeding habitat is not of great significance (although the close proximity of feeding habitat to breeding habitat is of importance). Therefore, only factors affecting site suitability for nesting are considered in this analysis. The Common Tern was selected to represent this guild since its habitat needs are representative of guild members, and this species is expected to nest on the non-vegetated islands created by the project. At this time an HSI model for the Common Tern is not available. However, an HSI model is available for the Least Tern. Nesting habitat needs of the Least Tern are very similar to those of the Common Tern, so the Least Tern model was utilized to quantify outputs produced by the project for this guild.

The Least Tern HSI model for nesting incorporates two variables focused on vegetative cover, but is valid only if foraging and substrate needs have also been met. It is expected that foraging habitat will be abundant. The substrate will be designed and placed to benefit this guild. The two variables incorporated in the model are (1) percent herbaceous and shrub canopy cover; and (2) average height of herbaceous and shrub canopy. Upland habitats with greater than 25 percent vegetative cover and or vegetation higher than 16 inches are modelled to have no value as nesting habitat. The only upland habitats of the restoration that are expected to be suitable as nesting habitat are the created bare/sparsely vegetated islands. The suitability index is 1.0 of an island habitat when cover and substrate conditions are optimized. All alternatives would incorporate similar substrate and vegetative cover on the created bare substrate islands to optimize utility of these features as nesting habitat for members of this guild, and all alternatives consider creating only 2-acre islands to minimize island attractiveness to predators. All other wetland and upland habitats, including remaining islands of the archipelago, will have greater than 25 percent vegetative cover, and are modelled to have no value as nesting habitat. Therefore, differences in habitat outputs for Common/Least Tern and other members of this guild for the alternative alignments are entirely a function of the total acreage of bare substrate islands created. Computations are included in Appendix B.

5.10.5.b Objective: Create nesting habitat for colonial waterbirds that nest on isolated vegetated islands

This guild includes a number of egret, heron, ibis, and cormorant species. Members of this guild nest on isolated estuarine islands, but also form colonies in other wetland and upland habitats on the mainland. These species' nests are vulnerable to human disturbance and also to predation, but to a lesser extent than the nests of the bare substrate nesting guild. The project is expected to create both nesting and foraging habitat for this guild. Nesting habitat that will be produced by the project is a highly significant contribution to the Chesapeake Bay ecosystem, whereas feeding habitat is not of great significance (although having feeding habitat in proximity to breeding habitat is of obvious importance). Therefore only factors affecting site suitability for breeding are considered in this analysis. The Great Egret was chosen to represent this guild since this species has a greater tendency to utilize isolated estuarine islands as nesting habitat in the Chesapeake Bay region than other members of the guild. Other species of this guild have needs less specific to the project output of isolated island habitat. The Great Egret HSI model developed by the USFWS was utilized to quantify outputs produced by the project for this guild.

The Great Egret HSI model for nesting on isolated islands includes only one variable: percent of island covered by woody vegetation greater than 3 feet in height. This SI is optimized (set to a value of 1.0) when greater than 60 percent of the island meets this criteria. All alternatives will maintain the existing vegetated islands and establish vegetation on the created islands to specifications that will be designed to benefit this guild. Therefore, differences in project output are entirely a function of the sum of vegetated island acreage created, maintained, and enhanced by the project. Habitat on Coaches, Jefferson, and the remnants of Poplar Island are included as project output since it is expected that habitat on these islands will only be maintained with a project, otherwise it is expected that this habitat will be lost to erosion within 35 years. However, application of this model requires an additional consideration. Larger islands are typically less valuable as colony sites than are smaller islands, due to the ability of larger islands to support resident populations of predators (such as fox and raccoon). To calculate effective acreage available for nesting, a correction factor was multiplied to the islands according to their size to compensate for increased predation on larger islands. Islands smaller than 50 acres in size are considered at full acreage value; on project completion, this category will include the enhanced remnants of Poplar Island and Jefferson Island. Islands greater than 50 but fewer than 250 acres in size are multiplied by a factor of 0.3; this category includes Coaches Island. Islands of greater than 250 acres in size are multiplied by a factor of 0.1; this category includes the contiguous area of upland created by the placement of dredged material. Computations are included in Appendix B.

5.10.5.c Objectives: Create coastal wetlands to provide fish and wildlife habitat, and to support the Chesapeake Bay food web

To quantify environmental outputs produced by the created marsh acreage for fish and wildlife, the community-based _Wetland Value Assessment Methodology and Community Model_ for brackish marshes was utilized. This model was developed to evaluate wetland creation/restoration project proposals submitted for funding under the Coastal Wetlands Planning, Protection, and Restoration Act of 1990. These models represent the habitat needs of a variety of species that utilize Gulf Coast tidal marshes at some time in their life history. Not all of these species occur in Chesapeake Bay marshes. Marshes along the mid-Atlantic coast possess a number of differences from tidal marshes of the Gulf Coast due to differences in climate and tidal regime, among other factors. However, the model does include variables for a number of the attributes that are important in determining the utility of the created marsh for fish and wildlife. Based on discussions with representatives from the USFWS, minor modifications were made to the model to improve its applicability to the Chesapeake Bay.

The model includes six suitability index (SI) variables. Four of these variables are ratios that are equivalent for all alternatives and are thus set as constants in the analysis. These constants are (1) percent open water covered by SAV, (2) marsh edge and open water interspersion, (3) salinity, and (4) aquatic organism access. Two model variables considered critical to the evaluation of habitat suitability do differ from alternative to alternative. These two variables are percent of marsh covered by emergent vegetation, and percent open water less than 3 feet deep.

Equations for the determination of SI_1 and SI_2 are presented below.

- SI_1 = (0.009 x % marsh area covered by emergent vegetation)
- The %project area covered by marsh in SI_1 = (marsh area created) / (marsh area + open water (e.g., tidal creeks, ponds, etc.).

  SI_2 = (0.007 x %area vegetated by SAV + 0.3).

  It is assumed that 10 percent of the adjacent shallow water areas will be occupied by SAV; thus, this SI variable becomes a constant equal to 0.37.

SI_3 values are determined graphically based upon a comparison of the proposed project to a pictorial series of marsh/open water interspersion configurations. The model favors marshes with creeks and ponds. An equal SI_3 value for all the alternatives was chosen since the alternatives do not differ notably in this regard.

The value for SI_4 was determined by calculating the area of open water less than or equal to 1.5 feet deep within the created marsh and comparing that to the total open water area to be created in the marsh.

The value for SI_5 is set to unity. The value for SI_6 for each alternative is set at 0.85 based upon the narrative description in the model. All alternatives are equivalent since aquatic organism access is determined by the gaps to be created in the protective dike.

The model equation incorporating the SI's discussed previously to calculate an HSI for each alternative is

$$HSI = \frac{[3.5 \times (SIV_1^3 \times SIV_2 \times SIV_6)^{1/5}] + [(SIV_3 + SIV_4 + SIV_5)/3]}{4.5}$$

Habitat on Coaches, Jefferson, and the remnants of Poplar Island are included as project output since it is expected that habitat on these islands will only be maintained with a project, otherwise it is expected that this habitat will be lost to erosion within 35 years.

To quantify and evaluate support to the food web that will be provided by the project alternatives, net primary productivity produced by each alternative was approximated. The habitat created by the project alternatives was considered in three rudimentary categories: wetlands; forested uplands; and open-water estuary. Primary productivity values were determined by acre for each habitat type based on values listed in Table 5.8. Computations of net gain in primary productivity are included in Appendix B.

Table 5-8: Ecosystem primary productivity values (Smith, 1980)

Ecosystem	**Primary Productivity**	
	(grams dry organic matter/m²/yr)	**(pounds dry organic matter /acre/yr)**
Temperate deciduous forest	**1,200**	**10,700**
Wetlands	**2,500**	**22,200**
Estuary	**1,800**	**16,000**

5.10.5.d Objective: Restore quiescent water habitat in Poplar Harbor to promote SAV growth

While it is unclear to what degree Poplar Island Harbor will be colonized by SAV, members of the interagency working group believe that quiescent water conditions will promote substantial SAV bed development. In all, over 1,000 acres of SAV could be promoted by the quiescent area created in the lee of the restored island. All of the project alternatives considered will likely produce the same acreage of protected water habitat, and thus no means to discriminate between the alternatives based on this output is available.

5.10.5.e Objective: Create a diversity of habitats to support a wide diversity of plant and animal species

Habitat diversity was compared between the project alternatives using the Shannon-Weaver Index. This index is routinely applied to compare species diversity between habitats in ecological analyses. In applying the index to consider species diversity, numbers of individuals per species are tallied for each habitat being compared. One member of any species has the same relative value as one member of any other species, other factors not considered. This index weighs the contribution of each habitat type according to its relative abundance. In applying this index to this project to evaluate habitat diversity (rather than species diversity), it is assumed that an acre of any habitat type represents a unit of that habitat type. Thus, 1 acre of salt marsh is equal to 1 acre of upland forest, other factors not considered.

The index is calculated according to the following equation:

- Diversity Index = $-\sum p_i(\log_{10} p_i)$, where P_i = (acres per particular habitat type)/(total restoration size in acres).

Higher values of the index indicate higher relative diversity. This index does not discriminate based upon total project size since the same diversity index will be calculated for an alternative with 2 acres of salt marsh and 2 acres of upland as for a site possessing 2,000 acres of salt marsh and 2,000 acres of upland.

The restoration alternatives would each have also incorporated creation of freshwater wetlands habitat within the uplands. However, details as to total area of this habitat type that would have been created for each alternative were not available.

5.10.6 Comparison of Environmental Outputs

5.10.6.a Objective: Create nesting habitat for ground-nesting colonial waterbirds that nest on isolated bare or sparsely vegetated islands

Given the simplistic model and optimum site conditions that will be produced by the created bare substrate islands, application of this model produced 1 nesting HU for Common/Least Tern per 1 acre of bare substrate island created (Table 5-9 and Appendix B). Configurations of the restoration with Alignment No. 2 produce the greatest number of nesting HU's for Common Tern (10 HU's), since this alignment is the largest and would contain the greatest number of bare substrate islands. Alternatives for alignment No.s 1 and 3 would both be expected to produce a notable positive impact to the member species in this guild, since suitable nesting habitat in the region will be substantially increased. Proposed acreage of bare substrate islands to be created was limited for all alternatives because of concerns over limitations in availability of sandy dredged material necessary to create these islands. If additional sand sources become available, then additional islands could be created.

5.10.6.b Objective: Create nesting habitat for colonial waterbirds that nest on isolated vegetated islands

Environmental output for this objective showed a wider range of nesting HU's produced than was determined for the previous guild represented by Common Tern (Table 5-9 and Appendix B). Nesting HU's were lowest for the alternatives that were 100 percent wetlands. Nesting HU's ranged from 31 to 35 HU's for these alternatives. Nesting HU's were highest on the alternatives which created and protected the largest areas of upland habitat; output from the 50% upland versions of Alignments 2 and 3 was 102 and 88 HU's respectively. The alternative configurations that would produce larger nesting HU's would be expected to provide a substantial positive benefit to populations of species within this guild.

5.10.6.c Objectives: Create coastal wetlands to provide fish and wildlife habitat and to support the Chesapeake Bay food web

The HSI's for the alternative configurations fell within a fairly tight range, which is not surprising since the alternatives presented are variations on the theme defined and are constrained within the plan formulation section of this report. Since HU = HSI x marsh acreage, the values of HU's produced serve to discriminate between the restoration alternatives largely as a function of the total acreage of wetlands created. The alternatives with the greatest acreage of created wetlands produce the most habitat for the community of fish and wildlife species that utilize coastal wetlands (Table 5-9 and Appendix B). All the project alternatives represent a substantial increase in HU's for fish and wildlife species that utilize colonial wetlands.

Coastal wetlands are among the most productive ecosystems on earth. The primary productivity analysis shows that project alternatives that create higher acreages of wetlands will produce the greatest amount of organic matter to benefit the Chesapeake Bay ecosystem (Table 5-9 and Appendix B). All the alternatives would produce a significant increase in tidal wetlands on a regional scale. There are approximately 134,500 acres of coastal wetlands and approximately 1,600,000 acres of open water within the Chesapeake Bay watershed. The Alternative Alignments Nos. 1, 2, and 3 would cause the loss of 0.05, 0.08, or 0.07 percent of that habitat respectively - a negligible loss of open water habitat from a regional perspective. In exchange, the alternatives would create from 410 to 1340 acres of tidal marsh depending on the plan selected. This represents a regional increase of 0.3 to 1.0 percent of this habitat type - a far greater gain than the relative loss of open water habitat from a proportional perspective.

5.10.6.d Objective: Restore quiescent water habitat in Poplar Harbor to promote SAV growth

It is not possible to quantify benefits produced by the restoration in this regard because it is unclear to what degree Poplar Island Harbor will be colonized by SAV. Members of the interagency working group believe that the quiescent water habitat produced and maintained by the project will promote SAV bed development. In all, over 1,000 acres of SAV could be promoted by the quiescent area created in the lee of the restored island, but all of the project alternatives considered will likely produce the same acreage of protected water habitat, and thus no means to discriminate between the alternatives based on this output is available. SAV in Chesapeake Bay are widely regarded as keystone species of the shallow water ecosystem. SAV beds provide spawning, nursery, feeding, and refuge habitat for numerous species of waterfowl, finfish, and shellfish; absorb nutrients and oxygenate the water column; and reduce wave energy and promote settling of suspended solids (Funderburk, 1991). Development of SAV beds will enhance the ecological value of Poplar Harbor, and members of the interagency working group expect a resultant net gain in fish productivity over current conditions.

5.10.6.e Objectives: Create a diversity of habitats to support a wide diversity of plants and animals

Projects producing the highest ratio of uplands to wetlands among the alternatives produced the highest diversity indexes (Table 5-9 and Appendix B). The habitat diversity indexes for the alternatives ranged from a low of 0.330 to a high of 0.640. Species diversity generally increases as area increases; thus, it can be expected that the larger restoration alternatives will support a greater and more diverse number of species within each habitat type.

5.10.7 Economic Analysis Procedure

Modelled project habitat outputs were compared to total project costs in a cost effectiveness analysis to provide guidance for the selection of the best project alternative. The Corps of Engineers Cost Effectiveness Analysis for Environmental Planning manual (COE IWR Report 94-PS-2) was utilized for this evaluation. Table 5-9 displays the total costs and environmental outputs quantified in units specific to each objective as discussed in 5.10.2 (Cost and Output Estimation) for the various project alternatives.

For each objective, project alternatives were analyzed for economic efficiency by first reordering the alternatives so that they were listed in order of ascending outputs (Appendix B). For each level of output the least cost alternative was then identified, and alternatives which produced equivalent output at a greater cost were eliminated from further consideration. For each objective, project alternatives were then analyzed for economic effectiveness by conducting a pair-wise comparison of outputs and costs to identify and delete those alternatives that will produce less output at equal or greater cost than subsequently ranked alternatives. After the economic efficiency and effectiveness analyses were completed for each objective a number of cost effective solutions for each objective remained (asterisked in Table 5-9, also see Appendix B). After completion of a cost effectiveness analysis Corps' policy encourages conducting an incremental analysis (e.g., Evaluation of Environmental Investments Procedures Manual IWR Report #95-R1). However, too few cost effective solutions remained after the cost effectiveness analysis was completed to conduct a meaningful incremental analysis for the majority of the objectives. Given this situation no incremental analysis was performed.

5.10.8 Conclusion

The Poplar Island study team explored a variety of potential configurations for the restored island. In the interest of maximizing environmental benefits, several alignments and numerous interior arrangements were considered. Components considered for the development of the interior of the island included several ratios of wetlands to uplands, different percentages of low marsh in wetlands areas, different sizes and locations of ponds and islands, and a variety of vegetation types for both wetland and upland areas. Economic and environmental costs and benefits were weighed, explored by project partners and contractors, and discussed by the project team. Selection of the recommended alignment was based on extensive information-gathering and research.

Table: 5-9 Summary of 15 final project alternatives considered.

Environmental outputs are for year 55 after complete vegetation establishment in created habitats.

Configurations of Project Alternatives					Environmental Outputs										Costs and Capacity		
Alignment No.	Site Area (acres)	Percent Tidal Wetlands	Upland Elevation (ft)		Least Tern Nesting HU's		Great Egret Nesting HU's (1)		Coastal wetland HU's (1)		Net Gain in Primary Produc-tivity (g/m2/yr)		Shannon Weaver Diversity Index for Created Habitats		Total Site Develop-ment Cost ($ million)	Site capacity (mcy)	$ Cost per cubic yard dredged material
				Objective: (2)	a		b		c		c		d				
No Action (3)	Undefined	0	0		0		0		0		-		-		0	0	0
1	820	50	10		6		72	*	335		41000		0.640	*	78	18.8	4.15
1	820	50	20		6		72		335		41000		0.640		88.6	28.7	3.09
1	820	70	10		6		55	*	461		254200		0.610	*	74.9	14.7	5.10
1	820	70	20		6		55		461		254200		0.610		81.6	20.6	3.96
1	820	100	-		6	*	31	*	649	*	574000	*	0.340	*	59.1	9.9	5.97
2	1340	50	10		10		102	*	531		67000		0.640	*	124.7	30.5	4.09
2	1340	50	20		10		102		531		67000		0.640		147.3	46.7	3.15
2	1340	70	10		10		75		736		415400		0.610		116.9	24.1	4.85
2	1340	70	20		10		75		736		415400		0.600		131	33.8	3.88
2	1340	100	-		10	*	35		1044	*	938000	*	0.340		89.4	16	5.59
3	1110	50	10		8		88	*	445		55500		0.640		104.7	24.5	4.27
3	**1110**	**50**	**20**		**8**		**88**		**445**		**55500**		**0.640**		**122.1**	**37.9**	**3.22**
3	1110	70	10		8		66		614		344100		0.610		100	20	5.00
3	1110	70	20		8		66		614		344100		0.610		110.8	28	3.96
3	1110	100	-		8	*	33		870	*	777000	*	0.330		76.3	13	5.87

(1) Includes existing islands of archipelago plus created habitat

(3) Assumes complete erosion of archipelago within 35 years

(2) Environmental Restoration Objectives

a. Create bare/sparsely vegetated islands

b. Create/enhance vegetated islands

c. Create tidal wetlands

d. Create a diversity of habitats

*Indicates Cost Effective Solution

When analyzing each alternative separately for cost-effectiveness based on the environmental objectives, there is no clear alternative that will maximize outputs. However, while not the most-cost-effective alternative in addressing any of the environmental goals, the outputs of the agency-supported alternative are comparatively well in every category, a sign that a well-rounded and diverse habitat plan has been developed. To maximize the outputs from the six environmental goals, and to provide the most cost-effective solution, and therefore to support the multi-objective ecosystem approach, it was determined that the agency-supported plan would be the optimal environmental restoration plan.

Section 6

Plan Description

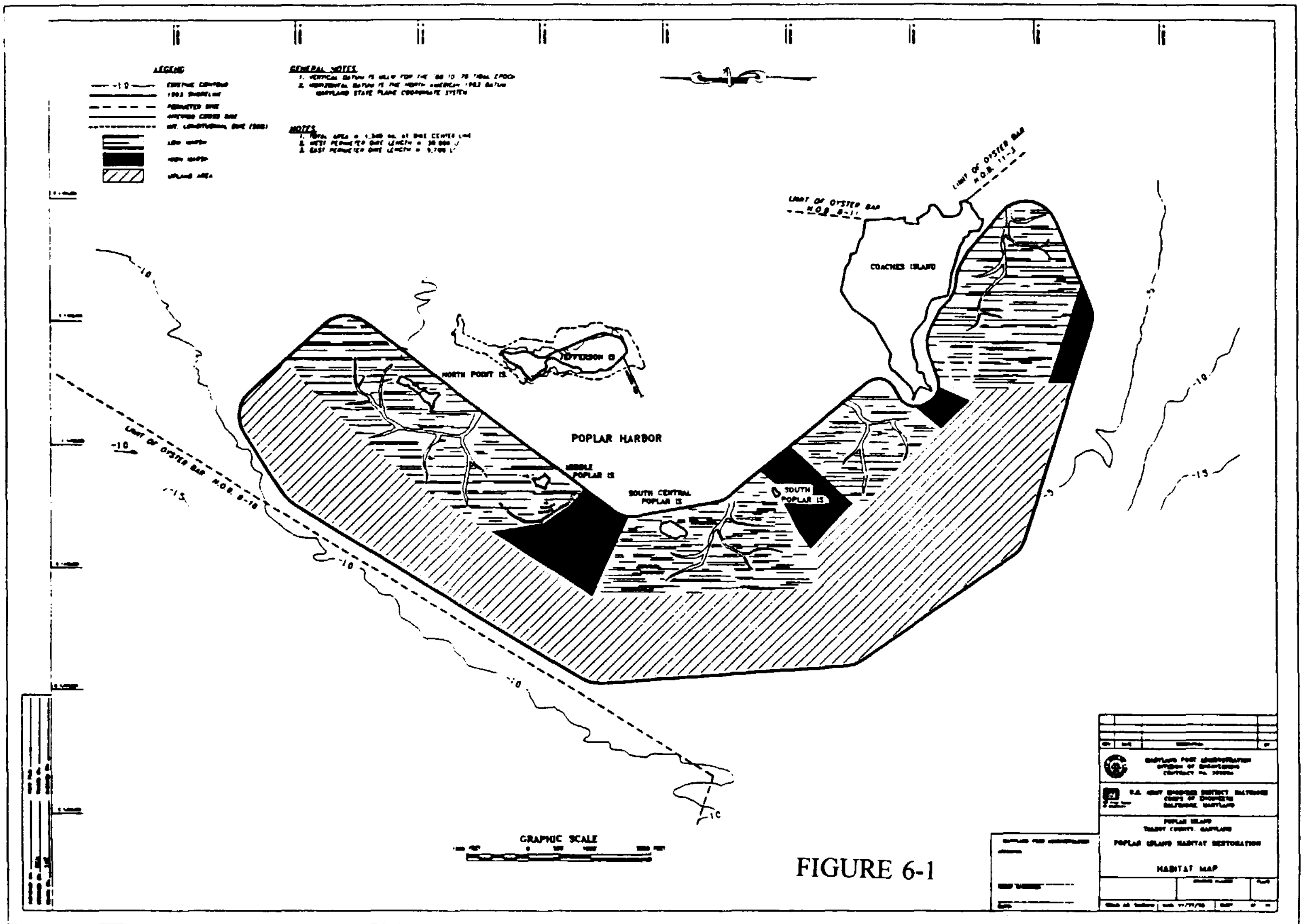
Following extensive review of the alternatives discussed in Section 2 and the decision process discussed in Section 5, it was determined that the most effective, and currently, the only available plan would be the construction of the Poplar Island project and its associated habitat development. The recommended plan for the Poplar Island Restoration feasibility study is described in this section along with the associated operation and maintenance requirements, the social and economic considerations, and the environmental consequences. The recommended plan was developed as a result of the collaborative efforts of the multi-agency study team described in Section 1. The result is a multi-objective plan which will support a wide diversity of fish and wildlife habitat. The following sections describe and document the engineering and environmental characteristics of the proposed alignment.

6.1 Description of the Recommended Plan

As described in Section 5, the recommended alignment encompasses approximately 1110 acres containing 50 percent tidal wetlands (80 percent low marsh and 20 percent high marsh) and 50 percent uplands with an upland elevation of up to +20' MLLW. The proposed alignment was selected based on comparative analysis of costs, soil conditions, capacity, borrow requirements, wetlands development, engineering efficiency, and hydrodynamics.

The Poplar Island Restoration Project involves constructing initial dikes around the island's 1847 footprint, raising some of the initial dikes up to elevation 23 MLLW, and filling the enclosed area with clean dredged material from the Baltimore Harbor approach channels. The filled areas would be developed into wetlands and upland habitat. The preferred dike alignment for Poplar Island would create a 1,110-acre dredged material placement area within a 35,000-foot perimeter (Figure 6-1). The dike would surround the entire placement area, including the four small remnant islands and the area south of Coaches Island. However, the dike would not connect directly to Coaches Island. Along the dike alignment to Coaches Island, a sand dune configuration is currently proposed that would allow for a small tideway to remain open between Coaches Island and the project. The State of Maryland intends to purchase 2.83 acres on Coaches Island. This includes a 5-foot strip along the south shore and a small peninsula. This area is marshland and totals 2.23 acres. The State intends to also purchase 0.6 acres of fastland along the 5-foot strip.

The dikes will be constructed by hydraulic dredging of sand from within the project area. Hydraulically placed sand will provide adequate geotechnical stability at the lowest cost per linear unit of dike structure. A detailed optimization analysis has been made to determine the conditions (i.e., design return periods for waves and water levels) that will serve as the basis



LEGEND
GENERAL NOTES
NOTES
POPLAR HARBOR
NORTH POINT IS
COACHES ISLAND
SOUTH CENTRAL POPLAR IS
SOUTH POPLAR IS
LIMIT OF OYSTER BAR
GRAPHIC SCALE
POPLAR ISLAND HABITAT RESTORATION
HABITAT MAP

FIGURE 6-1

for final design of the armor stone for the exterior slope of the perimeter dikes (GBA-M&K J.V. 1995a). The analysis considered an armored western dike and both armored and unarmored eastern dike alternatives (Figures 6-2 to 6-4). The recommended design for the western perimeter dike consists of a sand dike with 3H:1V exterior slopes protected with 1.5 to 2.0 ton armor stone up to elevation 11.5, an overbuilt interior section with 5H:1V slopes, and an unarmored dike section from elevation 11.5 to 23.0 constructed with sand under a later contract. Those interior dikes providing containment for the upland cells would also consist of a sand dike to approximately elevation 10 or 11 with an overbuilt interior slope, and would also be raised to elevation 23.0 using sand from an outside borrow source under later contract. The armored eastern dike would have a 3H:1V exterior slope with 250-pound armor, and a crest elevation of 8 feet. The eastern dike would not have to be raised since it contains the wetland cells. An unarmored reach of the eastern dike which parallels Coaches Island would have 5H:1V slopes and a crest elevation of 8.0.

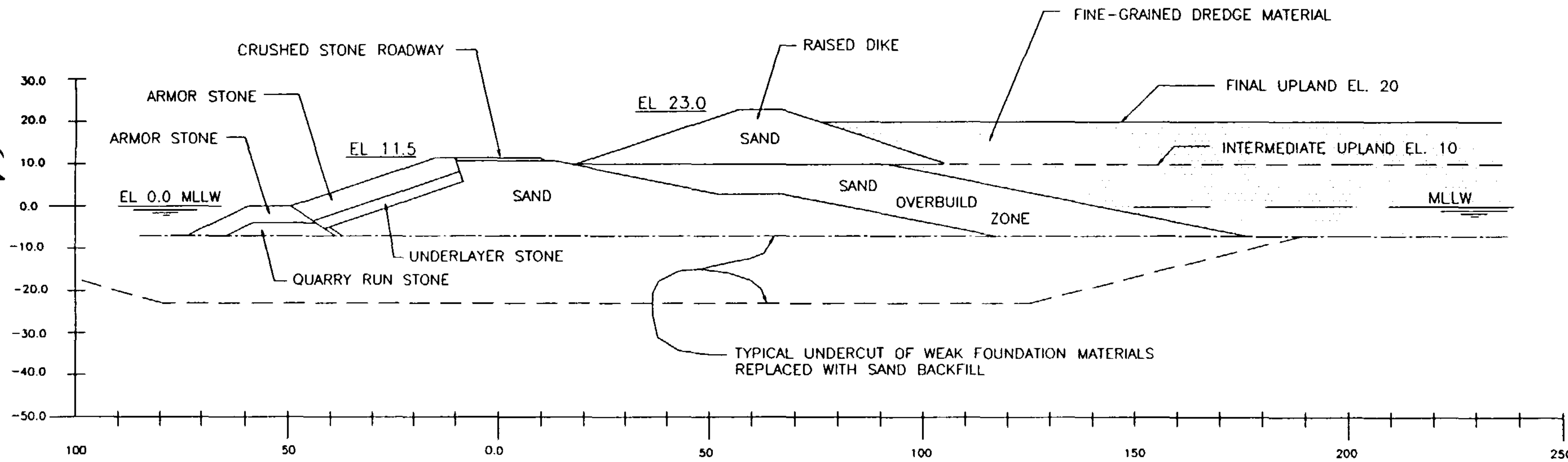
The plan for the placement area proposes 50 percent wetland and 50 percent upland habitats. Final configuration will include submerged aquatic habitat below the lower spring low water, mudflat, low marsh, high marsh, and upland (Figure 6-5; Table 6-1).

Table 6-1 Tidal Wetland Elevations and Habitats

		Elevation (ft) MLLW	Habitat Type
Lower Spring Low Water	LSLW	-0.6	Aquatic
Mean Lower Low Water	MLLW	0.0	Mudflat
Mean Spring Low Water	MSLW	0.25	Mudflat
Mean Low Water	MLW	0.3	Mudflat
Nat'l Geodetic Vertical Datum	NGVD	0.35	Mudflat
Mean Tide Level	MTL	0.9	Low Marsh
Mean High Water	MHW	1.5	Low Marsh
Mean Higher High Water	MHHW	1.8	High Marsh
Mean Spring High Water	MSHW	2.4	Upland
	---	>2.4	Upland

Source: GBA and M&N 1995a.

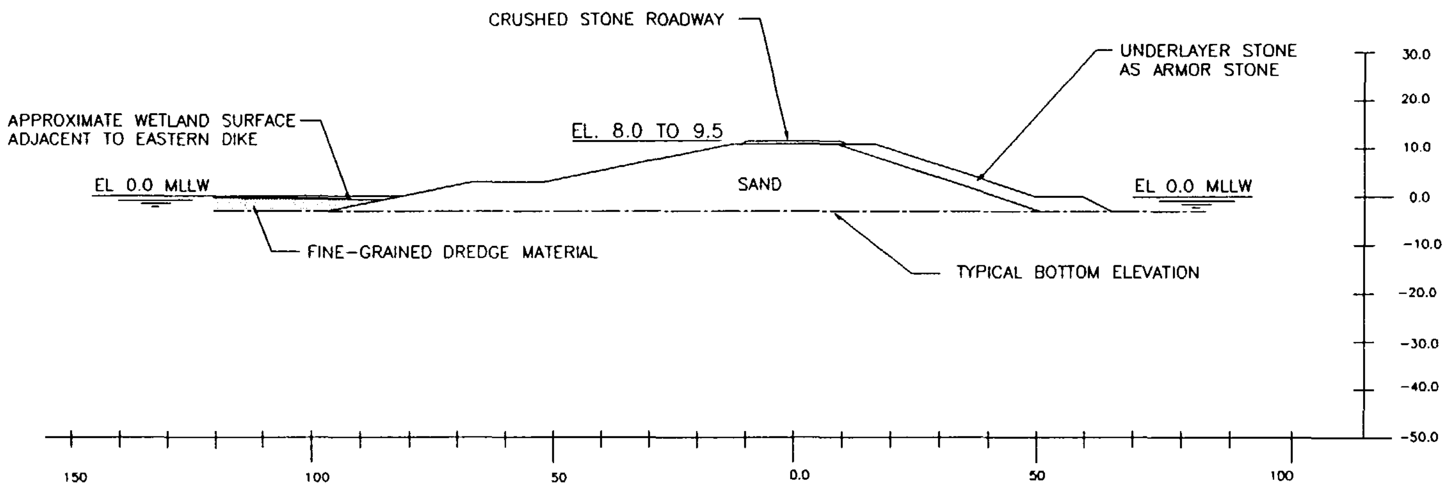
Vegetation types by planting zone to be used are indicated in Table 6-2.



TYPICAL WESTERN PERIMETER DIKE SECTION

SCALE: 1"=40' (HOR & VERT)

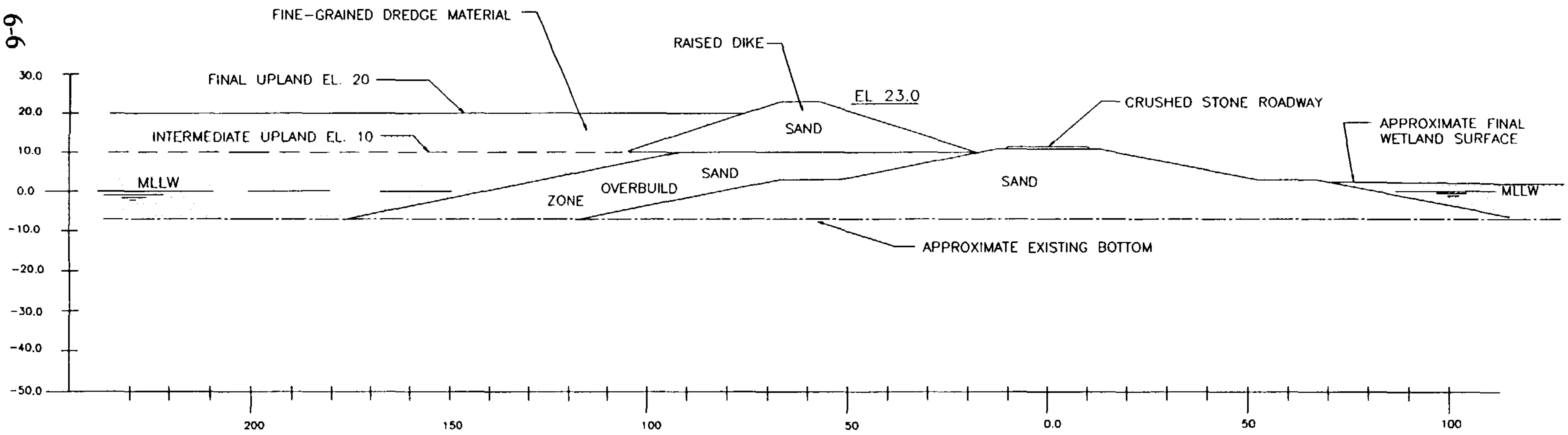
FIGURE 6-2



TYPICAL EASTERN PERIMETER DIKE

SCALE: 1" =40' (HOR & VERT)

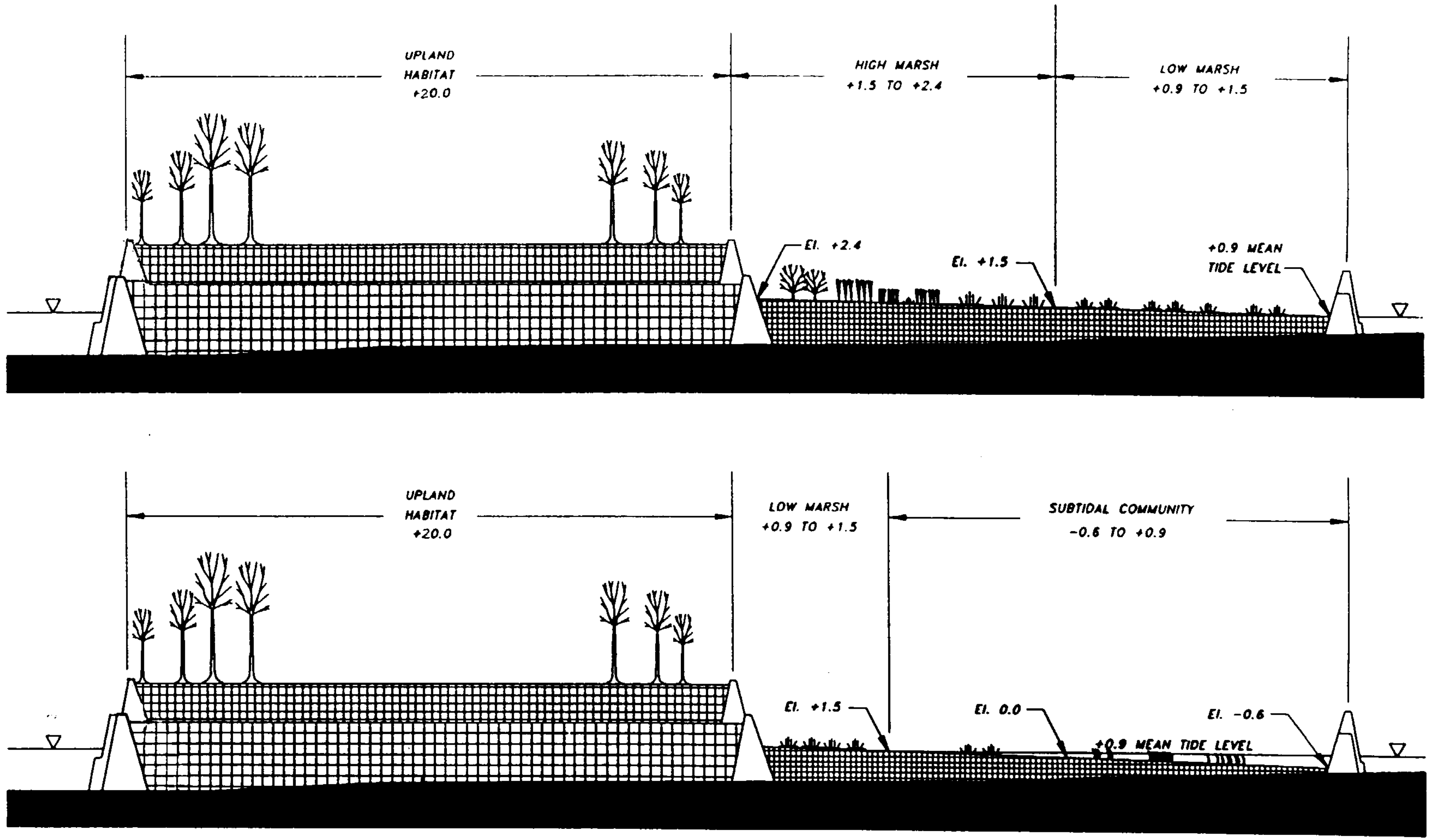
FIGURE 6-3



TYPICAL INTERIOR LONGITUDINAL DIKE

SCALE: 1"=40' (HOR & VERT)

FIGURE 6-4



NOTES
1. Vertical datum is MLLW for the '60 to '78 tidal epoch.
2. All elevations are in feet.

Figure 6-5 Typical island section - 50% wetlands and 50% upland.

Table 6-2
Vegetation Types by Planting Zone

Planting Zone	Tidal Range MLLW	Vegetation Type
Mudflat	-0.6 to 0.9	None
Low Marsh	0.9 to 1.5	Cordgrass
Low Marsh	1.3 to 1.5	Cordgrass Seed
High Marsh	1.5 to 2.4	Salt Hay
Upland	>2.4	Grasses, woody vegetation 1/

1. Initial plantings will be annual rye, tall fescue, panic grass if salt leaching is required
Source: GBA-M&N J.V. 1995c.

6.1.2 Project Features

The perimeter dike will contain the dredged material and provide coastal protection for the placement and habitat restoration site. Specifically, the perimeter dike will be designed to contain loose, fine-grained dredged material derived from the Baltimore Harbor Approach Channels. This will be achieved through the use of specific dike core material and construction geometry. The perimeter dike will be exposed to two principal wave regimes: (1) relatively high waves from the north, west, and south, and (2) relatively low waves from the east and southeast and within the interior of the containment dike. The portion of the perimeter dike exposed to high-energy wave attack is referred to as the Western Perimeter Dike, and the portion exposed to low-energy wave attack is referred to as the Eastern Perimeter Dike.

Geotechnical site investigations, subsurface explorations, soil testing, and the containment dike design were accomplished by Earth Engineering and Sciences, Inc. under a contract with Gahagan & Bryant Associates-Moffat Nichol, Engineers, Joint Venture, consultants to the MPA. Results of investigations and design are presented in a series of geotechnical reports not included in this report.

Approximately 85 Standard Penetration Test borings and 62 Cone Penetrometer Tests accomplished at the Poplar Island site indicated that the foundation soils can be grouped into four strata: 1) very soft normally consolidated recent deposits of silty clay, sporadically located near the surface; 2) a superficial silty sand, 0 to 30 feet in thickness; 3) soft to hard silty clay, 0 to 20 feet in thickness; and 4) stiff clay with pockets of sand at depth beneath the entire site. Based on the results of the foundation investigations, it was determined that the containment dike will be constructed with fine silty sands hydraulically dredged from the project area. Analyses indicate that the dikes can be constructed generally to approximately 5H on 1V slopes. The outer slope will be mechanically shaped to 3H on 1V prior to placement of armor stone in order to minimize the quantity of armor stone required for wave protection. A geotextile fabric and underlayer stone will be placed on the outer slope of the dike prior to placement of the armor stone. The fabric is necessary to prevent the sand in the dike from eroding out through the armor stone layers. Slope stability analyses indicated that the slopes will be stable on the sand foundation. The soft deposits of silty clay located sporadically along the western dike alignment will be removed prior to construction of the dike to insure stability, and eliminate any potential long-term settlement concerns. The smaller, more lightly armored eastern dike will be temporarily overbuilt in lieu of removing the soft foundation deposits. After displacements have occurred, final grading will be accomplished and the armor stone will be placed.

The initial armored perimeter dikes and internal dikes will be built to allow the placement of dredged materials to approximately elevation 10. The dikes providing containment of the upland cells will be raised to elevation 23 to allow development of the upland cells to approximately elevation 20. The extent of removal of weak foundation soils will be sufficient to assure stability of the dike section of the final crest elevation. The interior slope of the initial dikes will be overbuilt by approximately 75 feet at the crest and 60 feet at the base to provide a reliable foundation for the raising. The raising will be accomplished using sand obtained from a borrow site immediately south of the project on either side of the approach channel, or sand generated by channel dredging work. This approach assures that upland habitat can be accomplished to elevation 20 as proposed.

The method preferred by MPA for raising the Poplar Island dike from 10 feet to 23 feet consists of using dried material by intensive crust management along the perimeter of the upland cells. Confidence in this method is based on experiences at Hart-Miller Island. However, the initial 10-foot raising of the Hart-Miller dikes was accomplished using sand placed on the interior slope of the initial sand dike. Minimal dredged material was involved. Through crust management activities, a 100-foot wide platform of dried dredged material has recently been created inboard of the initial raised dike. This platform will support the proposed second dike raising of approximately 16 feet which has not yet been constructed. Essential to the success of this approach at Poplar Island is the limitation of dredged material lift thickness to 2 to 3 feet so that crust development can be accomplished. If even a single thick lift occurs, or if weather conditions inhibit crust development, the stability of the future raised dikes would be jeopardized. In addition, it would be difficult to generate the volume of material required to construct the required crust platform and the dikes even if a large dragline with a 150-foot reach was utilized. The risks of not being able to achieve elevation 23, or having to expend significant additional funds to achieve that elevation, are significantly greater for the crust management approach compared to the overbuild approach.

In order to verify the constructability of the proposed containment dike, the Baltimore District awarded a contract to C.J. Langenfelder & Son, Inc., to construct a 600-foot-long test dike section along a reach of the alignment during the summer of 1995 (Figure 6-6). Primary objectives of the test dike were to determine initial slopes of hydraulically dredged sands; appropriate equipment required to shape external slopes; steepest external dike slopes that can be achieved by shaping in order to verify armor stone quantities; wave erosion rates on external slopes to define the maximum length of time available to complete armoring;

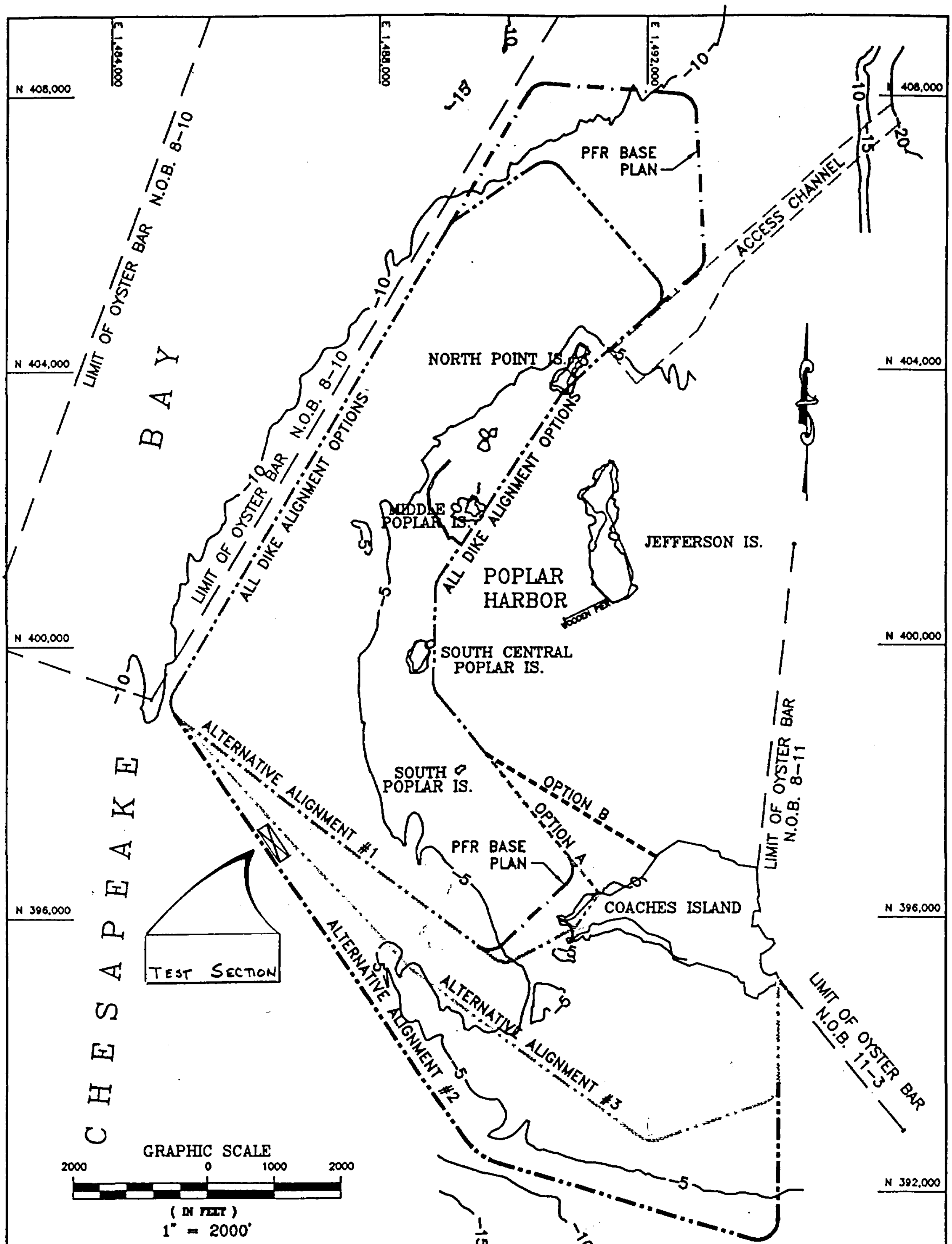


FIGURE 6-6
ALTERNATIVE ALIGNMENTS

effectiveness of construction methodologies; effectiveness of an alternative methodology utilizing sand-filled geotextile tubes to provide containment and interior cross dikes; turbidity levels during construction; and verification of the suitability of the fine sands in the borrow area.

During construction of the test dike with the fine sands in the borrow area, it was observed that the fine sand is extremely vulnerable to erosion, even during normal wave and tidal conditions. Therefore, it will be advantageous to construct the rock toe segment of the dike in advance to provide containment, and possibly to overbuild the rock toe to provide dissipation of wave energy to keep the fine sand in place until shaping and armoring can be accomplished. Also, it may not be possible to construct and maintain the interior of the containment dike slopes, or the interior cross dike slopes, at the 5H on 1V slopes originally proposed. An overbuilt section may be required within the range of normal wave and tidal activity to provide greater assurance of a stable final slope configuration. In addition, it may be necessary to provide for erosion above the normal tidal range caused by storms during the construction period by overbuilding the interior dike slope, or applying stone slope protection. Sand-filled tubes proved to be a technically feasible alternative containment structure. Although the selected hydraulically dredged sand dikes are more conventional, a contractor could submit a proposal to use sand-filled geotextile tubes. Sand-filled geotextile tubes could also be used for interior cross dikes. Information obtained from the test dike section relative to geometry and construction methodologies has been incorporated into the design, and will be included in the project plans and specifications.

Coastal Engineering investigations were accomplished by Moffat Nichol Engineers under a contract between Gahagan & Bryant-Moffat Nichol Engineers, Joint Venture, and the MPA. Detailed results of the investigations and designs are presented in the Hydrodynamic and Coastal Engineering Report prepared by Moffat Nichol Engineers for the MPA.

The Coastal Engineering investigations focused on defining the minimum crest elevation, exterior dike slopes, and armor stone required for the dikes built under the initial construction contract. The future unarmored raised dikes were not included in this part of the design effort. The discussions and Figures (6-8 through 6-13) reflect only the initial dike to maximum elevation 11.5, not the complete dike ultimately raised to elevation 23 feet. The elevations of the initial dikes were established based on a Type I dike structure, having only armor on the front slope and sand on both the crest and the back slope. Therefore, the heights of the initial dike were determined based on an allowable overtopping rate of 5 liters per meter per second for the 25-year design storm. For this condition, the initial perimeter dike would remain stable and protect the set-back raised dike section. However, storm events greater than the design event could potentially erode portions of the raised dike, requiring remedial measures.

The basic approach for the design of the initial dikes was to approximate the local wind climate, and employ this information toward the derivation of a design wave climate. Water levels are also an important consideration in the dike design. Design water levels in the study area are dominated by storm effects. The wind and water level information used for the design are presented in Section 3. Using the wind and water level information, a design wave climate was developed using procedures recommended by the Shore Protection Manual (SPM 1984).

The design was based on an optimized approach that attempts to obtain a balance between initial construction costs and maintenance costs associated with storm-induced damages to the containment dikes. Using the wave climate and water level information previously developed, the optimization analyses lead to the selection of the return period for waves and water levels that obtain this balance.

The basic approach consisted of developing a series of dike designs and construction cost estimates for various design levels. Total present worth maintenance costs were then developed based on damage estimates to the structure due to storm events exceeding the various designs. Curves of these present worth values per return period were then developed. Figure 6-7 shows an example plot of present worth costs. As can be seen from the figure, initial capital costs increase with increasing return period while maintenance costs decrease with increasing return period.

The optimization analysis considered an armored western perimeter dike and both an armored and unarmored eastern dike alternatives. The analysis indicated that the most cost-effective design was an armored western dike with a crest elevation of 11.6 feet MLLW, structure slope of 3H:1V, and 3,000-pound armor stone, and an armored eastern dike with a crest elevation of 8.0 feet MLLW, structure slope of 3H:1V, and 400-pound stone.

Physical model testing was then conducted to verify the western dike section design, which was based on the cost optimization analyses. Also, dike cross-sections with various water depths were evaluated. Data obtained from the physical model testing were used to finalize the design. Pertinent data included measurement and verification of the proposed armor size gradation, measurement of the significant and maximum wave height at the structure, measurement of wave overtopping, and observance of rock movement and/or displacement.

Evaluation of test results and previous analysis resulted in the selection of six design sections. Figures 6-8 through 6-13 present the dike cross-sections for typical sections along the perimeter dike alignment. Figure 6-8 shows a western dike section in 5 feet of water that has a crest elevation of +9.5 feet MLLW, includes two layers of 3,000-pound armor stone, and two layers of 250-pound underlayer stone overlying a geotextile that separates the stone revetment from the dike core. Figure 6-9 shows a western dike section in 7 feet of water that has a crest elevation of +10.5 feet MLLW and includes two layers of 3,000-pound armor stone and two layers of 250-pound underlayer stone overlying a geotextile. Figure 6-10 shows a western dike section in 8 feet of water that has a crest elevation of +11.0 feet MLLW and includes two layers of 4,000-pound armor stone and two layers of 250-pound underlayer stone overlying a geotextile. Figure 6-11 shows a western dike section that has a crest elevation of +11.5 feet MLLW, and includes two layers of 4,000-pound armor stone and two layers of 250-pound underlayer stone overlying a geotextile. Figure 6-12 shows an

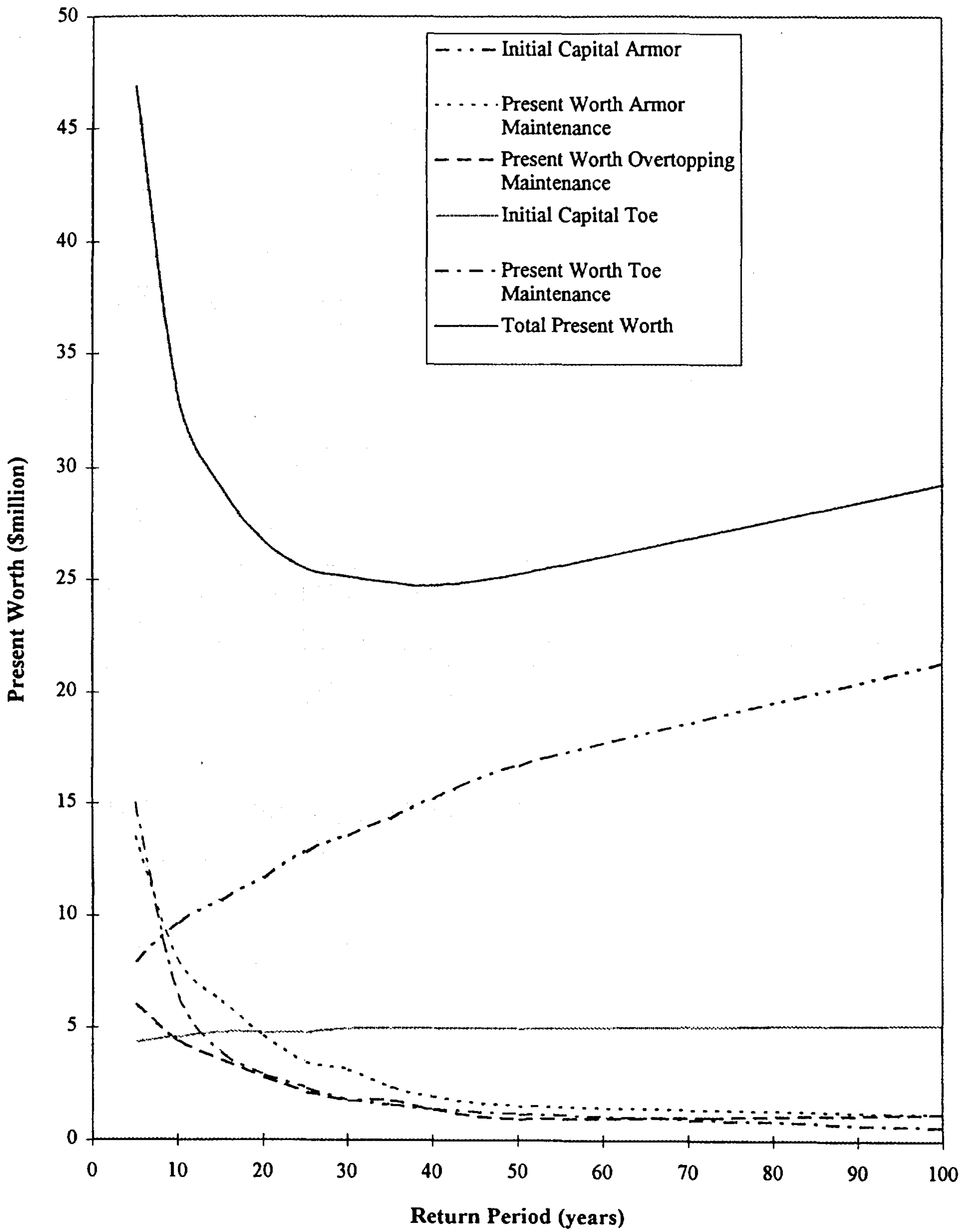
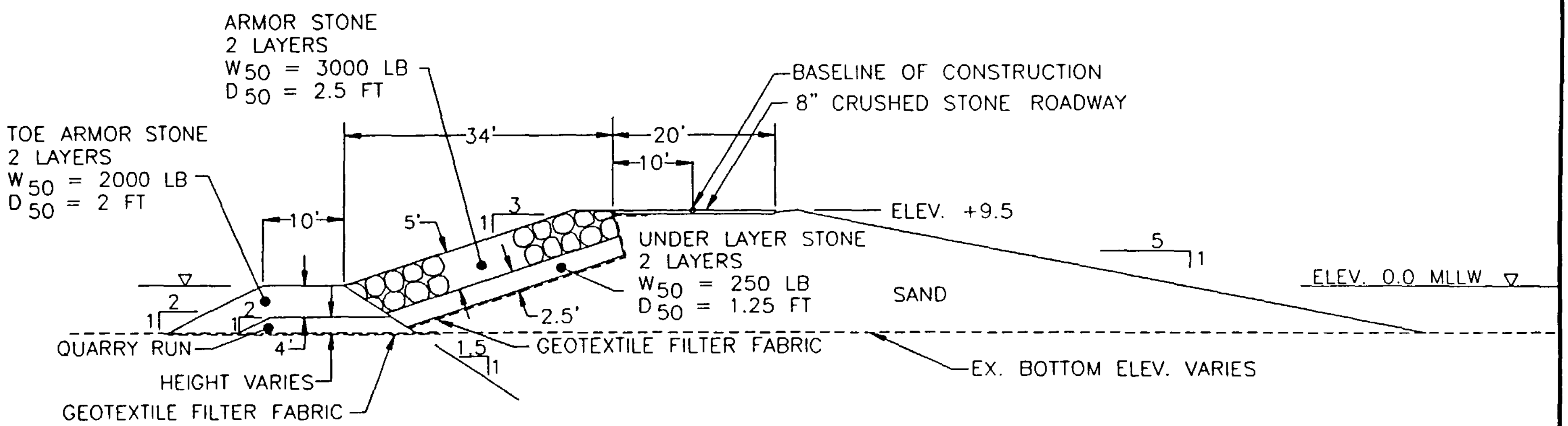


FIGURE 6-7 PRESENT WORTH COSTS FOR 3.0:1 SLOPE



TYPICAL DIKE SECTION No. 1

STA 183+00 to 192+00
STA 335+00 to 394+00

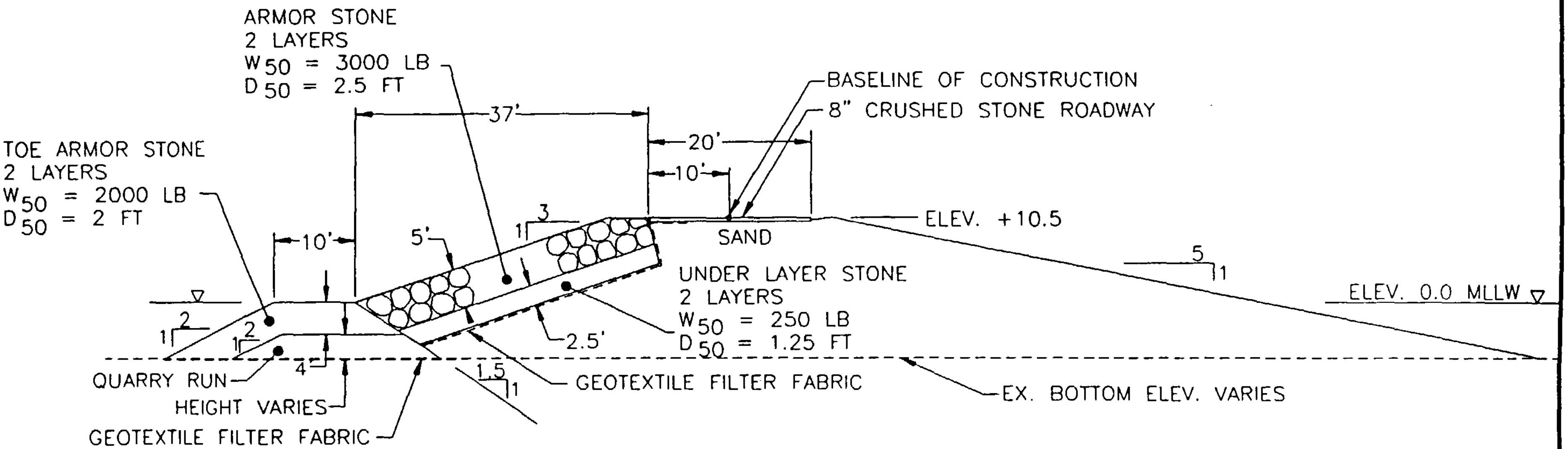
GAHAGAN & BRYANT
MOFFATT & NICHOL
A JOINT VENTURE

SCALE 0 5 10 20 30

6-14

FIGURE 6-8
TYPICAL DIKE SECTION NO. 1

GAHAGAN & BRYANT
MOFFATT & NICHOL
A JOINT VENTURE

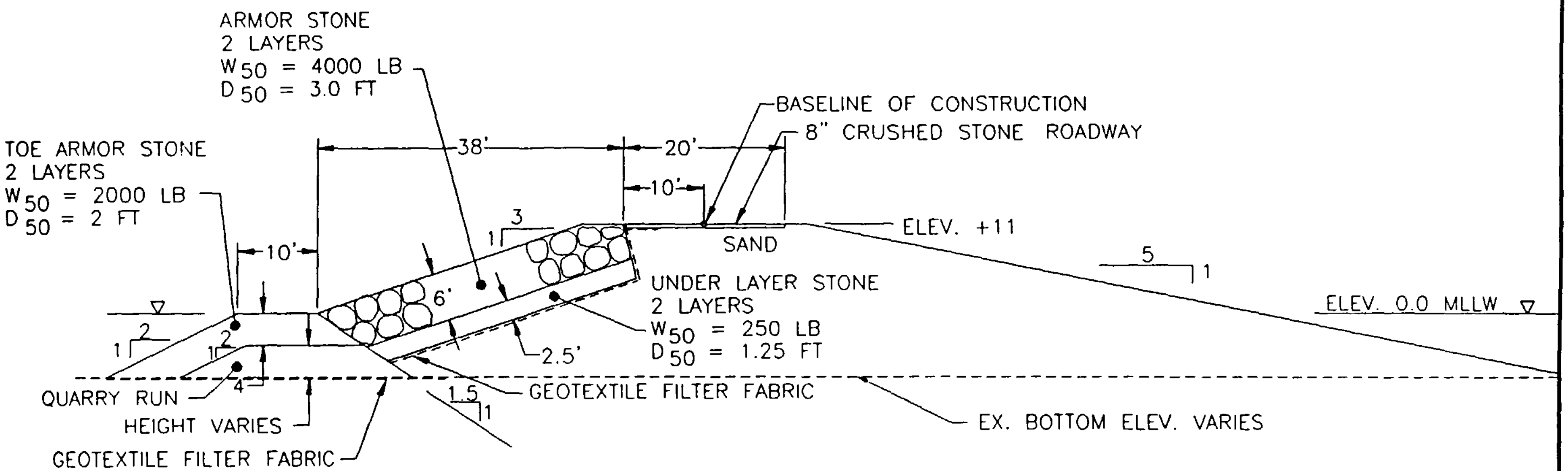


TYPICAL DIKE SECTION No. 2

STA 1+48 to 98+64

SCALE 0 5 10 20 30

FIGURE 6-9
TYPICAL DIKE SECTION NO. 2



TYPICAL DIKE SECTION No. 3

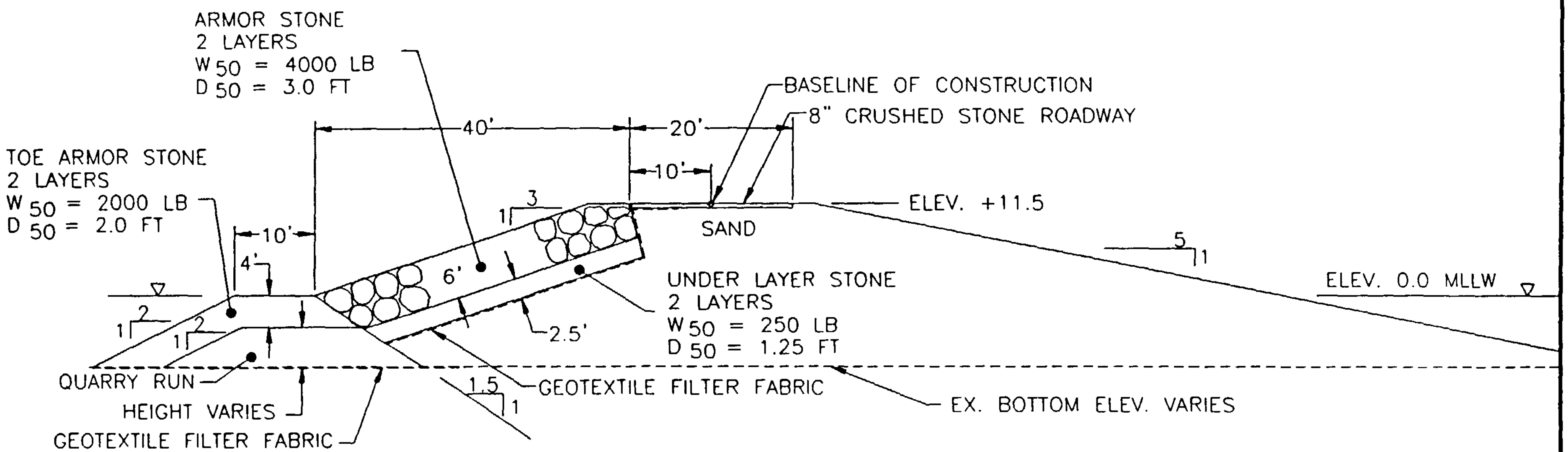
98+64 to 137+00

GAHAGAN & BRYANT
MOFFATT & NICHOL
A JOINT VENTURE

0 5 10 20 30
SCALE

6-16

FIGURE 6-10
TYPICAL DIKE SECTION NO. 3



TYPICAL DIKE SECTION No. 4

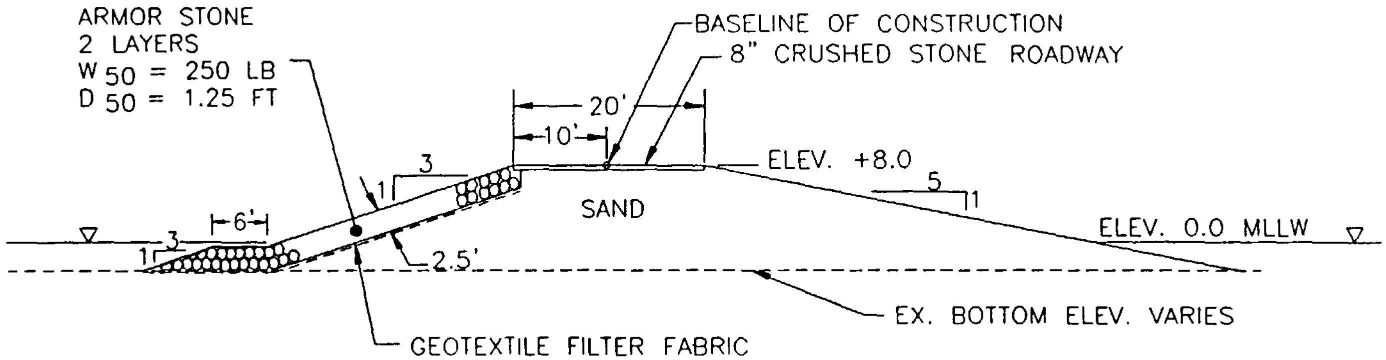
STA 137+00 to 183+00

GAHAGAN & BRYANT
MOFFATT & NICHOL
A JOINT VENTURE

SCALE 0 5 10 20 30

6-17

FIGURE 6-11
TYPICAL DIKE SECTION NO. 4



TYPICAL DIKE SECTION No. 5

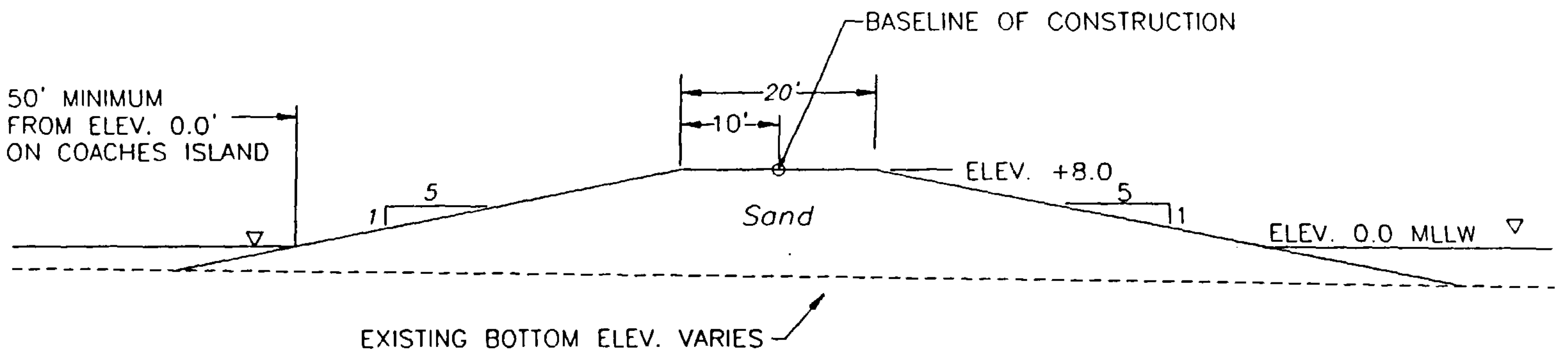
STA 192+00 to 290+00

GAHAGAN & BRYANT
MOFFATT & NICHOL
A JOINT VENTURE

SCALE 0 5 10 20 30

6-18

FIGURE 6-12
TYPICAL DIKE SECTION NO. 5



TYPICAL DIKE SECTION No.6

STA 290+00 to 338+00

GAHAGAN & BRYANT
MOFFATT & NICHOL
A JOINT VENTURE

FIGURE 6-13
TYPICAL DIKE SECTION NO. 6

eastern dike section in 3 feet of water that has a crest elevation of +8.0 feet MLLW and includes two layers of 250-pound armor stone overlying a geotextile. Figure 6-13 shows a dike section to be used along Coaches Island in 3 feet of water that has a crest elevation of +8 feet MLLW and consists of sand with no rock protection.

The most likely mode of failure of the containment dike would be the result of the failure of the armor stone. A reliability analysis of the armor design was conducted to assess this risk. The analysis provides a probability-based means for evaluating the risk of damage to the armor stone throughout various time periods. Risk-based computations of the failure probability were performed using a reliability function. Input variables to the reliability function include wave height, water depth, median rock diameter, and structure slope. Probability of exceedence of different damage levels over various time periods were then performed using a Monte Carlo simulation technique. Figure 6-14 shows an example of the results obtained in the form of a plot of probability of exceedence versus armor damage. A damage level of 4 indicates the onset of tolerable damage. The results show that there is a 52% chance that a western dike in 7 feet of water will exceed an armor damage level of 4 over a 20-year period. Similar analyses were performed for various water depths and for the eastern dike. The findings of high probabilities of dike damage were to be expected and these findings have been incorporated into the optimization analyses.

6.1.2.a Western Perimeter Dike. A preliminary design and construction staging for the western perimeter dike is shown in Figure 6-15. The armored toe dike provides protection to the adjacent oyster bar along the western dike during hydraulic placement of sand and provides partial protection to the sand core prior to completion of the slope protection.

6.1.2.b Eastern Perimeter Dike. The eastern perimeter dike generally follows the 1847 shoreline of the former Poplar Island. This portion of the perimeter dike is exposed to relatively low waves and will not have to be protected to the same degree as the western dike. Two slope designs were considered for the eastern dike: (1) an armored rock dike, and (2) an unarmored sand dike. The two design options are summarized in Figure 6-16.

6.1.2.c Interior Dikes. Interior dikes will be required to accommodate the large elevation difference between the wetland and upland cells and to support sequential development of wetland habitats. For example, an interior dike will allow early development of an initial wetland cell soon after the initial placement of material. There will be four primary wetland and two upland cells. Partitioning of the larger-sized wetland cells into smaller cells may also prove to be advantageous.

Wetland cross dikes will have slopes of 5H:1V, crest elevations of 8 feet, and crest widths of 20 feet. Longitudinal and upland dikes will have slopes of 5H:1V, with initial crest elevations of 10 feet and crest widths of 20 feet. Longitudinal dikes and the western perimeter dike will be raised to 23 feet. The raised dikes will have slopes of 3H:1V and crest widths of 10 feet.

Probability of Exceedence of Damage Level S in Lifetime of Structure for 7 ft Water Depth

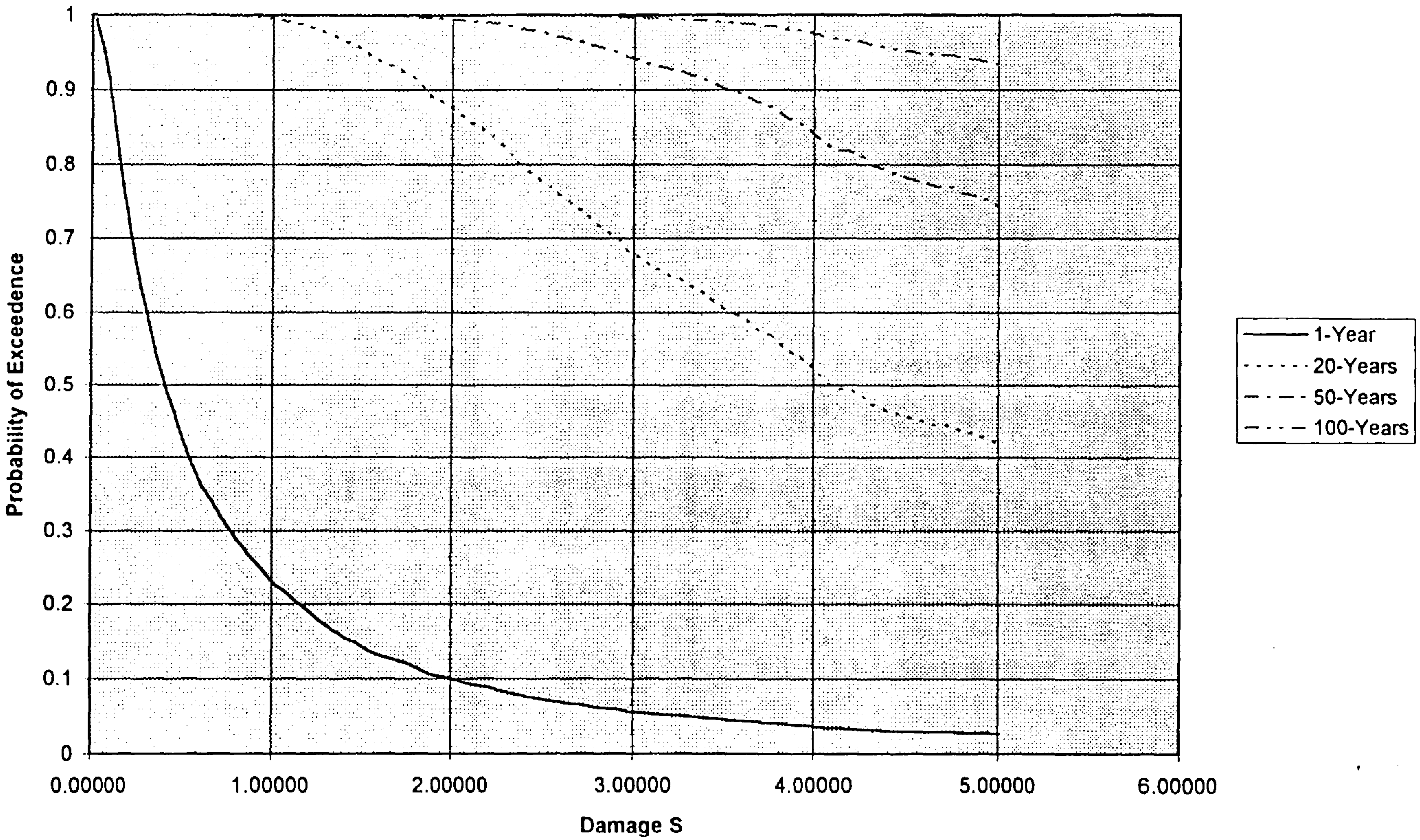


FIGURE 6-14

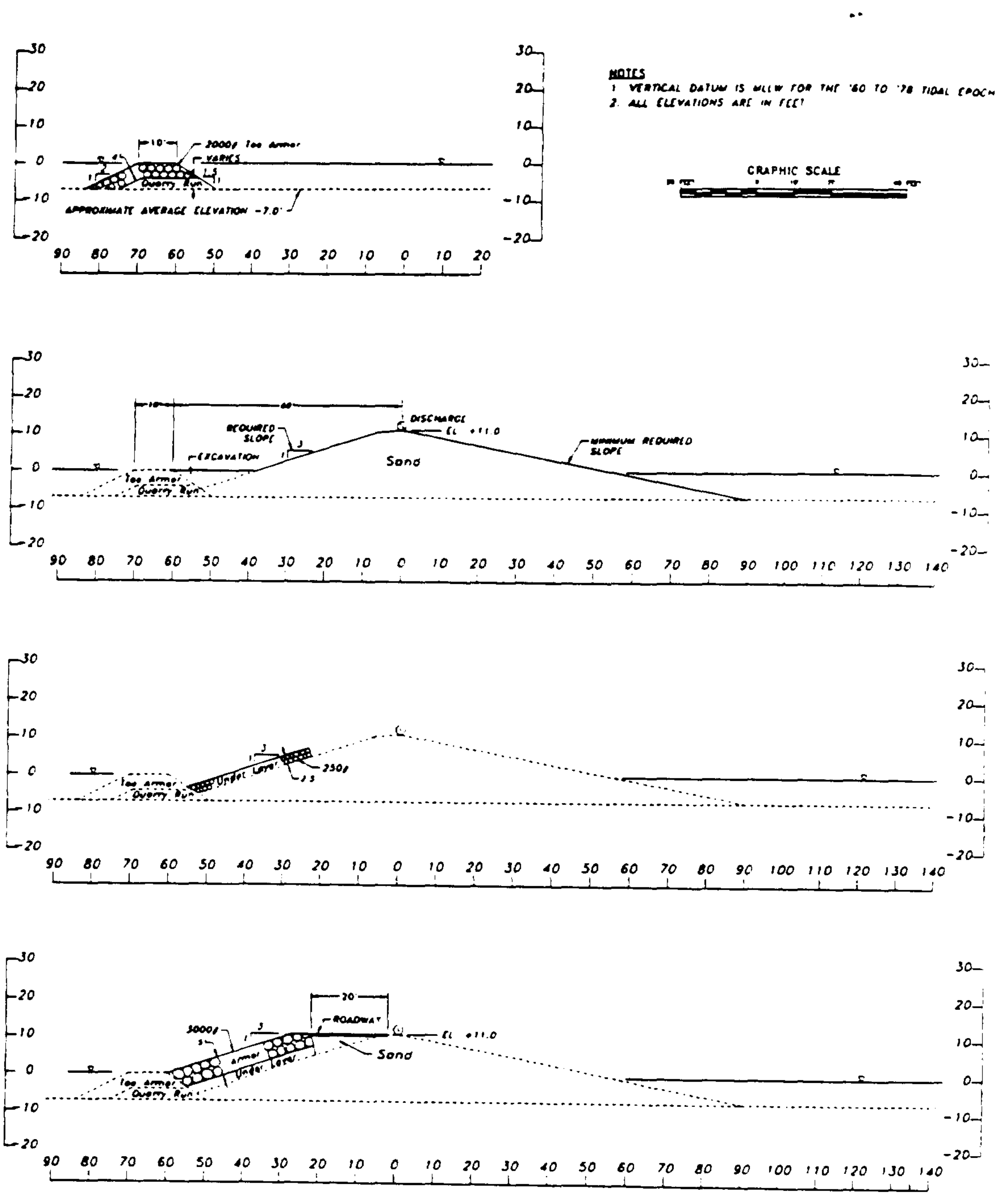


Figure 6-15
WESTERN PERIMETER DIKE
CONSTRUCTION STAGING

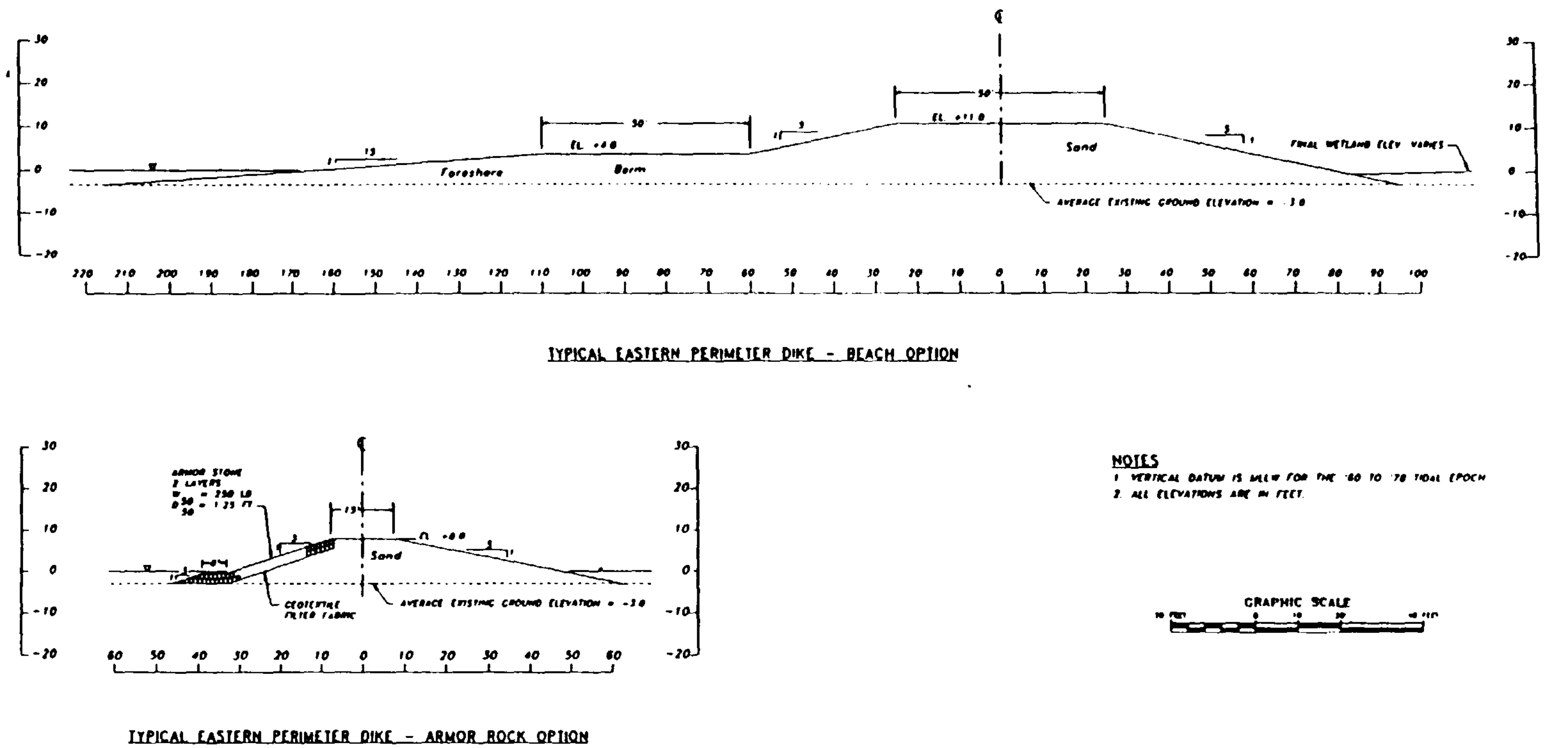


Figure 6-16
EASTE... PERIMETER DIKE

6.1.2.d Water Level Control Structures. Water level control structures will be required to convey excess slurry water from cells during placement and to allow discharge during drying. Control structures are critical to site operations; a proper design will accommodate the raising and lowering of weir boards during cell filling and drying, respectively. Water level control structure configuration will include one or more corrugated metal outlet pipes connected to risers fitted with wooden weir boards to control cell water levels.

Each wetland cell will have two control structures discharging through the eastern perimeter dike to Poplar Harbor and a third control structure discharging through a wetland cross dike into an adjacent wetland cell. Similarly, an upland cell will have two control structures discharging through an upland cross dike into the adjacent wetland cell and a third control structure discharging into an adjacent upland cell. These arrangements will provide maximum flexibility for cell water level control.

No control structures will be located along the western perimeter dikes. The wetland cell control structures discharging through the eastern perimeter dike will be deactivated after the perimeter dike has been breached to introduce tidal flows. The exact size of the breaches is still being evaluated based on tidal exchange. They will likely not be armored. Upland cell control structures will be needed indefinitely to control surface water drainage.

6.1.2.e Cell Design. During the operational life of the site, while filling of the tidal wetland and upland cells is taking place, placement procedures and possibly cell configurations will be adjusted to accommodate actual dredged material volumes. The cell area, volume, capacity, lift thickness, and time to fill relationships are a function of dredged material types, placement, and tidal wetland cell development schedules, as well as the conditions in the cells resulting from previous placements of dredged material. The cell arrangements are shown in Figure 6-17.

Cell characteristics for design objectives are shown in Table 6-3. The site management staff will conduct periodic surveys of cell elevations and cell material water content in order to track the performance of each cell for comparison with design objectives and cell development schedules. An estimate of cell capacity for the six cells is contained in Table 6-3. The actual cut volume being delivered to the site will vary from year to year. The bulked cut volume placed in a cell will determine lift thickness. In general, lift thickness will not exceed 3 feet for upland cells once the material reaches an elevation of MLLW. For wetland cells, lift thickness may be greater, but the placed volume will not exceed that necessary to reach the average finished grade after consolidation of the material.

At a uniform placement rate of 500,000 cubic yards per year, the wetland cells will be filled over a period of approximately 10 years. Individual cells can be filled in one placement season. The final schedule will depend upon filling and consolidation rates, cell planting rates, and the budgets for cell development. Discharges from the upland cell will be channeled to the weirs to avoid potential impacts of fluctuating salinity on the newly formed wetlands.

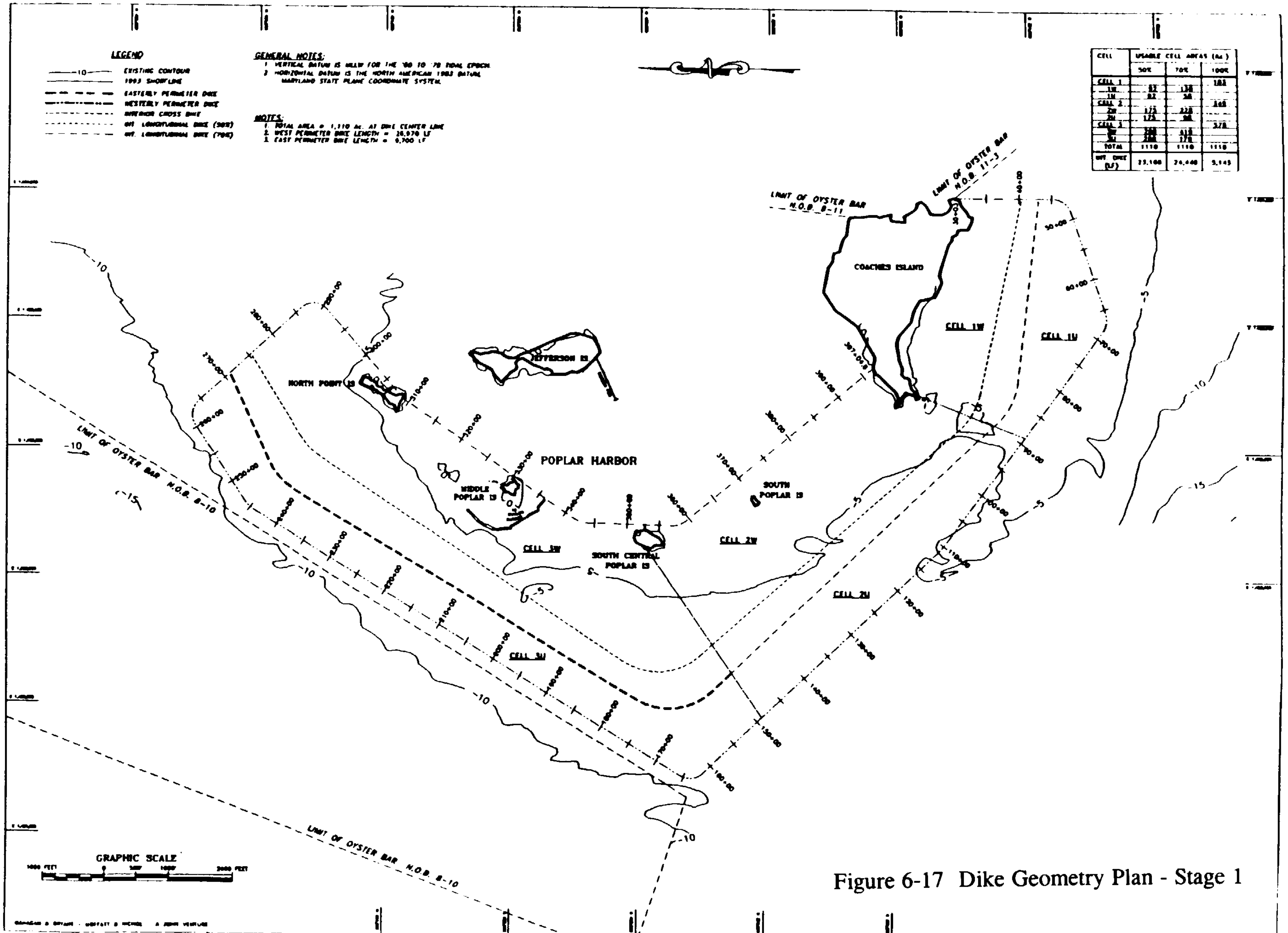


Figure 6-17 Dike Geometry Plan - Stage 1

6.1.2.f Habitat Areas. The overall habitat development footprint will be approximately 1,100 acres. Of this, one half will be upland and the other half will be tidal wetland. Eighty percent of the wetland area will be low marsh and the balance will be high marsh. Low marsh elevations will range from approximately 0.9 feet to 1.5 feet above MLLW, which corresponds to the tidal elevations between Mid Tide (MT) and MHW. High marsh will be at elevations of approximately 1.5 feet to 2.4 feet above MLLW, which corresponds to the tidal range of MHW to MSHW. Marsh elevations will be refined based on onsite tidal gauge data currently being collected. Upland areas will be at elevations up to 20 feet above MLLW. Adjustments to specific habitat locations will be made as needed during the dredging operations.

TABLE 6-3
CELL CHARACTERISTICS
DESIGN OBJECTIVES

No.	Type	Area [1]	Typical Bottom[2]	Elevation Finished	Cell Volume[3]	Cell Capacity[4]
1	Tidal Wetland	175	- 4.7	1.4	1.7	2.37
2	Upland	337	- 7.3	20.0	14.9	23.96
3	Tidal Wetland	139	-3.9	1.4	1.2	1.71
4	Tidal Wetland	87	-3.7	1.4	0.7	1.03
5	Tidal Wetland	140	-3.9	1.4	1.2	1.72
6	Upland	232	-5.5	20.0	9.5	15.39
Subtotal, wetlands		*555*		*1.4*	*4.8*	*6.83*
Subtotal, uplands		*555*		*20.0*	*24.4*	*39.35*
Project totals		***1010***			***29.2***	***46.18***

1. Cell areas are measured to the centerline of the confining dike.
2. Typical bottom elevations may be impacted by borrow activities within each cell.
3. Cell volume (million cubic yards) is the "cubage" of the cell using area and the typical bottom and finished elevations.
4. Cell capacity (million cubic yards) is measured by the channel cut volume which can be placed in the cell when accounting for the consolidation and shrinkage that takes place after placement of dredged materials.

Low Marsh

Low marsh will be dominated by smooth cordgrass (*Spartina alterniflora*). One upland island approximately 2 acres in size will be embedded in the low marsh in each cell. These islands will be surrounded by a channel approximately 50 feet wide, which will contain water 18 to 24 inches deep at low tide. This channel will serve as a "moat" to protect island habitat from predatory species that could disrupt breeding bird populations. It is expected that tidal ponds and dendritic channels will develop throughout the low marsh area, both of which will be 18 to 24 inches deep at low tide. Where channels do not develop naturally, they will be excavated to promote tidal flushing.

High Marsh

High marsh will be dominated by salthay (*Spartina patens*) and other grasses. The high marsh habitat will also include other communities such as rushes (*Juncus* sp.), especially along the upland border. Black needlerush (*Juncus roemerianus*) will more than likely colonize on its own, thereby diversifying the planted wetland community. This species should not be encouraged by planting because introduction before the cordgrasses have become established could result in large monotypic stands of this species, thereby lowering plant diversity. Tidal ponds, which will not be connected to tidal channels, will be constructed in the high marsh. These ponds will be flushed, in general, only during exceptional tide events.

Tidal Ponds

Tidal ponds will be approximately 2 acres in size, with bank slopes of 5:1, and they will be designed to optimize shore bird, wading bird, and waterfowl use. At low tide, approximately 80 percent (1.5 acres) of the low marsh tidal ponds will be 1 foot deep. Ten percent of each pond (0.25 acre) will be deep water refuge 3 feet deep, and the remainder (0.25 acre) will be at a depth of 0.5 foot. Low marsh ponds will be connected to circulating tidal channels.

High marsh ponds will be designed in a similar fashion except that water elevations will be for full pool water elevations. These ponds will be isolated from the daily tidal regime and will only receive tidal water during spring and storm tides. These ponds may dry during seasonal droughts.

Uplands

Upland habitat will support a mixture of forested, scrub/shrub, and nontidal wetland habitat. The contiguous upland habitat will be developed over the life of the project.

6.1.2.g Habitat Development. The following sections briefly describe the proposed approaches for development of habitats on Poplar Island.

Low Marsh Habitat

The dominant vegetation of low marshes in the Chesapeake Bay is the smooth cordgrass (*Spartina alterniflora*). This will probably be one of the dominant species established in low marsh areas of the project. There are several methods by which smooth cordgrass can be established on a site.

Saltmarsh cordgrass will be established on the site by seeding, nursing propagated stock, or placing field-collected sprigs or mats.

Seeds will be collected during the approximate 1-week period effective for this operation. Seed will be threshed and stratified stored in cold salt water for several months during the winter prior to planting.

Nursery propagated peat potted stock will be obtained from contract suppliers. To assure adequate supply, contracts will be let in the growing season prior to planting.

Sprigs and sod mats will be collected from existing smooth cordgrass marshes if needed and if collection impacts can be minimized. Impacts to the source marsh can be minimized by filling the holes left by plant collection with sand, and allowing the remaining plants to "fill in" the gaps.

Smooth cordgrass will be planted by appropriate methods for each propagule type. Seedlings, sprigs, plugs, or mats will be planted on centers or in rows. Unplanted areas will be left in each cell for natural propagation.

High Marsh Habitat

The predominant vegetation on the high marsh will be salthay (*Spartina patens*), with other grasses and rushes (*Juncus* sp.) at the upland/high marsh edge to diversify the habitat. Seeds, seedlings, plugs, and mats will be employed as appropriate and available. Planting techniques will be similar to those employed in low marsh establishment.

In general, peat potted material will be favored. Peat-potted material can be planted almost any time of year, and little post-planting care is required.

Tidal Pond Habitat

Low marsh ponds will be constructed so that at low tide, 80 percent of the area will be covered by one foot of water, 10 percent of the site will be covered by 3 feet of water, and the remainder of the site will be under 0.5 foot of water. High marsh ponds will be constructed with similar attributes, but the above specifications will apply to the pond at full pool. Bank slopes on both pond types will be approximately 5:1. Two ponds are suggested for each wetland cell, one in the low marsh, and one in the high marsh. Pond placement will be dictated somewhat by where dredged material settlement leaves depressions of approximately the correct depths, but some excavation will be required.

Island Habitat

The low marsh area of each wetland cell will include one upland island approximately 2 acres in size (and incorporate existing island remnants where possible), and surrounded by a 50-foot-wide channel 18 to 24 inches deep at low tide. Islands will be constructed by hydraulically placing sand in the wetland cell, and channels will be excavated when conditions permit. Islands will either be planted with a mixture of herbaceous plants and shrubs, or shell will be placed on portions of the island to develop tern nesting habitat. Herbaceous material and vines may include poison ivy (*Toxicodendron radicans*), Virginia creeper (*Parthenocissus quinquefolia*), trumpet vine (*Campsis radicans*), blackberries (*Rubus* sp.), and greenbrier (*Smilax rotundifolia*). Trees and shrubs may include marsh elder (*Iva frutescens*), groundsel tree (*Baccharis halimifolia*), wax myrtle (*Myrica cerifera*), and beach plum (*Prunus maritima*). It is recommended that the islands not be sited in close proximity to the upland area or the containment dikes in order to deter access by predators.

Upland Habitat

Uplands will include seasonal freshwater wetlands, forest, and scrub-shrub habitat.

The upland will be contoured to direct rainwater to constructed depressional areas. These areas will collect rainwater during the spring wet season, will initially be planted with herbaceous material that is somewhat salt tolerant, such as Olney's bulrush (*Scirpus americanus*), common three-square (*Scirpus pungens*), and black needle rush (*Juncus roemerianus*). After initial plant establishment, natural succession will result in the edges being dominated by volunteer woody species. Upland pond construction will not occur until the deposited dredged material has sufficiently dried and consolidated, and the sediments are capable of supporting plant growth.

After site conditions improve enough that woody plant species can be established, the upland areas will be planted with species typically found in the region. Trees could include loblolly pine (*Pinus taeda*), red maple (*Acer rubrum*), sour gum (*Nyssa sylvatica*), sweet gum (*Liquidambar styraciflua*), white oak (*Quercus alba*), red oak (*Quercus rubra*), willow oak (*Quercus phellos*), black cherry (*Prunus serotina*), and hackberry (*Celtis occidentalis*). The shrub layer may include wax myrtle, arrowwood (*Viburnum dentatum*), spicebush (*Lindera benzoin*), and sweet pepperbush (*Clethra alnifolia*).

Scrub/shrub habitat will be planted with a mixture of herbaceous plants and shrubs. Herbaceous material and vines may include poison ivy (*Toxicodendron radicans*), Virginia creeper (*Parthenocissus quinquefolia*), trumpet vine (*Campsis radicans*), blackberries (*Rubus* sp.), and greenbrier (*Smilax rotundifolia*). Trees and shrubs may include marsh elder (*Iva frutescens*), groundsel tree (*Baccharis halimifolia*), wax myrtle (*Myrica cerifera*), and beach plum (*Prunus maritima*). Natural successional processes may alter the area of this habitat with time.

6.1.3 Project Costs

The total cost is estimated to be $458.4 million. All costs are based on present worth costs as of 1 December 1995. This includes costs for maintenance dredging, placement, shaping and planting of the island, supervision and inspection, execution of the feasibility study, review of the plans and specifications, and advertisement and award of the construction contract (Table 6-4). Maintenance of the Federal navigation project includes the removal, transportation, and placement of approximately 38 million cubic yards of material at Poplar Island. The baseline cost for maintenance dredging and placement in the Deep Trough, the base plan, is currently estimated to be $151.2 million. The incremental project cost is the difference between the total project cost and the base plan cost, which is currently estimated to be $307 million. This number does not include $11 million for state maintenance during construction. The scheduling of these costs are shown in Table 6-5.

6.1.4 Phased Construction

Due to the large costs associated with the Poplar Island Restoration Project and the potential Federal fiscal limitations, a phased construction alternative (Figure 6-18) was considered. If phased, the project would be constructed as follows:

Phase I

The northernmost cells would be enclosed with a full-sized dike encompassing 650 acres, armored on all sides except the east. The borrow areas will, however, be outside of the dike during construction of Phase I. When the dike is completed, dredged material placement could begin. In conjunction with the northern perimeter dike, a stone dike extending along Poplar Harbor to the south shore of Coaches Island would also be constructed.

Phase II

When funding becomes available a second (adjacent) phase would be constructed and armored. Habitat reconstruction could begin on cells in the first phase as soon as the cells are filled. This process would be repeated for the third phase (south of Coaches Island), unless the second phase encompasses the entire area.

While this option would relieve some of the fiscal pressures at the onset of this project, phased construction would be a more costly option over the life of the facility due to the need to maintain incomplete sections of dike, construct more armored sections of dike (around each phase), and mobilize and demobilize additional crews and equipment. It is estimated that Phase I could cost about $47 million. The follow-on cost for Phase II is estimated to be about $31 million. This equates to about a $78 million containment structure, roughly a 10% increase over the cost to build a contiguous placement site. A phased construction approach does allow for several site development options. Phase I would constitute a self-contained placement facility. If funding is not available to complete Phase II, there is a possibility that Phase I may be the only action. If, however, more placement capacity is needed in the future, and funding is available, the remaining acreage could be utilized.

TABLE 6-4

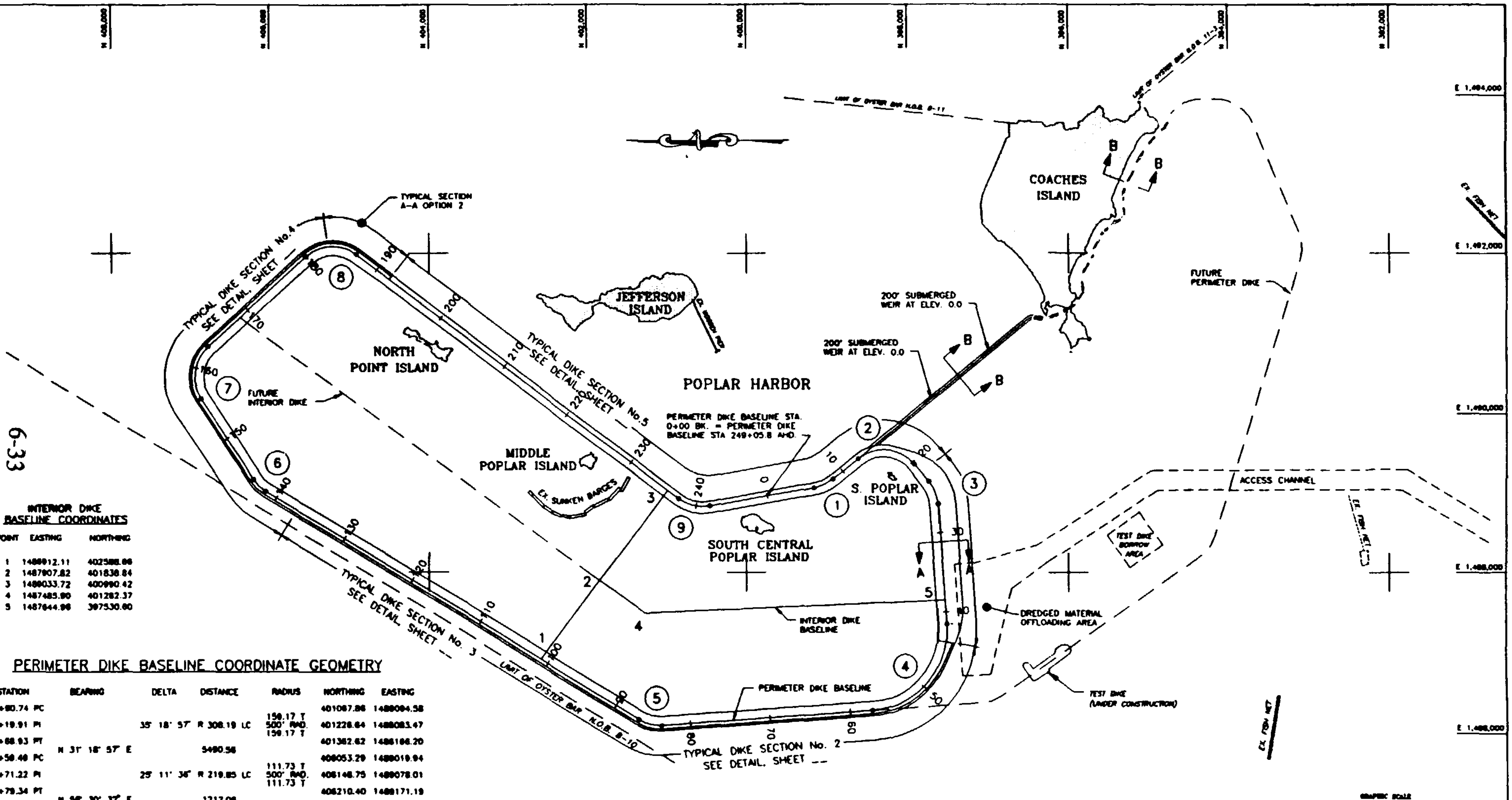
INCREMENTAL PROJECT COST
Poplar Island, Maryland

Section 204 - Beneficial Use of Dredged Material

ITEM	DESCRIPTION	SUB-TOTAL	CONTING.	TOTAL COST
Dredging and Placement Costs				
Dredging				
	Mobilization/Demobilization	$39,840,000	$6,557,000	$46,397,000
	Mechanical Dredging	$245,280,000	$40,369,000	$285,649,000
	Planning, Engineering, Design	$2,304,000	$371,000	$2,675,000
	Construction Management	$5,112,000	$841,000	$5,953,000
Placement Areas				
	Site Work, Mob/Demob, Administration	$15,065,000	$4,023,000	$19,088,000
	Permanent Vegetative Planting	$8,957,000	$2,471,000	$11,428,000
	Cell Closure/Finish	$2,359,000	$614,000	$2,973,000
	Incremental Dike Raise	$2,898,000	$759,000	$3,657,000
	Transportation	$4,750,000	$1,268,000	$6,018,000
	Planning, Engineering, Design	$541,000	$141,000	$682,000
	Construction Management	$3,312,000	$885,000	$4,197,000
Initial Construction				
	Lands and Damages	$73,500	$14,700	$88,000
	Breakwaters and Seawalls	$54,088,300	$13,522,100	$67,610,000
	Planning, Engineering, Design	$301,800	$60,400	$362,000
	Construction Management	$1,084,000	$216,800	$1,301,000
	PROJECT SUBTOTAL			**$458,078,000**
Baseline Dredging and Placement Costs				
Dredging/Transportation				
	Mobilization/Demobilization/Preparation	$10,608,000	$1,742,000	$12,350,000
	Mechanical Dredging	$111,840,000	$18,407,000	$130,247,000
	Engineering, Planning, Design	$2,304,000	$371,000	$2,675,000
	Construction Management	$5,112,000	$841,000	$5,953,000
	BASELINE SUBTOTAL			**$151,225,000**
	INCREMENTAL PROJECT COST			**$306,853,000**
	SAY:			$307,000,000

	Base Years Total	Year 1 Total	Year 2 Total	Year 3 Total	Year 4 Total	Year 5 Total	Year 6 Total	Year 7 Total	Year 8 Total	Year 9 Total	Year 10 Total	Year 11 Total	Year 12 Total
Disposal Areas													
Site Work/Mob, Demob/Admin		$652,000	$652,000	$652,000	$738,000	$692,000	$692,000	$738,000	$784,000	$734,000	$782,000	$803,000	$797,000
Permanent Vegetative Planting						$887,000			$1,230,000	$2,757,000			
Cell Closure											$2,206,000		
Incremental Dike Raise										$403,000	$403,000	$403,000	
Transportation		$238,000	$238,000	$238,000	$238,000	$238,000	$238,000	$238,000	$238,000	$238,000	$238,000	$238,000	$238,000
Planning, Engineering, Design		$46,000	$26,000	$26,000	$26,000	$26,000	$26,000	$26,000	$26,000	$26,000	$26,000	$26,000	$26,000
Construction Management		$149,000	$149,000	$149,000	$149,000	$149,000	$149,000	$149,000	$149,000	$149,000	$261,000	$149,000	$292,000
Dredging													
Mobilization, Demobilization, Prep		$1,909,000	$1,909,000	$1,909,000	$1,909,000	$1,909,000	$1,909,000	$1,909,000	$1,909,000	$1,909,000	$1,909,000	$1,909,000	$1,909,000
Mechanical Dredging		$11,753,000	$11,753,000	$11,753,000	$11,753,000	$11,753,000	$11,753,000	$11,753,000	$11,753,000	$11,753,000	$11,753,000	$11,753,000	$11,753,000
Planning, Engineering, Design		$111,000	$111,000	$111,000	$111,000	$111,000	$111,000	$111,000	$111,000	$111,000	$111,000	$111,000	$111,000
Construction Management		$245,000	$245,000	$245,000	$245,000	$245,000	$245,000	$245,000	$245,000	$245,000	$245,000	$245,000	$245,000
Lands and Damages	$88,000												
Breakwaters and Seawalls	$67,610,000												
Planning, Engineering, Design	$362,000												
Construction Management	$1,301,000												
Total Cost	$69,361,000	$15,103,000	$15,083,000	$15,083,000	$15,169,000	$16,010,000	$15,123,000	$15,169,000	$16,445,000	$18,325,000	$17,934,000	$15,637,000	$15,371,000
Base Plan Costs (Deep Trough)		$6.223,000	$6,223,000	$6,223,000	$6,223,000	$6,223,000	$6,223,000	$6,223,000	$6,223,000	$6,223,000	$6,223,000	$6,223,000	$6,223,000
Incremental Cost	$69,361,000	$8,880,000	$8,860,000	$8,860,000	$8,946,000	$9,787,000	$8,900,000	$8,946,000	$10,222,000	$12,102,000	$11,711,000	$9,414,000	$9,148,000
Federal Cost	$52,020,750	$6,660,000	$6,645,000	$6,645,000	$6,709,500	$7,340,250	$6,675,000	$6,709,500	$7,666,500	$9,076,500	$8,783,250	$7,060,500	$6,861,000
Non-Federal Cost	$17,340,250	$2,220,000	$2,215,000	$2,215,000	$2,236,500	$2,446,750	$2,225,000	$2,236,500	$2,555,500	$3,025,500	$2,927,750	$2,353,500	$2,287,000

	Year 13 Total	Year 14 Total	Year 15 Total	Year 16 Total	Year 17 Total	Year 18 Total	Year 19 Total	Year 20 Total	Year 21 Total	Year 22 Total	Year 23 Total	Year 24 Total	Year 25 Total
Disposal Areas													
Site Work/Mob, Demob/Admin	$797,000	$774,000	$774,000	$826,000	$826,000	$833,000	$833,000	$839,000	$836,000	$772,000	$772,000	$772,000	$718,000
Permanent Vegetative Planting									$2,655,000	$3,375,000			$524,000
Cell Closure/Finish								$255,000	$255,000			$257,000	
Incremental Dike Raise	$403,000	$406,000	$406,000		$409,000	$412,000	$412,000						
Transportation	$238,000	$239,000	$239,000	$241,000	$241,000	$243,000	$243,000	$245,000	$245,000	$247,000	$247,000	$247,000	$247,000
Planning, Engineering, Design	$26,000	$27,000	$27,000	$27,000	$27,000	$27,000	$27,000	$27,000	$27,000	$27,000	$27,000	$27,000	$27,000
Construction Management	$149,000	$150,000	$150,000	$147,000	$151,000	$152,000	$152,000	$154,000	$154,000	$330,000	$155,000	$155,000	$155,000
Dredging													
Mobilization, Demobilization, Prep	$1,909,000	$1,926,000	$1,926,000	$1,942,000	$1,942,000	$1,959,000	$1,959,000	$1,975,000	$1,975,000	$1,992,000	$1,992,000	$1,992,000	
Mechanical Dredging	$11,753,000	$11,855,000	$11,855,000	$11,957,000	$11,957,000	$12,060,000	$12,060,000	$12,162,000	$12,162,000	$12,264,000	$12,264,000	$12,264,000	
Planning, Engineering, Design	$111,000	$112,000	$112,000	$112,000	$112,000	$113,000	$113,000	$114,000	$114,000	$115,000	$115,000	$115,000	
Construction Management	$245,000	$247,000	$247,000	$249,000	$249,000	$251,000	$251,000	$253,000	$253,000	$256,000	$256,000	$256,000	
Lands and Damages													
Breakwaters and Seawalls													
Planning, Engineering, Desig n													
Construction Management													
Total Cost	$15,631,000	$15,736,000	$15,736,000	$15,501,000	$15,914,000	$16,050,000	$16,050,000	$16,024,000	$18,676,000	$19,378,000	$15,828,000	$16,085,000	$1,671,000
Base Plan Costs (Deep Trough)	$6,223,000	$6,277,000	$6,277,000	$6,331,000	$6,331,000	$6,385,000	$6,385,000	$6,439,000	$6,439,000	$6,493,000	$6,493,000	$6,493,000	
Incremental Cost	$9,408,000	$9,459,000	$9,459,000	$9,170,000	$9,583,000	$9,665,000	$9,665,000	$9,585,000	$12,237,000	$12,885,000	$9,335,000	$9,592,000	$1,671,000
Federal Cost	$7,056,000	$7,094,250	$7,094,250	$6,877,500	$7,187,250	$7,248,750	$7,248,750	$7,188,750	$9,177,750	$9,663,750	$7,001,250	$7,194,000	$1,253,250
Non-Federal Cost	$2,352,000	$2,364,750	$2,364,750	$2,292,500	$2,395,750	$2,416,250	$2,416,250	$2,396,250	$3,059,250	$3,221,250	$2,333,750	$2,398,000	$417,750



INTERIOR DIKE BASELINE COORDINATES

POINT	EASTING	NORTHING
1	1488912.11	402588.66
2	1487907.82	401838.84
3	1488033.72	400990.42
4	1487485.90	401282.37
5	1487644.96	397530.60

PERIMETER DIKE BASELINE COORDINATE GEOMETRY

P.I.	STATION	BEARING	DELTA	DISTANCE	RADIUS	NORTHING	EASTING
	83+80.74 PC					401087.86	1488004.58
5	85+19.91 PI		35° 18' 57"	R 308.19 LC	158.17 T 500' RAD. 158.17 T	401228.64	1488083.47
	86+88.93 PT					401362.62	1488166.20
		N 31° 18' 57" E		5490.56			
	141+58.40 PC					406053.29	1489019.94
6	142+71.22 PI		25° 11' 36"	R 219.85 LC	111.73 T 500' RAD. 111.73 T	406148.75	1489078.01
	143+79.34 PT					406210.40	1489171.19
		N 56° 30' 32" E		1217.06			
	155+96.41 PC					406881.96	1490186.19
7	160+29.01 PI		81° 44' 2"	R 713.26 LC	432.61 T 500' RAD. 432.61 T	407120.70	1490546.97
	163+ 9.67 PT					406797.99	1490835.08
		S 41° 45' 26" E		1686.29			
	179+95.96 PC					405540.06	1491958.11
8	184+ 6.36 PI		78° 45' 26"	R 887.29 LC	410.39 T 500' RAD. 410.39 T	405233.92	1492231.42
	188+83.25 PT					404906.16	1491984.44
		S 37° 0' 0" W		5074.94			
	237+58.19 PC					400853.14	1488930.27
9	239+75.59 PI		47° 0' 0"	L 410.15 LC	217.41 T 500' RAD. 217.41 T	400679.51	1488799.43
	241+88.34 PT					400485.41	1488837.18
		S 10° 0' 0" E		1325.28			
	????????? PC					399180.26	1489067.31
1	????????? PI		28° 33' 35"	L 257.96 LC	131.92 T 500' RAD. 131.92 T	399030.34	1489090.22
	????????? PT					398928.64	1489174.24
		S 38° 33' 35" E		???????			
				PI 2	500' RAD.	398230.22	1488751.19
				PI 3	500' RAD.	397628.80	1488020.74
				PI 4	1000' RAD.	397439.93	1486348.27

This Drawing Plotted 8 september 1995

U.S. ARMY ENGINEER DISTRICT, BALTIMORE
CORPS OF ENGINEERS
BALTIMORE, MARYLAND

Figure 6-18

POPLAR ISLAND HABITAT RESTORATION

DIKE GEOMETRY PLAN
STAGE 1

PLATE 4

Phased construction is not expected to have any effect on the earth resources in the project area, nor is a phased construction approach expected to alter residence times beyond the minimal increase expected for Poplar Harbor, because the phases are subsets (smaller versions) of the total project. The lack of a full perimeter dike will alter the hydrodynamics, and will also provide less protection for the newly constructed rock dike and south shore of Coaches Island.

Since phased construction will not enclose the borrow area, the area will only be marginally protected from turbidity effects during construction. However, phased construction is expected to have negligible impacts on sediment quality.

Phased construction will lessen the amount of Bay bottom that is buried initially, but in the long term, will result in the same amount of shallow water being shifted to upland/wetland habitats. Potential impacts to water quality and most living aquatic resources would be lessened in the short term, but multiple phase site development would periodically disturb the biota, potentially interfering with recovery times. Constructing the project in phases is expected to produce the same long-term benefits as constructing the total project initially, assuming that all phases are completed, producing a total 555 acres each of new upland and wetland habitats. If the project proceeds using phased construction, the ratio of restored subtidal, wetland, and upland habitat will not change. A phase I only restoration (650 acres) will yield an ecosystem output with the same habitat composition as the overall project but only on a smaller scale.

Although phased construction is expected to protract the short-term effects on phytoplankton, it is expected to have little effect overall. Similarly, phased construction is expected to protract the short-term effects on the fisheries and icthyoplankton but have little effect overall. In terms of bivalves, construction would bury fewer adult stages initially, but would also increase the potential for turbidity impacts over a longer period of time. Phased construction will influence the timing of stabilization of the islands, which will result in a postponement of the project benefits to oysters; however, phased construction is expected to have minimal effects on blue crabs. Overall, a phased approach to construction and dredged material placement could extend the duration of the project and could consequently extend the duration of short-term construction impacts. Although phased construction would prolong and ultimately delay the recolonization period of the benthic community, it is expected to have negligible effects on long-term impacts.

While phased construction activities provide the potential for protracted short-term impacts, dike construction along Poplar Harbor should protect the key SAV area (Poplar Harbor) from phasing effects. Although phasing of construction is not expected to influence vegetative resources, the basic impacts of construction to birds in the Poplar Island area will be disturbance of habitat.

A phased approach to island construction would change aesthetic impacts by limiting the amount of disturbance to a smaller area over a longer period of time. Aesthetically, this approach could protract impacts, too, over a longer time period, but at a lower level and over a smaller area of disturbance. Phased construction could also prolong noise disturbances to Coaches Island due to the need to maintain the sand dikes along the south side of the island. Phasing of construction over a multi-year period could also potentially impact socioeconomic resources for a longer period of time, although a smaller area would be disturbed in each construction increment.

6.1.5 Operation and Maintenance

The construction, operation, and maintenance of the Poplar Island Restoration Project will be a cooperative effort of the USACE, Baltimore District and the Maryland Port Administration. Initial construction and operation of the site will be managed and funded in accordance with Section 204 guidance provided in EC 1105-2-209 (DA 1995); but as each functional element of the project is completed and determined to be functioning as intended, it will become the responsibility of the Maryland Port Administration to operate, maintain, repair, replace, and rehabilitate the given project elements as needed. Such functional elements include the containment dikes; internal dikes; service structures; the access channels; and each of the four wetland and two upland habitat cells. Ultimately the entire site will become the responsibility of the Maryland Port Administration.

6.1.5.a Dredged Material Unloading Arrangements. Dredged material placed at the site will most likely be unloaded hydraulically from the scows in interior access channels. Water depths of 15 to 20 feet will be required for this operation.

An access channel will be dredged from deep water at the southern end of the site through the proposed sand borrow area west of Coaches Island. The channel would extend from the western perimeter dike to a point along the western perimeter dike and southwest of South Central Poplar Island. An initial unloading basin will be constructed southwest of South Central Poplar Island and will provide pipeline access within 10,000 feet of the northern portion of the site. When the cells occupying the proposed sand borrow area are to be filled, the western perimeter dike will be closed, and a second unloading area will be prepared outside the western perimeter dike.

6.1.5.b Site Infrastructure. Site infrastructure will include those site facilities required to support the project dikes and spillways. Infrastructure will include dike roadways, personnel and equipment access and storage areas, and operations and monitoring facilities. Infrastructure will be in place throughout the operational life of the facility.

6.1.5.c Cell Materials Management. Surface slopes of placed dredged materials used in planning the site are based upon experience with fine-grained maintenance materials placed hydraulically at HMI. Surface slopes above water will be 1H:1,000V. Below water they will be 1H:250V. Actual surface slopes encountered during cell filling and consolidation may vary and, thus, require some adjustment in operational procedures.

It is anticipated that no special drying efforts will be required in the tidal wetland cells to achieve a cell surface suitable for development of vegetation. It is also anticipated that, in addition to effectively controlling cell spillways, surface trenching will be required in the upland cells to reach the full drying of the newly placed material required to maximize cell capacity.

6.1.5.d Cell Development and Preparation. After dike construction is completed, clean dredged material will be hydraulically pumped into the cells. Depending on the quality and quantity of the material, more than one cell may be filled at a time. Under many circumstances, cells will be filled using thin "lifts" or layers of 2 to 3 feet of material. Between lifts, the material will be trenched to promote drainage and consolidation. Drying is not expected in low marsh areas.

Under some circumstances, thicker lifts of material may be pumped into the cell. This should be timed to occur only during periods when the cells are initially filled to just above the water line if large amounts of dredged material must be brought to the site.

Islands will be developed by pumping sand into the cells. The sand will be taken from the same borrow areas as the dike material or will be obtained from potential new work dredging areas.

Desalinization

Salts tend to concentrate at the surface of deposited dredged material. As the material dries, capillary action moves water and dissolved salts upward towards the surface, and evaporation leaves the salts behind. The majority of the salt will concentrate at or near the surface, generally within the first 3 inches. This can be a significant problem in any areas that will not be regularly inundated by the tides. This should not be of concern in areas that will be regularly flooded by tidal water, because salts will be readily flushed from the surface during each high tide event.

To promote infiltration, and thus salt leaching, the upland material may be rototilled or disced to loosen the soil. After it has been determined that salinity (and pH) conditions are suitable for plant establishment, an interim vegetative cover will be seeded in the upland areas. Annual rye (*Lolium trifolium*) and panic grass (*Panicum virgatum*) are somewhat salt tolerant. These grasses can be inexpensively seeded on the upland areas after dewatering and initial salt leaching. Lack of high germination rates and/or poor growth of these grasses on the site would be an indication that salt toxicity is still a problem, and additional soil conditioning would be undertaken.

Salt accumulation will not likely be a problem in the marsh areas or islands. If salt toxicity should appear to become a problem, corrective measures will be taken.

Marine sediments may be high in sulfides. When these materials are exposed to air, sulfuric acid forms. The pH can be low enough to inhibit plant growth. Application of lime or other materials (e.g. crushed shells) may be employed to increase the pH if site monitoring suggests acid inhibition of vegetation. This will be of particular concern in the upland cells and will have to be monitored.

If planting is not accomplished when the dredged material is workable, corrective measures may be needed. The silts and clays, upon drying, may become compacted and almost impervious to water. Tilling of the soil by discing or rototilling will be undertaken if required.

6.1.6 Monitoring

Over the life of the project, monitoring will need to be conducted to verify that habitat development is occurring as expected. Each habitat cell will be evaluated twice a year: once early and once late in the growing season. Ground and aerial surveys will be employed to evaluate habitat conditions.

Early season monitoring will verify that the vegetation overwintered successfully. Late season monitoring will determine relative losses and gains in coverage during the growing season.

The monitoring reports will include documentation of any detrimental effects to the habitat development and recommendations on approaches for ameliorating such effects. Wildlife signs and qualitative estimates of relative population will be included in each report. Evidence of storm, ice, or grazing damage, including erosion, heavy wrack accumulation, and the location of any debris that has been deposited on site will be identified and located on sketch maps.

General plant health will be noted as the basis for identifying and implementing correctional actions if necessary. The success of the various planting techniques will be noted as the basis for determining the installation of the subsequent cells. Specific items to be included as they occur will be (1) recruitment of SAV into Poplar Harbor and the tidal ponds, (2) the location of any recruitment of *Phragmites* soil conditions (pirld salinity) and (3) signs of human use of restored habitats. These items will be characterized at each monitoring period. Monitoring reports outlining the results and identifying possible maintenance needs will be submitted after each monitoring period.

Possible maintenance methods include fertilizer application, invasive plant control, pH adjustment, salinity amelioration, wildlife and insect pest control, and human use control.

To insure the integrity of the armored and unarmored dikes, the interior and exterior slopes and roadways will be monitored yearly following severe storm and icing events. Repairs will be made as necessary to the dikes.

Spillways will be monitored hourly during dredged material placement and dewatering operations to ensure the effluent discharge will not exceed state water quality standards for TSS.

Exterior water quality, oyster bars, benthics, fisheries, and sediment monitoring will be conducted as outlined in Section 8 of this report.

6.2 Cumulative Impacts

The beneficial use of the dredged material at Poplar Island has many positive environmental effects. Cumulative negative effects are minor, relatively short term, and of limited severity. Cumulative positive effects and overall benefits to the Chesapeake Bay economic and ecological systems are great and long lasting. The net environmental and economic effects of the project are clearly and demonstrably positive, and there is no potential effect on any cultural or archaeological resources. Thus, the Poplar Island Habitat Restoration Project represents a unique positive solution to difficult environmental, economic, and socio-political problems in the Chesapeake Bay area.

6.2.1 Cumulative Negative Effects

Negative effects of the project are described in detail in Section 5. For evaluating cumulative effects, negative impacts can be grouped in two categories: those affecting the substrate and those affecting the water column.

Substrate impacts will result from the direct placement of dredged material on existing bottoms. These impacts are relatively long term, and will continue through the life of the project. They are relatively small scale, since they are confined to the diked area which is within the historic footprint of Poplar Island. Major ecosystem components potentially affected by substrate impacts are estuarine benthos and SAV. As documented previously, SAV beds are sparse in the project area so adverse impacts will be minimal. Loss of benthos and benthic habitat will be minimal. Due to the very small-scale effects expected on most aquatic resources, cumulative negative impacts on estuarine substrates are of limited concern.

Potential negative impacts on water column resources arise through the loss of such habitat due to the presence of the diked area and localized, short-term increases in turbidity during construction and tug and barge movement. Relative to the total area of open water in the Chesapeake Bay estuary, the project area is very small, and replaces land area that was present historically. The cumulative direct negative impact of the project on water column resources is vanishing. Considered as a whole, including nondirect effects such as enhanced trophic base and breeding areas, the overall net impacts of the project on water column resources will be positive and will add considerably to the valuable open water resources of the mid-Chesapeake Bay region.

6.2.2 Cumulative Positive Effects

Major positive effects of the project result from the re-establishment of wetland and island habitat lost to the Chesapeake Bay estuary by erosional forces over the past century. Important benefits of such habitats include the following:

- High biotic productivity
- Water quality enhancement

- Breeding and foraging support for bird and wildlife populations

- Breeding and foraging support for commercially and recreationally valuable species of finfish and shellfish
- Breeding and foraging support for rare, threatened, or endangered species

These benefits of wetlands and the importance of wetland restoration and construction in providing them are described in detail in *Restoration of Aquatic Ecosystems: Science, Technology, and Public Policy*, NRC 1992. The ecological benefits of wetlands, in turn, support substantial recreational, educational, and research opportunities. The following sections briefly describe the specific benefits of the Poplar Island project. It is important to keep in mind throughout this analysis that the project is simply re-establishing an emergent area formerly present within the historic footprint. On a net cumulative basis, the Poplar Island project will restore to the adjacent Chesapeake Bay estuary a functional ecosystem lost through powerful erosional forces.

Biotic Productivity

Large estuaries in general, and the Chesapeake Bay estuary in particular, function biologically as detritus-based ecosystems (Adam 1990). This means that biological communities are supported by microbially mediated decomposition processes based on macrophytic vegetation (primarily, but not exclusively, tidal marsh macrophytic vegetation [particularly *Spartina* sp.] and the algae directly associated with marshes and mudflats). Many of the valuable functions of estuaries, including nursery functions for fish and shellfish, bird and wildlife habitat establishment, and water quality maintenance processes result directly from the high productivity of marsh plants and tidal linkage of the resulting biomass to the open estuary.

The Poplar Island project will restore to the Chesapeake Bay estuary a substantial increment of biological production. Estuarine tidal marshes are among the most productive habitats on earth (Odum 1983), and the wetland area to be restored at Poplar Island will provide a great quantity of energy (from marsh grass above- and below-ground production, benthic and stem algae, and photosynthetic microbes). In addition, upland areas adjacent to estuarine waters contribute to the high quality detritus base through loss of deciduous materials and litter to the aquatic ecosystem. This energy will, in turn, support the food web that leads directly to production of striped bass, croaker, weakfish, spot, bluefish, blue crabs, oysters, soft clams, and other important finfish and shellfish in the central Bay.

Water Quality Enhancement

Under present conditions, the remnant emergent islands and bars of the former Poplar Island are eroding continuously under the influence of various hydrologic forces. The eroded soils and sediments are transported in the water column throughout the Poplar Island area of the Chesapeake Bay. These suspended solids degrade open water habitat and make the local aquatic ecosystem stressful for many species. High suspended sediment loads abrade the gills of fish and shellfish, smother oyster beds, reduce light penetration and primary productivity, are avoided by foraging predatory species, and limit the area (often to the periphery of the plume, which may be a focal point for feeding) utilized by prey species.

Restoration of Poplar Island will reduce the ongoing degradation of water quality in the central Bay associated with the erosional transport of shoal sediments and island remnants. The dike systems being constructed for the dredged material containment are specifically designed to resist the erosional forces that destroyed Poplar Island over the past century. They are designed also to allow tidal flux and outflow for nutrient uptake and detrital transport by the marsh. By reducing a key source of suspended solids transport, it is expected that the restoration of Poplar Island will substantially enhance water quality and thus enhance the use by and production of important finfish and shellfish.

Bird and Wildlife Habitat

When island upland and wetland habitat is lost, associated regional biodiversity is reduced. The loss of Poplar Island, in particular, resulted in the reduction (to date) and potential elimination (within the near future) of important breeding and foraging habitat for waterfowl, wading birds, and wildlife species. This loss has both specific and cumulative impacts on Chesapeake Bay biological communities. The specific aspects of these losses are not inconsequential. Their significance is magnified when considered in the context of ongoing and rapid regional habitat loss. For many of the species that formerly utilized Poplar Island, the total available habitat in the Bay is shrinking as a result of development throughout the basin. Each available habitat area, and island habitats in particular, increases in value under such circumstances. Islands provide refuge for many species. The reduced access limits human disturbance, reduces or eliminates predation by such native and invasive species as fox and raccoon, and stabilizes the noise environment. Thus, the loss of Poplar Island has had and continues to have serious consequences for the overall ecological health of bird and wildlife populations in the Chesapeake Bay region.

Restoration of Poplar Island will provide diverse habitats suitable for many species of birds and wildlife. The island design, directly incorporating upland and wetland and developing nearshore shallows in association, will maximize the habitat value for a number of key species. On a cumulative basis, this will restore to the central Bay, the mid-Atlantic region, and the Atlantic flyway as a whole, a significant increment of population for a number of important bird and wildlife species.

Finfish and Shellfish Habitat

One of the most important functions of estuarine wetlands and nearshore environments is their role as nursery and foraging grounds for finfish and shellfish. The loss of Poplar Island has had some complex effects on these functions in the central Bay. On a transient basis, erosion has exposed habitat structure in the nearshore vicinity of the former island that provides cover for some species of recreational and commercial interest. However, this structure will be present for only a very short time. The erosional forces that destroyed Poplar Island will, in the near future, destroy or transport away this habitat cover. The shoal and shore habitat in place near the remnants of Poplar Island are limited in the functional support provided to aquatic resources. This is because they lack the crucial detrital input that drives the estuarine ecosystem, and that requires adjacent wetlands and uplands to provide the production base. On a cumulative basis, the present configuration of Poplar Island is attractive to, but not productive of, harvestable resources. Thus, this area can contribute to the catch, but not to the production necessary to support the catch. In the relatively near future, even the attractor of habitat structure will be lost unless restoration is undertaken.

On a cumulative basis, reconstructing Poplar Island will restore to the central Bay the full complement of linked habitats necessary for effective, long-term nursery and trophic support of finfish and shellfish. The complex of upland, wetland, nearshore, and shoal habitats that will be designed or that will develop in response to the island configuration will offer a diversity of habitat resources. These habitats will provide the trophic foundation, cover, and behavioral foci for propagation and nursery functions and attraction and concentration of harvestable adults. Thus, the Poplar Island restoration will contribute to both the production and focused harvest of resource species.

Rare, Threatened, and Endangered Species Habitat

Habitat for listed bird species is presently sparse and degrading in the vicinity of the former Poplar Island. With the exception of transient (nonbreeding) birds, only bald eagles nesting at Jefferson Island are present. Construction and dredged material placement activities will be implemented in such a way to minimize disturbance to this site (Section 5.4.8).

Transient listed bird species or species of concern observed in the vicinity of the proposed restoration include the least tern (Western populations federally listed, Maryland populations not listed or protected), the rare hooded merganser, and the rare sharp-tailed sparrow. As a focus for foraging, resting, or breeding by species of concern, the remnants of Poplar Island are poor and declining habitat. The diversity of such species in the area, and the contribution of the area to their habitat support, is presently low and will decline as the island remnants continue to erode.

The restoration will provide diverse and high quality habitat for a number of species of concern not presently found in the area. Some of these were likely present in historical times prior to major losses of emergent upland and wetland from Poplar Island. Among taxa likely to benefit from the restoration are wading birds, waterfowl, raptors, and song birds. The restored island may be particularly important as foraging or resting ground for such species as the black rail and northern harrier. Bald eagle, sharp-tailed sparrow, least tern, gull-billed tern, and several heron species will benefit from the protection and provision of breeding areas.

In addition to bird species, marine mammal and fish species that are listed as endangered for the northeast region of the U.S. include: right whale, humpback whale, fin whale, sei whale, Kemp's ridley sea turtle, leatherback sea turtle, green sea turtle, and shortnose sturgeon. Loggerhead sea turtles are listed as threatened in the region. These threatened and endangered species are considered occasional or transient in the Chesapeake Bay and are not likely to occur within the project area.

Protection of Adjacent Islands

Wind-driven waves, which are responsible for the current erosion of the archipelago, will continue to erode any exposed landmasses in the region. Erosion will be greatest along unprotected shorelines exposed to prevailing winds. Prevailing winds in this region throughout most of the year are from the north or northwest. Southern winds can, however, be extreme in some seasons, particularly summer. Shorelines can typically be protected in three ways: (1) by armoring with stone or bulkheading, (2) by using groins or breakwaters to diffuse the destructive forces of wave energies, or (3) by stabilizing through the use of vegetation. The reconstructed Poplar Island will act as a breakwater for the other islands in the chain (Coaches and Jefferson), while providing a protected cove that will encourage development of a biotic community intolerant of high wave action.

The reconstructed island will protect Poplar Harbor from wind-driven waves originating from all directions except the east. Jefferson Island will benefit from this protection along its west and southwest shorelines (adjacent to the harbor) and may even accrete some material along these shorelines. The reconstructed island is also expected to diffuse the worst of the waves generated from a northwest direction, affording some protection to Jefferson Island along the northwest shore. Poplar Island, however, will not protect the northern or eastern shorelines of Jefferson Island.

The proposed island will provide protection to the highly-exposed western and southern shoreline of Coaches Island where the most significant erosion to Coaches Island has taken place in recent years. Most of the northern shore of Coaches Island is protected by Jefferson Island and a rip-rapped shoreline. No protection of the eastern shoreline would be expected from the proposed action.

6.2.3 Cumulative Effects Summary

Cumulative negative effects of the dredged material placement and Poplar Island restoration will be minimal. Some local effects associated with loss of present bottoms and open waters can be expected, but such habitats are relatively extensive in the region, and the project will have little significant impact.

Cumulative positive effects and overall benefits to the Chesapeake Bay economic and ecological systems will be significant and long-lasting. Major economic benefits are associated with the provision of maintained channel access to the Port of Baltimore. The Poplar Island restoration employing dredged material will provide additional economic benefits from recreational and commercial activities supported by the restored habitats.

The Baltimore District has never constructed a beneficial use site of this magnitude or even a smaller beneficial use site in the project area. Future use of existing Bay islands beneficial use sites is unlikely for the Baltimore Harbor and Channels project because of the high transportation cost. The construction of Poplar Island will provide capacity for dredged material which would have to be placed in other ways i.e.; open water or upland placement. Poplar Island would lessen the impacts sometimes associated with open water or upland placement.

Hart-Miller Island near Baltimore is a confined placement site approximately 1140 acres in size, the size of the proposed Poplar Island project. It was originally designed for contaminated sediments and material form the 50-foot project although much of the material placed within the site is considered clean. It is not comparable to Poplar Island because Poplar Island was designed for beneficial use/wetlands creation and Hart-Miller was designed for recreation and wildlife use after placement is completed.

As described in Section 2 acceptable placement sites are in short supply and the need to maintain channels in the Bay is great. The Corps of Engineers and the MPA through the DNPOP and the DMMP are working with other agencies to identify placement needs and will look at beneficial uses for dredged material when possible.

Cumulative environmental benefits of the restoration will accrue throughout the central Chesapeake Bay area and the mid-Atlantic region. High quality, island-based wetland and upland habitat will support commercially and recreationally valuable finfish and shellfish; birds and wildlife; and rare, threatened, and endangered species. Water quality will improve as present erosion is eliminated, and the reconstructed island will provide erosion protection for adjacent islands in the group.

The effective coordination between the need for navigational dredging and the need for habitat restoration at Poplar Island provides an opportunity for long-term cumulative benefits to both the economic and ecological resources of the Chesapeake Bay region.

6.3 Environmental Compliance

For a placement site to be environmentally acceptable, the location, design, and operation must be in compliance with a suite of environmental protection statutes and executive orders. Table 6-6 outlines the statutes and executive orders that are potentially applicable to the project, including the level of compliance. The multiple organizations involved in the project and the ongoing and open communication surrounding decisions have helped ensure complete compliance with potentially applicable statutes and regulations.

The proposed action complies with applicable cultural resources statutes, including the state Archaeological and Historic Preservation Act and the National Historic Preservation Act. The assessment included evaluation of archaeological and historic resources, economic and social impacts, and interaction with coastal planning regulations. The Maryland State Historic Preservation office has been consulted and concurs that the project is in compliance.

The technical impact assessment documented in this report demonstrates that the project complies with applicable components of the Anadromous Fish Conservation Act; Clean Air Act; Coastal Barrier Resources Act; Coastal Zone Management Act; Estuary Protection Act;

Table 6-6 Compliance of the Proposed Action with Environmental Protection Statutes and Executive Orders

Statutes	Level of Compliance
• Anadromous Fish Conservation Act	Full
• Archeological and Historic Preservation Act	Full
• Clean Air Act	Full
• Clean Water Act	Full
• Coastal Barrier Resources Act	Full
• Coastal Zone Management Act	Full
• Comprehensive Environmental Response, Compensation, and Liability Act	N/A
• Endangered Species Act	Full
• Estuary Protection Act	Full
• Federal Water Project Recreation Act	N/A
• Fish and Wildlife Coordination Act	Full
• Marine Mammal Protection Act	Full
• Marine Protection, Research, and Sanctuaries Act	Full
• National Environment Policy Act	Full
• National Fishing Enhancement Act	Full
• National Historic Preservation Act	Full
• Resource Conservation and Recovery Act	N/A
• Rivers & Harbors Act	Full
• Watershed Protection and Flood Prevention Act River and Harbor Flood Control Act	N/A
• Wild and Scenic Rivers Act River and Harbor Flood Control Act	N/A
Executive Orders	
• Protection and Enhancement of Environmental Quality (Exec. Ord. No. 11514, 1977)	Full
• Protection and Enhancement of the Cultural Environment (Exec. Ord. No. 11593, 1971)	Full
• Floodplain Management (Exec. Ord. No. 11988, 1977)	Full
• Protection of Wetlands (Exec. Ord. No. 11990, 1977)	Full
• Federal Compliance with Pollution Control Standards (Exec. Ord. No. 12088, 1978)	Full
• Intergovernmental Review of Federal Programs (Exec. Ord. No. 12372, 1982)	Full
• Environmental Justice (Exec. Ord. No. 12898, 1994)	Full

Full Compliance: Having met all requirements of the statute or E.O. for the current stage of planning.

N/A: No requirements for the statute or E.O. for the current stage of planning

National Fishing Enhancement Act; Marine Protection, Research and Sanctuaries Act; and the Rivers and Harbors Act. The proposed action will be in full compliance with the Clean Water Act when the State of Maryland issues a water quality certificate or if Congress approves the EIS prior to construction. At the present time, the Corps intends to apply for a water quality certificate. No significant impacts are expected to any rare, threatened, or endangered species; the project complies with the Endangered Species Act and the Marine Mammal Protection Act.

The project also complies with all components of NEPA. Through the intensive coordination process, the project complies with the Fish and Wildlife Coordination Act.

A number of executive orders are applicable to the project. The impact evaluation process demonstrates that the project complies with Executive Orders number 11593 (1971), Protection and Enhancement of the Cultural Environment; number 11514, Protection and Enhancement of Environmental Quality; and number 12088, Pollution Control Standard.

The nature and design of the project explicitly incorporate compliance with Executive Orders number 11988, Floodplain Management, and number 11990, Protecting Wetlands.

The project will have no significant impact on minority or low-income communities, and complies with Executive Order number 12898, Environmental Justice. Further, the Working Group has involved the residents of Talbot County in the decision-making process via a series of public meetings.

Through coordination with the applicable state and Federal agencies, it was determined that no National Point Discharge Elimination System permit or Federal wetlands permit will be required for the project unless the state constructs the project on its own. The design and implementation of the project may also preclude the necessity for a state wetlands permit; the only permitting required may be documentation of compliance with the Coastal Zone Consistency Plan.

Section 7

Plan Implementation

The recommended plan described in Section 6 will require a number of commitments on the part of USACE and the non-Federal sponsor for the benefits of the plan to be realized. The major requirements of plan implementation are described below.

7.1 Cost-Sharing Responsibilities

Section 204 of WRDA 1992 authorizes the Corps to carry out ecosystem restoration projects in connection with dredging of authorized navigation projects. Ecosystem restoration projects are funded as navigation construction or operation and maintenance costs up to the level of the base plan. For costs above this baseline, non-Federal interests must enter into a cooperative agreement in accordance with the requirements of Section 221 of the Flood Control Act of 1970, agreeing to provide assurances as indicated in paragraph 7.3 below. WRDA 1992 established the cost sharing for Section 204 environmental restoration projects at 75 percent Federal and 25 percent non-Federal.

7.2 Identification of Local Sponsor

The State of Maryland, Department of Transportation, is the non-Federal sponsor for this project. Specifically, the MPA, through its Office of Harbor Development, was involved in all of the coordination related to this feasibility study. Throughout the entire study process, the Baltimore District continued to meet with the MPA and the State of Maryland. They are aware of the items of local cooperation described below and are aware of their responsibilities with regard to a potential project. They have participated throughout the study and have demonstrated a commitment to both the outcome of the study and project implementation.

7.3 Summary of Responsibilities

The sponsoring agency understands that they will be required to provide assurance of their authority and willingness to provide 25 percent of the incremental project costs and as further specified below:

a. Provide all lands, easements, and rights-of-way, including suitable borrow and dredged or excavated material disposal areas, and perform or ensure the performance of all relocations determined by the Federal Government to be necessary for the initial construction, periodic nourishment, operation, and maintenance of the project.

b. Provide all improvements required on lands, easements, and rights-of-way to enable the proper disposal of dredged or excavated material associated with the initial construction, periodic nourishment, operation, and maintenance of the project. Such improvements may include, but are not necessarily limited to, retaining dikes, wasteweirs, bulkheads, embankments, monitoring features, stilling basins, and dewatering pumps and pipes.

c. Provide, during construction, any additional amounts as are necessary to make its total contribution equal to 25 percent of incremental project costs.

d. For so long as the project remains authorized, operate, maintain, repair, replace, and rehabilitate the completed project, or functional portion of the project, at no cost to the Federal Government, in a manner compatible with the project's authorized purposes and in accordance with applicable Federal and State laws and regulations and any specific directions prescribed by the Federal Government.

e. Give the Federal Government a right to enter, at reasonable times and in a reasonable manner, upon property that the non-Federal sponsor, now or hereafter, owns or controls for access to the project for the purpose of inspection, and, if necessary after failure to perform by the non-Federal sponsor, for the purpose of completing, operating, maintaining, repairing, replacing, or rehabilitating the project. No completion, operation, maintenance, repair, replacement, or rehabilitation by the Federal Government shall operate to relieve the non-Federal sponsor of responsibility to meet the non-Federal sponsor's obligations, or to preclude the Federal Government from pursuing any other remedy at law or equity to ensure faithful performance.

f. Hold and save the United States free from all damages arising from the initial construction, periodic nourishment, operation, maintenance, repair, replacement, and rehabilitation of the project and any project-related betterments, except for damages due to the fault or negligence of the United States or its contractors.

g. Keep and maintain books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to the project in accordance with the standards for financial management systems set forth in the Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments at 32 Code of federal Regulations (CFR) Section 33.20.

h. Perform, or cause to be performed, any investigations for hazardous substances as are determined necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Public Law (PL) 96-510, as amended, 42 U.S.C. 9601-9675, that may exist in, on, or under lands, easements, or rights-of-way that the Federal Government determines to be required for the initial construction, periodic nourishment, operation, and maintenance of the project. However, for lands that the Federal Government determines to be subject to the navigation servitude, only the Federal Government shall perform such investigations unless the Federal government provides the non-Federal sponsor with prior specific written direction, in which case, the non-Federal sponsor shall perform such investigations in accordance with such written direction.

i. Assume complete financial responsibility, as between the Federal government and the non-Federal sponsor for all necessary cleanup and response costs of any CERCLA regulated materials located in, on, or under lands, easements, or rights-of-way that the Federal Government determines to be necessary for the initial construction, periodic nourishment, operation, or maintenance of the project.

j. As between the Federal Government and the non-Federal sponsor, the non-Federal sponsor shall be considered the operator of the project for the purpose of CERCLA liability. To the maximum extent practicable, operate, maintain, repair, replace, and rehabilitate the project in a manner that will not cause liability to arise under CERCLA.

k. Comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, as amended by Title IV of the Surface Transportation and Uniform Relocation Assistance Act of 1987 (Public Law 100-17), and the Uniform Regulations contained in 49 CFR Part 24, in acquiring lands, easements, and rights-of-way, required for the initial construction, periodic nourishment, operation, and maintenance of the project, including those necessary for relocations, borrow materials, and dredged or excavated material disposal, and inform all affected persons of applicable benefits, policies, and procedures in connection with said act.

l. Comply with all applicable Federal and State laws and regulations, including, but not limited to, Section 601 of the Civil Rights Act of 1964, Public Law 88-352 (42 U.S.C. 2000d), and Department of Defense Directive 5500.11 issued pursuant thereto, as well as Army Regulation 600-7, entitled "Nondiscrimination of the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army."

m. Provide 25 percent of that portion of total historic preservation mitigation and data recovery costs that are in excess of one percent of the total amount authorized to be appropriated for this project.

A copy of the model Project Cooperation Agreement (PCA) was provided to the MPA for their review in April 1995. Due to the magnitude of this project, there will be deviations from the model PCA.

7.4 Incremental Project Cost Estimate

Cost estimates have been developed for the Poplar Island Restoration Project. The estimate includes the feasibility study cost, costs for preparation of plans and specifications, construction, construction management, monitoring, and contingencies. The cost estimate for the project is \$307 million. The estimated cost includes \$69.4 million for initial dike construction, \$48.0

million for placement and habitat development, and $189.6 million in incremental transportation costs. The construction period for the initial containment dikes is estimated at 18 months. The total construction period, which includes filling of the site with dredged material and development of the habitat, is estimated at 26 years.

7.5 Funding Schedule

The initial construction contract cost (initial containment dikes) is approximately $69.4 million. The funding schedule is shown in Table 6.5. This schedule was developed because placement needs require the Poplar Island site to be operational by 1998. The initial funding would be required over 3 Federal fiscal years for initial dike construction ($0.7 million in FY96, $29.3 million in FY97, and $39.4 million in FY98). An additional $6.2 million would be required in FY98 to initiate placement operations. An average of about $6.5 million would be required annually thereafter to cover the cost of site operations, construction management, and habitat development. Table 6.5 also shows the Federal and non-Federal cost-sharing for the period.

7.6 Implementation and Funding Options

Typical procedures for USACE participation in beneficial use projects of this magnitude dictate that an initial study be conducted using Operations and Maintenance funds under the authority of Section 216 of the Flood Control Act of 1970. The report would serve as the basis for budgeting for a reconnaissance study and feasibility study. At the time of the sponsor's request for USACE participation, the USACE had prepared its FY96 budget submission. The USACE would not have been able to complete a Section 216 study and budget for the feasibility study, if permitted, until FY97, and for construction until later years. This schedule was not amenable to the sponsor's placement needs and capacity shortfalls. As mentioned earlier, a replacement for the HMI facility is required to be on-line in 1998. This could only be accommodated with a construction initiation in 1996. The current management plan for project implementation is shown on Figure 7-1.

FIGURE 7-1
Current Management Plan

Final Report Submitted	4 March 1996
Final EIS Issued	22 March 1996
30-day Public Review Completed	22 April 1996
Complete Corps Headquarters Policy Review	6 May 1996
Final Plans and Specifications Completed	22 March 1996
Complete Administration Approval Process	6 June 1996

In order to develop a timely and acceptable dredged material placement plan for the Baltimore Harbor and Channels Federal navigation project, and to take advantage of the opportunity to use the dredged material in an environmentally beneficial way, this study was conducted under the authority of Section 204 of the Water Resources Development Act of 1992, with the approval of HQUSACE. While this authority was essential for completing the necessary investigations within the prescribed timeframe, it was recognized that the current $15 million annual limit for the Section 204 program would not be conducive to project construction. The Federal share of the initial dike costs is expected to be $52.0 million: $0.5 million in FY96, $22 million in FY97, and $29.5 million in FY98. While the first year is within the national program limits of $15 million, the USACE received only about $2.5 million in Section 204 funds in FY96. The second year's funding requirement is beyond even the national program limit. For this reason, alternative implementation options were investigated during this study.

7.6.1 Implementation under Section 204

Approval under the authority of Section 204 could result in a number of implementation options based on the availability of funding. One option would be to develop a schedule commensurate with the expected funding stream from the Section 204 program; this, however, will extend the construction schedule of the initial dikes by a number of years. Another option would be to phase the construction, completing the overall diked area as funds are available, as was discussed in Section 6.1.4. Such an approach would be far more costly in the end, given the additional armoring that would be needed for what would have been unarmored, interior containment dikes. Once Congressional authorization has been obtained, the project could be specifically funded as part of an appropriations bill under Construction General.

Subject to the availability of non-Federal funding, a third option would be to offset shortfalls in Federal funding with additional sponsor outlays. Such precedence may exist under the authority of Section 11 of the River and Harbor Act of 1925. The non-Federal share of the initial dike construction would be about $17.3 million. Additional funds received from the state could be used to offset the FY96 deficit in Federal funds or, if sufficient, could lower the FY97 requirement to a level that could be addressed with Section 204 funding.

7.6.2 Congressional Authorization/Funding

Specific project authorization can be provided by Congress through any omnibus bill, but usually through a Water Resources Development Act (WRDA). This bill is typically passed bi-annually, but the last was WRDA 1992. The next WRDA, which is expected to be passed in 1996, could use this feasibility report and EIS as a basis for specific authorization; however, it is anticipated that construction would have to be initiated prior to such an action to maintain the current schedule.

7.6.3 Harbor Maintenance Trust Fund

Funding of the Federal share by the Trust Fund is not currently an option, except for the costs attributable to the base plan. Since Poplar Island is not the base plan for placement, it is not an

Operation and Maintenance cost that is eligible for reimbursement from the Trust Fund, unless an exception is made.

7.6.4 Combination of Section 204 and Congressional Authorization

A combination of the above-described implementation options could be the solution to meeting the scheduled capacity shortfalls. Authorization of the project under the Section 204 authority could allow the USACE to use existing Section 204 funds to initiate construction in FY96. Following up with specific authorization would allow the USACE to budget the remainder of the construction costs.

7.7 Financial Analysis

Construction is presently projected to begin in June 1996. At that time, the local sponsor must have funding mechanisms in place to provide the local share of project costs in a timely fashion. Based on the involvement and interest of the MPA in the project to date, and their extensive need to have placement sites available, the State of Maryland will become the non-Federal sponsor for the project. Once all aspects of the project cost-sharing responsibilities and the PCA are delineated, a letter stating the sponsor's support will be provided. However, recognizing that implementation of this project is essential to keeping the Port of Baltimore viable, the State of Maryland is prepared to fund a phased project on its own to have capacity by 1998.

7.7.1 Financing Plan

To date, the sponsor has not yet provided a specific financing plan for the project since the issue of the Federal role in project construction and funding has not been resolved. The State is fully committed to the project and is prepared to develop their financing plan in conjunction with the PCA process. They have already funded several million dollars in project design and have additional funds identified for project construction.

Financing methods generally available include special levies, general obligation bonds, and revenue bonds. It is also possible that the local sponsor's share of project costs may be funded through capital improvement programs of agency operating budgets.

7.8 Views of Local Sponsor

The local sponsor has diligently supported, promoted, and financed studies to identify dredged material placement sites in general, and this study in particular. They support the recommendations of this study.

Section 8

Monitoring Framework

EC 1105-2-209 entitled, *Implementing Ecosystem Restoration Projects in Connection with Dredging* (DA, 1995), provides guidance for projects implemented under Section 204 of the Water Resources Development Act of 1992. The guidance states that reasonable follow-up and monitoring studies to assure performance criteria or environmental compliance are met, are allowable. This section outlines the proposed monitoring framework for the Poplar Island Restoration Project.

8.1 Purpose

Monitoring of the Poplar Island Restoration Project will be performed to (1) ensure regulatory compliance, (2) document the creation of beneficial habitat, (3) confirm the expected findings of no negative impacts, and (4) provide operational input on the success of habitat creation and potential changes that will increase the habitat value and utilization. This monitoring framework, like the study process and project design, is the result of a collaborative effort. It has been developed to provide a monitoring framework that meets the regulatory agency, resource agency, and construction compliance requirements for the Poplar Island Restoration Project.

Agencies providing expertise and information on monitoring elements include EPA, NMFS, USFWS, the National Biological Survey (NBS), DNR (including the Maryland Geologic Survey(MGS)), MDE, MES, MPA, and the USACE. A multi-disciplinary team was used to develop the monitoring framework in order to contain costs, to ensure comprehensive monitoring, and to provide concurrent peer review of the monitoring effort.

The development of the monitoring framework is a dynamic process, and monitoring elements will evolve to fit changing conditions and findings. The specifics of each monitoring element will be controlled by the final project details. Changes in the monitoring framework will continue to be presented to the team of resource and regulatory agencies for their review and comment. The intention of this monitoring framework is that it be flexible to meet the needs of the project and the resource agencies over time. Each element will be evaluated at the end of each monitoring year, and the monitoring team will decide upon appropriate changes as necessary.

These monitoring needs require existing (baseline) data collection in the year prior to initiation of construction, as well as at various points during the life of the project. The baseline monitoring will utilize and enhance the data collected during the feasibility study as part of the NEPA requirements. The current data identifies and describes existing conditions and projected impacts to the degree sufficient for the EIS. The baseline monitoring data will include information not previously collected for the NEPA efforts. The baseline data documents existing conditions in the vicinity of the proposed island that will be used to assess future conditions both during and after island reconstruction. Baseline data collection was initiated in the fall of 1995 to gather a full year of data before construction of the project, currently planned to begin in the summer of 1996.

8.2 Monitoring Elements

8.2.1 Sediment Quality Monitoring

The objectives of this monitoring element are as follows:

(1) To monitor physical parameters and the concentrations of metals and other chemicals in sediment which could be indicators of accompanying effects to benthic infauna and potential bioaccumulation through the food chain

(2) To provide operational input on wetlands function and the need for soil conditioning to increase pH and reduce metals mobilization in the uplands

The hypothesis being evaluated is that project conditions will not significantly change the metals concentrations in sediments within Poplar Harbor. In order to evaluate this hypothesis, baseline sediment samples will be collected and analyzed for grain size, trace metals, carbon, nitrogen, and sulfur. Sample stations will be established at the same 11 points as the benthic monitoring and water quality monitoring stations described later. A farfield reference station will also be sampled. At intervals, sediments will again be collected from the same stations, analyzed, and the results compared to the baseline data.

The second sampling episode is scheduled to occur after the first placement of dredged material within the project cells and subsequent episodes are presently scheduled each year thereafter. As with all monitoring elements, the monitoring committee will undertake periodic reviews to determine onging sediment quality monitoring needs.

Two adjunct studies may provide additional sediment quality data helpful to the monitoring program. MGS has collected and analyzed sediments from 60 additional stations in the vicinity of Poplar Island and will make the data available to the monitoring team. This data has the potential to serve as a beseline for expanded sediment monitoring if ever needed. The other data set will result from periodic testing of sediments in the channels proposed for dredging by the USACE, Baltimore District. Dredged material samples will be analyzed and compared to reference samples collected from Poplar Harbor and another site south of the project. The USACE analyses will focus for the most part on the Priority Pollutant List less the volatile compounds.

8.2.2 Wetland Vegetation Monitoring

The objectives of this monitoring element are as follows:

(1) To measure and evaluate differences in plant community species composition, densities or production among the Poplar Island restored marshes, those of the remnant islands, and nearby reference marshes

(2) To measure and evaluate differences in plant community species composition, densities, or production associated with age (seral stage) of the restored marshes

(3) To measure and evaluate differences in plant species composition or zonation associated with age (seral stage) or topographic changes of restored marshes

(4) To provide operational input on survival of plant species and methods to increase planting success

The hypotheses being evaluated are as follows:

(1) There are no differences in plant community species composition, densities or production among the Poplar Island restored wetlands, those of the remnant islands, and nearby reference wetlands.

(2) There are no differences in plant community species composition, densities, or production associated with age (seral stage of the restored wetlands).

(3) There are no differences in plant species composition or zonation associated with age (seral stage) or topographic changes of restored wetlands.

In order to evaluate these hypotheses, vegetation surveys and collections will be performed in up to six permanently marked reference plots and at existing vegetated areas on the remnant islands at the end of the growing season during the baseline year. As each wetland cell is completed, sampling plots will be established in that cell. Transects will be established through each plot and will be permanantly marked. Plant shoot densities, vegetative cover, plant survival, above- and below-ground biomass, large-scale vegetation delineation and survival estimates, and a complete lists of species present will be monitored. Sufficient data will be collected using transect and quadrat sampling procedures established by the Federal Interagency Committee for Tidal Delineation (1989) in order to test the hypotheses stated above. The number of vegetation samples take will be determined based on the variability of the data; the more variable the data, the larges the number of samples that will be required. Vegetative cover monitoring in the created wetlands will be conducted twice a year during the first two growing seasons following planting. All parameters will be measured in the initial wetland cell at annual intervals through year 5, and in years 7, 10, 15, and 20. For later cells, this extended monitoring schedule may be modified by the monitoring committee.

Sediment movement and vegetation establishment, zonation, and spread will also be examined through topographic measurement along transects, fixed photo stations along the dikes, aerial photography, and comparison of surveys. These measures will be repeated after planting of the first cell and at the intervals established above.

8.2.3 Water Quality Monitoring

The objectives of this monitoring element are as follows:

(1) To characterize water quality in the project area to evaluate whether long-term water quality changes have resulted from the project

(2) To comply with Water Quality Certification turbidity monitoring requirements during construction

The hypotheses being evaluated are as follows:

(1) There will be no significant long-term change in water quality at Poplar Island. (A short-term change is expected.)

(2) Turbidity levels outside of a defined mixing zone will remain in compliance with the Water Quality Certification limitations during construction activities.

In order to evaluate these hypotheses, 11 stations will be monitored seasonally the year prior to dike construction. The same parameters as are evaluated in the Chesapeake Bay Program will be used for water quality testing. This will be repeated after completion of the dike at a frequency of once per month. Evaluations will be made annually on whether the monitoring should be continued.

Turbidity monitoring is also likely to be required during the construction period to measure compliance with turbidity limits specified in the project Water Quality Certificate.

Return water flow and runoff from dredged material placed within the site will be closely monitored at the discharge to maintain prescribed water quality standards.

8.2.4 Benthics Monitoring

The objectives of this monitoring element are as follows:

(1) To characterize the benthic community in the project area

(2) To verify reestablishment of the community, if disturbed, after construction

(3) To provide information on epibenthic colonization on the dike

(4) To assure there is no accumulation of contaminants in the tissue of benthic organisms in and around Poplar Island due to project conditions

The hypotheses being evaluated are as follows:

(1) There will be achievement of the benthic restoration goal (an abundance and diversity goal for benthic systems developed as part of the Chesapeake Bay Program) in Poplar Harbor within 2 years of exterior dike construction.

(2) There will be no accumulation of contaminants in benthic tissue as a result of project conditions.

(3) The project will promote an epibenthic community on the exterior dikes and stone habitat enhancement structures. This will enhance the habitat restoration impacts of the project and may offset the loss of the snag field to the recreational fishery.

In order to evaluate these hypotheses, 11 benthic infauna stations will be monitored once in the summer, once in the fall, and once in the spring in the year prior to dike construction. Three replicate samples per station will be collected. Community composition, abundance, and diversity will be measured and recorded. After the dike is constructed, the 11 infauna stations will be monitored during 3 seasons, along with 2 stations on the exterior dike to evaluate epibenthic colonization. Evaluations will be made annually on whether monitoring should be continued.

Benthic tissue samples will be collected when the benthic sampling occurs. The tissue samples will be analyzed for a complete scan of organic contaminants and metals. These samples will first be collected in the baseline year, then again no more than 3 years after that, and then again 1 year after the first uplands have begun to dewater. At least two benthic tissue stations will be located within the created wetlands at Poplar Island to measure contaminant concentrations in the tissue of the organisms most likely to be affected by any mobilization of metals from the dewatering of the uplands. After the results from each sampling event are known, evaluations will be made on whether monitoring should be continued.

8.2.5 Fisheries Use of Exterior Proximal Waters

The objective of this modeling element is to measure and evaluate differences in fish and decapod populations and densities before and after the project.

The hypotheses being evaluated are as follows:

(1) There is no difference in fish or decapod species composition or density within the Poplar Island Harbor area prior to island construction compared to after island construction (A change is expected.)

(2) There is no difference in faunal species composition or density in areas immediately adjacent to and outside of the dike prior to construction compared to after construction.

In order to evaluate these hypotheses, Poplar Harbor and areas on the reference islands east of the island footprint will be sampled using trawls, gill nets, throw traps, and crab pots. Additionally, gill nets will be used in the snag area on the western side of the remnant islands. This monitoring will provide baseline data on fish and decapod utilization. Species composition, abundance, and size will be recorded. Trawling will be performed in early spring, summer, and fall; gill netting will be performed during spring and fall; crab pots will be set in early summer; and throw trap sampling will be done during early fall. This monitoring will first be performed in the baseline year, then again after construction of the first cell, then annually for 3 years, then every 3 to 5 years.

8.2.6 Wetlands Use By Fish

The objective of this monitoring element is to measure and evaluate differences in decapod and fish densities and community species composition over time in the restored marshes, the reference marshes, and the remnant marshes at Poplar Island.

The hypotheses being evaluated are as follows:

(1) There are no differences between decapod or fish densities or community species composition among the Poplar Island restored wetlands compared to those prior to restoration. (A change is expected.)

(2) There are no differences between decapod or fish densities or community species composition among restored Poplar Island wetlands compared to nearby reference wetlands.

(3) There are no differences in decapod or fish densities or community species composition associated with age (seral stage) of restored Poplar Island wetlands. (A change is expected)

In order to evaluate these hypotheses, fish, shrimp, and crab use of the wetlands will be sampled in reference marshes, created marshes, and remnant marshes. Replicate fyke nets will be used, with six replicate stations per treatment type (reference, remnant, created) where possible. Sampling for fauna will be performed during early spring, summer, and fall. Environmental parameters will also be analyzed. Species, size, and abundance data will be recorded. This monitoring will first be performed in the baseline year, again after completion of the first cell, then annually for 3 years, then every 3 to 5 years.

8.2.7 Wetlands Use By Wildlife

The objectives of this monitoring element are as follows:

(1) To measure and evaluate species and numbers of migratory waterbirds nesting on the island

(2) To compare densities and species composition of migratory waterbirds on the restored marshes, the remnant marshes, and nearby reference marshes

(3) To evaluate differences in wildlife utilization with the seral age of the marsh

(4) To evaluate use of the island by terrapin

The hypotheses being evaluated are as follows:

(1) The species and numbers of migratory waterbirds nesting on the islands in the Poplar Island group show no numerical change or site relocation comparing pre- versus post-restoration of Poplar Island. (An increase is expected.)

(2) Densities and species composition of migratory waterbirds using (feeding, roosting) the wetlands do not differ among restored wetlands on Poplar Island, remaining island reference wetlands, or nearby mainland reference wetlands.

(3) Age (or seral stage) of restored sites have no influence on their relative attractiveness as nesting sites (uplands) or feeding sites (wetlands) to migratory waterbirds.

(4) Use of restored upland sites by nesting terrapins is no different from use at either remnant island or mainland reference wetlands.

In order to evaluate these hypotheses, the number of species and species densities of migratory waterbirds and terrapins on the remnant island marshes and in nearby reference marshes will be quantified. Nest counts will be conducted in the spring using key indicator species. Wetland plots in reference wetlands, created wetlands, and remnant wetlands will also be used to evaluate bird use. This will be performed one to two times per month in the spring and August to mid-September. Uplands transects will also be established for terrapin searches, which will be conducted at weekly intervals from June 1 to July 15. Indicator species are bald eagles, black ducks, little blue herons, least and common terns, snowy egrets, migrant shorebirds, and terrapins. Contingent upon available funding, the wildlife monitoring component should be reevaluated in the year 2008 to determine whether additional monitoring is warranted.

8.2.8 Shellfish Bed Sedimentation

The objective of this monitoring element is to provide information on the change in sedimentation rates on nearby charted oyster bars. The hypothesis being evaluated is that there is no increase in sedimentation rates on the charted oyster bars during construction of the exterior dikes at Poplar Island when compared to sedimentation rates prior to dike construction.

If monitoring indicates that the oyster bar is being impacted by sedimentation, bagless dredging or similar action will be used to mitigate the impact.

8.3 Management of Monitoring

USACE, Baltimore District personnel will manage the monitoring effort described above. In accordance with EC 1105-2-209, monitoring costs will be limited to 5 percent of the construction costs and will be cost shared in the same ratio as the overall project (75 percent Federal, 25 percent non-Federal). Some contibutory effort by other Federal and State resource agencies is possible, but cannot be programmed at this time.

It is estimated that dredged material will be placed at the site for a period of 24 years; based on this assumption, the above monitoring framework is anticipated to be in effect for approximately 30 years. Table 8-1 illustrates the years in which the various elements are expected to be monitored.

The monitoring team that has been instrumental in developing this framework, will be asked to continue as an monitoring oversight committee and to advise sight managers. In the immediate future, the team will be asked to review and finalize specific sampling plans for approved studies and to establish QA/QC requirements and data quality objectives. Regular monitoring reports will be issued and monitoring data will be available online. The District will work to establish a Poplar Island "Home Page" on the Internet with links to monitoring data.

Table 8-1

POPLAR ISLAND PROPOSED MONITORING SCHEDULE ACCORDING TO FRAMEWORK

	MONITORING YEAR																					
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2020
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	26
	(BASELINE)																					
STUDY ELEMENT																						
Sediment Quality	X			X	X	X	X	X	X	X	X	X	X									
Wetland Vegetation	X						X	X	X	X			X			X					X	X
Water Quality Monitoring	X		X	X			X			X			X			X					X	X
Turbidity		X	X	X																		
Benthics	X		X	X			X			X			X			X					X	X
Fisheries Use of Exterior Proximal Waters	X							X	X	X			X			X					X	X
Wetlands Use by Fish	X							X	X	X			X			X					X	X
Wetlands Use by Wildlife	X				X			X			X			X								
Shellfish Bed Sedimentation	X	X	X																			
Technical Integration	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Project Management	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	X- MONITORING TO BE PERFORMED																					

NOTES: 1. All monitoring elements will be evaluated annually to determine whether continued monitoring in each discipline is necessary. Some elements may be added or deleted as time goes on and conditions change.

2. Initiation of wetlands monitoring is contingent on completion of the wetlands plantings for the first cell.

Section 9

Public Involvement and Agency Coordination

The Poplar Island Restoration Project has received steady and growing interest from the public and from agencies involved in natural resources management on the Chesapeake Bay from the initiation of the feasibility phase of the project in September 1994. For many years prior to the formal project initiation, island restoration was the topic of many discussions among interested citizens, members of the port community, and natural resource management agency personnel as well as in articles in magazines such as *Smithsonian*. The concept that evolved, with the strong support and guidance of the USFWS, was to restore valuable island habitat by placing material dredged from navigation channels in the Bay.

Following completion of a pre-feasibility report by the State in 1994, the Corps of Engineers, the Maryland Port Administration, and representatives of Chesapeake Bay-area natural resources management and port community agencies began formal coordination activities for the project. Preliminary actions included organization of an environmental working group and development of a public involvement program. The goal for both of these tasks was to provide public and agency representation during the preparation of the feasibility study.

9.1 Purpose of Public Involvement and Agency Coordination

Corps policy and guidance emphasizes that opportunities for public involvement must be provided during the planning stages of a project. In addition, Corps guidance supports many Federal regulations requiring close coordination among all levels of government and natural resource management agencies. In conformity with these aims, a public involvement program was developed early in the Poplar Island Feasibility Study to outline the program objectives, a tentative program schedule, and products desired from the program.

The objectives of the Poplar Island Feasibility Study public involvement and agency coordination program included the following:

- Gather valuable information about the potential project;
- Fulfill requirements of the National Environmental Policy Act (NEPA) to inform the public and to inform decision makers;
- Provide effective coordination in order to prevent future project difficulties;
- Gain early support for the proposed actions as part of effective project management; and
- Explain expenditure of public monies to taxpayers.

The public involvement program was designed to provide opportunities for public participation during each planning stage. The study team was committed to conducting a public involvement program that incorporated public input into the project planning process. Actions of the project team were based on the understanding that review of project plans after they are developed does not constitute a meaningful public involvement program. The study team was also committed to a public involvement process that would be integral to the project and could (and, in fact, did) require informal, extensive, and sometimes lengthy dialogue between the planners and the public.

9.2 Program Structure

The major tasks in the public involvement program were divided into several stages, which fit into the general feasibility study schedule. The public involvement stages were identified as Project Initiation, Development of Alternative Plans, Development of Detailed Plans, and Conclusion of the Planning Study. Each stage of the public involvement program was defined by specific tasks that needed to be accomplished, appropriate forums for achieving those tasks, and products that were the desired result of the tasks completed.

Stage 1 - Project Initiation

The first stage of the public involvement and agency coordination program was designed to be exploratory and comprehensive with regard to the identification of public and agency concerns. During this stage, program activities were directed toward ensuring that a wide variety of viewpoints were expressed so that they could be considered during the planning process. The task of the public involvement program at this stage was to identify as many potential issues, opportunities, problems, and constraints as possible. Forums for accomplishing these tasks were agency coordination meetings, informal interest group meetings, and public scoping workshops.

Meetings in the project initiation stage furnished an opportunity to give information to the public, gather information from a multitude of sources, discuss the potential project, and brainstorm ideas, issues, and concerns. A video of the Poplar Island project, which emphasized the Corps/MPA partnership responsible for the project, was prepared by the MPA and shown during the project initiation stage. Printed information about the study was available, including a Public Notice mailed to agencies, organizations, and individuals; a Notice of Intent published in the Federal Register; meeting handouts; brochures; and news articles. At each public meeting during the feasibility study, comment cards were distributed, encouraging people to express their opinions, make comments, or ask questions.

The number of participants in the earliest days of the project was limited to those identified by the project team. These participants included a number of people and organizations who had been involved with the project during preparation of the pre-feasibility study or who were aware of the project and interested in being involved in the planning process. The group played an important role throughout the feasibility study and is expected to maintain some level of involvement through project completion. In general, several different public(s) participated, to some degree, during the first stage of the public involvement program. These publics included coordinating agencies, which were strongly and consistently involved; participating members of the general public, such as citizen who read or heard about the project, but were not otherwise involved. As expected, the number of participants in the Poplar Island public involvement program grew as the project progressed and as interested individuals and groups were identified.

Representatives of approximately a dozen agencies attended the initial kick-off meeting at the Corps of Engineers offices in December 1994. In addition to natural resource management agencies, representatives of the Talbot County Department of Public Works, Maryland Department of Transportation, and Rukert Terminals attended. In early 1995, informal meetings were also held with members of the Maryland Charterboat Association, the Talbot County Council, and a group of Tilghman-area watermen.

Public scoping workshops were held in February 1995 at Tilghman Island, on the eastern shore of the Bay, and at Chesapeake Beach on the western shore. The public workshops were advertised in local newspapers and announced by flyers mailed and posted in the area. Two meetings at which identical information was presented were held to provide equal access to information about the project to the interested public on both sides of the Bay.

The desired product of this stage of the study was information about the project, project area, and public perceptions. Preliminary information about the proposed project was provided by the study team to the public, and citizens and agencies responded with information about their ideas and concerns. The product of this exchange of information provided valuable input into the formulation of alternative plans during later phases of the project.

Several Tilghman-area watermen attended the public scoping workshop and expressed concern regarding impacts to the local fishery. Three informal meetings were held in the following weeks in order to discuss those concerns. Meetings with the watermen were attended by members of the study team, including representatives from the Corps, the MPA, USFWS, NMFS, and NOAA. The product of the meetings was a set of charts marked with the valuable fishery areas near Poplar Island, both open and closed to commercial fishing, as identified by the watermen. As a result of these meetings, the study team met with the Governor's Tidal Fish Commission Advisory Committee to request replacement areas to offset the loss of fishery due to project construction. The Commission agreed to forward a recommendation to the DNR to open several closed fishing areas.

Stage 2 - Development of Alternatives

Activities during the development of alternatives shifted from the exchange of more general information about the project background and the ideas, values, and concerns of the public to more specific topics. The second public meeting, held on 12 April 1995, included a presentation of several draft alternative plans. Meeting attendees were requested to comment on those alternatives. Several weeks prior to the public meeting, a news release, newspaper advertisements, and flyers mailed to those on the mailing list announced the meeting and invited the public to attend. The meeting was held at the Tilghman Elementary School. As a result of the low attendance at the February scoping meeting held on the western shore, a Stage 2 meeting was not planned for the western shore of the Bay. However, in response to a specific request by a small group of

Chesapeake Beach-area residents, several project team members presented the alternative plans at an informal meeting on 19 April.

During the alternatives development, the Working Group of the DNPOP used an iterative process to evaluate the benefits and impacts of each alternative and to select the preferred plan. The alternative selected encompassed 1,110 acres, with half developed as wetland habitat and half as upland habitat.

Stage 3 - Development of Detailed Plans

Stage 3 public involvement activities provided opportunities for the evaluation and modification of the selected alternative. During this stage, the project team and the public again assessed the impacts of the plan and considered ways to fine-tune the design to maximize benefits and minimize negative impacts. A public meeting was held on 23 August 1995, at Tilghman Elementary School to present the selected alternative to the public. Several weeks prior to the meeting, news releases and advertisements were published, and flyers announcing the meeting were mailed. In addition to addresses on the project mailing list, flyers were sent to approximately 1,500 watermen in the 3 counties closest to the project area.

Stage 4 - Conclusion of Planning Study

The objective of Stage 4 was to present the selected plan to the public. The Poplar Island draft Feasibility Study and EIS was provided for a 30-day public review on 13 November 1995. During the public review period, a public hearing was held to present the proposed project and to allow the public to make statements and ask questions regarding the project, which were recorded. The public hearing was held on 28 November 1995, at the Talbot County Free Library, in Easton, Maryland. A formal public hearing format was followed, with an assistant to the District Engineer officiating and approximately a dozen citizens attending. It is assumed that the small number of attendees was a result of the extensive and successful public involvement activities accomplished throughout the preceding months of the study. A short discussion period, with appropriate project team members responding to audience questions and comments, followed the formal presentation. The closure of government offices due to emergency winter weather conditions and government furloughs, as well as requests from several agencies, resulted in an extension of the review and comment period.

9.3 Relationship to Planning Process

Stages and tasks of the public involvement program were designed to coincide with study phases so that products of the program could be integrated into the planning process in a meaningful way. In addition to providing information on the project status, the project team gained information from the public. Preliminary public involvement activities also introduced the project team, the proposed project, and the public involvement process to the public, and began an interaction among the project players that was critical in building and maintaining support for the project. At each stage of the feasibility study, information gained during earlier public involvement activities was provided to the project team and incorporated into the project design.

9.4 Participation and Support

Prior to the initiation of the Poplar Island Restoration Feasibility Study, the project already had acquired a number of supporters and participants. The topic of island restoration had been discussed among environmentalists, recreationists, politicians, Bay-area natural resource managers, the port community, and others over a period of 25 years. Articles had appeared in newspapers and magazines, and natural resource management agencies had prepared conceptual designs for a habitat restoration project on the island. In 1994, the Maryland Port Administration prepared a pre-feasibility report outlining a project using dredged material placed within dikes to create a land area at the approximate size and location of the historic Poplar Island. Soon after completion of the pre-feasibility report, the Corps' Baltimore District joined the MPA as a project partner.

Early in the feasibility phase of the project, a meeting was held to discuss the project and associated environmental issues. A variety of agencies were represented at the meeting, setting the tone for the broadly supported and collaboratively developed project that was eventually produced. Attendees included representatives of natural resources management agencies and the port community. Agencies represented included NMFS, DNR, NOAA, USFWS, MES, MPA, MDE, EPA, and the Chesapeake Bay Program, as well as others in the port community. An Environmental Working Group was formed to provide guidance from an environmental perspective on issues such as project design and operation, habitat development, and monitoring of existing conditions and environmental impacts. The Working Group was comprised of representatives of natural resource management agencies, rather than commercial port community organizations.

Regular Working Group meetings were held throughout the feasibility study. In addition to the full Working Group, smaller sub-groups also met as needed to explore specific issues, such as development of a post-construction monitoring plan, or to provide guidance on habitat development.

9.4.1 Official Support

In addition to the regular coordination with and participation by agencies, organizations, and the public, government officials have strongly supported the project. On 14 April 1994, the Maryland Congressional delegation wrote to President Clinton seeking assistance in implementing beneficial-use projects, including the Poplar Island restoration project. The President responded on 13 June 1994, with support for the use of the Section 204 program. On 14 July 1994, Maryland Senator Paul S. Sarbanes wrote the Assistant Secretary of the Army for Civil Works (ASA[CW]) requesting his assistance in implementation of a project at Poplar Island. A letter on 10 May 1995 from Senator Sarbanes to ASA(CW) again requested support. On 7 September 1995, Senator Sarbanes and Senator Barbara A. Mikulski wrote the President, specifically requesting assistance in acquiring project funding. A similar letter was forwarded from Maryland Governor Parris N. Glendening to the President on 15 September 1995. A final letter of official support was sent by Mary Roe

Walkup, Maryland House of Delegates, to the Chief of Planning, Baltimore District, on 6 December 1995. These officials and members of their staffs have been involved in the entire planning process for this project. The Easton, Maryland, District Field Representative for Congressman Wayne T. Gilchrest attended a number of informal coordination meetings and public workshops. Copies of official correspondence are included in Annex C.

9.4.2 Public

The public involved with the Poplar Island study included a diverse group of organizations and individuals, ranging from large government agencies to retired couples living near the Bay. The diversity of participants was expressed by differences in their degrees and types of involvement with the project as well as differences in their backgrounds and perspectives; however, in general, participants belonged to several identifiable groups. A core group of agency representatives was involved early in the feasibility study and is expected to maintain an active role throughout the life of the project. This group is part of an ongoing collaborative process with the project team. A second group may be considered to be those agencies and organizations, such as local governments and commercial and recreational fishing interests, who are intermittently active in the public involvement program at times when their concerns and interests become issues in the study. A third group was composed of interested citizens who followed the study progress by attending public workshops, keeping informed about the project status, and making comments. Still another group, typically part of any public involvement program, might be defined as individuals who followed news of the project, but did not attend meetings or take an active part in other aspects of the public involvement process, and those individuals who did not take part in public involvement activities or demonstrate interest in the project, but who might, nevertheless, be affected by it.

The intent of the public involvement program was to identify each potential group or participant; to encourage constructive interaction between the group and the project team; to elicit the ideas, issues, and concerns important to each group; and to incorporate those ideas, issues, and concerns into the planning process.

Comments made during the study reflected a wide range of values, issues, and concerns including broad environmental issues, technical construction questions, and personal feelings about the island and the proposed project. Public perceptions expressed during the scoping process included an appreciation of the fishery and recreation resources, and the aesthetics and history of the island. Other comments during the study focused on the construction of the project: the cost, stability, potential for pollution, and impacts to fisheries. In general, the public expressed strong support for a project that protected the mainland and Poplar Harbor, created wildlife habitat, provided recreation and commercial fishing benefits, and maintained the island as a nature preserve with limited access.

9.4.3 Agency Coordination and Support

Strong and consistent agency coordination and support was a hallmark of the Poplar Island project. Agency participation was important in developing early conceptual plans for the island restoration and agencies will continue to play an active role through the feasibility study, project design, and implementation process. Agency coordination activities ranged from formal written communication among agencies to assistance with presentations and participation at public meetings and workshops. Formal communications included correspondence with the SHPO for cultural resources; with state and Federal agencies for monitoring concerns; with MDE for water quality issues; with USFWS and NMFS for threatened and endangered species; with DNR, NBS, NMFS, and USFWS for information on biological resources; and with the EPA for NEPA compliance. The involvement of a number of sponsors, contractors, and agencies in the collaborative approach to development of the project required sharing coordination letters and other communications as appropriate. For this reason, letters were often sent to one participant and forwarded to others. Extensive informal coordination also took place as natural resource management agencies participated in Environmental Working Group meetings, as questions were raised and answered during phone conversations, and in impromptu discussions as working group members met during normal work activities.

In addition to formal and informal coordination correspondence, review and comment activities, and other communication, a number of formal letters expressing agency support for the project were received by the Baltimore District. Copies of the support and comment letters as well as pertinent memoranda are included in Annex C. Following is a summary of key agency and official correspondence and the response or resolution of any issues raised.

<u>16 September 1994</u>	Letter from EPA to MES regarding NEPA compliance for Poplar Island Habitat Restoration Project.
Response/Action:	Based on considerations including those outlined in the letter from EPA, a decision was made to prepare an EIS for the project.
<u>21 October 1994</u>	Letter from Paul Slunt at MDE to USACE regarding scope of work for environmental sampling to be documented for the study.
Response/Action:	In response to this and a number of similar comments, a monitoring sub-group of the Environmental Working Group that met throughout the feasibility study to define the purposes, methods, and other details of the monitoring program.
<u>25 October 1994</u>	Phone conversation record for call from NMFS to USACE regarding environmental testing/sampling.
Response/Action:	These and similar issues were resolved by the monitoring sub-group.
<u>26 October 1994</u>	Letter from NMFS to MES regarding environmental sampling .
Response/Action:	This and similar issues were resolved by the monitoring sub-group.
<u>27 October 1994</u>	Memorandum from Cece Donovan/MES to Robert Smith/MES commenting on environmental scoping for the project.
Response/Action:	This and similar issues were resolved by the monitoring sub-group.
<u>1 November 1994</u>	Memorandum from DNR to MES regarding reclassification of Natural Oyster Bar 8-10, which is adjacent to the proposed alignment for the restored

	island. The re-classification had been requested by the project team in order to reduce the design constraints on the project development.
Response/Action:	The result of the DNR's determination to not pursue the re-classification of NOB 8-10 was to maintain the original (pre-feasibility) project alignment in that area.
8 November 1994	Letter from NMFS to MES regarding minimum environmental sampling.
Response/Action:	This and similar issues were resolved by the monitoring sub-group.
16 November 1994	Phone conversation record for calls between MES and USACE regarding environmental testing.
Response/Action:	This and similar issues were resolved by the monitoring sub-group.

(The following four letters were prepared by the environmental contractor, EA Engineering, to respond to comments made by various agencies on environmental testing for the project.)

23 November 1994	Letter from EA Engineering to USACE addressing comments on environmental sampling in 21 October letter from Paul Slunt of MDE.
28 November 1994	Letter from EA Engineering to USACE addressing comments in 27 October memo from Cece Donovan on environmental sampling.
5 January 1994	Letter from EA Engineering to USACE addressing comments on environmental sampling in 26 October NMFS letter.
6 January 1994	Letter from EA Engineering to USACE addressing comments on environmental sampling in 8 November letter from NMFS.
18 January 1995	Coordination letter from USACE to Congressional representatives. Identical letters were sent to Senators Barbara Mikulski and Paul S. Sarbanes, and Representatives Benjamin L. Cardin, Robert L. Ehrlich, Wayne T. Gilchrest, and Kweisi Mfume.
18 January 1995	Coordination letter from USACE to natural resource management agencies. Copies of the letter were sent to USFWS, U.S. Coast Guard, CBP, EPA, MDE, DNR, Chesapeake Bay Critical Areas Commission, Maryland Geological Survey, Talbot County Council, Maryland Waterman's Association, Maryland Saltwater Sportfishermen's Association, Chesapeake Audubon Society, Chesapeake Bay Foundation (CBF), NMFS, NOAA, and the Maryland Wetlands Committee.
18 January 1995	Letter from USACE to MPA regarding decision to prepare EIS.

19 January 1995 — Public Notice prepared by USACE and distributed to approximately 200 agencies, organizations, and individuals.

20 January 1995 — Cover letters from MES to NMFS sent with contractor responses to environmental testing comments in NMFS letter of 26 October and 8 November.

3 February 1995 — Letter from National Biological Survey to USACE regarding an offer of technical expertise on water birds at Poplar Island.

Response/Action: Dr. Michael Erwin, migratory bird expert at Patuxent Environmental Science Center and writer of the letter, subsequently became a member of the Environmental Working Group.

6 February 1995 — Memorandum for the Record regarding January 30 meeting with SHPO to discuss the results of the Phase I investigation and define Phase II tasks.

7 February 1995 — Letter from Maryland Historical Trust to USACE regarding cultural resources investigations at Poplar Island.

8 February 1995 — Notice of Intent, appeared in Federal Register.

14 February 1995 — Memorandum from cultural contractor, Goodwin and Associates, to project design contractors providing an update on Phase I and Phase II investigations at the project site.

16 February 1995 — Letter from U.S. Fish and Wildlife Service to environmental contractor responding to request for information on endangered species and fish and wildlife resources in the project area, in accordance with the Endangered Species Act and the Fish and Wildlife Coordination Act.

Response/Action: Information was incorporated into the study document.

17 February 1995 — Letter from Chesapeake Bay Foundation to USACE regarding CBF support for the project.

17 March 1995 — Memorandum for the Record documenting results of meeting among representatives of USACE, MES, MPA, and contractors regarding cultural resources investigations tasks.

5 April 1995 — Letter from NMFS to USACE regarding locations of fisheries in project area.

Response/Action: Information from NMFS as well as information from Tilghman-area watermen was incorporated into the design of the project.

5 April 1995 — Letter from Ms. Nancy Butkowski at DNR to USACE regarding potential spawning areas for horseshoe crabs and terrapins in the project area.

Response/Action: The potential for horseshoe crab habitat in the project area has been noted. Environmental monitoring on Poplar Island did not indicate use for spawning by horseshoe crabs or terrapins; however, some indications of use on Coaches Island were found. It is expected that a wetland plant nursery area approximately 10 acres in size and located between Coaches Island and the eastern dike will provide beaches for use by crabs and terrapins.

21 June 1995 — Letter from contractor (Goodwin and Associates) regarding schedule of cultural investigations in project area.

19 July 1995 — Letter from Mr. Robert L. Miller at Maryland DNR to environmental contractor providing information on threatened and endangered species and critical habitats in the Poplar Island area.

Response/Action: Information was included in study document.

27 July 1995 — Letter from MES to Maryland Watermen's Association regarding coordination with watermen on support for project. Although the project was strongly supported by watermen in general, informal meetings with Tilghman-area watermen had identified the loss of fishing areas as an important negative impact.

Response/Action: Members of the project team met with the Tidal Fish Commission on 15 August to request that the Commission recommend opening fishery areas that were currently closed to replace those lost to the project. The Commission agreed to make the recommendation to the DNR, with the caveat that watermen respect the marked boundaries.

8 August 1995 — Letter from NOAA to environmental contractor providing information on endangered species and fishery and habitat resources.

Response/Action: Information was incorporated into the study document.

23 August 1995 — Letter from USFWS to environmental contractor responding to a request for information on natural resources within the project area, in accordance with the Endangered Species Act, the Fish and Wildlife Coordination Act, and the Migratory Bird Treaty Act.

Response/Action: Information was incorporated into the study document.

1 September 1995 — Memorandum from MES to Members of Environmental working group requesting agency concurrence on monitoring plan.

7 September 1995 — Letter from Senators Mikulski and Sarbanes to President Clinton supporting the project and urging the President to make Poplar Island a national priority.

14 September 1995 — Letter from NMFS to MES regarding comments on the draft Habitat Development Report for the project.

Response/Action: These and similar comments were discussed at Environmental Working Group and habitat sub-group meetings and incorporated into the project design as appropriate.

15 September 1995	Letter from Governor Glendening to President Clinton supporting the project and urging Federal funding support.
25 September 1995	Executive Summary Letter from contractor (Goodwin and Associates) to Joint Venture discussing findings at Poplar Island.
3 October 1995	Letter from Maryland Historical Trust to USACE with discussion of draft Phase I Terrestrial and Marine Archeological Surveys for the project and Phase II Investigation for several sites.
27 November 1995	Letter from MES to USACE providing phone conversation notes from discussion between Cece Donovan and EPA Region III reviewers.
Response/Action:	Representatives of EPA resumed attendance at working group meetings; in addition, several discussions and meetings were held among USACE, CBP, EPA, and other project team members to clarify and resolve issues.
5December 1995	Letter of support from commercial marina at Knapp's Narrows, at Tilghman, Maryland.
6 December 1995	Letter of support for project from Mary Roe Walkup, Maryland House of Delegates.
12 December 1995	Letter from U.S. Department of the Interior requesting an extension of the draft report review and comment period to February 9, 1996.
Response/Action:	The review and comment period was extended.
14 December 1995	Letter of support for project from U.S Fish and Wildlife Service.
18 December 1995	Letter of support for project from National Biological Service/Patuxent Environmental Science Center.
21 December 1995	Letter of support from Maryland Department of the Environment.
28 December 1995	Letter from Maryland DNR to Baltimore District providing agency comments.
Response/Action:	Comments were incorporated into the final document and addressed in a reply letter.
3 January 1996	Agency comments received from Maryland Department of the Environment.
Response/Action:	Comments were addressed in working group meeting, in personal conversation, in final document, and in letter reply to agency.
3 January 1996	Letter of support from Maryland Department of Natural Resources.
16 January 1996	Letter of support from the Alliance for the Chesapeake Bay.

17 January 1996	Letter from EPA requesting an extension of comment and review period to 2 February.
Response/Action:	Review and comment period was extended; EPA draft comments were discussed at meeting among representatives of Corps, MPA, MES, FWS, and EPA on 25 January 1996.
18 January 1996	Agency comments received from Maryland Geological Survey.
Response/Action:	Comments were addressed in final document and in reply letter.
22 January 1996	Letter from NOAA/NMFS providing agency comments on draft document.
Response/Action:	Comments were addressed in final study document and in a reply letter.
23 January 1996	Letter of agency support for project from National Oceanic and Atmospheric Administration.
26 January 1996	Letter from the Maryland DNR to Baltimore District providing additional agency comments.
Response/Action:	Comments were addressed in final study document and in reply letter.
30 January 1996	Letter from U.S. Department of the Interior to Baltimore District providing FWS comments in accordance with Section 2(b) of the Fish and Wildlife Coordination Act and Section 7 of the Endangered Species Act.
Response/Action:	Comments were addressed in personal communication, in the final study document, and in a reply letter.
30 January 1996	Letter from the Maryland Oyster Recovery Partnership suggesting intertidal oyster reef development at the Poplar Island project.
Response/Action:	Comment will be discussed by the Environmental Working Group and addressed in Habitat Restoration Plan.
31 January 1996	Letter from the Maryland Department of the Environment to the Baltimore District stating that the project will comply with the Department's air quality regulations.
1 February 1996	Letter from Maryland Department of the Environment in support of the project and stating that the project is consistent with the State's Coastal Zone Management Program.
2 February 1996	Letter from EPA Region III providing comments on the draft EIS.
Response/Action:	Draft comments were discussed during a 25 January 1996 meeting with the EPA, Corps, MES, and environmental contractor; in a reply letter; and incorporated into the final document.

9.5 Chronology of Activities

January - February 1995

A draft Public Involvement program was developed and presented to the MPA, MES, and contractors early in the feasibility study. The draft program outlined the program purposes, stages, activities, and specific tasks; a draft schedule of activities; and the products desired from each task or activity. Initial public involvement activities included preparation of an agency coordination letter, a Congressional coordination letter, a Public Notice, and a Notice of Intent. In addition, news releases were provided to newspapers in the project area and flyers announcing the first public workshop were sent to addresses on the mailing list.

Although informal meetings were held throughout the feasibility study, a number of meetings were concentrated in the weeks prior to the first public workshop in February 1995. The purpose of these informal meetings was to initiate contacts early in the public involvement process with groups or organizations having a clear interest in the study.

21 and 23 February 1995

The first public workshops/scoping meetings were held on 21 and 23 February 1995. Two public scoping meetings were held in order to provide identical information to the interested publics on both sides of the Bay. Meeting presentations introduced the public involvement process and described the potential project.

12 April 1995

During Stage 2 of the public involvement program, the second public workshop/information meeting was held to present and discuss the development of alternative plans. Several weeks prior to the meeting date, news releases, newspaper advertisements, and flyers announced the meeting.

23 August 1995

The project plan selected by the project team and the Environmental Working Group was presented at the Stage 3 public information meeting. Several weeks before the meeting, advertisements, news releases, and mailed flyers invited the public to attend.

29 November 1995

A fourth and final public meeting was held during the public review period. The meeting format was a formal public hearing in compliance with NEPA requirements. The draft feasibility study and EIS were presented at the hearing. The recommended plan was presented and meeting attendees invited to discuss the information provided, ask questions, and comment on any and all aspects of the project. The small number of meeting attendees appeared to be familiar with and supportive of the project. In general, questions and comments following the presentation requested clarification or expansion of the information presented. Statements made at the hearing, as well as comments received during the EIS public review period, have been incorporated into the study documents.

After study completion, additional public involvement activities may include final news releases or other public information opportunities, as appropriate.

9.6 Public Involvement Activities and Results

A draft Public Involvement Program was outlined early in the feasibility study. The draft program included general descriptions of public involvement activities, such as "informal meetings with interest groups," rather than identification of specific groups or tasks. As appropriate groups and tasks were identified, the program was modified to include specific information. A Public Involvement Program outline and schedule is included in Annex C.

The public involvement activities were designed to introduce the project and the project team to the general public and interest groups, and to facilitate coordination with agencies; to elicit ideas, comments, and concerns that could be used to help shape the planning process; and to inform the public of the project status on a regular basis.

9.6.1 Informal Meetings

The earliest interaction between the project team and the public took place during informal meetings that were held with several interest groups. These meetings provided an opportunity to present the potential project to groups with particular interests in the project or project area. Informal meetings were held with the Maryland Charterboat Captains (7 February 1995), Talbot County Council (14 February and 13 June 1995), the Chesapeake Bay Alliance Critical Areas Commission (1 March 1995), and the Governor's Tidal Fish Commission Advisory Board (15 August 1995). Initial contact with a group of Eastern Shore watermen was made during the first public workshop/scoping meeting. Subsequent meetings with several Tilghman Island watermen were held during March and April. Meetings with the Tilghman-area watermen provided an opportunity to discuss the potential impacts of the project on the area fishery and on the watermen who fish there.

9.6.2 Scoping Meetings

The purposes of the first public workshop or scoping meeting were to introduce the project to the public; to begin preparing the public and the project team for further interaction; to identify the values, issues, and concerns of the interested public regarding the proposed project; and to identify potential environmental impacts. After a presentation on the pre-feasibility plan and the project status, scoping meeting attendees were asked to identify the good and bad things about Poplar Island as it exists and about the potential project, and to describe their ideas of a "perfect" Poplar Island. The responses of individuals on those topics produced a range of ideas and concerns from the loss of an important fishery to the possibility that the dike design as presented was inadequate to protect the restored island from storm damage. An informal poll identified the issues most important to the attendees and helped prioritize the issues. Issues identified as most important to the scoping meeting attendees included erosion causes and protection, impacts to the fishery, wildlife habitat, the project cost, and construction considerations. An open discussion period, allowing many of the comments and issues to be explored by the group, followed. Each of the ideas and comments was incorporated into the project, either through discussion with the project team, modification of the project design, or inclusion in the environmental documentation. A list of the comments made at the public workshops and on comment cards is in Annex C.

The original public involvement plan proposed that two meetings, identical in format and information presented, would be held at each stage of the public involvement process. The intent was to provide the same information to the publics located on each side of the Bay. Based on that plan, two scoping workshops were held, one at Tilghman Island on 21 February and the other at Chesapeake Beach on 23 February 1995. However, low attendance at the Chesapeake Beach scoping meeting, as well as low attendance at the second public information meeting held in April at the Chesapeake Beach location, led to the discontinuance of meetings on the western shore.

9.6.3 Public Information Meetings

As part of Stage 2 (Development of Alternative Plans) and Stage 3 (Development of Detailed Plans) public involvement activities, public information workshops were held at Tilghman Elementary School on 12 April and 23 August 1995. The 12 April meeting presented several alternative designs for public review and comment. Information/comments received at the meeting were integrated into the selection of the alternative project design which was then further developed by the project team. The selected and refined plan alternative was later presented at the August public information meeting. As part of the iterative review/comment/modify public involvement and design process, comments made at the August public information meeting were also incorporated into the project design.

9.7 Public Hearing

The final public meeting of the public involvement process was a public hearing on 28 November 1995. The meeting was held at the Talbot County Free Library in Easton, Maryland. The location was selected to provide a larger meeting room than that available on Tilghman Island, where earlier meetings were held. The meeting format was a formal public hearing, with an assistant to the District Engineer officiating. Statements made at the hearing were incorporated into the EIS and the planning process as a whole.

9.8 Communication With Public

Communication between the project team and the public was accomplished through informational meetings and handouts, news releases and articles, flyers, comment cards and letters, phone calls, and electronic mail. Attendees at public meetings were encouraged to express their opinions or ask questions at any time during the meeting proper or during the open discussion period, after the meeting in conversations with team members, or through mail or telephone communication. Discussions during public meetings were generally highly interactive and constructive. The project team included appropriate technical staff at public meetings so that relevant topics could be addressed and questions answered promptly. A number of comment cards were returned to the District office; several letters and e-mail messages were also received. Comments and discussions were generally constructive, with the majority supporting the project. Several of the mailed answering questions during meetings, by written communication, or in phone conversations. In addition, comments made at public meetings were provided to and discussed at the monthly project team meetings. Comments, letters, and other communications from the public are included in Annex C.

9.9 Agency Coordination

Extensive agency coordination was a critical element in the completion of the Poplar Island feasibility study. The USFWS and other natural resource management agencies provided early support and guidance for the concept of beneficial use of dredged material to restore the island. The agencies continued to support the project through completion of the pre-feasibility study by the MPA and preparation of the feasibility study by the Corps. Through the Environmental Working Group, the natural resource management agencies played a key role in the design of project alternatives, selection of the recommended project alignment, various project modifications, development of the habitat plan, and preparation of a monitoring framework to identify existing environmental conditions and to monitor the project area during and after construction. The Working Group met on a monthly basis, with additional meetings for sub-groups responsible for areas of particular concern or complexity, such as development of the monitoring framework and review of the habitat development plan. Natural resource agency representatives also participated in the public workshops and meetings as attendees, technical experts, or presenters.

Members of the Working Group included representatives of the USFWS, EPA, NMFS, NOAA, NBS, MDE, MPA, DNR, MES, and the Chesapeake Bay Foundation, as well as representatives from the Corps' Operations and Navigation and Planning offices. Meeting locations were rotated among the Corps' District office and the offices of MES, FWS, DNR, and MPA. In some cases, one agency was represented by several individuals, each providing technical expertise in a different area. For example, group members from NMFS/NOAA included scientists and technical experts from the Beaufort, South Carolina, office, from the Research Facility at Oxford, Maryland, and from the Silver Spring and Annapolis offices. The resulting depth of technical expertise on the Environmental Working Group provided a sound scientific basis for island construction, environmental monitoring, and habitat design decisions.

9.10 Press Coverage

Articles on the Poplar Island restoration have appeared in various publications for many years. The island's long history of human habitation, its importance to waterfowl, and its attractiveness to recreationists have been a focus of public interest. In addition, the steady erosion, fragmentation, and virtual disappearance of the island has created recent flurries of interest in the press. Two articles, presenting opposing arguments in the debate about restoring the island, appeared as early as 1971 in *Smithsonian* magazine. More recently, articles about the proposed project have appeared in daily papers on the Eastern Shore, in Baltimore, and in Washington D.C. Regional papers and other periodicals such as the *Chesapeake Bay Program* and the *Maryland Waterman's Gazette* have also carried stories about the project. Copies of a number of articles are in Annex C.

9.11 Summary

Poplar Island has been in the public eye for many years, and the idea of restoring the island has been discussed by various agencies and interest groups. Over the past decade, a concept evolved to beneficially use clean material dredged from Chesapeake Bay navigation channels to restore the island for wildlife habitat. A number of natural resource management agencies, as well as the port community have supported this concept. A 1994 pre-feasibility study based on this concept was prepared by MPA. The Corps became a project sponsor in 1994 and began preparing this Poplar Island Feasibility Study and EIS.

As part of the EIS, and in compliance with NEPA requirements, a public involvement and agency coordination plan were developed for the project. The purpose of these activities was to provide information to the public and to decision-makers. The project has been and will continue to be extensively coordinated with concerned Federal, state, regional, and local agencies. The focus of environmental coordination is to ensure that environmental factors are considered along with economic and engineering factors. Representatives from the Corps, EPA, NMFS, USFWS, NBS, DNR, MDE, MPA, MES and the Chesapeake Bay Foundation have worked together to plan the restoration of Poplar Island. Development of the plans for construction of the perimeter dikes, placement of the material, development of wildlife habitat, monitoring of the project, and management of the completed project was and will continue to be a collaborative effort among these groups, with environmental benefits as a primary goal.

In accordance with Corps policy and guidance, a comprehensive public involvement and agency coordination program was developed for the Poplar Island Project. Interested and affected individuals, groups, and agencies were provided opportunities to participate in the process of developing the proposed island restoration plan. Informal meetings with special interest groups (including several meetings to discuss fishery impacts with Tilghman-area watermen), public workshops and informational meetings, flyers, newspaper advertisements, news releases, and articles were used to provide information about the project. During each stage of the public information and agency coordination process, information was presented to the public and to agencies, review and comments were requested, and the feedback received was incorporated into the study.

Section 10

Summary and Conclusions

10.1 Overview

Poplar Island, formerly a 1,000-acre single island in 1847, has nearly disappeared due to increasing natural erosion. Only four small remnants (totaling 5 acres) and Coaches Island (totaling 74 acres) currently exist. A concept to reconstruct Poplar Island using clean dredged material from the Baltimore Harbor and Channels Federal navigation project has been developed through the cooperative efforts of many state and Federal agencies, as well as private organizations.

There is an opportunity to beneficially use clean dredged material derived from maintenance dredging activities to restore habitat in the mid-Chesapeake Bay. In the last 150 years, it has been estimated that 10,500 acres have been lost in the middle eastern portion of Chesapeake Bay alone. These losses have occurred as a result of erosion due to land subsidence, rising sea level, and wave action. The group of islands known as Poplar Island is currently eroding at the rapid rate of more than 13 feet per year. If the present rate of land loss continues unabated, the island will probably disappear by the turn of the century.

If the islands disappear, so, too, will the nesting snowy egrets, common egrets, cattle egrets, terns, cormorants, great blue herons, little blue herons, green herons, black ducks, and the endangered bald eagle that the islands currently support, as well as the aquatic habitat in Poplar Harbor. In addition, the continued erosion of the islands will continue to contribute to the Chesapeake Bay sediment loadings and will have a negative impact on the water clarity in the immediate vicinity of the islands. This will result in a continuation of the persistent turbidity that is currently present.

The USACE is responsible for operating and maintaining the 126 miles of Federal navigation channels that serve the Port of Baltimore. These channels are maintained through periodic dredging, with the material removed being placed in dredged material placement sites. The MPA is generally responsible for obtaining the rights for all lands, easements, rights-of-way, and relocations necessary for the development of placement sites, as well as for providing placement areas for the materials dredged from the navigation channels.

Since 1984, the HMI Containment Facility, constructed by the MPA, has been used for the placement of dredged material from the Port of Baltimore and certain reaches of the Baltimore/Chesapeake Bay Navigation Channels. Since its completion, approximately 62 million cubic yards of dredged material have been placed there. Originally, HMI was designed as a placement area for contaminated dredged material and material for the

Baltimore Harbor 50-foot project and was estimated to have an operational life of 15 years. However, demands for placement areas and funding constraints, especially in the Baltimore Harbor 50-foot channel deepening and widening project, caused it to be filled in less time with additional clean and contaminated material. As a result, the site is expected to reach its capacity, be capped with clean material, and be unavailable for use by the year 1998.

The Port of Baltimore is rapidly reaching a point where available placement area capacity will be insufficient to meet the port's dredging needs. Current projections indicate that without additional dredged material placement sites, existing capacity would prohibit necessary maintenance and modification of the Baltimore Harbor and Channels Federal navigation project.

A disruption in the constant maintenance that is required to keep the Port of Baltimore operational would result in significant adverse effects to both the local and the national economies. The Port handles approximately 40 million tons of cargo annually and 350,000 containers of cargo that move between the Dundalk Marine and Seagirt Terminals, and South Locust Point. Currently the Port generates 87,000 jobs, an estimated 45,000 of which are held by Maryland residents. A total of 18,000 are direct jobs; 6,600 are induced jobs, meaning that they support local purchases made by direct jobs; and 62,500 are jobs indirectly related to activities at the Port. Revenue impact from the Port results in earnings of $1.3 billion for firms in the maritime sector, contributes nearly $3 billion in business, and represents one-tenth of Maryland's gross state product.

The Poplar Island restoration project represents a cost-effective and environmentally beneficial solution to the dredged material placement problems facing the MPA. The Poplar Island project supports the objectives of the North American Waterfowl Management Plan relating to increasing habitats for emphasis species of migratory waterfowl such as black ducks, and is in full compliance with all applicable environmental protection statutes and executive orders. In addition, it is supported by all of the various state, Federal, and local natural resource management agencies.

10.2 Study Findings

As part of the Poplar Island Restoration Study, a coastal engineering assessment was made, hydrographic and topographic surveys were performed, and geotechnical and archeological investigations were conducted. Based on the results of these analyses and on input received from the various natural resource agencies and publics, a recommended plan was developed for reconstructing Poplar Island.

The recommended plan would create a 1,110-acre dredged material placement area around the island's 1847 footprint, within a 35,000-foot perimeter. This area would then be filled with clean dredged material and developed into low and high marsh wetlands and upland habitat. The projected site capacity associated with the recommended plan is 38 million cubic yards, which is expected to be placed over a period of 24 years. The site would consist of 50 percent tidal wetlands, of which 80 percent would be low marsh and 20 percent would be high marsh, and 50 percent uplands up to +20 feet MLLW. A dike would surround the entire area but would not tie directly into Coaches Island. Along the dike alignment adjacent to Coaches Island, a sand dune configuration is currently proposed that would allow for a small tideway to remain open between Coaches Island and the Poplar Island restoration area. This will protect ownership rights of both Coaches Island and the proposed restored island.

The recommended design for the western perimeter dike consists of a sand dike with 3H:1V exterior slopes protected with 1.5 to 2.0 ton armor stone up to elevation 11.5, an overbuilt interior section with 5H:1V slopes, and an unarmored dike section from elevation 11.5 up to 23.0 MLLW constructed with sand at a later date. Those interior dikes providing containment for the upland cells would also consist of a sand dike to approximately elevation 10 or 11 MLLW with an overbuilt interior slope, and would also be raised to elevation 23.0 using sand from an outside borrow source under later contract. The armored eastern dike would have a 3H:1V exterior slope with 250-pound armor, and a crest elevation of 8 feet MLLW. The eastern dike would not have to be raised since it contains the wetland cells. An unarmored reach of the eastern dike which parallels Coaches Island would have 5H:1V slopes and a crest elevation of 8.0.

No significant negative impacts will occur to the region's economic, cultural, recreational, or social resources will result from the implementation of the recommended plan. Cumulative negative effects of the dredged material placement and Poplar Island restoration are minimal. Some local effects associated with loss of present bottoms and open waters can be expected, but such habitats are relatively extensive in the region, and the project will have few significant impacts. Cumulative positive effects and overall benefits to the Chesapeake Bay economic and ecological systems are great and long-lasting. Major economic benefits are associated with the provision of maintained channel access to the Port of Baltimore. Cumulative environmental benefits of the restoration will accrue throughout the central Chesapeake Bay area and the mid-Atlantic region. High quality, island-based wetland and upland habitat will support commercially and recreationally valuable finfish and shellfish; birds and wildlife; and rare, threatened, and endangered species. Water quality will improve as present erosion is eliminated, and the reconstructed island will provide erosion protection for adjacent islands in the group.

The total cost of the project and dredging of the channels is estimated to be $458.4 million. Under Section 204 of the WRDA of 1992, the incremental costs, defined as the project costs above the base plan, are cost-shared 75 percent Federal, 25 percent non-Federal. The base plan for this project has been determined to be the Deep Trough since it would accomplish the placement of dredged material in the least costly manner that is consistent with sound engineering practice and that meets all Federal environmental standards. The cost of transporting and placing maintenance dredged material in the Deep Trough is $151.2 million. Consequently, the project cost is estimated to be $307 million.

10.3 Views of the Sponsor

The MPA fully supports the findings of this feasibility study and the recommended plan. They have been fully involved in every facet of the feasibility study and have been proactive in maintaining the study schedule. Their participation has included the following: (1) spending approximately $2.5 million to retain the services of a contractor to expedite the conduct of the feasibility study, (2) providing technical and financial information, (3) attending all study team meetings, (4) arranging workshops, (5) coordinating with the various natural resource management agencies, and (6) reviewing preliminary findings.

The MPA is aware of the items required for local cooperation, including (1) provision of LERR, (2) approval of the feasibility report and provision of a letter of intent, (3) requirements for non-Federal funding, and (4) negotiation and execution of the PCA.

The MPA has demonstrated a commitment to both the outcome of the study and project implementation.

Section 11

Recommendation

In conducting this feasibility study, I have investigated the possibility of beneficially using clean dredged material from the Baltimore Harbor and Channels Federal navigation project to restore aquatic and ecologically related habitat at Poplar Island, Maryland. This investigation has been conducted under the authority of Section 204 of the WRDA of 1992, as amended, which allows USACE to protect, restore, and create aquatic and ecologically related habitat. The State of Maryland (MPA) has been identified as the non-Federal sponsor and has indicated its intent to share the costs of project implementation. To date, the MPA has spent approximately \$2.5 million to retain the services of a contractor to expedite the conduct of the feasibility study.

As part of this feasibility study, I have given consideration to the relevant aspects of public interest, including environmental, social, economic, and engineering concerns. There exists a critical shortage of dredged material placement sites in the upper Chesapeake Bay. The Port of Baltimore is rapidly reaching a point where available placement area capacity will be insufficient to meet the port's dredging needs. A lack of placement capacity would prohibit necessary maintenance and modification of the Baltimore Harbor and Channels Federal navigation project, which will have an adverse impact on the local and national economy. The project proposed herein represents a cost-effective plan for providing adequate placement capacity for clean dredged material for 24 years, while also improving nationally and locally significant environmental resources. No significant negative impacts would occur to the region's economic, cultural, recreational, or social resources.

On the basis of these evaluations, and with the support of the various resource agencies, I recommend that 35,000 feet of containment dikes be constructed around the historic footprint of Poplar Island and then filled with approximately 38 million cubic yards of clean dredged material from the Baltimore Harbor and Channels Federal navigation project to create a 1,110-acre dredged material placement area. The placement site would consist of approximately 555 acres of upland habitat at an elevation up to +20 feet MLLW and 555 acres of wetland habitat that would be further divided into approximately 444 acres of low marsh and 111 acres of high marsh. The cost of implementing this project is currently estimated to be \$307 million and will be shared 75 percent Federal (\$230.2 million) and 25 percent non-Federal (\$76.8 million).

The recommendations contained herein reflect the policies governing formulation of individual projects and the information available at this time. They do not necessarily reflect program and budgeting priorities inherent in local and state programs, or the formulation of a national Civil Works water resources program. Consequently, the recommendations may be modified at higher levels within the executive branch before they are used to support funding.

Randall R. Inouye

RANDALL R. INOUYE, P.E.
Colonel, Corps of Engineers
Commander and District Engineer

ANNEX A

404(b)(1) EVALUATION

Annex A

CLEAN WATER ACT
SECTION 404(b)(1) EVALUATION

POPLAR ISLAND RESTORATION PROJECT
CHESAPEAKE BAY & TALBOT COUNTY, MARYLAND

21 February 1996

I. PROJECT DESCRIPTION

a. Location - Poplar Island, Talbot County, Maryland and Chesapeake Bay, Maryland.

b. General Description - The Poplar Island Restoration Project involves constructing armored dikes, breakwaters, and/or other structures approximating the island's 1847 footprint and filling the enclosed area with clean dredged material from Federal navigation channels in Chesapeake Bay. The 1,110 acre fill area will be subdivided to provide approximately 50% tidal wetland habitats and 50% upland island habitats. An access channel is required. A more detailed description of the project is given in the *Poplar Island, Maryland Environmental Restoration Project Draft Feasibility Report and Environmental Impact Statement,* to which this evaluation is appended.

c. Purpose - The purpose of the proposed project is to recreate and restore important regional habitat that has be lost through erosion of islands in the Chesapeake Bay and, at the same time, to provide for a truly beneficial use of sediments that must be dredged from Bay channels.

d. General Description of Dredged Material - The sediment to construct the dikes will be excavated from borrow areas on the project site and/or dredged from the proposed access channel. These sediments are expected to consist of fine sand with some silt and clay lenses, and due to its geomorphilogical position, to contain lower levels of anthropogenic contaminants than typical surface sediments in the Chesapeake Bay. The sediment to construct the proposed wetland and upland habitat area at Poplar Island will be dredged from the following Federal navigation channels or channel reaches in the Chesapeake Bay leading to Baltimore Harbor: the Craighill Entrance Channel; the Craighill Channel; the Craighill Angle, the Craighill Upper Range; the Cutoff Angle; the Brewerton Channel Eastern Extension; the Tolchester Channel; and the Swan Point Channel. Most project sediments will be excavated during periodic episodes of maintenance dredging. Accordingly, the fill sediment is expected to consist of relatively low cohesion silts and clays with some fine sands. Because the channels are removed from known point sources, anthropogenic contaminant concentrations are likely to be consistent with background levels in the Chesapeake Bay sediments.

e. Description of the Proposed Discharge Sites - The Poplar Island Project site is a rapidly eroding archipelago of islands located in the Chesapeake Bay at latitude 38° 46' N, and longitude 76° 23' W. The closest point of mainland is the Eastern Shore of Maryland just north of Tilghman Island, approximately 2 mile east of the site. The proposed containment dikes will enclose approximately 1110 acres of shallow water habitat, including the four smallest remnants of the archipelago (less than 5 acres total) and will abut, but not tie directly into the largest island of the archipelago, Coaches Island. (See the attached figure.)

f. Description of Discharge Method - It is expected that fine grained sand to be used in constructing the proposed dikes will be dredged hydraulically and pumped to the dike alignment. Some mechanical shaping of the sand will be required before armor stone can be placed on the exterior slopes. Some small amount of fine grained sediment unsuitable for dike construction may be sidecast near the borrow site within the proposed dike alignment. The material from the Federal channels will most likely be dredged mechanically and placed in barges. The barges will be towed or pushed to the proposed placement sites where the sediments will be pumped into the containment cells. The dredged material will be allowed to settle and consolidate. Supernatant water will be returned to the Bay through weirs or similar control structures in the eastern perimeter dike.

II. FACTUAL DETERMINATIONS

a. Physical Substrate Determinations

(1) Substrate Elevation and Slope - Elevations along the proposed eastern perimeter dike near Poplar Harbor are -1.5 and -3.5 ft. MLLW. Elevations along the proposed western perimeter dike are between -5 and -10 ft. MLLW. The average depth of water within the project area is approximately 7 ft. Water depth in the archipelago is 1 to 2 ft. in waters between or adjacent to the islets and increases very gradually to 6 to 8 ft. over a distance of approximately 4,000 ft. to the south, west, and east.

(2) Sediment Type - The sediments at the Poplar Island site are typical of lowland

sedimentary deposits and consist of gravel, sand, silt, and clay. The sediment to be used to construct the containment dikes is fine grained sand with some silt and clay lenses. The dredged materials proposed for filling the site are likely to be silt, with some clay and some fine sand.

(3) Discharge Material Movement - The fine grained sand used to construct the containment dikes will be placed and shaped to avoid unnecessary loss of materials. When completed, the containment dikes will control movement of the dredged material placed in the site.

(4) Physical Effects on Benthos - Benthos in the alignment of the containment dike will be buried during construction. Benthos in the containment cells will be buried with dredged material as the cells are filled. Benthos are expected to recolonize the wetland cells and may, over time, achieve higher densities in wetland cells and in the recreated Poplar Harbor. The long term, overall impact on regional benthic populations is not expected to be significant.

(5) Other Effects - Not applicable.

(6) Actions Taken to Minimize Impacts - Dredged material transported to the site will be contained within the armored dikes.

b. Water Circulation, Fluctuation, and Salinity Determinations

(1) Water - Temporary changes are expected in clarity, color, and quality of Bay waters in the immediate vicinity of the proposed construction. Because construction is expected to virtually end erosion of the remnant islands and resuspension of sediments in the vicinity of the project, clarity, color, and quality of nearby waters should improve somewhat after construction. Temporary, localized changes in clarity, color, and quality of Bay waters are also expected to accompany the periodic maintenance dredging episodes.

Supernatant water released from the placement site should not affect the clarity or color of nearby waters in Poplar Harbor or in the Chesapeake Bay.

(a) Salinity - No change is expected.

(b) Chemistry - Very slight and temporary changes are possible in the immediate vicinity of the dredging operations. Very slight and temporary changes are possible in the immediate vicinity of sand placement activities necessary for dike construction. Minor and temporary changes are possible within the allowed mixing zone[1] at the placement site. No change is expected outside the allowed mixing zone.

(c) Clarity - Minor and temporary changes are possible in the immediate vicinity of the dredging operations and near the area of sand placement during dike construction. Long term water clarity in the vicinity of the project should increase upon completion of the containment dikes. Minor and temporary changes are possible within the allowed mixing zone at the placement site during and after filling. These temporary changes should be offset by increased water clarity in Poplar Harbor resulting from construction. No change is expected outside the allowed mixing zone resulting from filling activities.

(d) Color - Minor and temporary changes are possible in the immediate vicinity of the dredging operations and near the area of sand placement during dike construction. Very minor and temporary changes are possible within the allowed mixing zone at the placement site during and after filling. No change is expected outside the allowed mixing zone resulting from filling activities.

(e) Odor - No change expected.

(f) Taste - Not applicable.

(g) Dissolved Gas Levels - Temporary changes (increase and/or decrease of dissolved oxygen) may occur in the immediate vicinity of the dredging operations and in the immediate vicinity of dike construction operations. No change is expected outside the site during and after placement of the dredged material.

(h) Nutrients - Temporary (24 to 72 hour) localized increases are expected at the dredging site and at the construction site due to resuspension of sediment during dredging operations. A slight and also temporary increase in nutrients may occur at placement site outfalls. Neither increase is likely to cause an increase in algal blooms.

(i) Eutrophication - Not expected to occur.

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1 The actual mixing zone for the site can only be determined after completing placement site design. Needed information includes the number and type of discharge control structures, exact location of proposed discharge structures, the size (capacity) of containment cells, and the maximum rate of dredged material placement.

(j) Others as Appropriate - None.

(2) Current Patterns and Circulation -

(a) Current Patterns and Flow - Vectors illustrating the direction and relative velocity of tidal currents in the vicinity of the Poplar Island archipelago are given in Figures 3-5 and 3-7 of the *Poplar Island, Maryland Environmental Restoration Project Draft Feasibility Report and Environmental Impact Statement.* Proposed construction is expected to increase and train tidal currents along the toe of the western dike, slightly increase the flow immediately to the east of Coaches Island, and substantially reduce flows through Poplar Harbor. It is also possible that the project may cause very small increase in tidal flow through Knapp's Narrows and a commensurate decrease in sedimentation. All of the aforesaid changes to flow would be consistent with flow patterns in the vicinity of Poplar Island approximately 150 years ago. No far field changes in flow will result from the proposed construction. No effects are expected from the required maintenance dredging of the channels or from the placement of dredged material in the proposed site.

(b) Velocity - See foregoing discussion of flow.

(c) Stratification - No change expected.

(d) Hydrologic Regime - No significant changes are expected.

(3) Normal Water Level Fluctuations - No significant changes are expected.

(4) Salinity Gradients - No changes are expected.

(5) Actions to Minimize Impacts - Not applicable.

c. Suspended Particulate/Turbidity Determinations

(1) Expected Changes in Suspended Particulates and Turbidity Levels in Vicinity of Project Sites - Minor and temporary increase of suspended particulate and turbidity is expected in the immediate vicinity of the dredging operations and in the immediate vicinity of dike construction operations. No change in suspended particulates and turbidity levels is expected outside of allowed mixing zones for dredging or for construction. Suspended sediment and turbidity in the vicinity of the archipelago are likely to be less than current levels after the proposed construction.

During and immediately after dredged material placement episodes, return water and runoff will be closely monitored and controlled to limit discharge of suspended particulates to acceptable levels. No change in suspended particulate concentrations or turbidity is expected outside of the allowed mixing zone.

(2) Effects on Chemical and Physical Properties of the Water Column - Minor and temporary changes are possible in the immediate vicinity of dredging operations, in the immediate vicinity of proposed dike construction, and in the immediate vicinity of return water flow. No changes are expected outside the allowed mixing zones.

(a) Light penetration - A minor, temporary decrease is anticipated in the immediate vicinity of the dredge plant during dredging and in the vicinity of sand placement during construction of the proposed containment dike. The possible decrease in light penetration will be confined to the allowed mixing zones. No changes are expected outside the allowed mixing zones.

(b) Dissolved Oxygen - A minor temporary change is possible in the immediate vicinity of dredging and construction operations. No change is expected outside the allowed mixing zone at the placement site.

(c) Toxic Metals and Organics - Dredging operations and construction operations are not expected to result in the release of any measurable amounts of contaminants into the water column. Dredged materials that are placed in containment cells at elevations above mean high water will be exposed to the atmosphere and weathering. Exposure of sulfitic marine sediments sets off a chemical reaction that tends to lower sediment/soil pH. This reaction and the exposure to rainfall (which also has a low pH) will cause some naturally occurring metals that are bound to the sediment to dissolve into the water[2]. Dissolved metals can be toxic to aquatic organisms, if present in sufficient concentrations, and could constitute a negative impact to the local biota in the immediate vicinity of the discharge of runoff water into Poplar Harbor. To address this concern, upland soil/sediment at the site will be managed and conditioned periodically to maintain the pH near neutral. This will keep the naturally occurring metals bound to the soil/sediment. Water quality at the weirs will also be monitored so incidences of low pH and high metals can be identified and controlled to minimize impact to local water quality. After high marsh and upland soils have been conditioned, amended, and planted, the potential release of metals will abate and the pH of runoff water will increase.

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2 The aforesaid diagenesis has not been observed to result in the release of any contaminants other than metals. Thus, the potential release of any organic compounds is not expected under similar circumstances.

Thus, the potential release of metals from the containment site can be mitigated. No change is expected outside the allowed mixing zone at the placement site.

(d) Pathogens - No change expected.

(e) Aesthetics - Temporary changes during construction might constitute a short-term decrease in aesthetic values. Upon completion of the project aesthetic values are expected to increase above current values.

(f) Others as Appropriate - None applicable.

d. Contaminant Determinations

Fine grained sand used to construct the proposed containment dikes will be taken from the project site itself. The site is far removed from known sources of anthropogenic contamination and there is no logical reason to believe that fine grained sand could contain higher level of contaminants than the surface sediment on which it will be placed. Therefore, the fine grained sand is determined to satisfy the contaminant determination requirements of 40 CFR 230.11.

Similarly, the sediments likely to be dredged from the Federal channels in the Chesapeake Bay leading to Baltimore Harbor are removed from known sources of anthropogenic contaminants. Hence, the placement of the dredged material from the Bay channels at the Poplar Island site cannot be expected to result in a measurable release of contaminants. However, these sediments are distant from the proposed placement site and periodic confirmatory analysis of channel sediment is recommended to allow comparison of anthropogenic contaminant levels in the proposed dredged material and in reference sediment from the placement site. Testing of channel material is underway and will be repeated at intervals not exceeding 3 years during the life of the project. Results of the initial chemical analysis will be sent to the appropriate regulatory agencies, will be available to the public at the USACE Baltimore District Ofiice, and in the future will be available electronically from the EPA's Chesapeake Bay Program database or from the proposed Poplar Island Project "Home Page."

e. Aquatic Ecosystem and Organism Determinations

(1) Effects on Plankton - Temporary and localized suppression of plankton communities is possible in the immediate vicinity of dredging operations and near dike construction activities. Long term effect is expected to be negligible.

(2) Effects on Benthos - Benthos in the immediate vicinity of the borrow site will be displaced and/or entrained with the fine grained sand used for containment dike construction. Benthos in the path of dike construction will be buried. Most of these effects are expected to be temporary. Benthic recolonization of disturbed areas outside the containment dikes should occur within a few months. Benthos within the placement site will be smothered with sediments. This effect is not expected to be significant.

(3) Effects on Nekton - Nekton in the immediate vicinity of the borrow site may be displaced or entrained with the dredged and/or borrow material. Effects are expected to be temporary.

(4) Effects on Food Web - No adverse effects expected.

(5) Effects on Special Aquatic Sites - Limited wetlands can be found on the smaller remnant islands. Without the proposed project or other intervention, these wetlands are expected to completely disappear in a few years. Though the project will create over 550 acres of wetland habitat in the vicinity of the remnant islands, it may hasten the demise of these small wetlands. Hence, short term effects will be local and severe. Long-term effects will be very positive and encompass a larger area.

(6) Threatened and Endangered Species - No threatened or endangered species have been observed to inhabit the project site. Endangered bald eagles (*Haliaeetus leucocephlus*) have been observed on nearby Jefferson Island in 1995, including a nesting pair. Construction of the project will not adversely impact threatened and endangered species and is likely to result in increased habitat for listed species in the long term.

(7) Other Wildlife - No impacts expected. Completed project will increase wildlife habitat.

(8) Actions to Minimize Impacts - The dredged material placed at the upland site will be confined to the diked area and best management practices will be employed to manage the site, to maximize environmental benefits, and to minimize potential adverse impacts.

f. Proposed Placement Site Determinations

(1) Mixing Zone Determinations - The mixing zone for material disturbed and suspended by the proposed activities will be confined to the smallest practicable zone.

(2) Determination of Compliance with Applicable Water Quality Standards - The proposed work will be performed in accordance with all applicable State of Maryland water quality standards.

(3) Potential Effects on Human Use Characteristics

(a) Municipal and Private Water Supply - No effect expected.

(b) Recreational and Commercial Fisheries - Minimal effect on crabbing and soft clam fisheries is expected.

(c) Water Related Recreation - The construction site and the project footprint will be lost to recreational boating. Poplar Harbor, areas near the rock face of the containment dike, and proposed rock berm fields will attract recreational boaters and recreation fishing when the project is completed.

(d) Aesthetics - Short term reduction in aesthetic values is expected during construction.

(e) Parks, National and Historical Monuments, National Seashore, Wilderness Areas, Research Sites, and Similar Preserves - No effects expected.

g. Determination of Cumulative Effects on the Aquatic Ecosystem - No permanent, long term, cumulative adverse effects to the existing aquatic ecosystem are expected as a result of the proposed project. The long term cumulative effect of creating more wetlands using dredged material is beneficial.

h. Determination of Secondary Effects on the Aquatic Ecosystem - No secondary effects are expected.

III. FINDING OF COMPLIANCE

No adaptations of the Section 404(b)(1) Guidelines were made relative to this evaluation.

a. The proposed construction of containment dikes and the subsequent filling of the dikes with dredged material to form wetland and upland habitats has been selected as the result of an alternatives analysis undertaken in accordance with the Guidelines given at 40 CFR 230.10(a). An exhaustive search for dredged material placement sites, including upland sites, is being undertaken in order to meet the dredging needs of the Port of Baltimore into the next century. This site has been identified from this ongoing search. This beneficial project represents the most practical, least environmental impact alternative identified that can accommodate the volume of dredged material needed to maintain navigability of the approach channels to the Port of Baltimore.

Accordingly, the alternatives analysis test is passed.

b. The proposed construction and fill with dredged material is not contrary to other state and Federal laws for the protection of water quality, aquatic species, or habitat; as follows:

(1) The proposed construction, dredging, and placement of dredged material will be in compliance with State water quality standards.

(2) The proposed construction, dredging, and placement of dredged material is not expected to violate the Toxic Effluent Standard of Section 307 of the Clean Water Act.

(3) The proposed project will not negatively affect any endangered species.

(4) No Marine Sanctuaries, as designated in the Marine Protection, Research, and Sanctuaries Act of 1972, are in the project area.

(5) The proposed construction, dredging, and placement of dredged material will not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreation and commercial fishing, plankton, fish, wildlife, and special aquatic sites. The life stages of aquatic life and other wildlife will not be adversely affected. No contaminants will be discharged in toxic concentration in violation of Section 307 of the Clean Water Act.

Thus, the proposed construction, dredging, and placement of dredged material satisfies the requirements test at 40 CFR 230.10(b).

c. Parts I and II of the analysis (preceding) show that the proposed construction, dredging, and placement of the dredged material do not contribute to the degradation of waters of the United States and as such, the proposed project and proposed use of the placement sites does complies with the requirements of 40 CFR 230.10(c).

d. Appropriate steps to minimize potential impacts of the placement of the material in aquatic systems will be followed.

The mandatory sequence of the Section 404(b)(1) Guidelines has been applied in evaluation of the proposed action. The proposed construction, dredging, and placement of the dredged material at Poplar Island is in compliance with the Section 404(b)(1) Guidelines

ANNEX B

ENVIRONMENTAL IMPACT STATEMENT INDEX

POPLAR ISLAND RESTORATION PROJECT, MARYLAND

INTEGRATED DRAFT FEASIBILITY REPORT AND DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS)

ENVIRONMENTAL IMPACT STATEMENT INDEX

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NOTE: * Indicates information required for NEPA compliance.

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ANNEX C

PUBLIC INVOLVEMENT

Annex C

Attachment A	Public Involvement Program Schedule and Outline
Attachment B	Public Notice and Notice of Intent Public Notice - 19 January 1995 Notice of Intent - 8 February 1995
Attachment C	Public Meetings - Agendas, Attendance Lists, Handouts Scoping Meeting, February 1995 Public Information Meeting, April 1995 Public Information Meeting, August 1995 Public Hearing, November 1995
Attachment D	Public Comments
Attachment E	Agency Coordination Coordination Letters from District Letters from Agencies, Other Communications
Attachment F	News Releases, Articles, and Advertisements

Attachment A

Public Involvement Program Schedule and Outline file: prog

POPLAR ISLAND HABITAT RESTORATION

DRAFT PUBLIC INVOLVEMENT PROGRAM

Draft Schedule

1995

STAGE 1

January 3 - October 18	Informal meetings w/interest groups - introduce project/team/public involvement process; begin interaction with public, interest groups, and agencies;
January 18	Agency coordination letters distributed
January 25	Congressional letters distributed
January 26	Public Notice and Agency Coordination Letter - announce project beginning; request comments/issues and POC; (approximately 180 mailed)
February 7	Informal Meeting w/interest group - Md. Charterboat Captains Meeting (Contact: Joe Rupp, Pres.)
February 8	News Release/Newsletter - describe project; request comments/involvement; announce scoping meetings
February 13	Informal Meeting w/interest group - Eastern Shore Watermen Meeting (Contact: Ronald Dizes)
February 14	Informal Meeting w/interest group - Talbot County Council Meeting (Contact: General Anderson)
February 21 & Feb 23	Scoping Meetings/First Public Workshop (Eastern and Western Shores) - describe project/public involvement process; work in nominal groups; brainstorm good/bad/ideas; prioritize values; (format: brief presentation & nominal groups)
March 1	Informal Meeting w/interest group - Chesapeake Bay Critical Areas Commission (Contact: Francis Flanigan)
March 1	Informal Meeting w/interest group - Sportfishing group (Contact: Richard Novotny)

STAGE 2

April 12	Second Public Workshop - project status; discuss alternatives/impacts/trade offs/compromises (format: information stations)

STAGE 3

August 23	Third Public Workshop - discuss, evaluate and rank a limited number of detailed plans (format: presentation and discussion)

STAGE 4

November 28	Fourth Public Workshop - present plan; discuss recommended plan and record comments; (format: public hearing)

DRAFT OUTLINE OF THE POPLAR ISLAND PUBLIC INVOLVEMENT PROGRAM

The purposes of public involvement for the Poplar Island Habitat Restoration Project include the following:

Required by the National Environmental Policy Act (NEPA)
- inform public
- inform decision makers

Method of gathering valuable information

Lack of coordination can result in project implementation difficulties

Good management includes gaining approval for proposed actions

Taxpayers entitled to explanation of tax dollars spent

Public involvement programs must provide opportunities for public participation during each planning stage. Public review of project plans after they are developed does not constitute a meaningful public involvement program. It is understood that public involvement may require informal and sometimes time-consuming dialogue between the planners and the public. The major tasks in a public involvement program may be divided into several stages and generally include the following:

Stage 1 - Project Initiation

The first stage of a public involvement program is exploratory and comprehensive with regard to the identification and definition of public concerns/issues/problems/constraints. During this stage of the public involvement program the actions are directed toward insuring a wide variety of viewpoints so that they can be considered during the planning process. The number of participants in this preliminary stage is limited to those identified by the project team and may not be as great as in later stages.

The initial objectives of a public involvement program tend to be more values-oriented and include obtaining information useful in directing the study (such as identification of problems, issues, objectives and goals, and alternatives to be considered); obtaining information about the political, social, and economic setting of the project area; and preparing the public, agencies, and project team for further interaction.

The target public(s) include both the participating public (agencies and citizens who are directly involved in the project or public involvement program) and the information audience (people who read or hear about the project/program but are not otherwise involved).

The available forums for Stage 1 involvement include small, informal discussion or brainstorming meetings; scoping meetings; project newsletters; questionnaires; and news articles.

The product of the Project Initiation Stage is information.

Stage 2 - Development of Alternative Plans

During Stage 2 the focus of the public involvement program shifts to the formulation and testing of alternative plans as well as making sure that values and problems identified in Stage 1 are adequately addressed in the alternatives developed. A number of alternatives may be presented at the second workshop as "straw men", to be dissected and reconfigured to satisfy the needs of segments of the public. For example, alternative plans may be geared to clammers, recreation boaters, or wildlife habitat. As the number of alternatives is winnowed to a practical number and representative variety, interests are balanced and trade-offs and compromises are negotiated. Problems, issues, and differing perspectives become clearer as alternatives are presented to the public for discussion.

The objective of Stage 2 is to provide opportunities for the interested publics to explore the implications of the alternative plans.

The target publics for involvement in the formulation of alternatives may be broad, with more publics identified as the implications of alternatives are clarified.

Workshops provide an effective forum for Stage 2 activities.

The product of this stage is the formulation of alternative plans.

Stage 3 - Development of Detailed Plans

Stage 3 of the public involvement program provides an opportunity for the assessment, modification and evaluation of alternative plans, leading to one recommended plan. During this stage project planners need to assess the impacts of the alternative plans and provide detailed alternative and impact information to the public. The public provides information on remaining or unresolved issues; on the adequacy of compromises, mitigation, or trade-offs; and on the preferred alternatives.

The objective of Stage 3 is impact assessment and evaluation of alternatives.

Public interest and involvement as well as the potential for conflict may be highest as real plans are examined and real impacts assessed during this stage.

Forums for public involvement during the development of detailed plans include public workshops, questionnaires, and project team contact persons.

The product of Stage 3 is a small number of detailed alternative plans, evaluated and ranked by workshop participants.

Stage 4 - End of the Planning Stage

The objective of this stage is development/selection of a plan that has a minimum of negative impacts and a maximum of positive impacts.

The target public includes both the participating public and the information audience.

The forums for public involvement include public workshops, newsletters, and news articles.

The product is a plan that has strong public/agency support and which can then be put forward as the recommended/proposed plan.

Attachment B

Public Notice and Notice of Intent

US Army Corps
of Engineers
Baltimore District

Public Notice

POPLAR ISLAND RESTORATION PROJECT

TO ALL INTERESTED PARTIES:

The Baltimore District, U. S. Army Corps of Engineers, proposes to restore approximately 1,000 acres of wildlife habitat using dredged material at Poplar Island in Talbot County, Maryland, in the upper Chesapeake Bay (Enclosure 1). Approximately 10 to 40 million cubic yards of material, primarily dredged during maintenance of the southern approach channels to Baltimore Harbor, would be placed behind dikes at the site. After placement, the material would be shaped and planted to create both intertidal wetland and upland wildlife habitat. Poplar Island has been identified by the U. S. Fish and Wildlife Service, the Maryland Department of Natural Resources, and other natural resource management agencies as a valuable nesting and nursery area for many species of wildlife, including bald eagles, osprey, heron, and egret. The project would restore Poplar Island to the approximate size and footprint of the island in 1857. Currently, the name Poplar Island refers to a group of four small remnant islands located adjacent to Jefferson Island and Coaches Island, approximately one mile northwest of Tilghman Island, on the Bay's Eastern Shore.

The project will be constructed under Section 204 of the Water Resources Development Act of 1992, which allows Federal funding for beneficial use of dredged material projects. Expected project benefits include the creation of wetland and upland wildlife habitat, stabilization of the rapidly eroding island remnants, and beneficial use of dredged material from Federal navigation channel maintenance activities. A project pre-feasibility report (similar to a Corps Reconnaissance report) was completed by the Maryland Port Administration (MPA) in 1993.

In compliance with the National Environmental Policy Act (NEPA), the Baltimore District will prepare an Environmental Impact Statement (EIS) for the project, which will include descriptions of the existing site conditions, design alternatives, project impacts, public involvement, and the recommended plan. A comprehensive public involvement program is being developed to coordinate with interest groups, the general public, and other Federal, State, and local agencies. Current project participants include the MPA and both Federal and State natural resource management agencies.

As part of the public involvement process, the Baltimore District is conducting a scoping process to identify issues and areas of concern. Any person who has an interest in the project or who may be adversely affected by the proposed project may make comments or suggestions or request a public hearing. Comments and requests should be submitted within 30 days of the date of this notice to the District Engineer, ATTN: CENAB-PL-EC, U.S. Army Corps of Engineers, Baltimore District, P.O. Box 1715, Baltimore, Maryland 21203-1715.

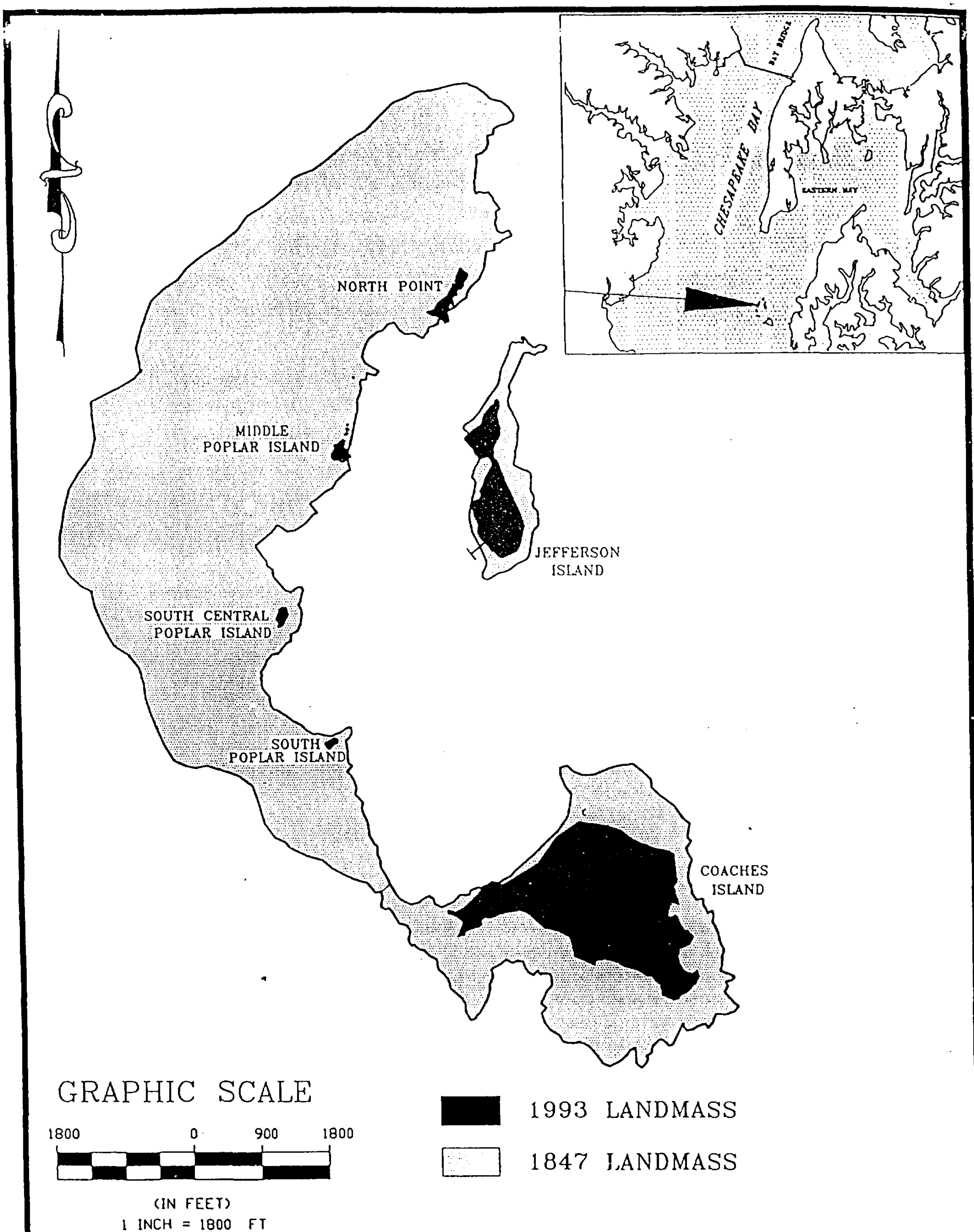
This Public Notice is being sent to organizations and individuals on the enclosed list (Enclosure 2). Please bring this notice to the attention of any other organizations or individuals with an interest in this matter.

FOR THE COMMANDER:

John C. Dering
for DR. JAMES F. JOHNSON
Chief, Planning Division

DATE: JAN 19 1995

Enclosures



ENCLOSURE 1.	POPLAR ISLAND ISLAND COMPARISON 1847–1993

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Post Office Box 1715
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13 Jan 1995

POPLAR ISLAND FEASIBILITY STUDY

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ENCLOSURE 2.

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TIDEWATER ADMINISTRATION, MDDNR
TAWES STATE OFFICE BLDG
ANNAPOLIS, MD 21401-9974
(410) 974-3782

* * * STATE AGENCIES * * *

16079 040 MDDNR G
MR. W. PETER JENSEN
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FISHERIES DIVISION, TIDEWATER ADMINIST.
MARYLAND DEPARTMENT OF NATURAL RESOURCES
TAWES STATE OFFICE BUILDING
ANNAPOLIS, MD 21401
(410) 974-3558

7693 040 MDDNR G
MR. PAUL MASSICOT
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580 TAYLOR AVENUE
TAWES STATE OFFICE BUILDING
ANNAPOLIS, MD 21401
(410) 974-2788

17542 040 MDDNR G
MS. JANET MCKEGG
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MARYLAND DEPARTMENT OF NATURAL RESOURCES
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ANNAPOLIS, MD 21401
(410) 974-2870

15184 040 MDDNR G
MR. ROBERT D. MILLER
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ANNAPOLIS, MD 21401-9974
(410) 974-3846 FAX (301) 974-2618

15308 040 MDDNR G
DR. SARAH TAYLOR
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45 CALVERT STREET
2ND FLOOR
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(410) 974-2418 FAX (410) 974-5338

7711 040 MDDNR G
DR. EMERY T. CLEAVES
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MARYLAND DEPARTMENT OF NATURAL RESOURCES
2300 ST. PAUL STREET, SUITE 440
BALTIMORE, MD 21218
(410) 554-5504 FAX (410) 554-5502

38377 040 MDDNRMGS G
MR. JEFF HALKA
MD DEPARTMENT OF NATURAL RESOURCES
MARYLAND GEOLOGICAL SURVEY
COASTAL & ESTUARINE GEOLOGY
2300 ST. PAUL STREET
BALTIMORE, MD 21218

15571 040 MDDT G
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SECRETARY
MD DEPARTMENT OF TRANSPORTATION
P. O. BOX 8755
BWI AIRPORT, MD 21240-0755
(410) 859-7397

15297 040 MDDTMPA G
MR. MICHAEL P. ANGELOS
EXECUTIVE DIRECTOR
MARYLAND PORT ADMINISTRATION
THE WORLD TRADE CENTER
BALTIMORE, MD 21202-3041
(410) 333-4500 FAX (301) 333-1126

17199 040 MDSHPO G
DR. SUSAN B.M. LANGLEY
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DIVISION OF HISTORICAL & CULTURAL PROGR.
MD DEPT OF HOUSING & COMMUNITY DEVELOP.
100 COMMUNITY PLACE
CROWNSVILLE, MD 21032-2023
(410) 514-7661

15321 040 MDSHPO G
MR. J. RODNEY LITTLE
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HISTORICAL AND CULTURAL PROGRAMS
MD DEPT OF HOUSING & COMMUNITY DEVELOP.
100 COMMUNITY PLACE, THIRD FLOOR
CROWNSVILLE, MD 21032-2023
(301) 514-7600 FAX (301) 974-3932

15458 040 VAMRC G
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MARINE RESOURCES COMMISSION
VIRGINIA NATURAL RESOURCES
P. O. BOX 756
NEWPORT NEWS, VA 23607-0756
(804) 247-2200

* * * REGIONAL AGENCIES * * *

7864 050 ICPRB G
MR. HERBERT M. SACHS
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INTERSTATE COMMISSION ON THE
POTOMAC RIVER BASIN
6110 EXECUTIVE BOULEVARD, SUITE 300
ROCKVILLE, MD 20852-3903
(301) 984-1908 FAX (301) 984-5841

7861 050 SRBC G
MR. PAUL O. SWARTZ
EXECUTIVE DIRECTOR
SUSQUEHANNA RIVER BASIN COMMISSION
1721 NORTH FRONT STREET
HARRISBURG, PA 17102
(717) 238-0422 FAX (717) 238-2436

* * * LOCAL AGENCIES * * *

* * * LOCAL AGENCIES * * *

8607 061 ANNE ARUNDE G
MR. JOHN GARY
COUNTY EXECUTIVE
ANNE ARUNDEL COUNTY
ARUNDEL CENTER
44 CALVERT STREET
ANNAPOLIS, MD 21404-1821
(410) 222-1821 FAX (410) 222-1155

38371 061 CECIL G
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PRESIDENT
CECIL COUNTY COMMISSION
COUNTY OFFICE BUILDING
ROOM 101
ELKTON, MD 21921
(410) 996-5201

8687 061 DORCHESTER G
MS. GLENN L. BRAMBLE
PRESIDENT
DORCHESTER COUNTY COMMISSIONERS
501 COURT LANE, COUNTY OFFICE BUILDING
P.O. BOX 26
CAMBRIDGE, MD 21613-0414
(410) 228-1700 FAX (410) 228-9641

8793 061 SOMERSET G
HONORABLE PHILLIP L. GERALD
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COMMISSIONERS FOR SOMERSET COUNTY
P.O. BOX 37
30513 PRINCE WILLIAM STREET
PRINCESS ANNE, MD 21853-0008
(410) 651-0320 FAX (410) 651-0366

8650 061 ST MARYS R G
MS. BARBARA R. THOMPSON
PRESIDENT
ST. MARY'S COUNTY COMMISSIONERS
P.O. BOX 653
GOVERNMENTAL CENTER, ROUTE 245
LEONARDTOWN, MD 20650
(301) 475-4461 FAX (301) 475-4489

6615 061 TALBOT G
MS. BLENDA W. ARMISTEAD
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TALBOT COUNTY COURTHOUSE
11 N. WASHINGTON STREET
EASTON, MD 21601
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8685 061 TALBOT R G
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PRESIDENT
TALBOT COUNTY COUNCIL
TALBOT COUNTY COURTHOUSE
11 NORTH WASHINGTON STREET
EASTON, MD 21601
(410) 822-2401 FAX (410) 822-8297

38409 061 TALBOT G
TALBOT COUNTY CHAMBER OF COMMERCE
P. O. BOX 9
PRINCE FREDERICK, MD 20678

38369 061 TALBOT G
GEN ANDREW H. ANDERSON
TALBOT COUNTY COUNCIL
29995 BOLINGBROKE LANE
TRAPPE, MD 21673
(410) 822-2401

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38372 062 ESSEX G
MR. GEORGE FRANGOS
ESSEX/MIDDLE RIVER CIVIC COUNCIL
3450 COURTHOUSE DRIVE
ELLICOTT CITY, MD 21043
(410) 313-3056 FAX (410) 313-3435

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6995 071 ENTERPRI G
EDITOR
BALTIMORE ENTERPRISE
1205 SOUTH CHARLES STREET
BALTIMORE, MD 21230
(410) 752-0711

38362 071 GAZETTE G
MR. BILL NACHMAN
GAZETTE-JOURNAL
P. O. BOX J, MAIN STREET
GLOUCESTER, VA 23061

7047 071 POST G
EDITOR
WASHINGTON POST
1150 15TH STREET, NW
WASHINGTON, DC 20071

38356 071 STAR DEMO G
EDITOR
STAR DEMOCRAT
P. O. BOX 600
EASTON, MD 21601

6999 071 SUN G
EDITOR
BALTIMORE SUN
501 NORTH CALVERT STREET
BALTIMORE, MD 21278

* * * PUBLIC MEDIA * * * = TELEVISION

* * * PUBLIC MEDIA * * *

7132 072 GABLE G
MS. DAIL GABLE
EDITORIAL DEPARTMENT
WJZ-TV, CHANNEL 13
TELEVISION HILL
BALTIMORE, MD 21211

38357 072 MPT G
NEWS DIRECTOR
MARYLAND PUBLIC TELEVISION
11767 OWINGS MILLS BOULEVARD
OWINGS MILLS, MD 21117

7140 072 WBAL-TV G
NEWS DIRECTOR
WBAL-TV, CHANNEL 11
3800 HOOPER AVENUE
BALTIMORE, MD 21211

7137 072 WBFF-TV G
NEWS DIRECTOR
WBFF-TV, CHANNEL 45
3500 PARKDALE AVENUE
BALTIMORE, MD 21211

7138 072 WMAR-TV G
NEWS DIRECTOR
WMAR-TV, CHANNEL 2
6400 YORK ROAD
BALTIMORE, MD 21212

* * * PUBLIC MEDIA * * * = RADIO

7289 073 WBJC-FM G
NEWS DIRECTOR
WBJC-FM
2901 LIBERTY HEIGHTS AVENUE
BALTIMORE, MD 21215

7254 073 WJHU RAD G
NEWS DIRECTOR
WJHU RADIO
34TH & CHARLES STREETS
BALTIMORE, MD 21218

* * * PUBLIC MEDIA * * * = OTHER

7375 074 ENGINEER G
EDITOR
BALTIMORE ENGINEER
11 WEST MOUNT VERNON PLACE
BALTIMORE, MD 21201-5190

7379 074 MAGAZINE G
EDITOR
MARYLAND MAGAZINE
STATE OFFICE BUILDING
ANNAPOLIS, MD 21401

* * * EDUCATIONAL INSTITUTIONS * * * = LIBRARIES

19146 081 BALTO COG G
LIBRARIAN
REGIONAL INFORMATION CENTER
BALTIMORE REGIONAL COUNCIL OF
GOVERNMENTS
601 N. HOWARD STREET
BALTIMORE, MD 21201-4585
(301) 333-4881

9043 081 COLL BAL G
LIBRARIAN
COMMUNITY COLLEGE OF BALTIMORE
2901 LIBERTY HEIGHTS AVENUE
BALTIMORE, MD 21215

12323 081 JHU G
LIBRARIAN
GOVERNMENT PUBLICATIONS DEPARTMENT
MILTON S. EISENHOWER LIBRARY
JOHNS HOPKINS UNIVERSITY
BALTIMORE, MD 21218

9049 081 LOYOLA C G
LIBRARIAN
LOYOLA NOTRE DAME LIBRARY
200 WINSTON STREET
BALTIMORE, MD 21212

9060 081 MDSDLR G
LIBRARIAN
STATE DEPARTMENT OF LEGISLATIVE
REFERENCE LIBRARY
90 STATE CIRCLE
ANNAPOLIS, MD 21401-1991

9083 081 TOWSON S G
DOCUMENT DEPARTMENT
ALBERT S. COOK LIBRARY
TOWSON STATE UNIVERSITY
TOWSON, MD 21204

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9062 081 UNIV BAL G
LIBRARIAN
LANGSDALE LIBRARY
UNIVERSITY OF BALTIMORE
1420 MARYLAND AVENUE
BALTIMORE, MD 21201

12235 081 UNIV MD G
DOCUMENTS LIBRARIAN
UNIVERSITY OF MARYLAND,
BALTIMORE COUNTY
5401 WILKENS AVENUE
CATONSVILLE, MD 21228

12236 081 UNIV MD G
LIBRARIAN
FREDERICK DOUGLAS LIBRARY
UNIVERSITY OF MARYLAND,
EASTERN SHORE
PRINCESS ANNE, MD 21853-1299

9066 081 USDCNMFS G
LIBRARIAN
NATIONAL MARINE FISHERIES SERVICE
BIOLOGY LABORATORY
OXFORD, MD 21654

9098 081 USFMC G
LIBRARY
FEDERAL MARITIME COMMISSION
1100 L STREET, NW
WASHINGTON, DC 20573

9085 081 WORCESTER G
LIBRARIAN
WORCESTER COUNTY LIBRARY,
SNOW HILL BRANCH
307 NORTH WASHINGTON STREET
SNOW HILL, MD 21863

19129 081 WORESTER G
MS. LOUISE ASH
COORDINATOR OF COMMUNITY SERVICES
WORCESTER COUNTY LIBRARY
307 N. WASHINGTON STREET
SNOW HILL, MD 21863
(301) 632-2600

* * * EDUCATIONAL INSTITUTIONS * * * - UNIVERSITIES

9258 082 COLL BAL G
DIRECTOR
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COMMUNITY COLLEGE OF BALTIMORE
2901 LIBERTY HEIGHTS AVENUE
BALTIMORE, MD 21215

9309 082 ERICKSON G
DR. HOWARD R. ERICKSON
VICE CHAIRMANZOOLOGY/ECOLOGY
STATE WATER QUALITY ADVISORY COMMITTEE
1041 SOUTH CONSTITUTION ROAD
PYLESVILLE, MD 21132

9319 082 ESSEX CO G
MS. CHARLOTTE BROZOOZOWSKI
CENTER FOR ENVIRONMENTAL SVCS
ESSEX COMMUNITY COLLEGE
ROSEDALE, MD 21237-0300

9338 082 GW UNIV G
DR. DORN MCGRATH
URBAN REGIONAL PLANNING DEPT
GEORGE WASHINGTON UNIVERSITY
WASHINGTON, DC 20052-0001

9287 082 SALISBUR G
PRESIDENT
SALISBURY STATE UNIVERSITY
SALISBURY, MD 21801

9285 082 ST JOHNS G
PRESIDENT
ST JOHNS COLLEGE
ANNAPOLIS, MD 21404

9290 082 TOWSON S G
PRESIDENT
TOWSON STATE UNIVERSITY
TOWSON, MD 21204

9248 082 UNIV BAL G
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BALTIMORE, MD 21201

13938 082 UNIV E C G
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TIDEWATER ATLANTIC RESEARCH
105 MEADOW DRIVE
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9250 082 UNIV MD G
DR. GIAN GUPTA
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EASTERN SHORE
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PRINCESS ANNE, MD 21853-1299

12361 082 UNIV MD G
MR. ROBERT E. ULANOWICZ
CENTER OF ENVIRON & ESTUARINE STUD
PO BOX 38
UNIVERSITY OF MARYLAND
SOLOMONS, MD 20688-0038

19128 082 UNIV MD G
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UNIVERSITY OF MARYLAND
UNIV OF MD, MD 20742
(301) 405-5189

* * * EDUCATIONAL INSTITUTIONS * * *

9267 082 UNIV MD G
DIRECTOR
WATER RESOURCES RESEARCH CENTER
UNIVERSITY OF MARYLAND
UNIV OF MD, MD 20742

9375 082 VIMS G
DR. GRANT GROSS
CHESAPEAKE RESEARCH CONSORTIUM, INC.
PO BOX 1280
SOLOMONS, MD 20688-1120

38361 082 VIMS G
MR. STEVE NELSON
CHESAPEAKE RESEARCH CONSORTIUM, INC.
P. O. BOX 1280
SOLOMONS, MD 20688

* * * EDUCATIONAL INSTITUTIONS * * * = OTHER

2877 083 UNIV MD G
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UNIVERSITY OF MD - EASTERN SHORE
PRINCESS ANNE, MD 21853

9443 083 WICOMICO G
PRINCIPAL
ELEMENTARY SCHOOL
POWELLVILLE, MD 21852

* * * SPECIAL INTEREST GROUPS * * * = NATIONAL GROUPS

9564 091 AUDUBON SOC G
REGIONAL VICE-PRESIDENT
NATIONAL AUDUBON SOCIETY,
MID-ATLANTIC REGIONAL OFFICE
1104 FERNWOOD AVENUE
CAMP HILL, PA 17011-6983

9322 091 SMITHSONIAN G
DR. TUNGLIN WU
CHESAPEAKE BAY CENTER
FOR ENVIRONMENTAL STUDIES
PO BOX 622, ROUTE 4
EDGEWATER, MD 21037

6673 091 STEVENS G
MS. CONNIE STEVENS
RESOURCES DEFENSE DIVISION
NATIONAL WILDLIFE FEDERATION
1412 SIXTEENTH STREET, NW
WASHINGTON, DC 20036

* * * SPECIAL INTEREST GROUPS * * * = STATE GROUPS

9539 092 CHAMBER OF G
MRS. ERNIE HONIG KENT
MD CHAMBER OF COMMERCE
60 WEST STREET
SUITE 405
ANNAPOLIS, MD 21401-2492

16665 092 CHESAPEAKE G
MR. WILLIAM C. BAKER
PRESIDENT
CHESAPEAKE BAY FOUNDATION
162 PRINCE GEORGE STREET
ANNAPOLIS, MD 21401
(410) 268-8816

38375 092 MARYLAND G
MR. LARRY SIMMS
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MARYLAND WATERMAN'S ASSOCIATION
1805-A VIRGINIA STREET
ANNAPOLIS, MD 21401
(410) 268-7722

38370 092 MARYLAND G
MR. DANIEL F. BECK
MARYLAND WATERMAN'S ASSOCIATION
2358 SCHAFFERS ROAD
ESSEX, MD 21221
(410) 687-8808

38374 092 MD CHARTER G
MR. JOSEPH F. RUPP
MD CHARTER BOAT ASSOCIATION
P. O. BOX 484
CHESAPEAKE BEACH, MD 20732
(410) 257-2727

1784 092 MD CNSRV G
MR. AJAX B. EASTMAN
MARYLAND CONSERVATION COUNCIL
112 EAST LAKE AVENUE
BALTIMORE, MD 21230

9534 092 MD CRUIS G
CHAIRMAN
MD CRUISING CLUB
904 STEVENSON LANE
TOWSON, MD 21204

9533 092 MD OUTBO G
MARYLAND OUTBOARD CRUISING CLUB
224 HILLTOP ROAD
PASADENA, MD 21122

16789 092 MD PILOT G
CPT MICHAEL WATSON
PRESIDENT
THE ASSOCIATION OF MARYLAND PILOTS
3720 DILLON STREET
BALTIMORE, MD 21224
(410) 276-1337 FAX (301) 276-1364

* * * SPECIAL INTEREST GROUPS * * *

17289 092 MD SALTWATE G
MR. RICHARD NOVOTNY
EXECUTIVE DIRECTOR
MD SALTWATER SPORTFISHERMEN'S ASSOC.
7626 BALTIMORE & ANNAPOLIS BLVD.
GLEN BURNIE, MD 21061
(410) 768-8666 FAX (410) 768-5988

* * * SPECIAL INTEREST GROUPS * * * = REGIONAL GROUPS

5822 093 ALLIANCE G
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ALLIANCE FOR THE CHESAPEAKE BAY
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BALTIMORE, MD 21212
(410) 377-6270 FAX (410) 377-7144

9578 093 CNTRL AT G
PRESIDENT
CENTRAL ATLANTIC ENVIRONMENTAL CNTR
PRINCE GEORGES & E STREETS
ANNAPOLIS, MD 21401

6047 093 E YACHT G
PRESIDENT
EASTERN YACHT CLUB
PO BOX 7872
ESSEX, MD 21221-3698

9584 093 SHELLFIS G
PRESIDENT
SHELLFISH INSTITUTE OF
NORTH AMERICA
C/O MORGAN & SONS
WEEMS, VA 22576

* * * SPECIAL INTEREST GROUPS * * * = LOCAL GROUPS

9574 094 AUDUBON SOC G
PRESIDENT
CHESAPEAKE AUDUBON SOCIETY
DRUID HILL PARK
C/O BALTIMORE ZOO
BALTIMORE, MD 21217

9884 094 AUDUBON SOC G
MR. NEAL FITZPATRICK
CONSERVATION DIRECTOR
AUDUBON NATURALIST SOCIETY
8940 JONES MILL ROAD
CHEVY CHASE, MD 20815
(301) 652-9188

38368 094 CHESAPEAKE G
MS. JANE NISHIDA
CHESAPEAKE BAY FOUNDATION MD OFFICE
164 CONDUIT STREET
ANNAPOLIS, MD 21401
(410) 268-8833 FAX (410) 280-3513

6178 094 CLEAN WT G
MR. JOHN KABLER
CLEAN WATER ACTION PROJECT
44 MADISON PLACE
ANNAPOLIS, MD 21401

17342 094 MD WETLANDS G
MS. VIVIAN NEWMAN
MARYLAND WETLANDS COMMITTEE
11194 DOUGLAS AVENUE
MARRIOTSVILLE, MD 21104
(410) 442-5639

6200 094 SCHAEDLICH G
MS. PAULA SCHAEDLICH
NATIONAL AQUARIUM
PIER 3
501 EAST PRATT
BALTIMORE, MD 21202

* * * SPECIAL INTEREST GROUPS * * * = COMMITTEES

9947 095 COASTAL RES G
REPRESENTATIVE
CRAC, TALBOT COUNTY
PO BOX 838
EASTON, MD 21601

12353 095 HART-MILLER G
MR. FREDERICK HABICHT
HART-MILLER ISLAND
CITIZENS OVERSIGHT COMMITTEE
2517 BARRISON POINT ROAD
ESSEX, MD 21221-6410
(410) 682-4496

38366 095 HART-MILLER G
MR. RANDY COGAR
HART-MILLER ISLAND
CITIZENS OVERSIGHT COMMITTEE
THREE RIVERTON ROAD
MIDDLE RIVER, MD 21220
(410) 391-1818

* * SPECIAL INTEREST GROUPS * * *

'632 095 HART-MILLER G
1. PEARL GINTLING
ART-MILLER ISLAND
ITIZENS OVERSIGHT COMMITTEE
718 NORTH POINT CREEK ROAD
PARROWS POINT, MD 21219
(10) 477-2370

* * BUSINESSES * * *

7503 100 BIGELOW G
R. PETER F. LARSEN
ENIOR SCIENTIST
IGELOW LABORATORY FOR OCEAN SCIENCES
EST BOOTHBAY HARBOR, ME 04575
207) 633-2173

19122 100 ESSEX MARIN G
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ESSEX YACHT HARBOR MARINA
500 SANDALWOOD ROAD
ESSEX, MD 21221
(301) 687-6634

19133 100 HILLTOP MAR G
MR. EDWARD J. GRUZS
OWNER
HILLTOP MARINA
1802 HILLTOP AVENUE
ESSEX, MD 21221
(301) 687-4689

* * POSTMASTERS * * *

1069 110 21913 G
POSTMASTER
CECILTON, MD 21913

* * INDIVIDUAL INTERESTS * * *

2394 120 CARL G
MR. ERIC R. CARL
2118 TRED AVON ROAD
ESSEX, MD 21221

6115 120 D'ANNA G
MR. CARMEN V. D'ANNA
21 HOLLY BEACH AVENUE
ESSEX, MD 21221

6117 120 DECKLEMA G
MR. JULIUS O. DECKLEMAN
201 OAK AVENUE
ESSEX, MD 21221

11628 120 GUCINSKI G
MR. HERMAN GUCINSKI
ENVIRONMENTAL CENTER
ANNE ARUNDEL COMMUNITY COLLEGE
101 COLLEGE PKWY
ARNOLD, MD 21012

12720 120 GUTMAN G
MR. JAMES E. GUTMAN
STATE WATER QUALITY ADVISORY COMMITTEE
233 WILTSHIRE LANE
SEVERNA PARK, MD 21146-4038
(410) 647-8965

12391 120 LEMANN G
MS. MARGARET Z. LEMANN
2618 HOLLY BEACH ROAD
ESSEX, MD 21221

11797 120 LEWIS G
MRS. HAROLD G. LEWIS
196 QUEEN ANNE CLUB DRIVE
STEVENSVILLE, MD 21666

11867 120 MC EWEN G
MR. KENT H. MCEWEN
429 NORTH MARYLN AVENUE
ESSEX, MD 21221

6131 120 MESSICK G
MR. WILLIAM J. MESSICK
2274 MONOCACY ROAD
ESSEX, MD 21221-1530

6134 120 MOHR G
MR. EDWARD C. MOHR
1702 OAKFIELD AVENUE
ESSEX, MD 21221

6135 120 MOKEN G
MR. ANTHONY J. MOKEN
2400 BAVERNSCHMIOT DRIVE
ROUTE 1
ESSEX, MD 21221

6138 120 NELSON G
MR. ARTHUR A. NELSON
670 GREYHOUND ROAD
ESSEX, MD 21221-1803

* * INDIVIDUAL INTERESTS * * *

3373 120 NUNAM G
HONORABLE MICHAEL W. NUNAM
DELEGATE
17 BIRCH RUN ROAD
CHESTERTOWN, MD 21620
(410) 758-3027

6147 120 PUNTE G
MR. JOSEPH H. PUNTE
101 PUNTE LANE
ESSEX, MD 21221

11956 120 RAUSCHER G
MR. JOHN C. RAUSCHER
2511 BARRISON POINT ROAD
ESSEX, MD 21221-6410
(410) 686-6017

6150 120 RIGGINS G
MS. VIRGINIA E. RIGGINS
BRANCH STREET
ESSEX, MD 21221

6155 120 SCHREIBE G
MR. ROBERT EL. SCHREIBER
2205 MIDDLEBOROUGH ROAD
ESSEX, MD 21221

6157 120 SELIG G
MR. WILLIAM A. SELIG SR.
358 MILES ROAD
ESSEX, MD 21221

8376 120 SISOLAK G
MR. JOSEPH SISOLAK
907 CHESAPEAKE AVENUE
SPARROWS POINT, MD 21219-1627
(410) 477-9295

fixed overhead costs already reflected inflation. We have, therefore, amended our calculation of fixed overhead by applying a factor to fixed overhead to account only for the effects of inflation on depreciation expense.

Final Results of Review

Upon review of comments submitted, the Department has determined the margin for CINSA to be 13.35 percent for the period December 1, 1990 through November 30, 1991. The Customs Service shall assess antidumping duties on all appropriate entries.

Furthermore, the following deposit requirements will be effective for all shipments of the subject merchandise, entered, or withdrawn from warehouse, for consumption on or after the publication date of these amended final results of review, as provided for by section 751(a)(1) Tariff Act of 1930, as amended (the Act): (1) the cash deposit rate for CINSA will be 13.35 percent as outlined above; (2) the cash deposit rate for APSA will continue to be 4.66 percent, the company-specific rate published for the most recent period; (3) if the exporter is not a firm covered in this review, a prior review, or the original less-than-fair-value (LTFV), but the manufacturer is, the cash deposit rate will be the rate established for the most recent period for the manufacturer of the merchandise; and (4) the cash deposit rate for all other exporters will be 29.52 percent, the "all others" rate established in the LTFV investigation. *See, Floral Trade Council* v. *United States*, Slip Op. 93–79, and *Federal Mogul Corp.* v. *United States*, Slip Op. 93–83.

These deposit requirements, when imposed, shall remain in effect until publication of the final results of the next administrative review.

This notice also serves as a final reminder to importers of their responsibility under 19 CFR 353.26 to file a certificate regarding the reimbursement of antidumping duties prior to liquidation of the relevant entries during the review period. Failure to comply with this requirement could result in the Secretary's presumption that reimbursement of antidumping duties occurred and the subsequent assessment of double antidumping duties.

In addition, this notice serves as a reminder to parties subject to administrative protective order (APO) of their responsibility concerning the disposition of proprietary information disclosed under APO in accordance with 19 CFR 353.34(d). Timely written notification or conversion to judicial protective order is hereby requested. Failure to comply with the regulations and terms of the APO is a sanctionable violation.

This notice is in accordance with sections 751(f) of the Act (19 U.S.C. 1675(f)) and 19 CFR 353.28(c).

Dated: February 2, 1995.

Susan G. Esserman,

Assistant Secretary, for Import Administration.

[FR Doc. 95–3134 Filed 2–7–95; 8:45 am]

BILLING CODE 3510–DS–P

DEPARTMENT OF DEFENSE

Office of the Secretary

Meeting of the Commission on Roles and Missions of the Armed Forces

AGENCY: Department of Defense, Commission on Roles and Missions of the Armed Forces.

ACTION: Notice.

SUMMARY: On January 25, 1995, 60 FR 4892, the Department of Defense published a notice concerning a meeting of the Commission on Roles and Missions of the Armed Forces. The open portion of this meeting, from 12:45 p.m. until 2:15 p.m., was cancelled. All other information remains unchanged.

Extraordinary circumstances compel this amendment to be posted in less than the 15-day requirement.

Dated: February 3, 1995

Patricia L. Toppings,

Alternate OSD Federal Register Liaison Officer, Department of Defense.

[FR Doc. 94–3163 Filed 2–7–95; 8:45 am]

BILLING CODE 5000–4–M

Strategic Environmental Research and Development Program, Scientific Advisory Board

ACTION: Notice

In accordance with Section 10(a)(2) of the Federal Advisory Committee Act (P.L. 92–463), announcement is made of the following Committee meeting:

Date of Meeting: March 7–9, 1995 from 0830 to approximately 1630.

Place: U.S. Army Corps of Engineers, Waterways Experiment Station, Vicksburg, MS.

Matters to be Considered: Research and Development proposals and continuing projects requesting Strategic Environmental Research and Development Program funds in excess of $1M will be reviewed.

This meeting is open to the public. Any interested person may attend, appear before, or file statements with the Scientific Advisory Board at the time and in the manner permitted by the Board.

For Further Information Contact: Ms. Amy Levine, 901 North Street, Suite 303, Arlington, VA, 22203, (703) 696–2124.

Dated: February 2, 1995.

L.M. Bynum,

Alternate OSD Federal Register Liaison Officer, Department of Defense.

[FR Doc. 95–3027 Filed 2–7–95; 8:45 am]

BILLING CODE 5000–04–M

Department of the Army

Intent To Prepare a Draft Environmental Impact Statement (DEIS) for the Proposed Section 204 Habitat Restoration Project at Poplar Island in Talbot County, MD

AGENCY: U.S. Army Corps of Engineers, DoD.

ACTION: Notice of Intent.

SUMMARY: The Baltimore District U.S. Army Corps of Engineers is investigating the use of dredged material to restore Poplar Island. The project would restore Poplar Island to its approximate size in 1857, thereby adding approximately 1,000 acres of wildlife habitat in the Upper Chesapeake Bay. The project would use approximately 10 to 40 million cubic yards of clean material, dredged primarily from the southern approach channels to Baltimore Harbor. The amount of material placed at the site would depend on the final design, including the island size and shape, and the relative proportions of upland and wetland habitat constructed on the island. Dredged material would be placed behind dikes at the site, then shaped and planted to create both intertidal wetland and upland wildlife habitat. The feasibility study is being conducted under the authority of Section 204 of the Water Resources Development Act of 1992. The potential non-Federal sponsor for the project is the Maryland Port Administration (MPA), a part of the Maryland Department of Transportation.

FOR FURTHER INFORMATION CONTACT: Questions about the proposed action and DEIS can be addressed to Ms. Stacey Brown, Project Manager, Baltimore District, U.S. Army Corps of Engineers, ATTN: CENAB–PL–PC, P.O. Box 1715, Baltimore, Maryland 21203–1715, telephone (410) 962–3639.

SUPPLEMENTARY INFORMATION:

1. The project will be constructed under Section 204 of the Water Resources Development Act of 1992, which allows Federal funding for the protection, restoration, and creation of aquatic and ecologically related

habitats, including wetlands, in connection with dredging for construction, operation, or maintenance of an authorized Federal navigation project.

2. Poplar Island is located on the Eastern Shore of the upper Chesapeake Bay, about one mile northwest of Tilghman Island, in Talbot County, Maryland. The present complex consists of four small remnant islands with a combined area of approximately 5 acres. The island has steadily eroded over time; in 1857 the island covered an area of approximately 1,000 acres; the remaining small islands are in danger of completely eroding within the next few years.

3. The project would restore Poplar Island to the approximate size and footprint of the island in 1857. The proposed project actions include the placement of approximately 10 to 40 million cubic yards of clean dredged material behind dikes at the site. The amount of material to be placed would depend partly on the relative proportions of upland and wetland habitat created. The material would be primarily dredged during maintenance of the southern approach channels to Baltimore Harbor. After placement, the material would be shaped and planted to create both intertidal wetland and upland wildlife habitat. Poplar Island has been identified by the U.S. Fish and Wildlife Service, the Maryland Department of Natural Resources, and other natural Resources management agencies as a valuable nesting and nursery area for many species of wildlife, including bald eagles, osprey, heron, and egret.

4. Expected project benefits include the creation of wetland and upland wildlife habitat, stabilization of the rapidly eroding island remnants, and beneficial use of dredged material from Federal navigation channel maintenance activities. A project pre-feasibility report (similar to a Corps of Enegineers Reconnaissance report) was completed by the Maryland Port Administration (MPA) in 1993.

5. Various alternative designs and projects size will be considered including the "no action" alternative. Alternatives to be considered will include variations such as the size and location of the placement area; dike configuration and construction materials; site capacity; and the relative proportions and locations on the island of wetland and upland habitat.

6. The Baltimore District is preparing a DEIS which will describe the impacts of the proposed projects on environmental and cultural resources in the study area and the overall public interest. The DEIS will also apply guidances issued by the Environmental Protection Agency, under authority of Section 404 of the Clean Water Act of 1977 (Pub. L. 95–217). Potential effects of the project on water quality, fish and wildlife resources, recreation, aesthetics, cultural, and other resources will be investigated.

7. The public involvement program will include meetings and coordination with interested private individuals and organizations, as well as concerned Federal, state, and local agencies. A public notice requesting comments on the proposed project amd a coordination letter have been sent to appropriate agencies, organizations, and individuals. Additional public information will be provided through printed media, mailings, and radio or television announcements. Two scoping meetings, identical in format, will be held at 7:00 p.m. on 21 February 1995 at Tilghman Elementary School, Tilghman, Maryland, and on 23 February 1995, at Beach Elementary School, in Chesapeake Beach, Maryland. Two meetings will be held to provide equal opportunities for residents on both the Eastern Shore and the west side of the Chesapeake Bay to take part in the public involvement program.

8. In addition to the Corps and the Maryland Port Administration, current participants in the DEIS process include, but are not limited to, the U.S Environmental Protection Agency, U.S. Fish and Wildlife Service, National Marine Fisheries Service, Maryland Department of Natural Resources, Maryland Department of the Environment and the Maryland Port Administration. The Baltimore District invites potentially affected Federal, state and local agencies, and other interested organizations and parties to participate in this study.

AVAILABILITY: The DEIS is tentatively scheduled to be available for public review in September of 1995.

Kenneth L. Denton,

Army Federal Register Liaison Officer.

[FR Doc. 95–3082 Filed 2–7–95; 8:45 am]

BILLING CODE 3710–41–M

U.S. Marine Corps

Privacy Act of 1974; Amend Record Systems

AGENCY: Marine Corps, Department of the Navy.

ACTION: Amend record system.

SUMMARY: The U.S. Marine Corps proposes to amend a system of records in its inventory of record systems subject to the Privacy Act of 1974 (5 U.S.C. 552a), as amended. During a recent review, the notice for MJA00009, entitled Marine Corps Command Legal Files, was found to be incorrectly republished in the **Federal Register** on February 22, 1993, at 58 FR 10658. This amendment will correct the notice.

DATES: The amendment will be effective on February 8, 1995.

ADDRESSES: Send comments to the Head, FOIA and Privacy Act Section, Headquarters, U.S. Marine Corps, 2 Navy Annex, Washington, DC 20380–1775.

FOR FURTHER INFORMATION CONTACT: Ms. B. L. Thompson at (703) 614–4008 or DSN 224–4008.

SUPPLEMENTARY INFORMATION: The U.S. Marine Corps record system notices for records systems subject to the Privacy Act of 1974 (5 U.S.C. 552a), as amended, have been published in the **Federal Register** and are available from the address above.

The specific changes to the system of records are set forth below followed by the system of records notice published in its entirety, as amended. The amendment is not within the purview of subsection (r) of the Privacy Act of 1974 (5 U.S.C. 552a), as amended, which requires the submission of new or altered systems reports.

Dated: February 1, 1995.

Patricia L. Toppings,

Alternate OSD Federal Register Liaison Officer, Department of Defense.

MJA00009

SYSTEM NAME:

Marine Corps Command Legal Files *(February 22, 1993, 58 FR 10658).*

* * * * *

CATEGORIES OF INDIVIDUALS COVERED BY THE SYSTEM:

Delete the last paragraph.

CATEGORIES OF RECORDS IN THE SYSTEM:

Delete entry and replace with 'Records of disciplinary proceedings, including courts-martial records and records of nonjudicial punishments with supporting documents, military justice management information pre-post trial (e.g., courts-martial docketing logs, reports of cases tried, etc.), pre-disciplinary inquires and investigations and documentation pertaining to post-hearing/trial review, clemency action, appellate leave or other personnel action related to or resulting from courts-martial, JAG Manual investigations pertaining to claims, line of duty misconduct determinations, command irregularities, and unusal

DEPARTMENT OF DEFENSE Billing Code: 3719-41

CORPS OF ENGINEERS, DEPARTMENT OF ARMY

Intent to Prepare a Draft Environmental Impact Statement (DEIS) for the proposed Section 204 Habitat Restoration Project at Poplar Island in Talbot County, Maryland.

AGENCY: U.S. Army Corps of Engineers, DOD

ACTION: Notice of Intent

SUMMARY: The Baltimore District U.S. Army Corps of Engineers is investigating the use of dredged material to restore Poplar Island. The project would restore Poplar Island to its approximate size in 1847, thereby adding approximately 1,000 acres of wildlife habitat in the Upper Chesapeake Bay. The project would use approximately 10 to 40 million cubic yards of clean material, dredged primarily from the southern approach channels to Baltimore Harbor. The amount of material placed at the site would depend on the final design, including the island size and shape, and the relative proportions of upland and wetland habitat constructed on the island. Dredged material would be placed behind dikes at the site, then shaped and planted to create both intertidal wetland and upland wildlife habitat. The feasibility study is being conducted under the authority of Section 204 of the Water Resources Development Act of 1992. The potential non-Federal sponsor for the project is the Maryland Port Administration (MPA), a part of the Maryland Department of Transportation.

FOR FURTHER INFORMATION CONTACT: Questions about the proposed action and DEIS can be addressed to Ms. Stacey Brown, Project Manager, Baltimore District, U.S. Army Corps of Engineers, ATTN: CENAB-PL-PC, P.O. Box 1715, Baltimore, Maryland 21203-1715, telephone (410) 962-3639.

SUPPLEMENTARY INFORMATION:

1. The project will be constructed under Section 204 of the Water Resources Development Act of 1992, which allows Federal funding for the protection, restoration, and creation of aquatic and ecologically related habitats, including wetlands, in connection with dredging for construction, operation, or maintenance of an authorized Federal navigation project.

2. Poplar Island is located on the Eastern Shore of the upper Chesapeake Bay, about one mile northwest of Tilghman Island, in Talbot County, Maryland. The present complex consists of four small remnant islands with a combined area of approximately 5 acres. The island has steadily eroded over time; in 1857 the island covered an area of approximately 1,000 acres; the remaining small islands are in danger of completely eroding within the next few years.

3. The project would restore Poplar Island to the approximate size and footprint of the island in 1847. The proposed project actions include the placement of approximately 10 to 40 million cubic yards of clean dredged material behind dikes at the site. The amount of material to be placed would depend partly on the relative proportions of upland and wetland habitat created. The material would be primarily dredged during maintenance of the southern approach channels to Baltimore Harbor. After placement, the material would be shaped and planted to create both intertidal wetland and upland wildlife habitat. Poplar Island has been identified by the U. S. Fish

and Wildlife Service, the Maryland Department of Natural Resources, and other natural resource management agencies as a valuable nesting and nursery area for many species of wildlife, including bald eagles, osprey, heron, and egret.

4. Expected project benefits include the creation of wetland and upland wildlife habitat, stabilization of the rapidly eroding island remnants, and beneficial use of dredged material from Federal navigation channel maintenance activities. A project pre-feasibility report (similar to a Corps of Engineers Reconnaissance report) was completed by the Maryland Port Administration (MPA) in 1993.

5. Various alternative designs and project size will be considered including the "no action" alternative. Alternatives to be considered will include variations such as the size and location of the placement area; dike configuration and construction materials; site capacity; and the relative proportions and locations on the island of wetland and upland habitat.

6. The Baltimore District is preparing a DEIS which will describe the impacts of the proposed projects on environmental and cultural resources in the study area and the overall public interest. The DEIS will also apply guidelines issued by the Environmental Protection Agency, under authority of Section 404 of the Clean Water Act of 1977 (P.L. 95-217). Potential effects of the project on water quality, fish and wildlife resources, recreation, aesthetics, cultural, and other resources will be investigated.

7. The public involvement program will include meetings and coordination with interested private individuals and organizations, as well as concerned Federal, state, and local agencies. A public notice requesting comments on the proposed project and a coordination letter have been sent to appropriate agencies, organizations, and individuals. Additional public information will

be provided through printed media, mailings, and radio or television announcements. Two scoping meetings, identical in format, will be held at 7:00 PM on 21 February 1995 at Tilghman Elementary School in Tilghman, Maryland, and on 23 February 1995, at Beach Elementary School, in Chesapeake Beach, Maryland. Two meetings will be held in order to provide equal opportunities for residents on both the Eastern Shore and the west side of the Chesapeake Bay to take part in the public involvement program.

8. In addition to the Corps and the Maryland Port Administration, current participants in the DEIS process include, but are not limited to, the U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, National Marine Fisheries Service, Maryland Department of Natural Resources, Maryland Department of the Environment, and the Maryland Port Administration. The Baltimore District invites potentially affected Federal, state and local agencies, and other interested organizations and parties to participate in this study.

9. The DEIS is tentatively scheduled to be available for public review in September of 1995.

James F. Johnson

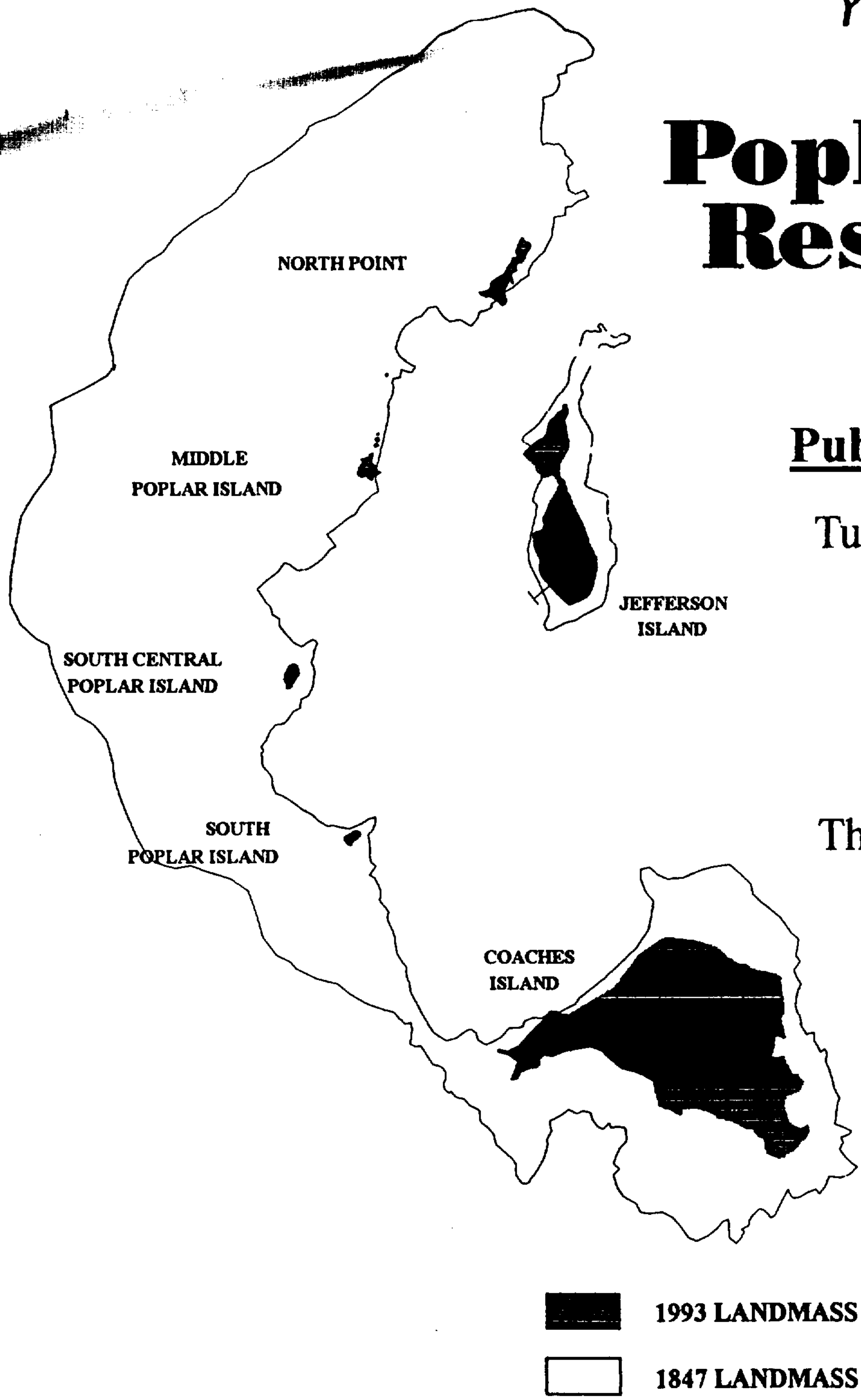
Dr. James F. Johnson
Chief, Planning Division

Attachment C

Public Meetings - Agendas, Attendance Lists, Handouts
Scoping Meetings, 21 and 23 February 1995
Public Information Meeting #2, 12 April 1995
Public Information Meeting #3, 23August 1995
Public Meeting #4, 28 November 1995

You are invited...

Poplar Island Restoration



Public Scoping Meetings

Tuesday, February 21, 1995
7:00 P.M.
Tilghman
Elementary School

Thursday, February 23, 1995
7:00 P.M.
Chesapeake Beach
Elementary School

All interested parties are invited to attend a public scoping meeting on the proposed restoration of Poplar Island to its approximate size in 1847.

WHAT IS A SCOPING MEETING?

A Scoping Meeting is a key step in the public process of writing an environmental statement for an action that is being proposed by the Federal Government. Environmental impacts include any impacts to the general health and welfare of the public. In this case, the proposed Federal action is to use clean, dredged material from the southern approach channels to the Port of Baltimore to restore Poplar Island to its approximate size in 1847.

The principal goal of a Scoping Meeting is to obtain public input into the document, called an "Environmental Impact Statement" (EIS), that the Government will prepare.

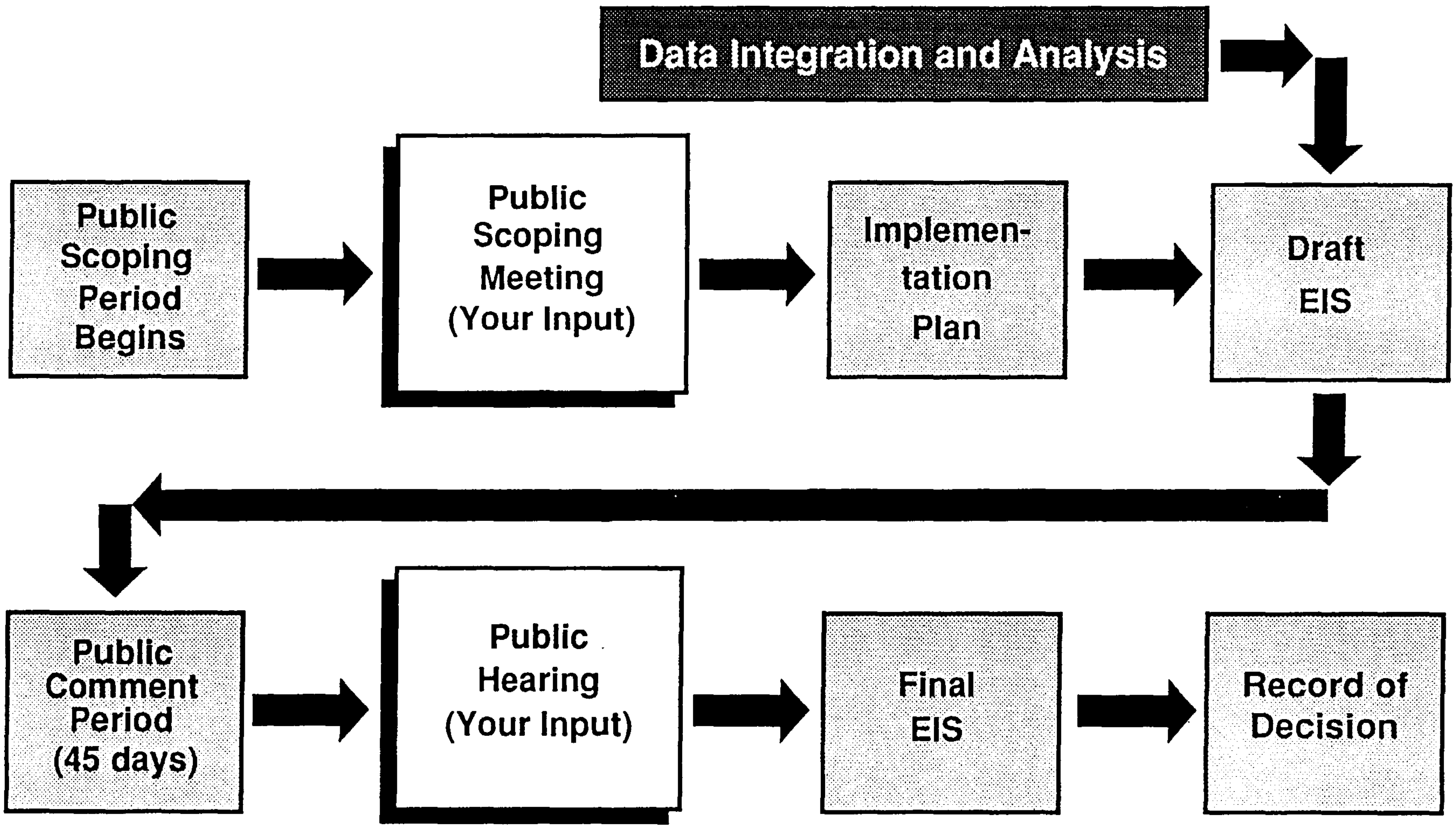
The Scoping Meeting is the first opportunity to make sure that all of the environmental impacts that reasonably may be associated with the proposed action, and all reasonable alternatives to the proposed action, including the environmental impacts that would be associated with those alternatives, are made known to the best of our ability. The time for discussing the actual environmental impacts and alternatives themselves will come when the draft EIS is available for public review and a Public Hearing, similar to today's Scoping Meeting, is called to obtain your reaction to the contents of the draft EIS.

We seek your participation and input at this Scoping Meeting so that we will be better able to identify the environmental aspects of the proposed Poplar Island Restoration Project and the reasonable alternatives to the Project, including the "no action" alternative. It is important to make your views known now, during the Scoping Meeting and throughout the study process. Comments may be made in writing at any time before the comment period closes on November 20, 1995. Your comments will help ensure that the Corps of Engineers (COE) fully addresses all of the appropriate environmental issues and concerns.

What does the Government do with the final EIS? The National Environmental Policy Act (NEPA), the President's Council on Environmental Quality's regulations for implementing NEPA, and the COE's own NEPA regulations, require the COE to use the information provided in the EIS when it decides the outcome of the proposed project. The COE's rules state that, during the decisionmaking process, the COE shall consider the relevant NEPA documents, public and agency comments (if any) on those documents, and COE responses to those comments. This is done as part of the COE's consideration of the proposal, including the alternatives analyzed in the EIS, before rendering a decision on the proposal.

Finally, when the COE issues its "Record of Decision" (ROD) for the proposed action, the COE will include the relevant NEPA documents, public and agency comments (if any) on those documents, and the COE's responses to those comments as part of the ROD.

Environmental Impact Statement (EIS) Process



US Army Corps of Engineers
Baltimore District

Public Notice

POPLAR ISLAND RESTORATION PROJECT

TO ALL INTERESTED PARTIES:

The Baltimore District, U. S. Army Corps of Engineers, proposes to restore approximately 1,000 acres of wildlife habitat using dredged material at Poplar Island in Talbot County, Maryland, in the upper Chesapeake Bay (Enclosure 1). Approximately 10 to 40 million cubic yards of material, primarily dredged during maintenance of the southern approach channels to Baltimore Harbor, would be placed behind dikes at the site. After placement, the material would be shaped and planted to create both intertidal wetland and upland wildlife habitat. Poplar Island has been identified by the U. S. Fish and Wildlife Service, the Maryland Department of Natural Resources, and other natural resource management agencies as a valuable nesting and nursery area for many species of wildlife, including bald eagles, osprey, heron, and egret. The project would restore Poplar Island to the approximate size and footprint of the island in 1857. Currently, the name Poplar Island refers to a group of four small remnant islands located adjacent to Jefferson Island and Coaches Island, approximately one mile northwest of Tilghman Island, on the Bay's Eastern Shore.

The project will be constructed under Section 204 of the Water Resources Development Act of 1992, which allows Federal funding for beneficial use of dredged material projects. Expected project benefits include the creation of wetland and upland wildlife habitat, stabilization of the rapidly eroding island remnants, and beneficial use of dredged material from Federal navigation channel maintenance activities. A project pre-feasibility report (similar to a Corps Reconnaissance report) was completed by the Maryland Port Administration (MPA) in 1993.

In compliance with the National Environmental Policy Act (NEPA), the Baltimore District will prepare an Environmental Impact Statement (EIS) for the project, which will include descriptions of the existing site conditions, design alternatives, project impacts, public involvement, and the recommended plan. A comprehensive public involvement program is being developed to coordinate with interest groups, the general public, and other Federal, State, and local agencies. Current project participants include the MPA and both Federal and State natural resource management agencies.

As part of the public involvement process, the Baltimore District is conducting a scoping process to identify issues and areas of concern. Any person who has an interest in the project or who may be adversely affected by the proposed project may make comments or suggestions or request a public hearing. Comments and requests should be submitted within 30 days of the date of this notice to the District Engineer, ATTN: CENAB-PL-EC, U.S. Army Corps of Engineers, Baltimore District, P.O. Box 1715, Baltimore, Maryland 21203-1715.

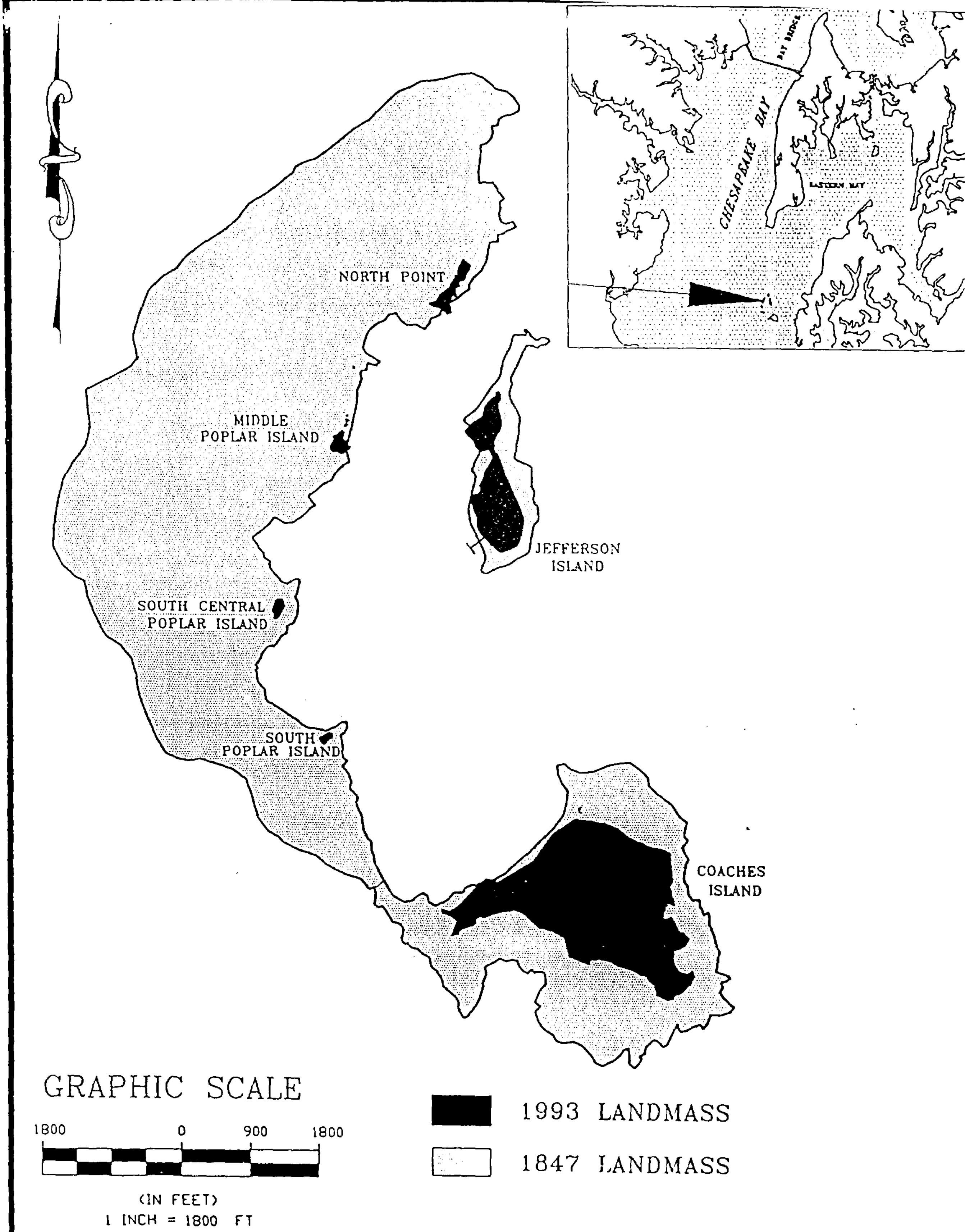
This Public Notice is being sent to organizations and individuals on the enclosed list (Enclosure 2). Please bring this notice to the attention of any other organizations or individuals with an interest in this matter.

FOR THE COMMANDER:

John C. Diering
for DR. JAMES F. JOHNSON
Chief, Planning Division

DATE: JAN 19 1995

Enclosures



ENCLOSURE 1.

POPLAR ISLAND

ISLAND COMPARISON 1847–1993

EIS Schedule for Proposed Poplar Island Restoration Project (Tentative)

Notice of Intent (NOI) (Public Comment Period Begins)	February 8, 1995
Public Scoping Meetings	February 21, 1995 February 23, 1995
Second Public Workshop (Discuss Status, alternatives, impacts)	March 30, 1995
Third Public Workshop (Evaluate and rank detailed plans)	May 17, 1995
Draft Environmental Impact Statement	September, 1995
Public Hearing	September, 1995
Final EIS	December, 1995
Record of Decision	December, 1995

US Army Corps of Engineers
Baltimore District

2

Poplar Island Feasibility Study

3

Handout Package

- Public notice
- Copies of slides
- Comment card -
  Used to compile mailing list for this study
  Receive future announcements, newsletters, notices
  Information is kept confidential
  Turn in the comment card at end of meeting or mail it to us

3

4

Poplar Island Feasibility Study

- Study requested by the Maryland Port Administration
- Purpose of study is to determine the feasibility of restoring upland and wetland habitat at Poplar Island with material dredged from the approach channels to the Port of Baltimore
- Study initiated September 1994
- Study is a joint effort of the Baltimore District and the Maryland Port Administration
- Maryland Port Administration has contracted with an architect-engineering firm to design the restoration project.

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Section 204, 1992 Water Resources Development Act

"(a) IN GENERAL. - The Secretary is authorized to carry out projects for the protection, restoration, and creation of aquatic and ecologically related habitats, including wetlands, in connection with dredging for construction, operation, or maintenance by the Secretary of an authorized navigation project."

1

6

Section 204 Cost Sharing

- If a project is authorized for Poplar Island, the Federal government would pay for 75 percent of the construction cost of the facility. Non-Federal interests (State of Maryland) would pay the remaining 25 percent, including all lands, easements, rights-of-way, and necessary relocations.
- Non-Federal interests would pay 100 percent of the operation, maintenance, and rehabilitation costs of the project.

2

7

Purpose of Tonight's Meeting

- Tell you about the proposed project
- To gather information relevant to the study
- To allow you to express your views on what should be investigated during the study
- To explain the study process and schedule
- Part of the scoping process for an environmental impact statement (EIS)

5

8

Cooperating Agencies

- Corps of Engineers
- Maryland Port Administration
- Maryland Environmental Service
- US Fish and Wildlife Service
- Other Federal, State and local agencies

5

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Tonight's Agenda

- Opening remarks
- Project background - Maryland Port Administration
- Project Overview - Maryland Environmental Service
- Explanation of breakout groups
- Break into small groups
- Discussion of small group results

6

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Project Need

- Port Of Baltimore needs dredged material placement areas.
- In the past 100 years, 10,000 acres of island habitat have been lost in the Bay.
- Size of Poplar Island has decreased from 115 acres in 1952 to less than 5 acres in 1993.

3

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Study Schedule

- Study initiated, September 1994
- ➡ Scoping meetings, February 1995
- ➡ Alternatives workshop, March 1995
- ➡ *Evaluation workshop, May 1995*
- Draft report and environmental impact statement , September 1995
- ➡ *Public hearing, September 1995*
- Final report December 1995
- Authorization by Secretary of the Army
- Initiate construction June 1996

9

14

Public Involvement Program

- Informal meetings with special interest groups
  - Eastern Shore Waterman's Association
  - Eastern Shore Legislators
  - Talbot County Council
  - Maryland Charterboat Captains
  - Others as requested
- Newsletters
- Workshops like tonight
- Formal public hearing at end of study

9

15

US Army Corps of Engineers

Project Need

- Frank Hamons
  Manager of Harbor Development
  Maryland Port Administration

1

16

US Army Corps of Engineers

Project Overview

- Bob Smith
  Study manager
  Maryland Environmental Service

1

17

US Army Corps of Engineers

Small Groups

- Topics to consider
  What are good characteristics about the Poplar Island area?
  What are the problems with Poplar Island?
  Your vision for Poplar Island
  What issues and concerns should be addressed?
- List ideas
- Identify important ideas
- Spokesperson will summarize group's thoughts

8

18

US Army Corps of Engineers

Discussion of Small Group Results

- Briefly summarize major discussion points of small groups
- How did your group vote on the issues?
- *Questions and answers*

3

20

US Army Corps of Engineers

Next Actions

- Engineering field investigations have been completed
- Environmental field investigations are continuing
- Developing alternative alignments
- Alternatives workshop in late March
- Test dike construction this summer

5

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US Army Corps of Engineers

Your Comments

- Mail comments to
  Stacey Brown
  Attention: *CENAB-PL-PC*
  Baltimore District, Corps of Engineers
  P.O. Box 1715
  Baltimore, Maryland 21203-1715
- Internet address for Stacey Brown
  seb@cenabpl.nab.usace.army.mil
- FAX comments to Stacey Brown at 410-962-4698
- *Comments due by 10 March 1995*

4

PUBLIC INVOLVEMENT SCOPING WORKSHOP - MEETING #1

TENTATIVE AGENDA

PURPOSE: To introduce the project to the public; to begin preparing the public and the project team for further interaction; to identify the values, issues, and concerns of the interested public regarding the proposed project; and to identify potential environmental impacts.

CONCEPTS: Low-key, Informative, Productive, Identical information provided at two scoping meetings at Tilghman and Chesapeake Beach.

PRODUCT: Prioritized list of interests/issues/concerns and potential environmental impacts identified by the interested and attending public.

2 min.	Welcome and introductions. (MAJ Deren, COE)
5 min.	Background/Context (Frank Hamons, MPA)
7 min.	Video.
15 min.	Presentation. (Bob Smith, MES)
5 min.	Explanation of small group/brainstorming. (MAJ Deren)
5 min.	Count off/move into small groups.
20 min.	Small groups/brainstorming topics. - positive - negative - ideal - issues
5 min.	Vote with stick-on colored dots.
2 min.	Move back into large group.
5 min.	Group spokesperson for each small group reads items identified by their group as most important.
10 min.	Discussion/questions/issues/thoughts/reactions. (MAJ Deren)
2 min.	Closure - Second public workshop - late March-early April. - You are welcome to contact any one of us to ask questions or to make comments. - Thank you for participating.

(Approximate time: 1 hour and 15 minutes)

HANDOUTS: Welcome to meeting/explanation of scoping process; Public Notice with map(s); newsletter; comment card; 4 colored dots.

GRAPHICS:
Board - 1847 footprint and island remnants;
Board - Alternative layouts;
Board - Typical cross section;
Board - Aerial photo of Poplar Island area.

SUPPLIES: Video, VCR, name tags (2 colors), sign-in sheets, pencils/pens, markers, cello and masking tape, scissors, handouts, business cards, easels, pads of butcher paper, colored dots, signs to meeting room, camera/film.

PERSONNEL:

MES - Bob Smith, Wayne Young
MPA - Dave Bibo, Mike Hart, Frank Hamons, Tricia Slawinski
COE - Stacey Brown, Carol Anderson-Austra, Mark Mendelsohn, Brian Walls, Wes Coleman, Bob Bank, Harold Nelson, MAJ Deren

PRE-MEETING TASKS: Decide on meeting room layout, set up tables, chairs, easels, video; organize sign-in sheets, pens/pencils, name tags, waste receptacle, brochures/handouts, refreshments; post direction signs; meet and make note of people to be introduced, both attendees and team members.

file: topics

SCOPING MEETINGS - GENERAL PREPARATION

Items to keep in mind:

1. Scoping meetings and other public involvement activities are purpose-driven. The purpose is to gather information regarding the project area and the proposed project from the public. The public should be, and should feel, that they are a genuine part of the decision making process.

2. The project is being planned WITH, not FOR, the participating agencies and the public. A commitment to public interaction will help to create a more integrated public perception of the project.

3. The project is PROPOSED. It is NOT a done deal. The proposed project has strong support from a number of publics and appears to be a win-win situation in providing environmental benefits and placement for dredged material. However, the proposed project could come to a screeching halt if it is not technically feasible, environmentally and economically beneficial, and acceptable to the public.

4. In compliance with the National Environmental Policy Act (NEPA), the purpose of the meeting is to gather information about public reactions, concerns, and ideas regarding the proposed project.

5. Public involvement does not necessarily simplify the planning process, and it may generate conflict, but it can show competing public wills and provide an opportunity to solve problems early in the project.

6. Public involvement can provide insights to perceptions of equal/unequal gain or loss resulting from a project. It is not so much the absolute gain or loss as the perceived relative deprivation of benefits that is key. The process can provide an opportunity for discussions regarding the appropriate mitigation for distribution of perceived gain or loss.

7. Public involvement is not a technique, but a strategy/approach/philosophy. The techniques used are not as important as the people and attitudes of those using a technique. Honesty is critical and will be judged by the public.

8. Public involvement can confront planners with problems we have no authority to solve; those who have that authority will have to exercise their responsibility as problems are identified.

9. If public reception to a meeting is hostile, keep in mind that it is not personal; the reaction is to the role or agency represented. If there is a potential for negative public reaction, avoid symbols of power such as large numbers of staff, elaborate graphics or visuals; present yourself as a human being on the same level as everybody in the audience.

10 . Please show respect to all speakers during the meeting, even if you're completely familiar with the material being presented or disagree with what is being said. Conversations in the back of the room are never as quiet as we intend them to be and are distracting as well as disrespectful.

SMALL GROUPS/BRAINSTORMING

PURPOSE: To identify values/issues/concerns of the interested and attending public.

METHOD:

1. Arrange seats in a circle; limit group size to approximately 10 people; don't seat friends/spouses together.

2. Each group has a facilitator and a scribe (someone who can write quickly and legibly).

3. Facilitator introduces self, scribe, and process. Check to see that everyone has 4 colored dots.

4. Be welcoming and encouraging; remember that we want to make it easy for attendees to provide information and ideas that will benefit the project; our task is to elicit information, to question, listen, and pay attention in a way that rewards each individual's input; take care not to challenge, however negative or hostile an attendee may appear; facilitate expression of the thought or problem; address group members by name.

5. Remind the small group of the brainstorming rules:
   - work quickly;
   - get as many ideas written down as possible;
   - focus on the topic for a minute before beginning;
   - move sequentially around the circle;
   - everyone gets an equal chance to speak;
   - don't edit your own or others ideas, just say it;
   - keep the ideas flowing, if you can't think of anything, say "pass", and keep thinking; something else may come to you during the next round;

6. Introduce one topic at a time. Have the topic written at the top of a sheet of butcher paper.

7. Ask that the group members focus on the topic; explain what the topic means; give an example.

   "Think about something that's good about Poplar Island; it might be a memory of a picnic on the island when you were a child, or the way it looks in the sunset, or that it is a good place to go fishing."

8. Go around the group as many times as possible in the time allowed. Make suggestions if ideas are slowing down. Keep the tone of the group light, but productive. When the time is almost up ask for any last thoughts, from anyone, not necessarily in turn. Compliment the group for all the good ideas.

9. Scribes: abbreviate where possible; if there is any question about whether the item as written reflects what the speaker said, check with the speaker. ("Does this say what you mean?")

10. As each topic is completed, tape the paper(s) up on the wall.

11. When all 4 topics have been brainstormed and the papers taped up, have the group vote with their colored dots. Dots can be placed by whichever items each person thinks are the most important considerations for the project. All 4 dots can be placed by one item, or one dot can be placed by one item under each topic, etc. (One person, 4 votes; it's better than a democracy.)

12. Draw the group's attention to the items that got the most votes in their group. You might informally summarize the results. ("It looks like this group is really interested in/concerned about _____, _____, and _____, and pretty concerned about _____.")

13. Ask for a volunteer to read the highest priority items/concerns/ideas when the large group reconvenes.

14. Thank the group for their efforts.

15. Assist the group members in reconvening into the large group.

SUGGESTED FACILITATORS/SCRIBES: Stacey Brown/Wayne Young, Tricia Slawinski/Mark Mendelsohn, Dave Bibo/Bob Bank, Brian Walls/Bob Smith, Carol Anderson-Austra/Mike Hart, MAJ Deren/Wes Coleman.

Frank Hamons, Harold Nelson - Oversee small groups, keep times for brainstorming activities.

SMALL GROUP/BRAINSTORMING TOPICS

The small groups will consider four topics related to Poplar Island. The purpose of the questions/topics is to elicit information about the values of the public regarding Poplar Island and the proposed project. General information about the proposed project will be provided prior to forming the small groups. The questions/topics are:

1. What is good about the island?

2. What is bad or negative about the island?

3. What is your idea of a perfect Poplar Island?

4. What issues or problems can you think of regarding Poplar Island or the project?

Sometimes it helps for facilitators to give examples to get a group going on brainstormed lists. Following are a few suggestions for introducing the questions/topics:

(For topic 1)
"Think about something that's good about Poplar Island; it might be a memory of a picnic on the island when you were a child, or the way it looks in the sunset, or that it is a good place to go fishing."

(For topic 2)
"What can you think of that's bad or negative about the island? It might be simply that it's eroding, or that you can't go crabbing there any more, or that last time you were there you saw litter along the shore."

(For topic 3)
"Use your imagination and think of the most perfect condition for Poplar Island. Create a vision in your mind and describe what it could be like if there were unlimited money and other resources. You might say it's just perfect the way it is; or it should be the way it was in 1847; or that it should be forested, or quiet, or more accessible."

(For topic 4)
"What issues need to be addressed about Poplar Island and this project? Making the fishing better? Keeping the big or little boats out? Making the island better for water fowl? For clams? For people?"

Note that ideas brought forward by the group may represent conflicting views, values, or possibilities. That's ok; reassure the group that conflict can be productive. All ideas are valid and valuable at this stage of the project. It's simple to solve one problem, but design and engineering (and life) frequently involve finding solutions for a wide range of problems related to the task at hand. Public input helps to identify existing conditions, define problems, and develop strategies and future actions for the project.

Poplar Island Habitat Restoration
Scoping Meetings

The purpose of the scoping workshops was to provide preliminary information about the proposed project and to gather information about the values of the population which would be impacted by the project. Comments made during the scoping process for the project reflected a wide range of values, interests, and concerns, including broad environmental issues, technical construction questions, and personal feelings about the island and the proposed project.

The following lists include responses to questions addressed during brainstorming sessions at two scoping meetings held on Tilghman Island, on the Eastern shore, and at Chesapeake Beach, on the west side of the Bay. The lists include responses to four questions regarding what the meeting attendees felt was good, bad, or problematical about the island in the past, in its existing condition, and in the future, both with and without the project. Attendees were also asked to describe their idea of the perfect Poplar Island.

In response to the question "What is good about Poplar Island?", the issues identified as most important focused on the value of the area for clamming, crabbing, and fishing; its environmental/habitat value; the protection from erosion it provides; and its natural beauty and other features. The historic resources of the island were also considered important, as well as the potential for recreation and jobs if the island is restored.

Responses to the question "What is bad about Poplar Island?" reflected two different perspectives: dissatisfaction with existing conditions in the Poplar area and concerns with the proposed project. Existing conditions which were considered "bad" focused on the effects of erosion: the resulting shoaling and sedimentation in the surrounding areas as well as the loss of trees, irregular shoreline, and other wildlife habitat. Negative aspects of the proposed project were identified as the impacts of construction on fishing activities, and the high cost of the proposed project, as well as questions about the ability of the retaining dikes to withstand storm conditions.

The majority of responses on the topic of Issues, Problems, and Concerns with the project were identified as potential problems with the strength of the structure and project impacts during and after construction on fishing and wildlife habitat in the area. Other issues identified were the potential for pollution from material placed on the island, project costs, ownership of the restored island, and the impacts to cultural resources and conservation efforts.

The majority of comments describing the "perfect Poplar Island" ranged from "leave it the way it is now" to "restore it to a forested wildlife sanctuary". Most responses described an ideal island restored to the size of the original (1847) island, with little or no development. According to the comments, the ideal island would be maintained for wildlife habitat and scientific study, and with limited or passive recreation use, such as bird watching or visits by science classes.

Meeting attendees were divided into four groups at the Tilghman meeting and each group's comments are listed separately below. Attendees at the Chesapeake Beach meeting remained in one group for the brainstorming exercise. Numbers in parentheses indicate "votes" for items attendees felt were the most important considerations for the Poplar Island area.

Poplar Island Habitat Restoration
Scoping Meeting #1
Tilghman Island 2/21/95

Group #1

Good

Only clam producing places left (8)
Protects shoreline of E. Shore (2)
Protects birds/nesting (2)
Likes to see island
Helps fishing
Helps fishermen/seafood industry

Bad

Erosion contributes to shoaling of Knapps Narrows (1)
E. Side hard to navigate
Channel shoals
Too many birds eat bait
No SAV

Issues/Problems/Concerns

Ruination of clam/oyster bottom-clams everywhere around island (5)
How long of buffer zone during construction (2)
Containment of material/fines affecting oyster bar (2)
How long construction
How long will project last
Access channel tearing of bottom
Maintenance of project

Perfect Poplar Island

Original Size (4)
Size 20 years ago (1)
Create nursery (1)
Erosion stopped-left alone-let nature take its course
Same depth

Group #2

Good

For the environment
Conservation
Crabs, fish, fishing opportunities
Doesn't destroy marshes or farmland
Cultural resources site

Bad

Loss of mainland protection
Doesn't maintain shoreline
Loss means losing sea bird habitat
Loss of deer haven
Loss of eagle habitat

Issues/Problems/Concerns

How can we prove dredged material is clean (5)
Need bottom habitat for clammers, crabbers (4)
People need to work on the water (4)
Maintain/salvage existing cultural resources (3)
Loss of bay bottom (2)
Mother nature/conservation (2)

Perfect Poplar Island

What it is now
Move it to Smith Island
Keep Poplar where it is now
Enhanced bottom habitat along with island restoration
Balance the needs of everyone interested

Group #3

Good

Without it we lose all the marsh in the area (1)
Natural buffer (1)
Restores natural harbor (1)
Alignment 3 is more cost-effective than alignment 1
If you're going to do something good, let's do it in Talbot County
Possible jobs for watermen

Bad

Immediate impacts to clammers/crabbers (2)
Area open during construction (buffer zones) (2)
Dike riprap before sand (1)
Ht. of East Dikes (1)
Uplands should be 22 ft. like HMI (1)
Thin lifts of dredged material (1)
Too much wetland (high ground more important)
Foundation strengths
Lowes wharf-marsh will be exposed without project
Concern with construction of wetlands so as not to form mudflats

Issues/Problems/Concerns

Erosion
Siltation

Perfect Poplar Island

Containment before placement (3)
Restrict the island width, make higher (2)
Do it similar to the way its being laid out
Wildlife sanctuary

Group #4

Good

Better crabs and clams since eroded (more area) (2)
Nothing (1)
Former good habitat (1)
Historical resources-steam engine (1)
Stop erosion from Tilghman Island
Good placement site
Habitat
Former good farmland
Duck hunting
Safe harbor
Goats (30 wild)
Grow tomatoes and wheat
Crabs and clams
History

Bad

Gone and too costly too save (2)
Possibility of losing material during construction- need stone dike on all sides (1)
Eroding
Too far from girls for HB
Not providing protection for Tilghman
Possibility of losing material if built
Too late for Army Corps
Loss of property

Issues/Problems/Concerns

Cost-too high (6)
Possibility to lose mud-will rinse out (5)
Place stone dike bulkhead-cost a fortune (1)
Every 10 years ice storm-consider ice-need to protect from all sides (1)
Silt will run everywhere (1)
Hurricanes from NE (1)
Idea too stupid
If you're going to do it-do it right
If material breaks loose-mess up all area
Every 10 years ice storm-consider ice

Can't be wetland
Water control
Rough seas

Perfect Poplar Island

10' water on top (1)
Let it go-leave the way it is
Can do anything on it
Tie in Coach's Island
Good agriculture/forest land
Good habitat
Scientific study
Good use of $

Poplar Island Habitat Restoration
Scoping Meeting #2 2/23/95
Chesapeake Bay, MD

Good

Pristine, beautiful place (2)
Bring back marshes/good marshes (2)
Wildlife Habitat (1)
Recreate islands/stop erosion (1)
Irregular shoreline (1)
Good placement site
Good oyster area
Protection for harbor
Clear water
Snags provide good fishing habitat
Provides possible recreational/wildlife opportunities
Provides protection to shoreline
Protection of oyster bars
Sub-aqueous vegetation
Good clamming/crabbing area
Good camping/good fishing
Aid to navigation
Remote area
Provides excellent fishing
Providing habitat

Bad

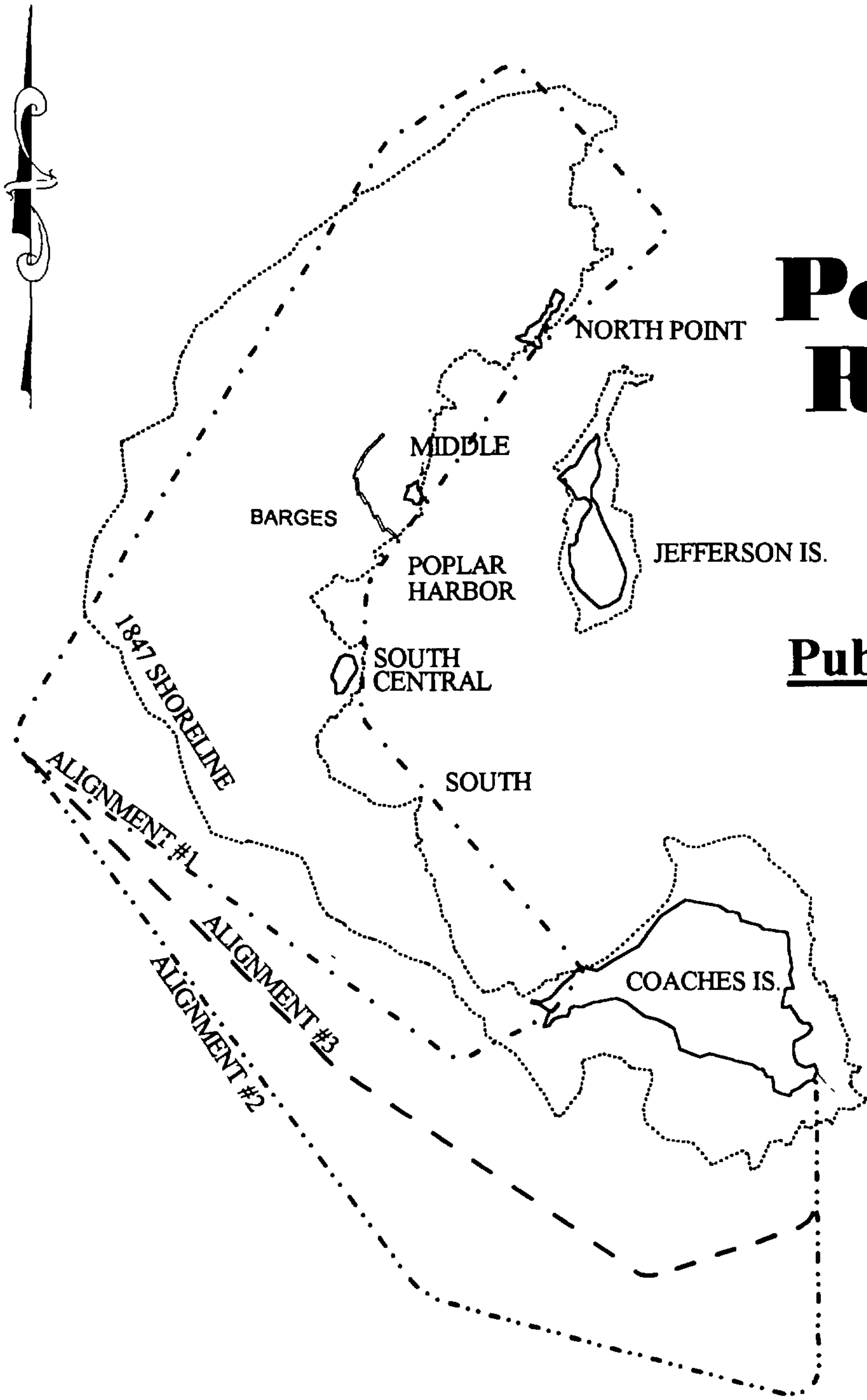
Erosion is occurring (1)
No trees (1)
Losing shoreline/coves (1)
Stumps are navigation hazard
Sediment is filling in channels
Oyster bars are disappearing due to erosion

Issues/Problems/Concerns

Sequence of construction and minimization of impacts to habitat (3)
Ownership of land for the future (3)
Safety for fishing gear during construction-designated access channels (3)
Where is fill coming from?/Is it clean? (2)
Public access to testing records (2)
What will dikes be constructed of? (1)
How will material impact crabs, clams, oysters, etc.? (1)
Jetties for habitat/some type of beach/variation of water-stone interface (1)
Clean dirt needs to be used (1)
Material needs to be monitored to ensure cleanliness (1)
Sedimentation during construction
How will construction impact crabs, oysters, etc.?
Duration of project as it relates to aesthetics and habitat

Perfect Poplar Island

No facilities (2)
Wildlife-endangered (2)
Bird watching (1)
Restore it to the way it was (1)
Wildlife sanctuary (1)
Limited/regulated hunting-upland game/migratory waterfowl (1)
Lots of trees (poplars, pines, hardwoods)
No fast boats/jet skis/water skiing
No habitation by humans
One caretaker to live there, no developments
School visits
Emergency shelter
Camping-groups/individuals
Wonderful fishing spot
Boat anchorages
Dikes with "nooks and crannies"
Biketrail
Re-establishment of oyster bars/marshes
Passive, low key activities (interpretive services)



You are invited...

Poplar Island Restoration

Public Information Meeting

Wednesday, April 12, 1995

7:00 P.M.

Tilghman
Elementary School

All interested parties are invited to attend a meeting to discuss possible alternatives for the proposed restoration of Poplar Island.

WELCOME

to the

POPLAR ISLAND RESTORATION

PUBLIC INFORMATION MEETING

This meeting is a step in the public participation process that is required by the National Environmental Policy Act (NEPA) for Federal plans and projects. The purposes of NEPA include encouraging "productive and enjoyable harmony" between human activities and the environment.

Earlier steps in the public involvement process for the Poplar Island project have included informal meetings with a variety of interest groups (such as watermen and charterboat captains), coordination with natural resource management agencies (such as DNR, FWS, and NMFS/NOAA), and public scoping meetings. A full schedule of public information meetings and agency coordination will continue throughout the life of the project.

The principal goal of this meeting is to obtain public input on alternative alignments being developed by the engineering contractor. As required for the Environmental Impact Statement (EIS) being prepared for the project, comments made during earlier steps in the public involvement process are being incorporated into the design process. Public and agency input is expected to include comments and other information on environmental, economic, aesthetic, and cultural impacts to the project area.

We seek your input at this meeting so that we will be better able to identify the impacts - both positive and negative - of the proposed project. Your comments and suggestions will be considered and addressed in the EIS.

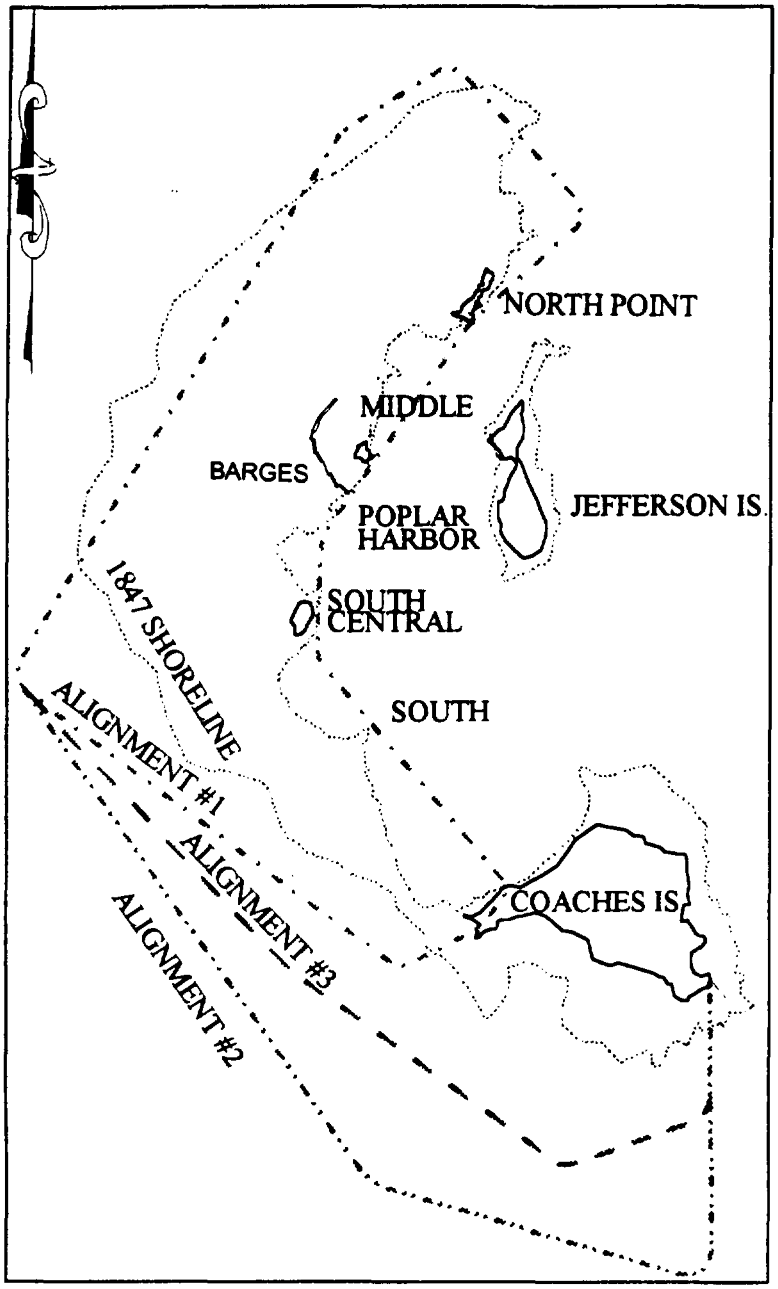
This meeting will include a brief presentation on the background and status of the proposed project, a description of the alternative designs being developed, and a question and answer and open discussion periods.

We invite you to provide comments, suggestions, and ideas about the project at this meeting or any time throughout the study. Comments may be written or sent via internet to the addresses below:

U. S. Army Corps of Engineers
Poplar Island Restoration Project
Attn: CENAB-PL-PC
P. O. Box 1715
Baltimore, Maryland 21203-1715

Internet address: seb@cenabpl.nab.usace.army.mil

WELCOME
TO THE
POPLAR ISLAND RESTORATION STUDY
PUBLIC INFORMATION MEETING



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Earlier steps in the public involvement process for the Poplar Island project have included informal meetings with a variety of interest groups (such as watermen and charterboat captains), coordination with natural resource management agencies (such as DNR, FWS, and NMFS/NOAA), public scoping meetings. A full schedule of public information meetings and agency coordination will continue throughout the life of the project.

The principal goal of this meeting is to obtain public input on alternative alignments being developed by the engineering contractor. As required for the Environmental Impact Statement (EIS) being prepared for the project, comments made during earlier steps in the public involvement process are being incorporated into the design process. Public and agency input is expected to include comments and other information on environmental, economic, aesthetic, and cultural impacts to the project area.

We seek your input at this meeting so that we will be better able to identify the impacts - both positive and negative - of the proposed project. Your comments and suggestions will be considered and addressed in the EIS.

This meeting will include a brief presentation on the background and status of the proposed project, a description of the alternative designs being developed, and a question and answer and open discussion period.

4/12/95

PUBLIC INFORMATION WORKSHOP - MEETING #2

TENTATIVE AGENDA

PURPOSE: To provide a description of the plan alternatives and project status and an opportunity for the public to comment and ask questions about the project.

CONCEPTS: Provide information and answer questions on plan alternatives and technical aspects of the project.

PRODUCT: Prioritized list of preferred alternatives or plan elements identified by the interested and attending public.

2 min. Welcome/introductions (Brown, COE)

5 min. Project background/context (Hamons, MPA)

10 min. Project Status (Smith, MES)
- Alternatives development
- Public involvement
- Environmental testing

20 min. Presentation of project alternatives (Thomas, GBA)

5 min. Environmental Testing/Monitoring (Walls, COE)
- Dredged material/biological
- Pre-construction
- During construction
- Post-construction

20 min. Questions and Answers/Open Discussion

2 min. Closure
- Third public workshop - late May-early June
- You are welcome to contact any one of us to ask questions or to make comments.
- Thank you for participating.

(Approximate time: 1 hour)

HANDOUTS: Welcome to meeting/meeting purpose and agenda; alternative layouts; newsletter; comment cards; 3x5 cards/pencils.

GRAPHICS:
Board - 1847 footprint and island remnants;
Boards - Alternative layouts;
Board - Typical cross section;
Board - Aerial photo of Poplar Island area.
Board - Flow diagram
Others

SUPPLIES: Name tags (2 colors), sign-in sheets, pencils/pens, markers, cello and masking tape, scissors, handouts, business cards, easels, pads of butcher paper, 3x5 cards, signs to meeting room, camera/film.

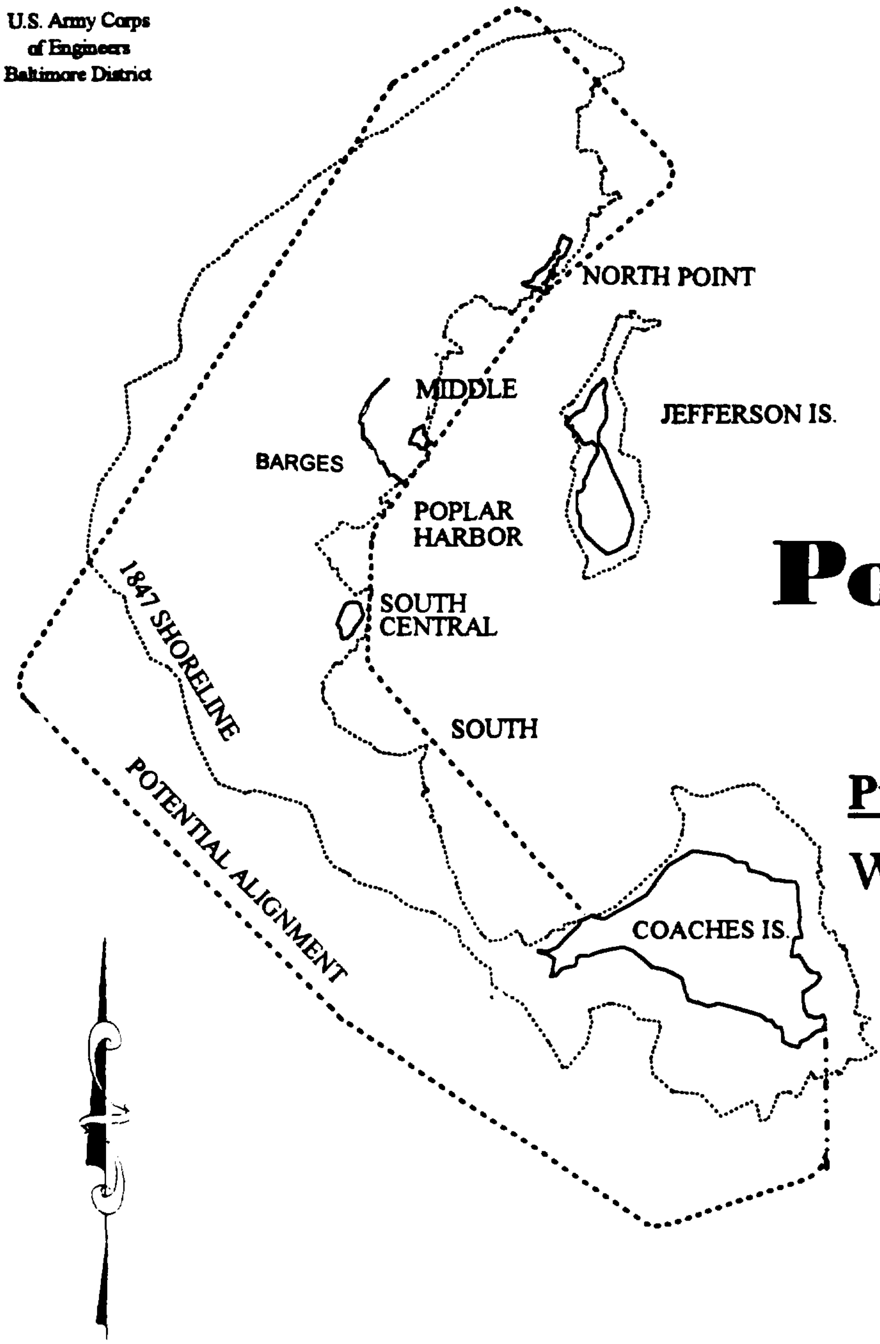
PERSONNEL:
MES - Bob Smith
MPA - Dave Bibo, Frank Hamons
COE - Stacey Brown, Carol Anderson-Austra,

Brian Walls, Wes Coleman
GBA - Dick Thomas
EA - Frank Pine

PRE-MEETING TASKS: Decide on meeting room layout, set up tables, chairs, easels; organize sign-in sheets, pens/pencils, name tags, waste receptacle, brochures/handouts, refreshments; post direction signs; meet and make note of people to be introduced, both attendees and team members.

U.S. Army Corps
of Engineers
Baltimore District

Maryland Port
Administration



You are invited...

Poplar Island Restoration

Public Coordination Meeting

Wednesday, August 23, 1995

7:00 P.M.

Tilghman

Elementary School

21374 Foster Avenue

Tilghman, MD

All interested parties are invited to attend a meeting to provide an update on the project status and a description of the potential project alignment and the limited funding alternative.

POPLAR ISLAND RESTORATION PROJECT

PUBLIC INFORMATION MEETING

Welcome to the third public information meeting for the Poplar Island Restoration Project. The purpose of this meeting is to present a brief overview of the project status, the alternative alignments for the restored island, and the test dike, as well as a description of the recommended project alignment. In addition, this is an opportunity for the public to ask questions and make comments about the project.

This meeting is a step in the continuing public participation process that is required by the National Environmental Policy Act (NEPA) for Federal plans and projects. The purposes of NEPA include encouraging "productive and enjoyable harmony" between human activities and the environment.

Earlier steps in the public involvement process for the Poplar Island project have included a number of informal meetings with a variety of interest groups (such as watermen and charterboat captains), coordination with natural resource management agencies (such as DNR, FWS, and NMFS/NOAA), and two public meetings similar to this one.

As required for the Environmental Impact Statement (EIS) being prepared for the project, comments made during each step in the public involvement process are being incorporated into the project. We seek your input at this meeting so that we will be better able to identify the impacts - both positive and negative - of the proposed project. Your comments and suggestions will be considered and addressed in the EIS. We invite you to provide comments, suggestions, and ideas about the project at this meeting or any time throughout the study. Comments may be written or sent via internet to the addresses below:

U. S. Army Corps of Engineers
Poplar Island Restoration Project
Attn: CENAB-PL-PC
P. O. Box 1715
Baltimore, Maryland 21203-1715

Internet address: seb@cenabpl.nab.usace.army.mil

MEETING AGENDA

Welcome and Introductions	Stacey Brown, COE
Project Background	Frank Hamons, MPA
Project Status	Bob Smith, MES
Test Dike	Brian Walls, COE
Recommended Alignment	Bob Smith, MES
Environmental Impacts	John Gill, FWS/Brian Walls, COE
Discussion/Questions	
Closure	

8/23/95 Tilghman Elementary

CONTINUING COORDINATION MEETING - MEETING #3

TENTATIVE AGENDA

PURPOSE: To provide an update on the project status and a description/discussion of the recommended project alignment and the limited funding alternative.

CONCEPT: Provide information, conduct discussion, and answer questions on the recommended alignment and the limited funding alternative.

PRODUCT: A description of the presentation, discussion, and comments to be incorporated into the final design and NEPA documentation prepared for the project.

2 min.	Welcome/introductions (Brown, COE)
5 min.	Project background/context - Limited funding alternatives (Hamons, MPA)
10 min.	Project status (Smith, MES) - Review of alternatives - Public involvement - Tilghman area watermen - Environmental testing/monitoring
5 min.	Test dike (Walls, COE)
20 min.	Presentation of recommended alignment (Smith, MES)
5 min.	General Environmental Impacts (Walls, COE; Gill, USFWS) - During construction - Project features - Post-construction
20 min.	Questions and Answers/Open Discussion
2 min.	Closure - Next meeting - public hearing - Nov 95 - You are welcome to contact any one of us to ask questions or to make comments. - Thank you for participating.

(Approximate time: 1 hour and 15 minutes)

HANDOUTS: Welcome to meeting/meeting purpose and agenda; MPA brochure; comment cards; 3x5 cards/pencils.

GRAPHICS:
Board - 1847 footprint and island remnants;
Boards - Alternative layouts;
Board - Typical cross section;
Boards - Aerial photos of Poplar Island.
Board - Flow diagram

Board - Recommended alignment (and limited funding alternative)
Others

SUPPLIES: Name tags (2 colors), sign-in sheets, pencils/pens, markers, cello and masking tape, scissors, handouts, business cards, boards, easels, pads of butcher paper, 3x5 cards, signs to meeting room, camera/film, refreshments.

PERSONNEL:

MES - Bob Smith
MPA - Dave Bibo, Frank Hamons
COE - Stacey Brown, Carol Anderson-Austra,
Brian Walls, Wes Coleman
GBA - Dick Thomas
M&N - John Headland
EA - Frank Pine

PRE-MEETING TASKS: Decide on meeting room layout, set up tables, chairs, easels; organize sign-in sheets, pens/pencils, name tags, waste receptacle, brochures/handouts, refreshments; post direction signs; meet and make note of people to be introduced, both attendees and team members.

POPLAR ISLAND RESTORATION PROJECT

FINAL PUBLIC INFORMATION MEETING

November 28, 1995
Talbot County Free Library, Easton, Maryland

Welcome to the fourth public information meeting for the Poplar Island Restoration Project. The purpose of this meeting is to present a summary of the recommended project, including the alternatives considered, and the environmental impacts of the project, both adverse and beneficial, as presented in the draft Feasibility Report and Environmental Impact Statement (EIS). In addition, this is an opportunity for the public to ask questions and make comments about the project.

This meeting is a step in the public participation process that is required by the National Environmental Policy Act (NEPA) for Federal plans and projects. The purposes of NEPA include encouraging "productive and enjoyable harmony" between human activities and the environment, as well as providing information about a project to the public and to decision-makers.

Earlier steps in the public involvement process for the Poplar Island project included a number of informal meetings with a variety of interest groups (such as watermen and charterboat captains), coordination with natural resource management agencies (such as the Department of Natural Resources, Fish and Wildlife Service, National Marine Fisheries Service, and the National Oceanic and Atmospheric Administration), and three public meetings.

As required for the draft EIS prepared for the project, comments made during each step in the public involvement process have been incorporated into the project. Your input at this meeting will also be incorporated into the project planning process and addressed in the environmental documentation prepared for the project. The meeting will be recorded, and a transcript of the recording will be prepared and available upon request.

After this meeting, further comments may be written or sent via internet to the addresses below. Comments must be received by December 28, 1995, in order to be incorporated into the project documents.

U. S. Army Corps of Engineers
Poplar Island Restoration Project
Attn: CENAB-PL-PC
P. O. Box 1715
Baltimore, Maryland 21203-1715

Internet address: stacey.e.brown@ccmail.nab.usace.army.mil

MEETING AGENDA

Welcome and Introductions	**Stacey Brown, COE**
Recommended Project and Schedule	**MAJ Lawrence A. Deren, COE**
Comments and Questions	
Closing	**Stacey Brown, COE**

FINAL POPLAR ISLAND PUBLIC INFORMATION MEETING
November 28,1995 - Easton Library
TENTATIVE AGENDA

PURPOSE: To present the recommended project design and the resulting environmental impacts, both positive and negative.

CONCEPT: Present information, answer questions, and accept comments on the proposed project and the draft EIS.

PRODUCT: A transcription and video of the presentation, questions, and comments. All statements will be addressed in the final EIS.

2 min.	Welcome/introductions (Brown, COE) Congress, others, project team
20 min.	Presentation of recommended project (Maj. Deren, COE) Future actions/schedule
30 min.	Questions, comments
10 min.	Closing (Brown, COE) - opportunity after meeting to discuss project - opportunity to comment by mail - thank you for participating

(Approximate time: 1 hour)

HANDOUTS: Welcome to meeting/meeting purpose and agenda; MPA brochure; comment cards; 3x5 cards/pencils.

GRAPHICS:
Board - 1847 footprint and island remnants;
Boards - Alternative layouts;
Board - Typical cross section;
Boards - Aerial photos of Poplar Island.
Board - Flow diagram
Board - Recommended alignment (and limited funding alternative)

SUPPLIES: Name tags (2 colors), sign-in sheets, pencils/pens, markers, cello and masking tape, scissors, handouts, business cards, boards, easels, butcher paper, 3x5 cards, signs to meeting room, video camera/film, refreshments.

PERSONNEL:
MES - Bob Smith
MPA - Dave Bibo
COE - Maj. Deren, Stacey Brown, Wes Coleman, Clyde Jobe, Doug Garman, Brian Walls, Carol Anderson-Austra
GBA - Dick Thomas
M&N - John Headland
EA - Frank Pine

PRE-MEETING TASKS: Decide on meeting room layout, set up tables, chairs, easels; organize sign-in sheets, pens/pencils, name tags, waste receptacle, brochures/handouts, refreshments; post direction signs; meet and make note of people to be introduced, both attendees and team members.

Attachment D

Public Comments

COMMENT CARDS

Pre-addressed post cards were distributed at each public meeting. The cards provided an opportunity for comments and questions. A number of cards were returned at the meetings or by mail with a request that the senders name be added to the project mailing list. Approximately 35 messages were received on the comment cards, in letters or notes, and by electronic mail. The following messages were mailed, faxed, or e-mailed to the Corps' project manager. In response to these and other messages, information was phoned, faxed, or mailed, as appropriate.

Mr. and Mrs. Irvin Berkemeier
P.O. Box 238
Tilghman, MD 21671

February 15,1995

U. S. Army Corps of Engineers

Re: EIS to assess the environmental effects of using dredged material to enlarge Poplar Island to its approximate size in 1847.

I will not be able to make the meeting scheduled for February 21, 1995 (7:00PM) at Tilghman Elementary School. I have the following questions and or comments:

* Where would the dredged material come from?
* Ball park figure on cost?
* Is the dredged material the proposed dredge (spoils) from the Baltimore Inner Harbor?
* Will previous owners of home sites on Poplar Island regain/be able to re-establish their land titles/squatters rights?
* Will this dredge filled approx. 1000 acres be strictly wildlife habitat or will it be developed into state of Maryland enterprizes such as Black Walnut point Inn and Wildlife Refuge at the end of Tilghman Island?

Clarence N. Scott
Facilities Manager
Montgomery County Schools
4703 Red Fox Road
Rockville, MD 20852
(301) 770-6374

February 18,1995

I believe this is an excellent project and I give my complete support.

Gregory Phillips
228 Camper Circle
Tilghman, MD
(410) 886-2431

February 13, 1995 (mtg)

I would be willing to talk about plan.

Lanny Ray
Captain
Maryland Charter Boat Association
615 E. Marshall Avenue
Deale, MD 20751
1-(410)-867-1795

February 14, 1995

Looking forward in watching the island gaining its original shape.

Pete Sweitzer
Waterman - 50 years
P.O. Box 139
Tilghman, MD 21671

February 23, 1995

This project will be a great benefit to Baltimore, MD, Talbot County, Tilghman Island in particular. Do not let self-serving people get in your way.

Leroy W. Brooks
Duns Cove Farm
P.O. Box 98
7004 Duns Cove Road
Sherwood, MD 21665
(410) 886-2257

March 2, 1995

We are strongly in favor of this project. Rebuild to 1,000 acres in accordance with your plans. Construct retaining bulkhead to minimize damage to other area and aquatic life. Should be very beneficial to the restoration of the Chesapeake Bay and the wildlife habitat.

April 6, 1995

I wish to compliment you on your preparation and conduct of the very informative meeting held at Tilghman Elementary School, February 21, 1995.

I have walked on, fished and crabbed around Poplar Island since the 1920's and have observed the continuous eroding of the island as well as the enormous decline of marine life, aquatic vegetation and upland wildlife.

A few of the watermen present expressed concerns that the project would endanger some marine life and were threrefore opposed to the project. Historically some watermen have been opposed to any change just because it may possibly, temperarally [sic] affect their own personal income, without regard to the beneficial overall effect the change may have on other people, the environment, or the ecology. The long range benefits vastly override selfish short-term effects.

The approach channels to Baltimore Harbor are to be dredged anyway and Poplar Island is an ideal place to deposit some of the clean material.

The proper construction of the retaining dykes [sic] to contain the dredged material with no seepage, thereby creating intertidal wetland and upland wildlife habitat, restoring the island to its early 19th century size is a very worthwhile project. It would be a tremendous benefit to the Chesapeake Bay, the surrounding wetlandss and shorelands of the Eastern Shore, as well as greatly helping to restore endangered marine life and many species of wildlife.

I strongly recommend your proceeding with the Poplar Island Restoration Project. It may prove to be an ideal pilot Project to effectively correct other seriously eroding land areas.

Sincerely,

(signed) Leroy W. Brooks P. O. Box 98 Sherwood, MD 21665

Captain George A. Prenant
President
AAA Charterboats Inc.
946 Main Street
Deale, MD 20751
(301) 261-5656

February 11, 1995

Re-forest Poplar Island after reservation with trees that will allow Cormorants and Herons roosting and nesting. Use trees like are left on island now.

Thomas L. Johnson
Tracy Lynn Charters
1121 Brice Drive
Edgewater, MD 21037
(301) 261-7734

February 13, 1995

Hope this study doesn't disturb the fishing on Poplar Island or surrounding areas.

Robert C. Sweitzer
Waterman
P.O. Box 315 Coopertown Road
Tilghman, MD 21671
(410) 886-2605

March 6, 1995

Stay within framework of plan. Idea is good, needs more in depth study. Island Restoration Project should be beneficial to all in the future.

Charles C. Lynde
5703 Shore Drive, B-3
Churchton, MD 20733
(410) 867-3608

March 10,1995

Much in favor of this reconstructing of this island.

Hugh K. Bailey
9979 Wades Point Road
McDaniel, MD 21647
(410) 745-3120

February 21, 1995 (mtg)

Costs way too high and sure to go much higher than estimates if job is done right. Totally impractical. Waste of taxpayer's money.

Randy Gowe
Waterman
21456 P.O. Box 152
Tilghman, MD 21671
(410) 886-2367

February 16, 1995

Time date where future meetings are going to be held.

Captain Louis K. Forrest
Fin Finder Charters
P.O. Box 421
Lexington Park, MD 20653
1-800-831-2702

February 21,1995

I am considering fishing more in that area and want not to interfere.

Stephen and Adrienne Nassau
7415 Nevis Road
Bethesda, MD 20817
202-775-1550 AM
301-229-5715

March 13,1995

See the comments faxed and e-mailed to Stacey Brown on 3-13-95. We own the property which is at the southernmost point of Green Marsh Point. We have 850 feet of shoreline and another 750 feet of bulkheaded shoreline. The marsh is eroding rapidly. The project is vital to preserving the marsh which is an important part of the ecological system beneficial to the health of the bay. We are anxious to do what we can to see it approved.

Memorandum

(fax date) March 2, 1995

TO: Stacey Brown FROM: Stephen & Adrienne Nassau RE: Poplar Island Restoration Project DATE: March 13, 1995

We own the property at Green Marsh Point in Sherwood, Md., which is directly opposite Coaches Island. We have over 1000 feet of shoreline on the Bay, 850 feet of which is the marsh which begins on our property and goes north toward Goat Island and Punch Point. Our property is among those that would be most directly affected by the Poplar Island Restoration Project. However, we live and work in the Washington area during the week and were not advised of the Public Scoping Meeting which was held on Tilghman Island a few weeks ago. We certainly would have participated in the meeting if we had known about it.

The marsh opposite Poplar Island is eroding rapidly because the protection which once was provided by the Island is no longer there. The State Department of Natural Resources has just completed a study of our shoreline and shoreline of the property directly to the south of us. The report states the following:

> The need for shoreline protection at these two properties is justified by the existing site conditions.... The rate of erosion taking place along these shorelines, generally between 5 and 6 feet per year, is a direct result of the large open water and the severe storms experienced in the area. Wind generated waves intensify the normal tidal conditions causing these shorelines to erode. As a result of this on-going erosive process, marsh lands have receded, unprotected bank areas have been undermined, protected bank areas are overtopped and exposed, and sediments are being released into the Bay.

The Poplar Island Restoration proposal will help to dampen the wave action against the marsh and slow down the rate of erosion. This will prolong the life of the marsh significantly, which will in turn continue its beneficial ecological effects on the Bay.

We strongly support the concept of continuing the wildlife sanctuary on Coaches Island, which provides an unspoiled and protected habitat for the birds and animals which is becoming less and less easy for them to find.

Poplar Island has a unique place in the history of Maryland and the Chesapeake Bay. It would be a shame to allow it to disappear entirely beneath the water.

We wish to be kept advised of developments regarding the Project and the schedule of public meetings. Mail should be sent to: Stephen and Adrienne Nassau
7415 Nevis Road
Bethesda, MD 20817
Phone 301-229-5715 (h) 202-775-1550 (w) 202-775-0008 (fax)
E-mail snassau@igc.apc.org

Our local address is 21476 Donnell Jones Rd., Sherwood, MD 21665, and local phone no. is 410-886-2714.

Thank you.

April 12, 1995 (mtg)

(List from Ms. Nassau)

EIA SHOULD EXAMINE

How to assure that dredge material is free of toxic material
- sterilization
- testing
- choice of dredge sites

testing on reg. basis required. Prob w/hot spots

How to stabillize soil as you go.
(wind erosion problem)
Can you plant as you go.

Effect of new material on water qualityin immediate area
(e. g. turbidity)

Archaeological investigation

Possible effect on erosion or build up on adjacent mainland and Green Marsh

Effect on oysters, clams, crabs, etc.
existing fish and birds both during and after construction period

Noise of construction

How to guarantee restored area will not be built on

How many boats per day during construction period. Hours of operation. What kind of machinery.

How to prevent additional erosion of recovered areas

Construction period for phase 1, 2, 3.

Alternatives to water discharge point and effects.
involvement of school children and neighbors in restoring habitat and education, etc.

Nature trails

Would water disposal have better water quality than receiving waters?

How long does it take to fill a cell

Any special characteristics of dredge material that is different from material on Poplar now?

Rock or sand on E side? Mud flats or not?

Drainage from Poplar?

Who will maintain site after construction with whose money?

Effect on aquifer

Do you have an alternate site for contaminated soils?

(fax) April 19,1995

Ms. Brown, I wish to thank you and the others involved for the excellent presentation on the project at Tilghman last week. It was most informative.

Of most concern to the owners of nearby property fronting on the Bay is the effect that the changed currents and wave action resulting from the rebuilding of the Island will have on the shoreline. It would be useful if these matters could be addressed in the future.

At the meeting, my wife asked if there were any similar projects of this scope in existence, and apparently there are none. We were just with a friend from the Netherlands who suggested the Corps might want to contact Dutch engineering firms who have had a lot of experience with rebuilding land that has been washed away. He said the results have sometimes been unexpected and he thought their experience might be useful.

Thanks again.

Steve Nassau

G. A. Hamilton
P. O. Box 222
Tilghman, MD 21671
410-886-2345

April 12, 1995 (mtg)

Please include funds to repair unexpected damage, E. G. additional silting in Knapps Narrows channel due to the Poplar Island reconstruction

Mr. and Mrs. Tilghman C. Coale
109 Rock Lane
Kent Point Farm
Stevensville, MD 21666-3855

April 6, 1995

Dear Sir: We are happy to see the notice in the Annapolis paper about the dumping of clean dredge material to restore acres of land on Poplar Island. We live on the very end of Kent Island (South) facing Popular [sic] Island and we've seen the erosion of this beautiful place go into the water each year. Not only are you helping to maintain the island for wildlife but it's going to help our shoreline from eroison. Popular Island acts as a buffer. We feel it will help the whole end of Kent Island on both Eastern Bay and the Chesapeake Bay. We hope you get many good comments about this project. Keep up the good work. Sincerely,

Mr. and Mrs. Tilghman C. Coale

P. S. We only wished we knew about the meeting sooner so we could be there - we had other commitments.

Harold E. Cartright
2556 Hoopers Island Road
Fishing Creek, MD 21634

April 12, 1995

Dear Sirs: I am unable to attend tonight's meeting an the "Poplar Island Restoration", but am vitally interested because I live on an island in Chesapeake Bay south of the site.

Please send me information on why, who is paying, how much, and why Poplar Island and not Barren Is. or Smith or any of the other islands that are washing into the bay.

Thank you
Harold E. Cartright
2556 Hoopers Island Road
Fishing Creek, MD 21634

Sinclair Gearing
2717 Riva Road
Annapolis, MD 21401
410-266-5868/267-6475

April 14, 1995

Awaiting call-back on possible 2nd Chesapeake Beach Meeting on the project. Add to observations voiced at meeting last winter that I think it important to plan some form of beach replenishment around outside of rip-rap/rubble bulkhead. At least enough shore to beach a boat and wade around most of island, if necessary. SG

Robert K. Keller
8612 Tilghman Island Road
Box 130
Wittman, MD 21676
410-745-2237

April 13, 1995

1) Good meeting Tilghman April 12 Expressed concern to Bibo (MPA) and to John Gill - Federal Wildlife that there was no established policy commitment by top State or Federal authorities covering the future use of Poplar Island - by the public (such as nature trails - boat landings etc especially eastern side of island. Please advise what can we expect etc This is important I am very concerned about keeping this protected.

Gerald A. Cole
2554 Hooper Island Road
Fishing Creek, Maryland, 21634

Department of Microbiology & Immunology
University of Maryland School of Medicine
655 W. Baltimore St.
Baltimore, Maryland
410-706-7112
fax 706-7496

Sirs: It is difficult for me to understand why the CE would spend the time, effort, and taxpayer dollars on the restoration of Poplar Island after years of neglect when other Chesapeake Bay areas are in more immediate need of Federal assistance to prevent major land-loss due to erosion. A good example is Smith Island which, together with its inhabitants, is in danger of extiction [sic]. Another is Barren Island which is disappearing at an alarming rate thereby increasing the rate of erosion of upper Hooper Island about a mile to the east. These same areas are also habitats for wildlife. As a home owner in the Bay area I wonder how the decision is made to restore one site and ignore others that seem (to me) to be of significantly greater importance to the lives of people. Can you provide [me] with that information?

Yours truly, G. A. Cole

Mrs. Ednah Stang
Member
Boat Act Advisory Committee
7166 Lauren Lane #606
Easton, Maryland 21601 410-820-5142

August 23, 1995

First trees to be planted by the Boat Act Advisory Com. (Enclosed photos of trees planted on dredged material.)

Gregory P. Wilson
21420 Dogwood Cove Road
Tilghman, Maryland 21671
410-886-2309

August 23, 1995

(Is self employed.) (Wants) local employment.

Charles E. Neumiller, Jr.
Md. Watermen's Association P. O. Box 138
Cordova, Maryland 21625

August 23, 1995

The restored island should be kept as a wildlife refuge.

Robert A. Cooper
General Manager
Higgins Crab House
507 Hazelwood Drive
Easton, Mayland 21601
410-822-9277/home
410-745-5056/work

October 16, 1995

I am most concerned about this project being a success - My wife's mother and her family of "Ridgeways" were born on Poplar Island.

From: igc>snassau
Subject: Re: Poplar Island Restoration Project Meetings
To: seb
Cc:
Sent: 10/25/95
Received: 10/25/95

Cc: snassau@igc.apc.org As you may recall, I own property directly east of Coaches Island. I am interested in getting an update on the project. Specifically, I have been told that Jefferson Island will now be tied into the rebuilt island. Can you verify this? Also, I would like information on who will have title to the rebuilt island? Will it be the present owners of Jefferson and Coaches or the state or federal government? Thanks for your cooperation.

Stephen M. Nassau

Author: Stacey E Brown at zzplan
Date: 11/20/95 4:58 PM
Priority: Normal
Receipt Requested
: snassau@igc.apc.org at INTERNET
C: Stacey E Brown
Subject: Poplar Island Restoration Project
---------------------------------- Message Contents ----------------------------------

Mr. Nassau - I apologize for not having responded to your messages sooner, however we have changed mail systems and I did not know there were messages in my old mailbox.

In answer to your questions, Jefferson Island will not be tied into the rebuilt island and the rebuilt island will belong to the State of Maryland.

As far as a project update goes, the draft feasibility study and draft environmental impact statement are currently out for public review. Copies are available at public libraries in Easton, St. Michaels, Cambridge, Princess Anne, Chesapeake Beach, and Baltimore, Maryland.

There will be a public meeting on Tuesday, November 28th at the Talbot County Free Library at 100 W. Dover Street in Easton, Maryland at 7 p.m.

If you have any additional questions please feel free to contact me by phone at (410) 962-3639 or by e-mail at my new address which is stacey.e.brown@ccmail.nab.usace.army.mil.

Stacey Brown

Attachment E

Agency Coordination
Coordination Letter from District to Agencies
Letters from Agencies
Other Communications

Coordination Letters from District

18 January 1995 Letter from District to Congressional Representatives

Identical leltters were sent to Senators Mikulski and Sarbanes, and to Representatives Cardin, Ehrlich, Gilchrest, and Mfume

18 January 1995 Letter from District to Agencies

Identical letters were sent to representatives of the following agencies: National Marine Fisheries, NOAA/ Coast and Geodetic Survey, U.S. Fish and Wildlife Service, U.S. Coast Guard, U.S. Environmental Protection Agency/Chesapeake Bay Program, U.S. Environmental Protection Agency/Region III, Maryland Department of the Environment, Maryland Department of Natural Resources, Chesapeake Bay Critical Areas Commission, Maryland Geological Survey, Talbot County Council, Talbot County Manager, Maryland Saltwater Sportfishermen's Association, Alliance for the Chesapeake Bay, Chesapeake Audubon Society, Chesapeake Bay Foundation - Maryland Office, Maryland Wetlands Committee

Letters From Agencies, Other Communications

Numerous sponsors, contractors, and agencies collaborated in producing the Poplar Island Restoration Feasibility Study. The success of the project required many high-energy, productive meetings; careful consideration of complex issues; joint responsibility; short timeframes for products; and quick turn-around of products for review and comment. Open communication among many participants was critical for completion of the study. Accomplishment of the project goals was possible only through the sharing of coordination letters and other communications as appropriate. For this reason, letters were often sent to one participant and forwarded to others. Extensive informal coordination also took place. Therefore, agency coordination for the project, as reflected in the following letters and memos, was necessarily significant.

<u>16 September 1994</u> Letter from EPA to MES regarding NEPA compliance for Poplar Island Habitat Restoration Project.

<u>21 October 1994</u> Letter from Paul Slunt at MDE to USACE regarding scope of work for environmental sampling to be documented for the study.

<u>25 October 1994</u> Phone conversation record for call from NMFS to USACE regarding environmental testing/sampling.

26 October 1994 — Letter from NMFS to MES regarding environmental sampling .

27 October 1994 — Memorandum from Cece Donovan/MES to Robert Smith/MES commenting on environmental scoping for the project.

1 November 1994 — Memorandum from DNR to MES regarding reclassification of Natural Oyster Bar 8-10, which is adjacent to the proposed alignment for the restored island. The re-classification had been requested by the project team in order to reduce the design constraints on the project development.

8 November 1994 — Letter from NMFS to MES regarding minimum environmental sampling.

16 November 1994 — Phone conversation record for calls between MES and USACE regarding environmental testing.

(The following four letters were prepared by the environmental contractor, EA Engineering, to respond to comments made by various agencies on environmental testing for the project.)

23 November 1994 — Letter from EA Engineering to USACE addressing comments on environmental sampling in 21 October letter from Paul Slunt of MDE.

28 November 1994 — Letter from EA Engineering to USACE addressing comments in 27 October memo from Cece Donovan on environmental sampling.

5 January 1994 — Letter from EA Engineering to USACE addressing comments on environmental sampling in 26 October NMFS letter.

6 January 1994 — Letter from EA Engineering to USACE addressing comments on environmental sampling in 8 November letter from NMFS.

18 January 1995 — Letter from USACE to MPA regarding decision to prepare EIS.

20 January 1995 — Cover letters from MES to NMFS sent with contractor responses to environmental testing comments in NMFS letter of 26 October and 8 November.

3 February 1995 — Letter from National Biological Survey to USACE regarding an offer of technical expertise on water birds at Poplar Island.

6 February 1995 — Memorandum for the Record regarding January 30 meeting with SHPO to discuss the results of the Phase I investigation and define Phase II tasks.

7 February 1995 — Letter from Maryland Historical Trust to USACE regarding cultural resources investigations at Poplar Island.

14 February 1995 — Memorandum from cultural contractor, Goodwin and Associates, to project

design contractors providing an update on Phase I and Phase II investigations at the project site.

16 February 1995 Letter from U.S. Fish and Wildlife Service to environmental contractor responding to request for information on endangered species and fish and wildlife resources in the project area, in accordance with the Endangered Species Act and the Fish and Wildlife Coordination Act.

17 February 1995 Letter from Chesapeake Bay Foundation to USACE regarding CBF support for the project.

17 March 1995 Memorandum for the Record documenting results of meeting among representatives of USACE, MES, MPA, and contractors regarding cultural resources investigations tasks.

5 April 1995 Letter from NMFS to USACE regarding locations of fisheries in project area.

5 April 1995 Letter from Butkowski at DNR to USACE regarding potential spawning areas for horseshoe crabs and terrapins in the project area.

21 June 1995 Letter from contractor (Goodwin and Associates) regarding schedule of cultural investigations in project area.

19 July 1995 Letter from Mr. Robert L. Miller at Maryland DNR to environmental contractor providing information on threatened and endangered species and critical habitats in the Poplar Island area.

27 July 1995 Letter from MES to Maryland Watermen's Association regarding coordination with watermen on support for project. Although the project was strongly supported by watermen in general, informal meetings with Tilghman-area watermen had identified the loss of fishing areas as an important negative impact.

8 August 1995 Letter from NOAA to environmental contractor providing information on endangered species and fishery and habitat resources.

23 August 1995 Letter from USFWS to environmental contractor responding to a request for information on natural resources within the project area, in accordance with the Endangered Species Act, the Fish and Wildlife Coordination Act, and the Migratory Bird Treaty Act.

1 September 1995 Memorandum from MES to Members of Environmental working group requesting agency concurrence on monitoring plan.

7 September 1995 Letter from Senators Mikulski and Sarbanes to President Clinton supporting the project and urging the President to make Poplar Island a national priority.

14 September 1995	Letter from NMFS to MES regarding comments on the draft Habitat Development Report for the project.
15 September 1995	Letter from Governor Glendening to President Clinton supporting the project and urging Federal funding support.
25 September 1995	Executive Summary Letter from contractor (Goodwin and Associates) to Joint Venture discussing findings at Poplar Island.
3 October 1995	Letter from Maryland Historical Trust to USACE with discussion of draft Phase I Terrestrial and Marine Archeological Surveys for the project and Phase II Investigation for several sites.
27 November 1995	Letter from MES to USACE providing phone conversation notes from discussion between Cece Donovan and EPA Region III reviewers.
5 December 1995	Letter of support from commercial marina at Knapp's Narrows, at Tilghman, Maryland.
6 December 1995	Letter of support for project from Mary Roe Walkup, Maryland House of Delegates.
12 December 1995	Letter from U.S. Department of the Interior requesting an extension of the draft report review and comment period to February 9, 1996.
14 December 1995	Letter of support for project from U.S Fish and Wildlife Service.
18 December 1995	Letter of support for project from National Biological Service/Patuxent Environmental Science Center.
21 December 1995	Letter of support from Maryland Department of the Environment.
28 December 1995	Letter from Maryland DNR to Baltimore District providing agency comments.
3 January 1996	Agency comments received from Maryland Department of the Environment.
3 January 1996	Letter of support from Maryland Department of Natural Resources.
16 January 1996	Letter of support from the Alliance for the Chesapeake Bay.
17 January 1996	Letter from EPA requesting an extension of comment and review period to 2 February.
18 January 1996	Agency comments received from Maryland Geological Survey.

22 January 1996 — Letter from NOAA/NMFS providing agency comments on draft document.

23 January 1996 — Letter of agency support for project from National Oceanic and Atmospheric Administration.

26 January 1996 — Letter from the Maryland DNR to Baltimore District providing additional agency comments.

30 January 30 1996 — Letter from U.S. Department of the Interior to Baltimore District providing FWS comments in accordance with Section 2(b) of the Fish and Wildlife Coordination Act and Section 7 of the Endangered Species Act.

30 January 1996 — Letter from the Maryland Oyster Recovery Partnership suggesting intertidal oyster reef development at the Poplar Island project.

31 January 1996 — Letter from the Maryland Department of the Environment to the Baltimore District stating that the project will comply with the Department's air quality regulations.

1 February 1996 — Letter from Maryland Department of the Environment in support of the project and stating that the project is consistent with the State's Coastal Zone Management Program.

2 February 1996 — Letter from EPA Region III providing comments on the draft EIS.

January 18, 1995

Planning Division

Honorable Barbara A. Mikulski
United States Senator
World Trade Center
Suite 253
401 E. Pratt Street
Baltimore, Maryland 21201

Dear Ms. Mikulski:

This letter is to inform you that the U. S. Army Corps of Engineers, Baltimore District, has initiated the preparation of an Environmental Impact Statement (EIS) for a Section 204 habitat restoration project at Poplar Island, in Talbot County, Maryland, and to request the assistance of your organization. Section 204 of the Water Resources Development Act of 1992 authorizes the Corps to carry out projects for the protection, restoration, and creation of aquatic and ecologically related habitats, including wetlands, in connection with dredging for construction, operation, or maintenance of an authorized Federal navigation project.

The Poplar Island project would restore approximately 1,000 acres of wildlife habitat in the upper Chesapeake Bay using approximately 10 to 40 million cubic yards of material dredged primarily from the southern approach channels to Baltimore Harbor. The material would be placed behind dikes at the site, then shaped and planted to create both intertidal wetland and upland wildlife habitat.

In compliance with the National Environmental Policy Act (NEPA), the EIS will include descriptions of the existing site conditions, design alternatives, project impacts, public involvement, and the recommended plan. We are requesting information on these topics, as well as input on other issues or concerns regarding this project.

This material is being provided for your information. Coordination letters with the same information are being sent to the organizations and individuals on the enclosed mailing list. If you have any questions or comments at any time throughout the study, please feel free to contact me or have a member of your staff contact Dr. James F. Johnson, Chief, Planning Division, at (410) 962-4900.

Sincerely,

Randall R. Inouye, P.E.
Colonel, Corps of Engineers
District Engineer

Enclosures

Identical letters to be sent to the following people:

Honorable Barbara A. Mikulski
United States Senator
World Trade Center
Suite 253
401 E. Pratt Street
Baltimore, Maryland 21201

Honorable Paul S. Sarbanes
United States Senator
100 South Charles Street
Tower 1
Suite 1010
Baltimore, Maryland 21201

Honorable Benjamin L. Cardin
Representative In Congress
540 East Belvedere Avenue
Suite 201
Baltimore, Maryland 21212

Honorable Robert L. Ehrlich Jr.
Representative In Congress
1407 York Road
Lutherville, Maryland 21093

Honorable Wayne T. Gilchrest
Representative In Congress
1 Plaza East
Suite 105
Salisbury, Maryland 21801

Honorable Kweisi Mfume
Representative In Congress
2203 North Charles Street
Baltimore, Maryland 21218

January 18, 1995

Planning Division

Mr. William Matuszeski
Director
U.S. Environmental Protection Agency
Chesapeake Bay Program Office
410 Severn Avenue, Suite 109
Annapolis, Maryland 21403

Dear Mr. Matuszeski:

This letter is to inform you that the U. S. Army Corps of Engineers, Baltimore District, has initiated the preparation of an Environmental Impact Statement (EIS) for a Section 204 habitat restoration project at Poplar Island, in Talbot County, Maryland, and to request the assistance of your organization. Section 204 of the Water Resources Development Act of 1992 authorizes the Corps to carry out projects for the protection, restoration, and creation of aquatic and ecologically related habitats, including wetlands, in connection with dredging for construction, operation, or maintenance of an authorized Federal navigation project.

The Poplar Island project would restore approximately 1,000 acres of wildlife habitat in the upper Chesapeake Bay using approximately 10 to 40 million cubic yards of material dredged primarily from the southern approach channels to Baltimore Harbor. The material would be placed behind dikes at the site, then shaped and planted to create both intertidal wetland and upland wildlife habitat.

In compliance with the National Environmental Policy Act (NEPA), the EIS will include descriptions of the existing site conditions, design alternatives, project impacts, public involvement, and the recommended plan. We are requesting information on these topics, as well as input on other issues or concerns regarding this project.

Identical letters are being sent to the individuals and organizations on the enclosed list. Also enclosed is a copy of the Public Notice and a separate mailing list for that document. It is requested that you provide an agency point of contact (POC) within 30 days from the date of this letter to facilitate future coordination. If you have any questions, please call Ms. Carol Anderson-Austra, Planning Division, at (410) 962-2910.

Sincerely,

Dr. James F. Johnson
Chief, Planning Division

Enclosures

Identical coordination letters sent to the following:

Mr. Timothy Goodger
Assistant Coordinator
National Marine Fisheries Service
Habitat and Protected Resources
Oxford, Maryland 21654-0279

Mr. David B. Enabnit
Deputy Chief, Mapping & Charting Branch
Coast & Geodetic Survey, NOAA
SSMC 3, Station 7360
1315 East-West Highway

Mr. John P. Wolflin
Supervisor, Annapolis Field Office
U.S. Fish and Wildlife Service
Chesapeake Bay Field Office
177 Admiral Cochrane Drive
Annapolis, Maryland 21401

CPT Gregory S. Cope
Commanding Officer
U.S. Coast Guard Marine Safety Office
U.S. Custom House
40 South Gay Street
Baltimore, Maryland 21202-4022

Mr. William Matuszeski
Director
U.S. Environmental Protection Agency
Chesapeake Bay Program Office
410 Severn Avenue, Suite 109
Annapolis, Maryland 21403

Mr. Peter H. Kostmayer
Regional Administrator
U.S. Environmental Protection Agency
Region III
841 Chestnut Building (3RA00)
Philadelphia, Pennsylvania 19107-4431

Mr. Ken Pensyl
Chief, Water Quality Certification Division
Non-Point Source Program
Maryland Department of Environment
2500 Broening Highway
Baltimore, Maryland 21224

Honorable Torrey C. Brown
Secretary
Maryland Department of Natural Resources
Tawes State Office Building
580 Taylor Avenue
Annapolis, Maryland 21401

Dr. Sarah Taylor
Executive Director
Chesapeake Bay Critical Area Commission
45 Calvert Street
2ND Floor
Annapolis, Maryland 21401

Dr. Emery T. Cleaves
Director
Maryland Geological Survey
Maryland Department of Natural Resources
2300 St. Paul Street, Suite 440
Baltimore, Maryland 21218

Mr. Clinton S. Bradley III
President
Talbot County Council
11 North Washington Street
Easton, Maryland 21601

Ms. Blenda W. Armistead
County Manager
Talbot County Courthouse
11 N. Washington Street
Easton, Maryland 21601

Mr. Larry Simms
Executive Director
Maryland Waterman's Association
1805-A Virginia Street
Annapolis, Maryland 21401

CPT. Michael Watson
President
The Association of Maryland Pilots
3720 Dillon Street
Baltimore, Maryland 21224

Mr. Richard Novotny
Executive Director
Maryland Saltwater Sportfishermen's
Association
7626 Baltimore & Annapolis Boulevard
Glen Burnie, Maryland 21061

Mrs. Frances H. Flanigan
Executive Director
Alliance For the Chesapeake Bay
6600 York Road
Suite 100
Baltimore, Maryland 21212

President
Chesapeake Audubon Society
Druid Hill Park
c/o Baltimore Zoo
Baltimore, Maryland 21217

Ms. Jane Nishida
Chesapeake Bay Foundation Maryland
Office
164 Conduit Street
Annapolis, Maryland 21401

Ms. Vivian Newman
Maryland Wetlands Committee
11194 Douglas Avenue
Marritsville, Maryland 21104

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
841 Chestnut Building
Philadelphia, Pennsylvania 19107-4431

RECEIVED
SEP 22 1994
M. E. S.
WASTE MGT.

September 16, 1994

Mr. Robert Smith
Maryland Environmental Service
2011 Commerce Park Drive
Annapolis, Maryland 21401

Re: Poplar Island Habitat Restoration Project and the National Environmental Policy Act (NEPA) Compliance

Dear Mr. Smith:

Thank you for sending the Prefeasibility Report for the Poplar Island Habitat Restoration Project that was jointly completed by Maryland Environmental Service (MES) and Maryland Port Administration. We have also received the minutes and request for comments to the Poplar Island Working Group meeting that was held on August 3, 1994 from Glenn Eugster of the Chesapeake Bay Program Office. He has been extensively involved in commenting on this project and has kept the NEPA Review Team up to date on the details of this project. In accordance with the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act, EPA has reviewed Poplar Island Work Group materials and the Prefeasibility Report for recommendation of proper NEPA documentation.

The project involves the utilization of approximately 11 million cubic yards (MCY) of dredged materials to create almost 1000 acres of habitat on Poplar Island. Wetland habitat will be targeted for approximately 70% of the restoration project and approximately 30% will target upland habitat. The dredged materials will be obtained from Federal navigation projects in the area. The largest cost that will result from this project is the transport of the compatible dredged material to the restoration site. Cost for the project will be shared by the Maryland Port Administration and the U.S. Army Corps of Engineers (Corps), Baltimore District.

The ultimate goal of NEPA is not to produce documents, but for the federal government to consider fully the environmental effects of proposed action into their decision making process. Considering that this project is a restoration project, which is intended to positively impact the environment through habitat creation, no net adverse environmental impacts are anticipated as a result of this project. However, the scope of the project is based on approximately 1000 acres of impact, whether positive or negative, to the waters of the U.S. and is costly. The decisions that will be made regarding the technical designs and alternative methods for creating the habitat will ultimately result in restoration for the benefit of the Chesapeake Bay ar : the expenditure of a large amount of federal resources. Consequently, EPA recommends that a project of this scope warrants an EIS, which would serve as a decision making tool to help determine a preferred alternative.

After reviewing the existing information on the project and the plans to gather additional data for the NEPA documentation recommended by the Working Group, it appears that little addtional effort would be required to produce an EIS instead of an Environmental Assessment (EA). However, proceeding with an EIS could save time and resources in the long term. If the Corps decided to go forward with an EA only to discover that an EIS was warranted, the whole review process and revisions would have to begin again. This would prolong the whole public and resource agency participation process as well as resources for the revision of the documents. It is ultimately the lead agency's decision to decide the type of document that is needed to fulfill the NEPA requirements.

EPA appreciates the opportunity to comment early in the process. Please continue to keep us informed on the status of this project. If you have any questions on our comments, please do not hesitate to contact me or Danielle Algazi of my staff. We can be reached at (215) 597-1177 and (215) 597-1168 respectively.

Sincerely,

Roy E. Denmark

Roy E. Denmark, Jr.
Acting Chief
Environmental Planning and
Assessment Section

CC: Wes Colman, U.S. Army Corps of Engineers, Baltimore District
Tim Goodger, National Marine Fisheries
John Gill, U.S. Fish and Wildlife Service, Annapolis Field Office

MARYLAND DEPARTMENT OF THE ENVIRONMENT
CHESAPEAKE BAY AND WATERSHED MANAGEMENT ADMINISTRATION
410-631-3572

October 21, 1994

Carol Anderson-Austra
Planning Division
Baltimore Corps of Engineers
P.O.Box 1715
Baltimore, Maryland 21203-1715

RE: COMMENTS ON DRAFT "SCOPE OF WORK-ENVIRONMENTAL SAMPLING FOR POPLAR ISLAND" RELATIVE TO THE EA/EIS

Dear Ms. Anderson-Austra

As part of the Poplar Island Workgroup commitment of October 13, 1994, MDE is providing you with comments on the draft "Scope of Work(SOW)-Environmental Sampling for Poplar Island" relative to the EA/EIS. Our comments are as follows:

The objective of the study should be stated.

Why are we vertically-compositing samples from shallow waters? In the Bay-wide monitoring, samples are taken at various depths due to significant changes in the water column. These shallow waters around Poplar Island would not be expected to have vertical differences.

Again, why are we measuring field parameters at surface, mid-depth, and bottom of the water column?

The SOW does not tell me what you plan to do with the data. It does not tell me why each station was pick were it is or how the data is planned to be analyzed. Are you just documenting existing water quality conditions? Is it to be used in a model? In other words, what is the monitoring rationale?

Our last comment deals with the laboratory methods. Based on conversations with Mr. Narendra Panday on October 20 & 21, you were informed that there are some major differences between the laboratory methods of EA and the U. of Md. It was suggested that you call Mr. Carl Zimmermann, chemist at the U. of Md., and speak to him directly. We assume that the differences will be resolved and that the data would therefore be consistent with our Bay data.

Sincerely,

Paul W. Slunt 10/21/94

Paul W. Slunt, Jr.,
Poplar Island Workgroup
member for MDE

CONVERSATION RECORD

TIME: 11:15 DATE:Oct 25, 1994 FILE NAME: POPLAR/nmfs

TYPE: TELEPHONE: incoming

Name of person(s) contacted:	Organization:	Phone No.:
Dave Meyer	NMFS/NOAA	919-728-8743

SUBJECT: NMFS Comments on Environmental SOW

SUMMARY: Mr. Meyer said that his office is preparing a letter which includes comments from several individuals at both the lab and restoration center where he and Chris Doley work. Their comments include the following points:

1. Mr. Meyer feels that the testing/sampling stations marked on the map do not have a pattern in the underwater areas; in the land areas there seems to be some balance. I responded that the station locations had been changed since the map was marked up; if he sends a map with the locations they prefer, we will be glad to consider them.

2. Comment: The proposed seining near the islands will produce qualitive measures; he suggested using block nets to capture quantitative information as well. Also, there should be seining on the east as well as west sides of the islands, and possibly near Coach's and Jefferson Island. He explained that block nets are set perpendicular to the shore so that a seine can be run between them, reducing the number of animals that escape from the sample. Response: A decision has been made to change seining locations to include test sites on the west sides of the islands. In addition, we will consider test locations near Coach's and Jefferson's Islands and the use of block nets.

3. Comment: The mesh size of the seines should be the same as that of the trawl nets for easier comparison. I will discuss with environmental and contracting folks.

4. Comment: Mr. Meyer suggests testing for icthyoplankton at a series of 3 sets of 3 locations (for a total of 9 test sites). Each set would include a test site west of the island footprint, a test site within the island footprint, and a test site east of the island footprint. Ideally, the tests should be replicated 3 times at each of the test sites within each sampling period/night/visit. Also ideally, the test times would include a Spring tide/new moon for maximum fish, and a neap tide for the least fish. He stated that, in general, it is more important to sample several times at one location than once at several locations.

5. Comment: SAV beds need to be delineated and the number of shoots and total biomass defined as a way of identifying the quality as well as the extent of the existing SAV. Depending on the size and location of the beds, it is possible that trawling or dropnet sampling for animals should also be done in the beds.

6. Comment: It is not clear what size sampling tools will be used. It may be necessary to sample for both large and small animals, requiring the use of large and small sampling tools. Response: Comment will be considered.

As a follow-up, I asked Mr. Meyer to prioritize his comments and suggestions as guidance when we are considering the costs and benefits of the actions. He said he will have to give that some thought before he responds.

ACTION REQUIRED: Coordinate with contractor, SQS/Walls, PM, and environmental technical folks.

NAME OF PERSON DOCUMENTING CONV. CA-A	SIGNATURE	DATE

ACTION TAKEN:

SIGNATURE	TITLE	DATE

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Southeast Fisheries Science Center
Beaufort Laboratory
101 Pivers Island Road
Beaufort, NC 28516-9722

October 26, 1994

Mr. Robert Smith
Maryland Environmental Service
2011 Commerce Park Drive
Annapolis, MD 21401-2995

Dear Bob:

We have reviewed the scope of work proposed for the environmental sampling of Poplar Island. We do feel it is a good starting point, but feel that additional information on the biotic communities needs to be obtained to assess the impact to them within the footprint and the surrounding the area of Poplar Island. In particular we feel that more emphasis should be placed on characterizing the function of the existing marsh, SAV and oyster beds adjacent to and within the footprint of the proposed island.
We do agree that sampling for fauna should be conducted during at least three seasons and benthic infauna and water quality in all four seasons. We suspect that faunal collections will be made during the spring, summer and fall. We do wonder however, what was the rational for deciding to use 10 stations for infaunal and water quality sampling. Why were they selected as shown on the figure. We feel that stations should be equally distributed along the eastern, western and within the footprint of the proposed island with adequate replication (n=5 for each area) to statistically validate the observation obtained.

Sediment analysis (at least once) should be conducted within the study site in connection with benthic and terrestrial collections. This should include sediment analyses for nearby oyster reefs and seagrass beds. Minimum information of particle size and organic content should be collected.

For the aquatic ecology assessment (this includes blue crab, trawling and ichthyoplankton assessment) we propose that a minimum of nine stations be established with three replicates at each of the stations (Figure 1). Sampling for blue crabs and trawling should be conducted during spring, summer and fall.

What size mesh do you propose to use for the crab pots? This type of sampling is not of much use to collect anything other than adult and sub-adult crabs. A small mesh size or different method needs to be used for smaller sized crabs.

For benthic invertebrate (infaunal) assessment a petite Ponar sampling device is proposed but there is no indication of size of the sampler or screens to sieve the sediment. Will the size gear suggested be able to adequately sample for clams and other macrofauna. What about smaller infauna? Instead of using one device to sample the benthic community it may be better to use two separate methods or methodologies, one for measuring large macrofauna (such as clams), and another to measure smaller infauna such as polychaetes. This may better determine the community structure.

Ichthyoplankton sampling as proposed is not sufficient. What is the rational for the two stations as proposed? The effect of the island will have a more pronounced effect than on just the area that will be lost once the island is built. The area immediately adjacent to the island will also be effected through at least the change in water movement within the area. This too should be examined. A total of nine stations should be set up three on both the eastern and western sides of the island and three within the foot print of the proposed island. Within each site three replicate tows should be made during each season (winter, spring and summer), during flood tide on either a new or full moon (this should be consistent throughout the sampling schedule). How will sampling be accomplished for ichthyoplankton? Will they be fished as a push net, abeam, astern? Push net type is preferable, abeam is suitable if the boat maintains an arc course with the net on the outside of the arc. Whichever method employed it is also necessary to attempt to fish at least 100 m^3 of water with each replicate net.

How long or far are the trawls with the otter trawl going to be? We suggest a set distance (~100 m) at a set speed or a set time and speed with distance being determined using a range finder. This could help to quantify animals within the area as well as determine species composition. These trawls should also be done on a rising spring tide at the nine stations we suggest for the ichthyoplankton sampling. Replicate nets at each station would be preferable. Also, an on-board holding tank should be considered for animal collected while they are being identified (to species we hope) to increase there chances for survival. We also suggest using similar mesh sizes for trawls and seines so the results could be comparable to some degree.

The beach seining proposed is not very informative or valuable. Why only fish on the western side of two islands? It would be better to fish one replicate seine on both the eastern and western sides of three or more islands within the footprint of the proposed island, at and Jefferson and Coaches Island (and n of two is not sufficient for valid statistical analysis). Further, the typical beach seining proposed is a qualitative measurement of fish species, not a quantitative measure. With a little more effort the beach seining could be quantitative through the use of block nets set up ~ 80 ft apart from each other perpendicular to the shore immediately prior to seining. Once the side block nets are set, a 100 ft beach seine could be pulled landward with each end abutted against a block net.

The determination of SAV presence and assessment needs to be more extensive. It would be better to first delineate the boundaries of SAV, possibly through areal photography survey of the area under suitable conditions (if they occur), and then ground truthing of the areas suspected of being SAV. During ground truthing (which should be done during the summer) systematic or randomly quantifying SAV species and shoot density by species should be performed (i.e., are there 100 or 10,000 shoots/ m^2) to assess the condition of the SAV areas. This could be performed through coring of the SAV or *in situ* shoot counts with the aid of SCUB. The SAV should also be sampled for fanual use through trawling replicate areas for larger mobile fauna (at least three areas, if they exist) and throw traps for smaller less mobile epifauna. Infauna should also be sampled as at the unvegetated stations and the sediment should be analyzed for grain size and organic content (once). Above and below ground biomass of the SAV should also be quantified.

Wetlands should be not only delineated but quantified for areal coverage as should the terrestrial areas. For both areas, species surveys at each of the islands in the footprint of the island should be conducted during late spring and summer to determine vegetation species present, estimated coverage of each species (listing the dominant) and systematic or randomly determined shoot densities of the dominant species. During the spring summer and fall, replicate quantitative samples of the marsh areas for fish shrimp and crab use should be obtained using the islands as replicates and species identified and quantified. Replicate infaunal sampling, sediment size and organic characteristics of the island marshes should also be obtained during the fall.

There should be a survey of the existing oyster beds to examine if they are productive (spat settlement, size of live oysters etc.). This should be performed during the early summer and fall. An examination of sediment condition for the oyster beds should also be performed to detect any sedimentation that might occur due to water flow or current changes in the area due to the proposed island.

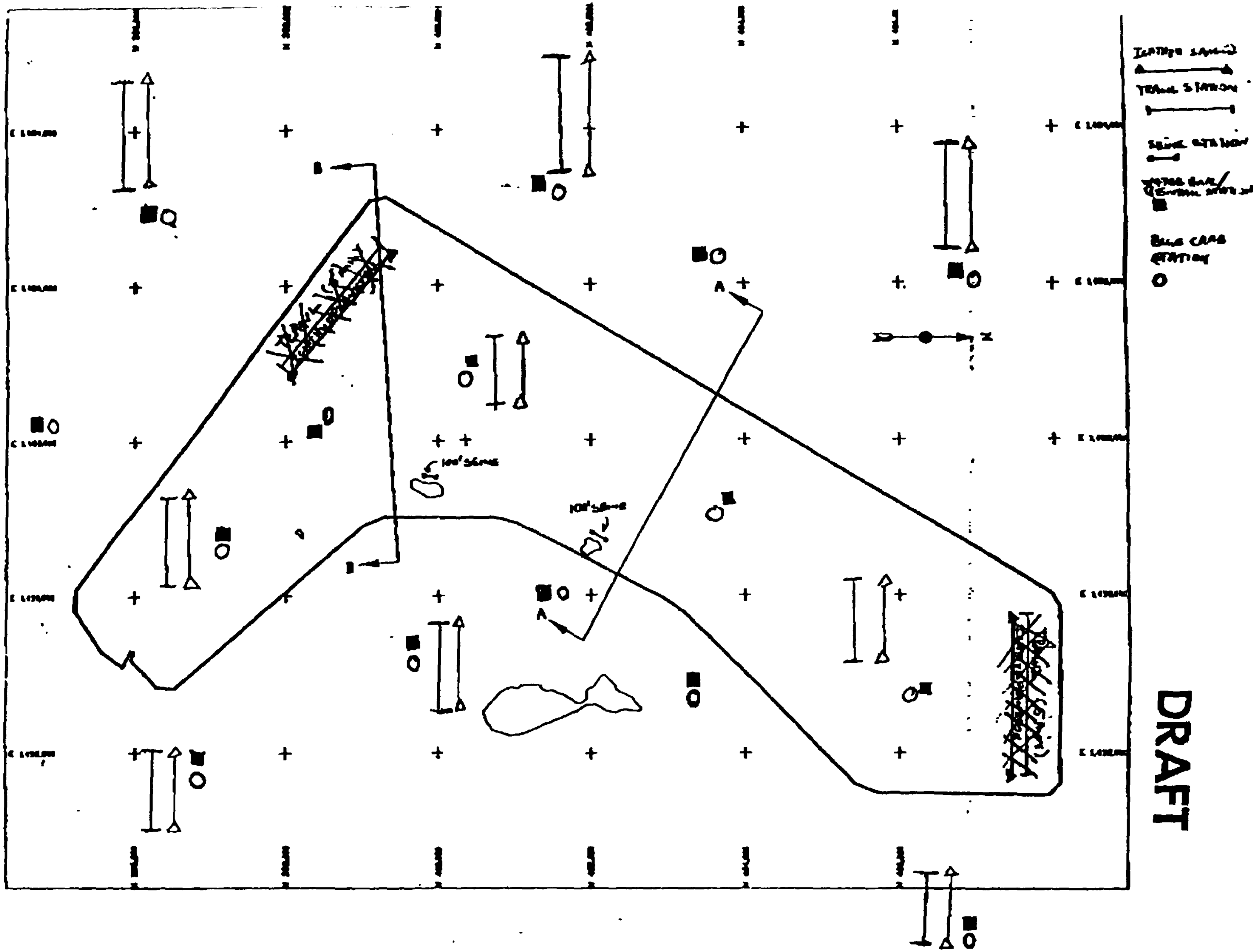
The examination of the terrestrial component of the island remnants is very vague. What does it encompass? There should be a systematic or randomized survey of the vegetation noting the dominant and an assessment of all plant species present during the late spring and summer. Additionally the use of the islands by terrestrial animals and birds needs to be assessed. Possibly through live trapping and track and scat surveys for terrestrial animals and visual bird surveys.

If you have any questions or need something else pertaining to this project let me know (919) 728-8743.

Sincerely,

David L. Meyer
Research Fishery Biologist

cc: G. Thayer
D. Hoss
C. Doley
J. Thomas
B. Norman
G. Mayer
C. Anderson
T. Goodger


TRAWL STATION
SEINE STATION
BLUE CRAB STATION
100' SEINE
100' SEINE
DRAFT

October 27, 1994

MEMORANDUM

TO: Bob Smith, Project Manager

FROM: Cece Donovan

SUBJECT: Environmental Sampling at Poplar Island - Comments on the Scope of Work

Prior to tomorrow's meeting, here are my written comments on the above-mentioned scope. Most of these comments are those mentioned in the Oct 13 POP Work Group meeting.

Page 1 - Assumptions

Assumption 1

1. Sampling for ichthyoplankton may only yield valuable data in the spring/early summer. So one sample collection may be adequate.

2. Most benthic organisms have been observed to have growth seasons in either the spring and fall. It may be wise to only sample in these seasons, rather than also in the winter and summer, when there is not much going on.

Assumption 2

1. Nine stations were counted from the original plan for aquatic sampling - there were a total of 10 stations, but 9 were in the water and one on land.

2. Should any background or reference stations be included - not for the purposes of future monitoring, but to establish whether or not this area is comparable - more or less valuable or unique than other nearby areas. This was the issue in G-West - if the area to the south contained "valuable" or "unique" habitat that may be impacted. Background or reference stations may be advisable for some, if not all, study elements to answer this questions for the impact assessment.

Assumption 3

1. As the Chesapeake Bay Program water quality monitoring study is conducted on a monthly and biweekly basis depending on the season, this may be a better frequency for the

study. Also, unless there is suspicion that the water column is stratified in this area, the need to sample at varying depths may not be necessary.

Assumption 5

1. For B., see above comment under assumption 2.

2. For C, see above comment under Assumption 1.

3. For D, acoustics may be useful in detecting fish, and diel sampling.

4. Some mention should be made in the Aquatic Ecology section that Rare, Threatened and Endangered Species will be noted if encountered, and that an aquatic survey will be conducted, as well as the Terrestrial Survey noted in Assumption 6.

Maryland Department of Natural Resources

Tidewater Administration
Tawes State Office Building
580 Taylor Avenue
Annapolis, Maryland 21401

William Donald Schaefer
Governor

Torrey C. Brown, M.D.
Secretary

RECEIVED NOV 2 1994 M.E.S. WASTE MGT.

RECEIVED NOV 2 1994 M.E.S. WASTE MGT.

November 1, 1994

MEMORANDUM

TO: Robert Smith, MES

FROM: Chris Judy, DNR Shellfish Program Chris

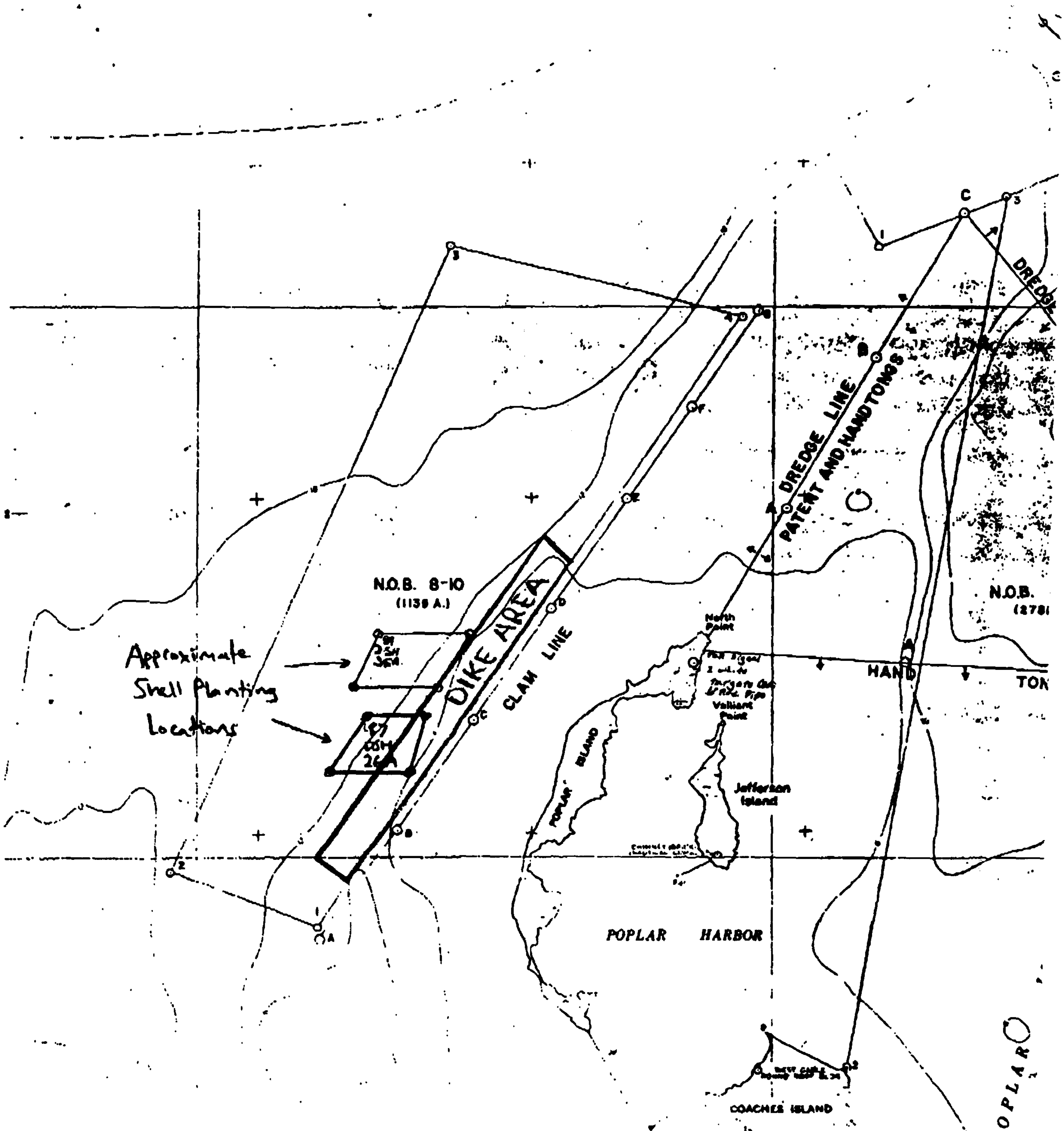
SUBJECT: Poplar Island Project - Natural Oyster Bar 8-10

I am responding to your request that the Fisheries Division consider reclassifying a portion of the eastern boundary of Natural Oyster Bar 8-10 where a proposed dike would intrude into the bar.

The Director of the Fisheries Division, W.P. Jensen, has decided to not pursue a reclassification of that bottom from natural oyster bar. Within the 55 acre section that your office indicated would be impacted by a reclassification, there is a shell planting made in 1987 that is populated by oysters. Adjacent to the area is another shell planting, made in 1989, also populated by oysters. The shell plantings are illustrated on the attached chart.

If you have any questions please call me at 974-3733.

NOV-04-'94 FRI 17:40 ID:MES ANNAP WSS MGMT TEL NO:301-974-7236 #718 P03



Not a legal oyster bar chart:
For diagrammatic purposes only

Prepared By DNR, Shellfish Program 11/1/94

8

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Habitat and Protected Resources
Division
904 South Morris Street
Oxford, Maryland 21654

8 November 1994

Mr. Robert Smith
Maryland Environmental Service
2011 Commerce Park Drive
Annapolis, MD 21401-2995

Dear Mr. Smith:

The comments that follow are the consensus opinion of the National Marine Fisheries Service (NMFS), as represented by the Southeast Fisheries Science Center, Beaufort Laboratory; NOAA Chesapeake Bay Program Office, Annapolis; NOAA Restoration Center, Silver Spring; and Northeast Region, Habitat and Protected Resources Division, Oxford, with respect to the minimum sampling requirements for living aquatic resources and habitat that we need to satisfy our mandates pursuant to the National Environmental Policy Act (NEPA).

In our opinion, the information generated by the present field sampling plan will not be adequate to characterize the existing environment biologically, as required by NEPA. In the absence of a suitable site characterization, potential impacts, either positive or negative, cannot be adequately addressed. On the other hand, the plan identifies some sampling that will not provide particularly useful data, which are unnecessary for the characterization (e.g., winter fish trawl and blue crab surveys). We believe that with some adjustments in the proposed sampling plan, the data that are collected will not only satisfy NEPA, but also provide a statistically sound baseline from which can be measured the relative success, or failure, of the project during the monitoring phase. We provided many recommendations to enhance the statistical validity of the sampling design previously (David L. Meyer, 26 Oct. 1994). By incorporating these recommendations, sampling efforts can serve multiple purposes, thereby saving time, money, and reducing duplication of effort.

A major deficiency is that the sampling plan fails to address molluscan shellfish resources. The footprint of the restored island approaches Natural Oyster Bar (NOB) 8-10 on the west shore, and encroaches upon a natural seed bar on the east. NOB 8-11 north of Poplar Island may also be affected. Additionally, the footprint will encroach upon softshell clam habitat currently available to commercial harvest. The sampling plan must describe existing shellfish resources so that the potential impacts to these resources can be addressed in the NEPA document. Furthermore, the NEPA document must also address mitigative measures to reduce those impacts, which will not be possible if shellfish resources are not adequately described. If someone other than the contractor (e.

MD DNR) is going to describe molluscan shellfish resources for subsequent environmental impact analysis, it should be so noted in the sampling plan.

As stated previously, winter fish trawl and blue crab surveys will not yield particularly useful information. Instead of winter surveys, more samples at more stations should be collected in the remaining seasons. Additionally, running replicate fish trawls immediately after sampling along the same transects will not yield meaningful data. Fish will be dispersed following the initial trawl; sufficient recovery time must be allotted before fish will re-assemble. As an alternative, more stations or sampling times should be established. Similarly, replicate seine samples should not be collected. As an alternative, stations should be established at sheltered and exposed environments on the same islands. Comparing sheltered to exposed areas should provide useful insights for evaluating potential impacts of island restoration. Consideration should be given to include seine sampling stations at Jefferson and Coates Islands. Again, winter sampling is unnecessary. We recommend that final details of field sampling design be discussed at the next workgroup meeting where consensus may be reached.

It appears that modifications in proposed field techniques to characterize wetlands and SAV are generally satisfactory. However, it should be noted that the SAV sampling procedures are not adequate for horned pondweed (Zannichellia pallustris). Horned pondweed emerges in the early spring, disappears as water temperatures warm in the summer, and may re-appear in the autumn. If historic SAV surveys conducted under the auspices of the Chesapeake Bay Program indicate horned pondweed is a species of significance in the project area, sampling strategies will need to be modified. Additionally, if wetlands and SAV are not going to be sampled to determine the extent of faunal use, a literature review should be conducted to document what is known relative to similar habitats.

If you have questions concerning these comments, please call me at (410) 226-5771.

Sincerely,

Timothy E. Goodger

Timothy E. Goodger
Assistant Coordinator

cc: Dave Meyer/Gordon Thayer-Beaufort Lab.
Bruce Norman/Bess Gillelan-NOAA Chesapeake Bay Off.
Chris Doley-NMFS
Roy Denmark-EPA-Region III
John Gill-FWS, Annapolis
Nick Carter-DNR-Tidewater
Mark Mendelsohn-Corps of Eng.-Balt.
Stacey Brown-Corps of Eng.-Balt.
Brian Walls-Corps of Eng.-Balt. (Operations)

CONVERSATION RECORD

TIME: : :16/11/94 FILE NAME: usr2/mendels

TYPE:

TELEPHONE: VISIT:

incoming:

outgoing:x CONFERENCE:

Name of person(s) contacted: Organization: Phone No.:

Bob Smith MES

SUBJECT: Poplar Island Restoration

SUMMARY:

I returned Bob's call. He was concerned that the 8 Nob 1994 letter from Tim Goodger (NMFS) said that wint testing for crabs and fish wasn't necessary. I told him that if the consensus among agencies was that winter testing wasn't necessary then let's not do it. I told him that neither USFWS or DNR said not to do it. He said that John Gill (USFWS) suggested winter testing.

I told him that because of dredging restrictions most of our work would be done in the winter and it would be good to know what the impacts be if any. He said that there was a seed oyster bed on the east side of the islan which impacts the design that has wetlands on that side.

He said that DNR is going to locate all clam and oyster areas. He said that the oyster bar within footprint is considered alive by DNR. He said that we will have to mitigate for any loss of habitat that NMFS is concerne about. I told him that I would like to not use the word mitigation because of what it implies.

He said that the job is to get all the agencies which support the project to work together.

We then talked about whether we really wanted complete seasonal reports or if we could use seasonal data. H said that there is a risk in using interim data but we don't want to wait till the final report for all 4 seasons to come in when we will be pushed for time. I told him that there is probably information from each season's report that we can use for the NEPA doc. He said that the contractor will present the first data at 17 Nov 1994 mtg and we can decide if it is what we need.

ACTION REQUIRED:

Mark Mendelsohn 11/16/94

_NAME OF PERSON DOCUMENTING CONV. SIGNATURE DATE

ACTION TAKEN:

_SIGNATURE TITLE DATE

EA Engineering, Science, and Technology

Corporate Headquarters
11019 McCormick Road
Hunt Valley, MD 21031
Telephone: 410-584-7000
Fax: 410-771-1625

23 November 1994

Ms. Carol Anderson-Austra
Planning Division
Baltimore District, USACE
P.O. Box 1715
Baltimore, MD 21203-1715

RE: MDE comments on Draft "Scope of Work - Environmental Sampling for Poplar Island"

Dear Carol:

This letter is in response to the letter to you from Paul Slunt (attached) describing his comments to the Poplar Island sampling plan. We can go over these with you to finalize the reply .

1. The specific objective of the field study is to a) corroborate existing information and b) to provide adequate additional baseline data to support the preparation of an Environmental Document. The level of effort was developed to include those groups of aquatic and terrestrial /wetland biota which were considered of sufficient importance to provide the necessary basis for defining existing conditions. The purpose is to determine if any unusual or unique communities exist which would be significantly impacted by the proposed action as well as the types and general structure of the resources affected. This information will also be used in conjunction with existing information and available data from the literature or agency files to define the anticipated impacts of the proposed action.

   The Scope of the field effort was developed in cooperation with the Baltimore District USACE, MES, USFWS, and Maryland DNR. The station locations, sampling frequency and number of replicates were arrived at through consultation with these agencies. Further, the station locations were defined to low for near and far field comparisons for benthic infauna and water quality.

2. The vertical compositing is a standardized method to obtain a more representative sampleof the water column at any given location. We routinely measure field parameters at the surface, mid-depth, and bottom, unless the depth is less than 3 feet deep. While vertical differences are not anticipated in shallow water, some stations are deeper than others, anwe prefer to be consistent.

3. The data will first be organized into raw data tables to be included in the quarterly data reports. Each discipline will be analyzed differently, but no modelling will be done. We do not intend to establish any trends, since this is not considered necessary for purposes of establishing existing conditions. Trends can only be established by collecting over a number of years. The efforts undertaken here are not intended to be part of a longterm monitoring program. That program will be developed following these baseline surveys. The monitoring program is proposed to be comparisons between the immediate post-construction condition, and reference areas where established communities exist. Since it is clear that the island reconstruction will result loss of bottom and shoreline within the dike. The sampling will verify the communities affected, provide adequate support for the NEPA documentation, but is not intended to conceptually form the basis of a monitoring plan.

   The water quality data will be compared among stations and between seasons. The new data collected during these baseline studies from MES station 004 will be compared with both historical and current state data from this station to determine consistency.

   Fish and ichthyoplankton data will be organized into tables defining relative species composition, length/age class, and relative abundance. The intent is to compare this information with existing data and to establish existing conditions.

4. The water quality samples will be analyzed by the CEES laboratory at the CBL lab in Solomons. This is the lab which analyzes all the samples under the Chesapeake Bay Program. Therefore, all differences have been resolved.

If you have any comments related to these answers, please call me at any time. We will have complete responses to all the comments from NMFS early next week. I am waiting until we have resolved the issues surrounding the change in dike configuration before completing those comments. I think we should meet sometime soon to discuss the issue of monitoring. If a reasonable plan can be outlined, at least for discussion purposes, I think most of the concerns raised should be resolved.

Sincerely,

Frank W. Pine, Ph.D.
Project Manager

cc: R. Smith
D. Urso
M. Hart
File 60864.01
f:/ea&m/poplar/usace23.nov

EA Engineering, Science, and Technology

Corporate Headquarters
11019 McCormick Road
Hunt Valley, MD 21031
Telephone: 410-584-7000
Fax: 410-771-1625

28 November 1994

Ms. Carol Anderson-Austra
Planning Division
Baltimore District, USACE
P.O. Box 1715
Baltimore, MD 21203-1715

RE: Cece Donovan's comments on Draft "Scope of Work - Environmental Sampling for Poplar Island"

Dear Carol:

This letter is in response to the memorandum to you from Cece Donovan (attached) describing her comments to the Poplar Island sampling plan. We can go over these with you to finalize the reply.

Assumption 1

1. While we agree that ichthyoplankton sampling would be most productive in the spring/early summer, there are concerns about the potential restrictions against construction activities during the winter/early spring months because of anadromous fish spawning. Information related to the winter season may be important in attempting to have that restriction relaxed or removed. Timing will be important and it may be of value to conduct a field effort later in the winter as an additional ichthyoplankton assessment. Further, we originally understood that the request for the full winter survey was related to maintaining equal effort in all four seasons.

2. The benthic sampling provides the best assessment of the general condition of the area and should be continued for all four seasons. We can determine the relative abundance and diversity for each season, and compare seasons.

Assumption 2

1. The number of stations originally proposed was four, all in the water. This was changed to ten in the water. The terrestrial stations were added just before the fall sampling trip. We have no recollection of there ever having been nine stations proposed, or one on land. At this time we are considering some additions due to changes in the configuration of the dike.

2. Two of the ten benthic/water quality stations were located east of Coaches Island as background stations. At the time these were chosen, it was agreed not to add other disciplines at these two stations. We believe that the uniqueness of the area proposed for reconstruction will be determined by comparison of the data collected in the area with existing information.

Assumption 3

1. An increase in sampling frequency would be prohibitively expensive. Since we are sampling at the same location as the state at station BWQ 8-104, we can determine if there are any significant discrepancies. We need to keep in mind that the purpose of the field investigations is to confirm existing information and complete an existing conditions section of the Environmental Document.

Assumption 5

3. While acoustics may be useful, the sampling needs to be uniform and consistent with respect to general location and method. We believe that the methods chosen are the most appropriate.

4. Rare, threatened, and endangered species will be noted throughout the field efforts, both during aquatic and terrestrial surveys. Potential RTE plants will be specifically included in the terrestrial survey.

If you have any comments or questions related to the above discussion, please call me at any time.

Sincerely,

Frank W. Pine, Ph.D.
Project Manager

cc: R. Smith
D. Urso
M. Hart
File 60864.01
f:\ea&m\poplar\usace28.nov

EA Engineering, Science, and Technology

Corporate Headquarters
11019 McCormick Road
Hunt Valley, MD 21031
Telephone 410-584-7000
Fax 410-771-1625

5 January 1995

Mr. Robert Smith
Maryland Environmental Service
2011 Commerce Park Drive
Annapolis, MD 21401-2995

RE: Response to National Marine Fisheries Service comments on Draft "Scope of Work - Environmental Sampling for Poplar Island"

Dear Bob:

This letter is in response to the 26 October 1994 letter to you from David L. Meyer, National Marine Fisheries Service, Beaufort Laboratory(attached). The responses to the 8 November letter are provided separately.

1. The specific objectives of the field studies are to a) corroborate existing information and b) to provide data to support the preparation of an Environmental Document. The level of effort was developed to include those groups of aquatic and terrestrial /wetland biota which were considered of sufficient importance to provide the necessary basis for defining existing conditions. The purpose is to determine if any unusual or unique communities or habitats exist which would be significantly impacted by the proposed action as well as the types and general structure of the resources affected. This information will also be used in conjunction with existing information and available data from the literature or agency files to define the anticipated impacts of the proposed action.

   The Scope of the field effort was developed in cooperation with the Baltimore District USACE, MES, USFWS, and Maryland DNR. The station locations, sampling frequency and number of replicates were arrived at through consultation with these agencies. Further, the station locations were defined to allow for near and far field comparisons for benthic infauna and water quality.

2. Sediment samples have been taken in conjunction with the benthic sample collection during the Fall. These will be analyzed for particle size distribution and organic content.

3. While we agree that ichthyoplankton sampling would be most productive in the spring/early summer, there are concerns about the potential restrictions against construction activities during the winter/early spring months because of anadromous fish spawning. Information related to the winter season may be important in attempting to establish utilization of the area by anadromous fish species. Timing will be important and it may be of value to conduct a field effort later in the winter as an additional ichthyoplankton assessment. Further, we originally understood that the request for the full winter survey was related to maintaining equal effort in all four seasons. For this reason we will be conducting a complete survey during winter.

4. The crab pots are standard commercial gear with approximately a 1 inch mesh. This part of the program was meant to target the commercial fishery and was meant to be qualitative.

5. Sorting protocol-- we are using a large ponar and a 600μm mesh sieve in the field. In the lab the samples are rinsed with a 500 μm sieve and are sorted under a dissecting microscope, then identified to the lowest practical taxon and enumerated.

6. Ponar will sample a general cross section of relatively immobile epifauna and infauna. Five or more replicates might be necessary for statistical comparisons in the monitoring phase but such rigorous statistical comparisons are not required to characterize the site for NEPA purposes. The study as it is set up now does not address larger infauna and epifauna (clams and oysters). Some of the information will be derived from state records. Other data will be collected by the state DNR and included in the document.

7. The proposed ichthyoplankton sampling program was designed only to provide data for a characterization of existing conditions near the archipelago and was not meant to be a basis for statistical comparisons. Ichthyoplankton sampling was done near the end of the flood tide/high slack and the beginning on the ebb tide, but was not coordinated with a full or new moon. Tidal cycles have been shown to have an influence on abundance, but depending on the area, low tide can influence sample composition as much as high tide. In the area that we're working, flood tide might influence abundances, but would probably have little effect on composition. The same is probably true for the higher amplitude tides of the new/full moon.

8. Our plankton sled was towed astern. Depth in the water column was estimated using a metered block, clinometer and depth nomograph. Nets were set on the bottom and raised incrementally (every minute) with the last minute being a surface set. During most of the set the net was below our prop wash, and was being towed some distance behind the boat.

9. Both otter trawl and ichthyoplankton tows were 5 minutes long. All were at set boat speeds (1300 and 900 rpms, respectively) and beginning and end coordinates were taken at each.

Ichthyoplankton sample volume averaged 100 m^3 and estimates of bottom trawled were about 15 second of longitude or 300+ meters.

10. Otter trawls were done on the flood tide.

11. The sampling program involved 2 seines and 2 trawls at each location and were not true replicates but rather side by side samples. This is a method we have used effectively to maximize effort in relatively small areas where, for example, a 10 minute trawl tow would cover too much linear area and run outside of the target area or there is a limited area to seine. This method covers a large amount of space over a small distance of bottom or shoreline. The fish collected from the first of the two hauls at each location were held in tubs while the second haul was made. This ensures that any disoriented organisms are not recaptured in the second haul.

12. The beach seine locations have already been moved. Sampling could not be done on the west side of North or South Central Poplar due to the tremendous number of downed trees. Approximately 200 feet of shoreline were covered in two tows. This constitutes the northern tip and a mid-island reach of South Central Poplar and the entire easternshore and the north and south tips of Middle Poplar Island. Block netting would be counterproductive in that we would scare more than we caught.

    Sampling in many of the areas proposed on the enclosed map would be impossible. There is not enough clear (relatively snag free) deep water between the islands to trawl. Stations placed outside of the footprint on the north west side would be over the commercial oyster beds which we have been told are off limits. Having comparable gear sizes between seine and trawl is neither necessary or desirable...the programs are meant to target different lifestages.

13. We will use existing aerial photographs and other existing historic SAV bed information to initially define the detailed sampling locations. This will be accomplished by reviewing Maryland Department of Natural Resources' SAV survey photos or by having an early season (e.g. May) photo taken for the study area in addition to having an aerial photo taken in mid-summer. The SAV sampling approach will include concentrated sampling point locations in areas identified from photos and other available information as potential SAV beds. A more widely spaced sampling approach will be used to cover the remainder of the study area. In terms of SAV abundance determination, a limited quantitative approach will be used in any areas found to have SAV present. This will include the use of a weighted PVC quarter-meter square quadrat from which all SAV plants can be removed and counted/weighed. Sampling locations will be based upon a stratified random method of selection. Sediment tube coring is not planned.Trawling in SAV beds is strongly discouraged as it is likely to result in significant damage. We will rely upon existing data to characterize the general faunal composition of beds. If required, more intensive sampling

of SAV could be made a part of the monitoring plan.

14. The wetland low marsh and high marsh areas have already been well characterized on the four small islands in terms of plant species present during the fall survey. Any additional species identified in subsequent surveys will be added to the inventory list. Regarding quantitative sampling of vegetation it has always been our intent to estimate areal coverage using the Braun-Blanquet Method. We will use quadrat sampling (e.g., 1 m^2 plots for herbaceous plants and 10 m^2 for shrubs) along transects established through the various communities present. In order to satisfy the request for stem density data we can conduct counts on a limited number of the quadrats, for example, one out of ten. Vegetation from these stem density plots can be clipped at ground level and removed, taken to EA's biology lab for counting, and wet and dry weights can be determined for biomass, if necessary. If the footprint of the dike is expanded, forested areas on Coaches Island can be quantitatively surveyed by employing known dimension plots (e.g., 1/10-acre) in which to identify tree species, determine diameter at breast height, and estimate shrub and herbaceous plant coverage. It does not seem necessary to conduct more intensive surveys of the remnants of Poplar Island, since they are all flooded at seasonal high tides and all upland vegetation is dead or dying.

15. The state of Maryland will be conducting surveys of the beds and charted oyster bars in the area.

16. On the four remnant islands we have investigated the presence of terrestrial wildlife (e.g., mammals, reptiles, and amphibians) including investigation for the presence of sign (scat, tracks, bones, etc.). These initial efforts suggest that the presence of these animals is highly unlikely, since the remnant islands are small and are flooded during spring and storm high tides. However, the potential addition of Coaches Island to the study area raises the possibility for the occurrence of mammals and herptiles. In order to characterize this potential resource some limited trapping efforts might be incorporated to supplement the customary documentation of wildlife sign. This could be accomplished by setting small mammal trap lines (e.g., Sherman live traps and/or Victor or Museum Special snap traps) in areas of potential habitat on Coaches Island. Additionally, reptiles and amphibians could be captured using funnel or drift fence trapping and pitfall trapping. This effort would best be undertaken in the spring or summer.

    The timed bird observation efforts appear to be sufficient to characterize presence and use. However, the bird survey efforts may also warrant some modification. This is due to the fact that evidence of bird nesting has been observed on the islands. In order not to disturb/displace these birds during the spring and summer surveys it may be necessary to establish the observation points offshore of the islands and conduct the bird survey from a small anchored boat.

The quantitative natural resource inventory measures recommended above will function to allow for establishment of the existing conditions for the NEPA documentation process. The survey efforts will also function to provide insight into the potential plant and animal colonization sources for the island habitats to be created during the proposed restoration project. Additionally, this effort can also function as a basis for defining the necessary elements of a sound monitoring program and to track progress of the project.

If you have any comments or questions related to the above discussion, please call me at any time.

Sincerely,

Frank W. Pine, Ph.D.
Project Manager

cc: C Anderson-Austra
D Urso
M. Hart
File 60864.01
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EA Engineering, Science, and Technology

Corporate Headquarters
11019 McCormick Road
Hunt Valley, MD 21031
Telephone 410-584-7000
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6 January 1995

Mr. Robert Smith
Maryland Environmental Service
2011 Commerce Park Drive
Annapolis, MD 21401-2995

RE: National Marine Fisheries Service comments on Draft "Scope of Work - Environmental Sampling for Poplar Island", 8 November Letter.

Dear Bob:

This letter is in response to the 8 November 1994 letter to you from Timothy E. Goodger National Marine Fisheries Service, Beaufort Laboratory (attached).

1. The specific objectives of the field studies are to a) corroborate existing information and b) to provide data to support the preparation of an Environmental Document. The level of effort was developed to include those groups of aquatic and terrestrial /wetland biota which were considered of sufficient importance to provide the necessary basis for defining existing conditions. The purpose is to determine if any unusual or unique communities or habitats would be significantly impacted by the proposed action as well as the types and general structure of the resources affected. This information will also be used in conjunction with existing information and available data from the literature or agency files to define the anticipated impacts of the proposed action.

   The Scope of the field effort was developed in cooperation with the Baltimore District USACE, MES, USFWS, and Maryland DNR. The station locations, sampling frequency and number of replicates were arrived at through consultation with these agencies. Further, the station locations were defined to allow for near and far field comparisons for benthic infauna and water quality.

   The quantitative natural resource inventory measures recommended will function to allow for establishment of the existing conditions for the NEPA documentation process. The survey efforts will also function to provide insight into the potential plant and animal colonization sources for the island habitats to be created during the proposed restoration project. Additionally, this effort can also function as a basis for defining the necessary elements of a sound monitoring program to track progress of the project.

2. The study as it is set up now does not address larger infauna and epifauna (clams and oysters). While this appears to be a deficiency, the State of Maryland has already begun an assessment of the adjacent oyster beds and will conduct an assessment of soft-shell clam beds in the area. Some of the information can also be derived from state records, but the completeness of those records will need be evaluated.

3. While Blue crab and fisheries sampling in the winter is less valuable than at other times of the year, it is important to maintain consistency in seasonal efforts as well as providing documentation of winter anadromous fish utilization (February through April). Two seine and trawl hauls were proposed for each sampling station to cover the most area (maximize effort) in restricted sampling areas (the relatively small footprint and the limited seinable beaches of the islands). There is not enough room for a 10 minute trawl within most areas of the footprint, because of all the snags and shallow water. We have used this technique effectively in moderate-sized rivers where stations needed to be placed closely. The hauls are not really replicates, but are end to end for the seines and side by side (separated by several hundred feet) in the case of trawls. More stations might be considered for a monitoring program but the sampling we're doing maximizes the agreed upon effort required for support of the NEPA document.

4. We will use existing aerial photographs and other existing historic SAV bed information to initially define the detailed sampling locations. This will be accomplished by reviewing Maryland Department of Natural Resources SAV survey photos or by having an early season (e.g. May) photo taken for the study area in addition to having an aerial photo taken in mid-summer. The SAV sampling approach will include concentrated sampling point locations in areas identified from photos and other available information as potential SAV beds. A more widely spaced sampling approach will used to cover the remainder of the study area. In terms of SAV abundance determination, a limited quantitative approach will be used in any areas found to have SAV present. This will include the use of a weighted PVC half-meter square quadrat from which all SAV plants can be removed and counted/weighed. Sampling locations will be based upon a stratified random method of selection. Sediment tube coring is not planned.
Trawling in SAV beds is strongly discouraged as it is likely to result in significant damage. We will rely upon existing data to characterize the general faunal composition of beds. If required, more intensive sampling of SAV could be made a part of the monitoring plan.

The presence of Zannichellia palustrus will be investigated in both April and late May to ensure that it is adequately assessed.

If you have any comments or questions related to the above discussion, please call me at any time.

Sincerely,

Frank W. Pine, Ph.D.
Project Manager

cc: C. Anderson-Austra
D. Urso
M. Hart
File 60864.01
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January 18, 1995

Planning Division

Mr. Frank L. Hamons
Manager, Harbor Development
Maryland Port Administration
Maritime Center II
2310 Broening Highway
Baltimore, Maryland 21224-6621

Dear Mr. Hamons:

The purpose of this letter is to document the decision to prepare an Environmental Impact Statement (EIS) for the Poplar Island Section 204 Restoration Project. The decision was the result of several recent informal discussions among various team members and natural resource management agencies. As we agreed at the initiation of the study, initial environmental actions would be geared toward preparation of an Environmental Assessment (EA) to provide comprehensive environmental analysis and documentation in compliance with National Environmental Policy Act (NEPA) requirements. We further agreed that an early decision point would be built into the schedule to determine whether an EA or a full EIS would be the most appropriate document to prepare.

At this time it appears that preparation of an EIS, rather than an EA, will provide greater assurance to concerned agencies and individuals that comprehensive environmental analysis and documentation will be prepared. The preparation of an EIS is not expected to impact the current study schedule, which calls for construction to be initiated in June 1996.

If you have any questions regarding matter, please call me or my action officer, Ms. Carol Anderson-Austra, at (410) 962-2910.

Sincerely,

Dr. James F. Johnson
Chief, Planning Division

Copy Furnished:

Mr. Roy Denmark, Environmental Protection Agency, Region III
Mr. Timothy Goodger, National Marine Fisheries Service
Mr. John Gill, U.S. Fish and Wildlife Services
Mr. Nick Carter, Maryland Department of Natural Resources
Mr. Paul Slunt, Maryland Department of the Environment
Mr. Robert Smith, Maryland Environmental Service
Mr. Glenn Eugster, Chesapeake Bay Program, EPA

CENAB-OC (Ms. Katherine Will)
CENAB-OP-R (Mr. Brian Walls)
CENAB-PL-PC (Ms. Stacey Brown)
ERB Reading File

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MARYLAND
ENVIRONMENTAL
SERVICE

William Donald Schaefer
Governor

George G. Perdikakis
Director

January 20, 1995

Mr. Timothy E Goodger
National Marine Fisheries Service
Habitat and Protected Resources Division
904 South Morris Street
Oxford, MD 21654

Dear Mr. Goodger:

In response to your letter of 8 November 1994, the attached letter addresses your concerns about the Environmental Scope of Work for Poplar Island. These responses have been prepared in cooperation with the Environmental Section of the Corps of Engineers, Baltimore District and EA Engineering, Science, and Technology.

If you have any questions or comments about the responses, please call me at (410) 974-7261.

Sincerely,

Robert Smith

Robert Smith
Project Manager

Attachment.

cc: Wayne Young, MES
Michael Hart, MPA
Stacey Brown, USACE
Richard Thomas, GBA/MN, JV

MARYLAND
ENVIRONMENTAL
SERVICE

William Donald Schaefer
Governor

George G. Perdikakis
Director

January 20, 1995

Mr. David Meyer
National Marine Fisheries Service
Southease Fisheries Science Center
Beaufort Laboratory
101 Pivers Island Road
Beaufort, NC 28516-9722

Dear Mr. Meyer:

In response to your letter of 26 October 1994, the attached letter addresses your concerns about the Environmental Scope of Work for Poplar Island. These responses have been prepared in cooperation with the Environmental Section of the Corps of Engineers, Baltimore District and EA Engineering, Science, and Technology.

If you have any questions or comments about the responses, please call me at (410) 974-7261.

Sincerely,

Robert Smith
Project Manager

Attachment.

cc: Wayne Young, MES
Michael Hart, MPA
Stacey Brown, USACE
Richard Thomas, GBA/MN, JV

2011 Commerce Park Drive • Annapolis, Maryland 21401 • 410/974/7281 • Fax 410/974/7267

Bob ... Carol A-A

United States Department of the Interior

NATIONAL BIOLOGICAL SURVEY

PATUXENT ENVIRONMENTAL SCIENCE CENTER
Branch of Migratory Bird Research
11410 American Holly Drive
Laurel, Maryland 20708-4015

February 3, 1995

District Engineer
ATTN:CENAB-PL-EC
U.S. Army Corps of Engineers
Baltimore District
P.O. Box 1715
Baltimore MD 21203-1715

Dear Sir:

I am responding to your public notice on the "Poplar Island Restoration Project" announced by Dr. J.F. Johnson on January 19, 1995. As federal researchers at a facility interested in natural resource management, we would like to offer our technical expertise in developing plans for the project and any post-project monitoring. We work closely with the Chesapeake Bay Field Office, U.S. Fish & Wildlife Service and would coordinate our activities with that office.

We are presently planning some research and monitoring of Army Corps project sites including Smith Island and Barren Island where geotubes are being installed. Poplar would make another excellent site because of the environmental similarities with these two sites. Our initial research aims at relating habitat condition to bird use of the sites over a time series, including shorebirds, colonial nesting species, waterfowl, and migrant songbirds. Another study will focus on colonization of newly created sites (e.g. dredge sites) by micro- and macroinvertebrates, fish, and plants.

I am planning to attend the Feb. 7 meeting at John Gill's FWS office to discuss the monitoring aspect of the project. I have been in contact with Ms. Donovan of the MES concerning the meeting.

Thank you for the opportunity to provide input into the project. This appears to be a project with a "win-win" solution.

Sincerely,

M. Erwin

R. Michael Erwin, PhD
Group Leader, Migratory Birds

cc: S. Funderburk, CBFO
J. Gill, CBFO
L. Mitchell, CBFO
G. Therres, MD DNR
S. Hughes, MD Coop. Res. Unit/UMES

CENAB-PL-EC 6 February 1995

MEMORANDUM FOR RECORD

SUBJECT: SHPO Consultation for Poplar Island Study

1. The purpose of this memorandum is to document the results of a meeting held on 30 January 1995, between Mr. Ken Baumgardt, CENAB-PL-EC; Dr. Christopher Goodwin, Goodwin and Associates; and Dr. Susan Langley, Maryland Historic Trust, regarding the Phase I investigation of the Poplar Island Project Area.

2. Dr. Langley was favorable regarding the results of the Phase I investigation, and fully accepted the recommendations and conclusions of the contractor as presented in their Management Summary of 13 January 1995. Discussions were held regarding the level of continued investigations and the survey methodology to be employed, as follows:

a. It was agreed that submarine historic features were exposed on the bottom surface, and may hold fragile historic materials, and that Phase II investigations should be conducted by manned scuba exploration of the sites.

b. It was agreed that potential deeply buried shell middens should be tested using borings and suction dredges to collect sufficient materials to tell whether they are natural or manmade features.

c. It was agreed that the historic site on South Central Island should be tested with conventional approaches as soon as possible, due to its rapidly eroding condition.

d. It was agreed that the unexplored area to the west of the present islands is too shallow for sonar exploration, but a combination of magnetometer survey and subsurface testing with a clam dredge will adequately identify any sites in that area.

e. It was agreed that the location of the proposed test dike has been adequately surveyed, and there are no cultural resources in the area which will be affected by the construction of the test dike.

3. Dr. Goodwin was requested by the Joint Venture to prepare a cost estimate for the agreed upon Phase II investigations. Completion of the Phase II is expected to occur during the spring and summer of 1995, so that a Conditional No Adverse Effect Agreement can be prepared and signed prior to construction.

4 Questions regarding this matter can be addressed to Mr. Ken Baumgardt, at (410) 962-2894.

Kenneth Baumgardt
Historian, CENAB-PL-EC

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MARYLAND HISTORICAL TRUST

Office of Preservation Services

Parris N. Glendening, Governor
Patricia J. Payne, Secretary

February 7, 1995

Dr. James F. Johnson
Chief, Planning Division
Baltimore District
U.S. Army Corps of Engineers
P.O. Box 1715
Baltimore, MD 21203-1715

Re: Poplar Island Restoration Project, Talbot County, Maryland

Dear Dr. Johnson:

In response to your public notice of 19 January 1995, this office has reviewed the above-referenced undertaking with respect to effects on historic properties.

For terrestrial archeology at Poplar Island, our files record six inventoried archeological sites. These resources include sites 18TA217 (Archaic and Woodland periods), 18TA218 (Late Archaic, Middle and Late Woodland, nineteenth century), 18TA219 (Archaic and Woodland), 18TA222 (Late Archaic), 18TA236 (eighteenth and nineteenth centuries), and 18TA237 (seventeenth and eighteenth centuries). (Three other inventoried archeological sites are located on nearby Coaches and Jefferson islands.) In 1993, R. Christopher Goodwin & Associates conducted archival research and a pedestrian reconnaissance for the project, finding an additional historic-period site (MP.1) on Middle Poplar Island. Their draft December 1993 report, Phase IA Archeological Investigations at Poplar Island, Talbot County, Maryland, recommended an intensive terrestrial archeological survey for the project area.

The Trust concurs that a Phase I archeological investigation should be conducted to identify archeological properties in all upland portions of the area of potential effects. The survey should be carried out by a qualified professional archeologist, and performed in accordance with the Standards and Guidelines for Archeological Investigations in Maryland (Shaffer and Cole 1994) and with Archeology and Historic Preservation; Secretary of the Interior's Standards and Guidelines (1983). Based upon the results of the survey, we will be able to determine whether or not the project may affect significant archeological resources and make appropriate recommendations for any additional work. Further consultation with our office will be necessary to comply with Section 106 of the National Historic Preservation Act of 1966.

We understand that Goodwin & Associates is currently completing the recommended Phase I survey. The Trust looks forward to reviewing a copy of their complete Phase I report.

The extent and nature of investigations pertaining to submerged cultural resources were discussed in a meeting 31 January 1995 between Goodwin and Associates, Mr. Kenneth Baumgardt, U.S. Army Corps of Engineers, and the State Underwater Archeologist. At that time it was determined that six (6) submerged anomalies specified in an Executive Summary (13 January 1995) would be investigated using divers and some limited form of dredging or bucket sampling. It was also agreed that areas not previously surveyed because they are too shallow to permit remote sensing, and an additional area south and southwest of Coaches Island, within the parameters of the Alternative Alignment #2 would be examined by divers using suction dredges.

If you have any questions or require further information, please contact Dr. Susan Langley (for underwater archeology) or Dr. Gary Shaffer (for terrestrial archeology) at (410) 514-7600.

Thank you for your cooperation and assistance.

Sincerely,

Elizabeth J. Cole

Elizabeth J. Cole
Administrator
Archeological Services

EJC/GDS/SL
9500083
cc: Dr. R. Christopher Goodwin
Mr. Thomas Williams
Mr. Victor MacSorley
Mr. Shawn Callahan

R. CHRISTOPHER GOODWIN & ASSOCIATES, INC.
337 East Third Street, Frederick, MD 21701 • 301-694-0428
5824 Plauche Street, New Orleans, LA 70123 • 504-736-9323
848 Blountstown Highway, Unit "D", Tallahassee, FL 32304 • 904-575-0565

MEMORANDUM

DATE: February 14, 1995

TO: Richard F. Thomas, PE
Dennis Urso
GBA - M&N A Joint Venture

FROM: R. Christopher Goodwin, Ph.D., President & CEO

RE: Archeological Investigations Update

On January 31, 1995, Dr. Goodwin and April Fehr from Goodwin & Associates, Inc. met with Dr. Susan Langley of the Maryland Historical Trust and with Mr. Ken Baumgardt of the U.S. Army Corps of Engineers, Baltimore District, concerning the need for additional archeological investigations for the Poplar Island Restoration Project. The following tasks were recommended to complete the additional Phase I and Phase II investigations as required by the Trust and the Baltimore District:

Terrestrial and Near-shore Investigations

1. **Shoreline survey at Coaches Island.** This task involves a limited shoreline survey along the portion of Coaches Island affected by proposed alternative alignments 2 and/or 3 (including Option B). The purpose of this task is to determine the presence/absence of previously identified site 18TA216, and to identify any other archeological resources along the shore.

2. **Near-shore dredging at Coaches Island.** This task involves obtaining limited hand-held induction dredge samples for the near-shore area of Coaches Island. The purpose of this testing is to identify archeological deposits in the near-shore area, if any. The dredging is an extension of the terrestrial survey and will locate submerged portions of terrestrial sites.

3. **Phase II testing at Site 18TA237, South Central Island.** The purpose of this task is to provide data concerning the integrity and National Register potential of site 18TA237. Close interval shovel testing, test unit excavation, feature recordation and near-shore dredging will be used to determine the National Register eligibility of this site. The site is threatened by severe erosion and the Baltimore District feels that the Phase II should be undertaken during the spring of 1995.

Marine Investigations

1. **Phase I remote sensing survey of area encompassed by new dike alignment**. This task involves remote sensing survey of previously unsurveyed bottom lands within the proposed dike alignment encompassing Coaches Island. The remote sensing survey array will consist of a proton precession magnetometer and recording fathometer. A side scan sonar will be deployed over those areas with a water depth of five (5) ft or more. Survey will be conducted along predetermined lanes spaced 50 ft apart. Positioning control will be maintained using DGPS.

2. **Phase II underwater testing of anomalies**. Magnetic and acoustic anomalies located during Phase I survey of the Poplar Island project area will be examined to determine their cultural significance. Anomalies to be tested include 10-727, 10-755, 30-1151, 40-665, 48-819, and a cluster formed of anomalies 58-1477, 60-579, and 62-1508. Anomalies will be tested through a combination of visual search, metal detecting, probing and excavation. The purpose of this task is to provide data concerning the integrity and National Register potential of submerged cultural properties.

3. **Underwater examination of unexplored near-shore areas**. During Phase I survey of the original Poplar Island area, some areas were not accessible to survey owing to limitations of the equipment and a depth of water too great for non-diving techniques. The Maryland Historical Trust has requested some testing of those areas. Testing methods will be similar to those listed for Phase II testing. Testing locations will be derived from geographic coordinates for terrestrial features indicated on historic maps. Five test loci will be selected for examination.

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Chesapeake Bay Field Office
177 Admiral Cochrane Drive
Annapolis, Maryland 21401

February 16, 1995

Ms. Jane Boraczek
EA Engineering, Science and Technology
11019 McCormick Road
Hunt Valley, Maryland 21031

Re: Poplar Island Restoration Project
Talbot County, Maryland

Dear Ms. Boraczek:

This is in response to your December 8, 1994, letter requesting natural resources distribution information for the vicinity of Poplar Island. We have received your request and are providing the enclosed information in accordance with the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) and the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 *et seq.*).

Endangered Species

A bald eagle (*Haliaeetus leucocephalus*) nest is located on Jefferson Island. A breeding pair of eagles used this nest in 1994, although no young were fledged. Bald eagles are currently listed as Federally endangered, although the U.S. Fish and Wildlife Service (Service) has proposed reclassifying them to threatened. Glenn Therres of the Maryland Department of Natural Resources (DNR) can be reached at (410) 827-8612 for further information regarding bald eagle populations in the mid-Bay region.

The West Coast and Central Plains populations of least terns (*Sterna albifrons*) are listed as Federally endangered, but its Atlantic Coast breeding population is not Federally listed. Least terns are colonial nesters that prefer rocky or sandy substrates with sparse vegetation. A cooperative least tern habitat restoration effort was undertaken at Poplar Island during the spring of 1994. Clam shell was spread on one of the grounded barges to provide nesting substrate. This project will be monitored to determine if least terns initiate nesting at Poplar Island in 1995.

Except for occasional transient individuals, the Poplar Island complex is not known to support any other Federally listed, proposed or candidate species.

This response relates only to threatened and endangered species under our jurisdiction. For information on other rare species, including state-listed species, you should contact the Maryland Natural Heritage Program at (410) 974-2870.

Fish and Wildlife Resources

Midwinter waterfowl surveys by the Service and the Maryland Department of Natural Resources (DNR) have identified the following species in the vicinity of Poplar Island:

Year	Bufflehead	Mergansers	Oldsquaw	Canada Geese	Tundra Swans
1990		20			
1992	10		13	300	30
1993	10		117		

Bufflehead (*Bucephala albeloa*), mergansers (*Mergus serrator* and/or *M. merganser*) and oldsquaw (*Clangula hyemalis*) are common during winter in the open waters of Chesapeake Bay. These species feed primarily on fish and aquatic invertebrates. Canada geese (*Branta canadensis*) typically roost in large flocks in the open waters, and feed in marshes or fields during the day. Other common wintering waterfowl species that may occur in the vicinity of Poplar Island include ruddy ducks (*Oxyura jamaicensis*), canvasbacks (*Athya valisineria*) and common goldeneye (*Bucephala clangula*). Larry Hindman of the DNR can be reached at (410) 827-8612 regarding waterfowl use of the Poplar Island region.

Poplar Island provides breeding habitat for a variety of colonial waterbirds. Great blue herons (*Ardea herodias*), great egrets (*Casmerodius albus*), cattle egrets (*Bubulcus ibis*), snowy egrets (*Egretta thula*) and little blue herons (*Florida caerulea*) are known to have nested on the island. Numbers of nesting double-crested cormorants (*Phalacrocorax auritus*) are increasing in Chesapeake Bay, and Poplar Island supported numerous nesting pairs in 1994. Further information regarding colonial waterbird use of Poplar Island can be obtained from David Brinker of the DNR at (410) 974-3195.

Severe erosion has resulted in significant losses of forested upland, sandy shore and tidal marsh habitats at Poplar Island. Erosion results in the conversion of fastlands to shallow water habitat, which is a valuable resource for many fish species. Shallow estuarine waters provide excellent conditions for growth of phytoplankton, bacteria and algae. Due to high primary production, these areas also provide good foraging habitat for consumers such as shorebirds, wintering waterfowl and anadromous fish. The juvenile forms of anadromous species such as alewife (*Alosa pseudoharengus*), blueback herring (*A. aestivalis*), and white perch (*Morone americana*) may occur in these shallows. Other common Bay species that would be expected in this area are spot (*Leiostomus xanthurus*), bay anchovy (*Anchoa mitchilli*) and striped bass (*Morone saxatilis*). Shallow waters with sandy substrates are especially valuable habitat to female blue crabs (*Callinectes sapidus*) bearing eggs ("sponge crabs"), because the coarse sediments in these areas aid in sloughing of fertilized eggs. Detailed information regarding fisheries resources near Poplar Island can be obtained from Nick Carter of the DNR at (410) 974-5780.

There are several natural oyster (*Crassotrea virginica*) bars adjacent to the Poplar Island complex. The Poplar Island Bar (#8-10) consists of approximately 1100 acres of Bay bottom west of Poplar Island, while the Poplar Island Narrows Bar (#8-11; 1700 acres) is located between Poplar Island and the mainland. Oyster larvae are carried from spawning grounds to these bars, where spat setting occurs. Water quality in the vicinity of oyster bars can affect their ability to support juvenile oysters, impeding recruitment into the reproductive population. Oyster populations on many bars in the mid-Bay region, including those adjacent to Poplar Island, have been negatively impacted in recent years by the diseases MSX and dermo.

The shallow waters adjacent to the Eastern Shore between the Chester River and Tangier Sound are among the most highly productive soft shell clam (*Mya arenaria*) waters in the Bay. Soft shell clams are found primarily in areas with sandy substrates, although they also occur on harder clay bottoms. The original footprint of Poplar Island is characterized by a hard clay substrate, and would thus be expected to produce fewer clams than the sandy substrate outside the island's original footprint. Juvenile clams are an important food source for blue crabs, mud crabs, flatworms, mummichogs and spot. Adult soft shell clams are commercially harvested, and may be heavily depended upon by ducks, geese and swans. All of the Bay waters surrounding Poplar Island are open to shellfish harvesting. Chris Judy of the DNR can be reached at (410) 974-3733 regarding shellfish populations near Poplar Island.

Submerged aquatic vegetation (SAV) plays an important role in nutrient and energy cycling in Chesapeake Bay. In addition to serving as a significant food source for waterfowl, SAV provides protective cover for molting blue crabs and the juvenile life forms of many fish species. SAV is a good indicator of water quality due to its sensitivity to turbidity and nutrient levels. The 1978 Bay-wide SAV survey documented SAV beds in the shallows adjacent to Poplar Island, Jefferson Island and Coaches Island. Although the species composition of these beds was not documented, nearby SAV beds on the mainland shoreline consisted of sago pondweed (*Potamogeton pectinatus*), redhead grass (*P. perfoliatus*), widgeon grass (*Ruppia maritima*) and horned pondweed (*Zanichellia palustris*). By 1984, only a few small patches of SAV were present adjacent to Coaches Island. Aerial surveys have not documented any SAV within the Poplar Island complex since 1984.

Wildlife habitat value of the islands has been drastically affected by the severe erosion. Hundreds of acres of forested habitat and tidal marsh have been lost. Prior to erosion, the Poplar Island complex may have supported large numbers of colonial nesting waterbirds, waterfowl and songbirds. Some species, such as osprey, may still nest within the Poplar Island complex, although in reduced numbers compared to the 19th century.

The value of mid-Bay island habitat to wildlife is evidenced by the density and diversity of colonial waterbirds continuing to nest at Poplar Island, despite tremendous losses of habitat. As a cooperator in the Poplar Island Restoration Project, the Service is committed to restoring the habitat value of this island complex to 19th century levels. If there are further questions regarding this project, please contact John Gill of this office at (410) 573-4529.

Sincerely,

for John P. Wolflin
Field Supervisor
Chesapeake Bay Field Office

cc: Nick Carter (DNR)
Bob Smith (MES)
Frank Hammons (MPA)
Carol Anderson-Austra (COE)
Tim Goodger (NMFS)

Chesapeake Bay Foundation

Environmental Defense - Environmental Education - Land Management

Maryland Office • 164 Conduit Street • Annapolis, Maryland 21401
(410) 268-8833 Fax (410) 280-3513

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Pennsylvania Executive Director

February 17, 1995

Colonel Randall R. Inouye
District Engineer
U.S. Army Corps of Engineers
Baltimore District
P.O. Box 1715
Baltimore, Maryland 21203-1715

Dear Colonel Inouye,

The Chesapeake Bay Foundation (CBF) appreciates the opportunity to comment on the U.S. Army Corps of Engineers proposal to create approximately 1000 acres of wildlife habitat using 10 to 40 million cubic yards of dredged material at Poplar Island in Talbot County, Maryland. We support the Poplar Island project which will result in a net gain in habitat for a number of Chesapeake Bay living resources.

The Poplar Island project is a creative solution to a complex and pressing problem: cost-effective and environmentally sound placement of dredged material. While there are still some environmental issues to be resolved, we feel that the current concept to create a system of wetlands and uplands within a footprint similar to the Island's 1847 landmass will result in a variety of water quality and habitat benefits to the area.

As a participant in the various Dredged Material Working Groups, CBF has been pleased to see that representatives of local interest groups (e.g. Maryland Charter Boat Association) have been included in the planning process. The practical knowledge of fisheries issues as provided by the people intimately familiar with the project area has been invaluable. We hope that input from additional local groups and individuals who may be affected by the Poplar Island activities (e.g. small vessel operators, crabbers, clammers) will be gained as soon as possible. It is to everyone's advantage to have concerns and needs identified and addressed early in the design phase.

Headquarters: 162 Prince George Street • Annapolis, Maryland 21401 • (410) 268-8816
Virginia Office: Heritage Building • 1001 E. Main Street • Richmond, Virginia 23219 • (804) 780-1392
Pennsylvania Office: 214 State Street • Harrisburg, Pennsylvania 17101 • (717) 234-5550

Nonchlorine Bleached Recycled Paper

CBF is optimistic that Poplar Island will be a truly beneficial and innovative project, if future challenges are faced as a partnership. We look forward to working with the Corps and the other public and private interest groups involved in this effort.

Sincerely,

Thomas V. Grasso
Acting Executive Director

CENAB-PL-EC 17 March 1995

MEMORANDUM FOR RECORD

SUBJECT: Continued Phase I for Poplar Island Study

1. The purpose of this memorandum is to document the results of a meeting held on 16 March 1995, between Mr. Ken Baumgardt, CENAB-PL-EC; Mr. Christopher Polglase and Ms. April Fehr of Goodwin and Associates, and Mr. Michael Hart and Mr. Bob Smith, Maryland Port Authority, and Mr. Richard Thomas, Joint Venture. The meeting was held to discuss the recommendations for continued cultural resource investigations for the Poplar Island study.

2. Goodwin and Associates provided the Joint Venture with a proposal to conduct Phase I investigations for the expanded part of the project, and Phase II investigations for one terrestrial archeological site and six underwater magnetic anomalies. Due to the fact that the Phase I investigations were not completed, it was determined to be more appropriate to complete them before proceeding to the more expensive underwater Phase II investigations. However, due to the rapidly eroding condition of the terrestrial archeological site, it was recommended that the Phase II investigation of this site be conducted immediately.

3. Based upon the results of the meeting, R. Christopher Goodwin and Associates will submit to the Joint Venture a detailed cost proposal to complete all Phase I investigations and conduct a Phase II investigation on the terrestrial archeological site. All underwater investigations will be delayed until the summer of 1995. This procedure will not affect the project schedule, and may result in substantial cost savings by limiting the amount of Phase II investigations required for the project.

4. Questions regarding this matter can be addressed to Mr. Ken Baumgardt, at (410) 962-2894.

Kenneth Baumgardt
Historian, CENAB-PL-EC

/export/home/k9b/mfr.popis.0395

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Habitat and Protected Resources
Division
904 South Morris Street
Oxford, Maryland 21654

5 April 1995

Mr. Brian Walls
Planning Division
Baltimore District
Corps of Engineers
P. O. Box 1715
Baltimore, Maryland 21203

Dear ~~Mr. Walls~~ Brian:

As per your request of 4 April 1995, I am providing a copy of the map designating the relative locations of several important fisheries in vicinity of Poplar Island (enclosure 1). The map was prepared by staff from presentations at the 22 March public meeting.

Also enclosed is the requested list of endangered and threatened species that are within the purview of the National Marine Fisheries Service. As stated previously, however, except for occasional transient individuals, these species are not likely to occur in the project area. Consequently, no further coordination pursuant to Section 7 is required, unless new information becomes available or project conditions change.

If you have questions, or wish to discuss other issues, please call me at (410) 226-5771.

Sincerely,

Tim Goodger

Timothy E. Goodger
Assistant Coordinator

Enclosures

cc: **Dave Meyer**
Lee Crockett
Chris Doley

FIGURE 1

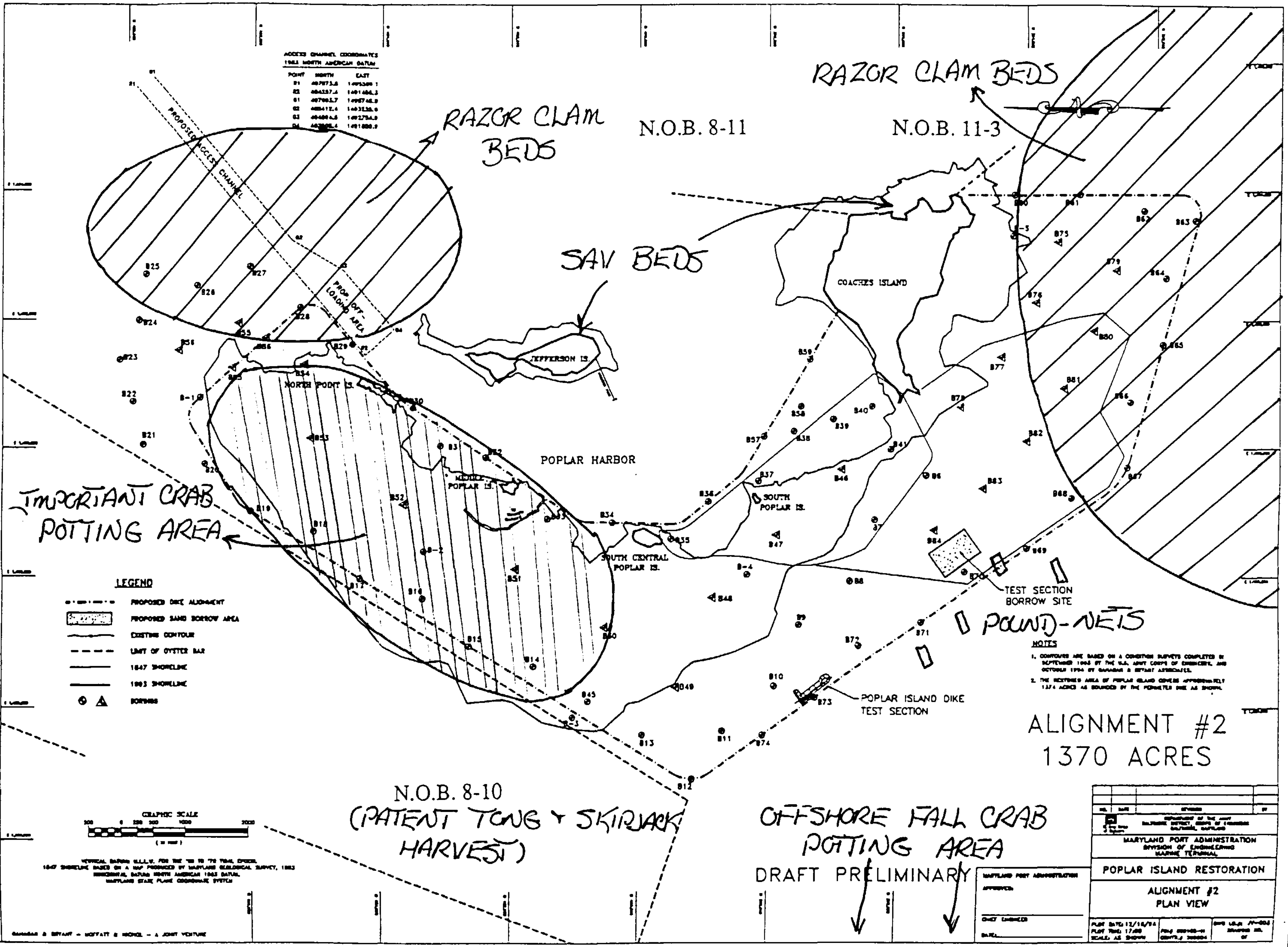

Figure 2: Map of Poplar Island archipelago. Note location of test dike and borrow site in relation to islands and natural oyster bars (N.O.B.).

NATIONAL MARINE FISHERIES SERVICE

Endangered Species List for Northeast Region

ENDANGERED -

Right whale (Eubalaena glacialis)

Humpback whale (Megaptera novaeangliae)

Fin whale (Balaenoptera physalus)

Sperm whale (Physeter macrocephalus)

Sei whale (Balaenoptera borealis)

Kemp's ridley sea turtle (Lepidochelys kempi)

Leatherback sea turtle (Dermochelys coriacea)

Green sea turtle (Chelonia mydas)

Shortnose sturgeon (Acipenser brevirostrum)

THREATENED -

Loggerhead sea turtle (Caretta caretta)

4-5-95

Parris N.Glendening
Governor

Maryland Department of Natural Resources

Tawes State Office Building
Annapolis, Maryland 21401

John R. Griffin
Secretary

Ronald N. Young
Deputy Secretary

April 5, 1995

Ms. Carol Anderson-Austra
Baltimore District
U.S. Army Corps of Engineers
P.O. Box 1715
Baltimore, Maryland 21203-1715

Dear Ms. Anderson-Austra,

We have received a public notice concerning the construction of a containment dike as part of the Poplar Island restoration program. This area looks like a potential spawning area for both horseshoe crabs and terrapins. Does the environmental assessment consider these two species in their analysis? Will the dike prevent these species from utilizing the Poplar Island habitat? As part of the Chesapeake Bay Program to protect living resources in the Bay, a Horseshoe Crab Management Plan was developed in 1994. One of the plan's important recommendations is to protect spawning habitat. Peak spawning time for horseshoe crabs occurs in May and June and they prefer beach areas within bays and coves which are protected from surf. Although there is limited data on the distribution and abundance of horseshoe crabs in the Bay, their occurrence has been documented in the Miles River, Eastern Bay area and the Chester and Choptank Rivers. We would like to coordinate our efforts to protect these species.

I would be happy to provide you with any information you might need to ensure that horseshoe crab and terrapin spawning needs are considered in decisions regarding beach habitat. I can be contacted at 410-974-2241. Thank you for the opportunity to comment.

Sincerely,

Nancy H. Butowski

Nancy H. Butowski
Fisheries Biologist
Fishery Management Plans

R. CHRISTOPHER GOODWIN & ASSOCIATES, INC.

337 East Third Street, Frederick, MD 21701 • 301-694-0428
5824 Plauche Street, New Orleans, LA 70123 • 504-736-9323
848 Blountstown Highway, Unit "D", Tallahassee, FL 32304 • 904-575-0565

June 21, 1995

Mr. Richard F. Thomas, PE
Project Manager
GBA-M&N A Joint Venture
9009-O Yellow Brick Road
Baltimore, Maryland 21237

RE: Schedule for Archeological Investigations at Coaches and Poplar Island

Dear Mr. Thomas:

As you requested, enclosed please find a proposed schedule for completion of Phase I archeological investigations at Coaches Island and Phase II testing at Site 18TA237, and for Phase II testing of six marine anomalies. The Phase I schedule essentially follows that proposed by the Joint Venture (JV) except that we have included a week for review of the draft report by the JV and the Maryland Port Authority (MPA) prior to submittal to the Maryland SHPO.

There are two options for the Phase II investigations. Option 1 follows from the desire expressed by Mike Hart in our March 16, 1995 meeting to have the Phase I report reviewed by the Maryland Historical Trust prior to planning the Phase II investigations. This would mean that we could not start Phase II work until SHPO review is completed in October, and that the Phase II draft report would be submitted the end of November. Option 2 proposes that a summary letter be prepared within two weeks of completion of the Phase I fieldwork and that a meeting be held with the Maryland Historical Trust to discuss the results and obtain a preliminary reading of their expectations for Phase II investigations. While the Trust will not formally review a summary letter, they likely would agree to discuss the results and their concurrence with the findings. This would mean that Phase II work could begin in August, and a draft Phase II report could be submitted in September.

The budget we have submitted for the *Phase II Evaluations of Six Marine Anomalies at Poplar Island* applies only to those anomalies discovered during the Phase I investigations at Poplar Island. If additional anomalies and/or potentially significant terrestrial sites are found during the Phase I investigations at Coaches Island, a revised budget will be submitted.

We look forward to working with you on this project. We will be in the field next week. Please do not hesitate to contact us should you have questions about this schedule or the project in general.

With best regards, I remain

Yours faithfully,

April Fehr

April L. Fehr, M.A.

SCHEDULING OPTIONS FOR PHASE I AND PHASE II ARCHEOLOGICAL INVESTIGATIONS
AT POPLAR AND COACHES ISLAND

Prepared June 21, 1995

Phase I Survey at Coaches Island and Phase II Investigations at 18TA237

Start Fieldwork	June 28
End Fieldwork	July 21
Draft Report Submittal	August 30
Complete In House (JV/MPA) Review	September 6
Complete SHPO Review (30 days)	October 6
Final Submittal	October 27

[Option 1] Phase II Investigations (Starting After SHPO Review of Phase I)

Start Fieldwork	October 18
End Fieldwork	October 27
Ph.II Draft Report Submittal	November 27
Complete In House (JV/MPA) Review	December 4
Complete SHPO Review (30 days)	January 2
Final Submittal	January 23

[Option 2] Phase II Investigations (Starting After Review of Preliminary Phase I Results by JV/MPA and meeting with SHPO)

Start Fieldwork	August 16
End Fieldwork	August 25
Ph.II Draft Report Submittal	September 22
Complete In House (JV/MPA) Review	September 29
Complete SHPO Review (30 days)	October 30
Final Submittal	November 27

RECEIVED

AUG 3 1995

EA Engineering, Science, and Technology
EA-Hunt Valley

Parris N. Glendening
Governor

Maryland Department of Natural Resources
Fish, Heritage and Wildlife Administration
Tawes State Office Building
Annapolis, Maryland 21401

John R. Griffin
Secretary

Ronald N. Young
Deputy Secretary

July 19, 1995

Mr. Donnell E. Redman
EA Engineering, Science and Technology
11019 McCormick Road
Hunt Valley, MD 21031

RE: Request for Threatened and Endangered Species and Critical Habitats Information for the Poplar Island Complex.

Dear Mr. Redman:

There is an active Bald Eagle's nest on the north end of Jefferson Island. The island complex has a long history of use by various colonial nesting waterbirds. In 1995 Double Crested Cormorants, Snowy Egrets and Cattle Egrets nested on Poplar Island and Great Blue Herons nested on Coaches Island.

I regret the delay in responding to your request.

Sincerely,

Robert L. Miller
Environmental Review Coordinator

cc: G. Therres
D. Brinker

ER95796.TA

MARYLAND
ENVIRONMENTAL
SERVICE

Parris N. Glendening
Governor

James W. Peck
Director

July 27, 1995

Mr. Lawrence W. Simns
Executive Director
Maryland Watermen's Association
1805-A Virginia Street
Annapolis, MD 21401

Dear Mr. Simns:

The Maryland Port Administration, the Maryland Environmental Service, and the U.S. Corps of Engineers are developing a project to restore Poplar Island as wildlife habitat using dredged materials. As you may know, the project has received support from almost everyone associated with the Chesapeake Bay. This support has been achieved by encouraging the participation of all interested parties.

During the process, the project has encountered some opposition from the local watermen on Tilghman Island who harvest clams and crabs at Poplar Island. The Project Team has acknowledged the watermen's concerns about removing the 1100 acres from commercial use and met with the watermen several times to identify potential areas which, if opened to commercial use, might compensate for the use of the Poplar Island area.

We have identified several alternatives and discussed these with the Department of Natural Resources. We also need to discuss the alternatives with the MWA as the representative agency for the commercial watermen in the Chesapeake Bay. If possible, we would like to meet with you sometime in the next two weeks and the time and place of the meeting can bee coordinated with your schedule. Please contact me at (410) 974-7261.

Sincerely,

Robert L. Smith

Robert L. Smith
Project Manager

cc: Mr. Frank Hamons, MPA
Mr. David Bibo, MPA
Ms. Stacey Brown, USACE

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Habitat and Protected Resources Division
904 South Morris Street
Oxford, Maryland 21654

8 August 1995

RECEIVED

AUG 10 1995

EA Engineering, Science and Technology
EA - Hunt Valley

Mr. Edward W. Morgereth, Jr.
Environmental Assessment and Management
EA Engineering, Science, and Technology
11019 McCormick Road
Hunt Valley, Maryland 21031

Dear Mr. Morgereth:

Reference is made to your letter, dated 24 July 1995, requesting information relative to endangered or threatened species found within the vicinity of Poplar Island. Enclosed is a list of endangered and threatened species that are within the purview of the National Marine Fisheries Service (NMFS). However, except for occasional transient individuals, these species are not likely to occur in the project area. Consequently, no further coordination pursuant to Section 7 is required, unless new information becomes available or project conditions change.

Although the Poplar Island proposal does not pose an imminent threat to protected resources, the project will significantly affect other fishery resources and habitat in the area. The NMFS has expressed concerns for these resources, particularly shellfish, to the Corps of Engineers, Maryland Environmental Service, and others in previous correspondence and at meetings of the Poplar Island Working Group.

If you have questions, or wish to discuss other issues, please call me at (410) 226-5771.

Sincerely,

Timothy E. Goodger

Timothy E. Goodger
Assistant Coordinator

cc: Lee Crockett-Bay Program
Chris Doley
David Meyer-Beaufort Lab.
Brian Walls-Corps, Baltimore District

Enclosure

NATIONAL MARINE FISHERIES SERVICE

Endangered Species List for Northeast Region

ENDANGERED -

Right whale (*Eubalaena glacialis*)

Humpback whale (*Megaptera novaeangliae*)

Fin whale (*Balaenoptera physalus*)

Sperm whale (*Physeter macrocephalus*)

Sei whale (*Balaenoptera borealis*)

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

Leatherback sea turtle (*Dermochelys coriacea*)

Green sea turtle (*Chelonia mydas*)

Shortnose sturgeon (*Acipenser brevirostrum*)

THREATENED -

Loggerhead sea turtle (*Caretta caretta*)

4-5-95

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Chesapeake Bay Field Office
177 Admiral Cochrane Drive
Annapolis, MD 21401

August 23, 1995

RECEIVED
AUG 24 1995
EA Engineering, Science and Technology
EA [illegible]

Mr. Edward W. Morgereth, Jr.
EA Engineering, Science, and Technology
11019 McCormick Road
Hunt Valley, MD 21031

Re: Poplar Island Project
Talbot County, Maryland

Dear Mr. Morgereth:

This responds to your July 24, 1995, request for information supporting your investigation of natural resources within the above referenced project area. We have reviewed the information you enclosed and are providing comments in accordance with the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*), the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 *et seq.*), and the Migratory Bird Treaty Act (40 Stat. 755, as amended; 16 U.S.C. 703 *et seq.*).

Endangered Species

The following listed species nests on Jefferson Island which is within the referenced Poplar Island chain.

Bald eagle (*Haliaeetus leucocephalus*)

Sections 4(d) and 9 of the Endangered Species Act prohibit "taking" of listed species. "Take" is defined to include harming or harassing such species, or attempting to engage in any such conduct. "Harm" is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns such as breeding, feeding or sheltering. "Harassment" is defined as those actions that may result in injury to listed species by significantly disrupting normal breeding, feeding or sheltering patterns.

You may wish to contact Mr. Glenn Therres of the Maryland Department of Natural Resources at (410) 827-8612 for further information about the eagle nest and for time-of-year restrictions necessary to minimize impacts from construction activities.

This response relates only to threatened and endangered species under our jurisdiction. For information on other rare species, including state-listed species, you should contact Ms. Lynn Davidson of the Maryland Natural Heritage Program at (410) 974-2870.

We appreciate the opportunity to provide information relative to fish and wildlife resources. If you have any questions on these comments, please contact Andy Moser of this office at (410) 573-4500.

Sincerely,

G. A. Moser

for John P. Wolflin
Supervisor
Chesapeake Bay Field Office

MEMORANDUM

TO:

Maryland Dept. of the Environment
Visty Dalal

Maryland Environmental Service
Cece Donovan

Maryland Port Administration
David Bibo

National Marine Fisheries Service
Lee Crockett, CBO
Dave Meyer, Beaufort Lab.
Chris Doley, Silver Spring
Tim Goodger, Oxford Lab

Maryland Dept. of Natural Resources
Nick Carter
Bill Panageotou, MGS
Jim Hill, MGS

US Fish & Wildlife Service
John Gill

US Army Corps of Engineers
Carol Anderson-Austra
Mark Mendlesohn
Brian Walls

FROM: Bob Smith

SUBJ: Monitoring Framework

DATE: September 1, 1995

The attached documents were sent out today for agency concurrence. There were minor format revisions to the last version you received.

Number of pages (including this cover sheet) 15

September 1, 1995

RE: Agency Concurrence with Poplar Island Monitoring Framework and Baseline Monitoring Implementation Plans

Dear

Thank you for your agency's participation in the collaborative team which has worked on the Poplar Island Monitoring framework and implementation plan. The interagency cooperation has resulted in a cost-effective, multi-disciplinary framework and implementation plan which can be a model for future projects.

Please review the attached documents - "Poplar Island Restoration Project Monitoring Framework" and "Poplar Island Baseline Monitoring Implementation Plan." These documents have been prepared using a multi-disciplinary team which included representatives of five federal and four state agencies and are being provided to you to obtain your agency's concurrence. Please note that agency concurrence is an indication that the framework and implementation plan are adequate as submitted to meet the identified monitoring needs at Poplar Island. After concurrence by all agencies, the framework will be provided to the U.S. Army Corps of Engineers for inclusion in the Environmental Impact Statement (EIS) documentation.

Please indicate your agency's concurrence for each document separately on the attached letter and return a copy of the letter to me by September 8, 1995.

Thanks again for your assistance. As you know, time is of the essence in completing the EIS and beginning the baseline monitoring this fall, so your speedy response will be appreciated by all concerned. Upon receipt of concurrence, MES will coordinate implementation of the baseline monitoring plan with MPA and the Baltimore District Corps of Engineers, and keep you posted on developments. If there are any questions, please contact me at 410-974-7261.

Sincerely,

Wayne Young
Program Director
Environmental Dredging Program

Attachments

1. Concurrence Letter
2. Monitoring Framework
3. Implementation Plan

Date:______________

Mr. Wayne Young, Program Director
Environmental Dredging Program
Maryland Environmental Service
2011 Commerce Park Drive
Annapolis, MD 21401

Dear Mr. Young:

Concurrence by my agency with the Poplar Island Restoration Project Framework and Implementation Plan for Baseline Monitoring are indicated below.

Sincerely,

John Wolflin
U.S. Fish and Wildlife Service

My agency concurs that the Poplar Island Restoration Project Monitoring Framework submitted as Attachment 2 to my letter of September 1, 1995 from the Maryland Environmental Service satisfies the monitoring needs for this project.

____
Printed Name: Date
Printed Title:
U.S. Fish and Wildlife Service

My agency concurs that the Poplar Island Restoration Project Baseline Monitoring Implementation Plan submitted as Attachment 3 to my letter of September 1, 1995 from the Maryland Environmental Service would satisfy the monitoring needs for this project.

____
Printed Name: Date
Printed Title:
U.S. Fish and Wildlife Service

POPLAR ISLAND RESTORATION PROJECT

MONITORING FRAMEWORK

I. PURPOSE

This document has been developed to provide a multi-disciplinary monitoring framework that meets the regulatory agency, resource agency and construction compliance requirements for the Poplar Island Restoration Project.

II. INTRODUCTION

Clean dredged material will be used to restore over 1100 acres of wetland and upland habitat at Poplar Island in Talbot County, Maryland. The Maryland Port Administration (MPA) has worked with state and federal resource agencies and the U.S. Army Corps of Engineers (USACE) to formulate design, construction, and site management plans for the placement of dredged sediment to restore the eroded Poplar Island, a valued bird and wildlife habitat resource in the Chesapeake Bay.

The proposed habitat will include uplands and tidal and intertidal wetlands. The project will also create a sheltered harbor which is expected to result in hydrodynamic and water quality conditions that will enhance the colonization and growth of submerged aquatic vegetation and will also enhance juvenile fish habitat.

Construction of the outer dikes of the facility is scheduled for 1996, with filling of the first cells planned for 1997. Monitoring needs have been identified in a collaborative manner by a multi-disciplinary group of state and federal regulatory and resource agencies. Multi-disciplinary monitoring is required for this project, and this is reflected in the framework. Monitoring will be performed to ensure regulatory compliance, to document the creation of beneficial habitat, to confirm the expected findings of no negative impacts, and to provide operational input on the success of habitat creation and potential changes which will increase the habitat value and utilization.

These monitoring needs require baseline data collection in the year prior to initiation of construction, as well as at various points during the life of the project. The baseline monitoring will utilize and enhance the data collected during the feasibility study as part of the National Environmental Protection Act (NEPA) requirements. The NEPA data is to be included in the federal Environmental Impact Statement (EIS). The NEPA data was only intended to identify and describe existing conditions and projected impacts to the degree sufficient for the EIS. The baseline data will include monitoring information not previously collected for the NEPA efforts.

Baseline data collection must start in the Fall of 1995 in order to gather a full year of baseline data before planned construction of the project begins in the summer of 1996. Baseline data collection will focus on gathering information for use in establishing reference and baseline conditions. The baseline and reference information will then be used for comparison with during- and post-project conditions.

III. BACKGROUND

This framework was prepared as part of the monitoring plan development services which are currently being performed for MPA by the Maryland Environmental Service (MES). This stage of development of a comprehensive, collaborative monitoring framework will be complete upon concurrence from participating resource and regulatory agencies. The Baltimore District, USACE, is participating as a potential source of project funding and the regulatory authority under Section 404 of the Clean Water Act.

Agencies providing expertise and information on monitoring elements include the National Marine Fisheries Service, the U.S. Fish and Wildlife Service, the National Biological Survey, the Maryland Department of Natural Resources (including the Maryland Geologic Survey), the Maryland Department of the Environment, the Maryland Environmental Service, the U.S. Environmental Protection Agency and the U.S. Army Corps of Engineers, Baltimore District. A collaborative, multi-disciplinary team was used to develop the framework in order to contain costs, to ensure comprehensive monitoring and to provide concurrent peer review of the monitoring effort.

The development of the framework is a dynamic process and monitoring elements will evolve to fit changing conditions and findings. Given that details of the project design, schedule and operations are still being finalized, the specifics of each monitoring element will be controlled by the final project details. All changes in the monitoring framework will continue to be presented to the team of resource and regulatory agencies for their review and comment.

IV. MONITORING ELEMENTS

A. Sediment Quality Monitoring

Objectives- To monitor physical parameters and the concentrations of metals and other chemicals in sediment which could be indicators of accompanying effects to benthic infauna and potential bioaccumulation through the food chain. To provide operational input on wetlands function and the need for soil conditioning to increase pH and reduce metals mobilization in the uplands.

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Hypothesis- Project conditions will not change the metals behavior in Poplar Island wetlands or Poplar Harbor when compared to regional background sediments.

Brief Description - Baseline sediment sample collection, analysis for grain size, trace metals, C/N/S. Baseline year will include 60 additional reference stations for establishment of reference values and statistical database. Sample stations established at the same eleven points as the benthic monitoring and water quality monitoring stations. Scheduling of the second sample event will be dependent on three factors - inflow of dredged material, closing off of Poplar Harbor and the number of years since the baseline monitoring. The second sample event will take place no less than three years after the first event, but no longer than one year after Poplar Harbor is closed off and inflow begins. The third sampling event will take place within one year after the first cell received material above mean lower low water and no later than three years after the second sampling event. Samples are planned to be collected annually after this for a ten year period.

B. Wetland Vegetation Monitoring

Objectives

To measure and evaluate differences in plant community species composition, densities or production among the Poplar Island restored marshes, those of the remnant islands and nearby reference marshes; to measure and evaluate differences in plant community species composition, densities or production associated with age (seral stage) of the restored marshes; to measure and evaluate differences in plant species composition or zonation associated with age (seral stage) or topographic changes of restored marshes. To provide operational input on survival of plant species and methods to increase planting success.

Hypotheses

1. There are no differences in plant community species composition, densities or production among the Poplar Island restored wetlands, those of the remnant islands and nearby reference wetlands.

2. There are no differences in plant community species composition, densities or production associated with age (seral stage of the restored wetlands).

3. There are no differences in plant species composition or zonation associated with age (seral stage) or topographic changes of restored wetlands.

Brief Description - Vegetation surveys and collections will be performed at the end of the growing season during the baseline year. Up to six permanently marked plots of known size will be selected in a reference wetlands and at existing vegetated areas on the remnant islands. A transect will also be established through each plot and will be permanently marked. Plant shoot densities, plant survival, above and below ground biomass survival and large scale vegetation delineation and survival estimates will be performed. Sediment movement and vegetation zonation will also be examined through topographic measurement along transects, aerial photography and comparison of surveys. This will be repeated after planting of the first cell and every three years after that.

C. Water Quality Monitoring, including Turbidity Monitoring

Purpose - To characterize water quality in the project area, to evaluate whether long term water quality changes have resulted from the project. To comply with Water Quality Certification turbidity monitoring requirements during construction.

Hypotheses

1. There will be no significant long term change in water quality at Poplar Island. (A short term change is expected.)

2. Turbidity levels outside of a defined mixing zone will remain in compliance with the Water Quality Certification limitations during construction activities.

Brief Description - Eleven stations will be monitored once in the summer, once in the fall and once in the spring in the year prior to dike construction. The same parameters as are tested in the Chesapeake Bay Program will be used for water quality testing. This will be repeated after completion of the dike at a frequency of once per month during warm months and once per month during colder months. Evaluations will be made annually on whether the monitoring should be continued.

Compliance turbidity monitoring is not defined as yet, it will depend on test dike data. Turbidity monitoring will be required during construction, compliance limits will be set in the Water Quality Certification. This monitoring may be performed by the operators of the site or another agency.

D. Benthics Monitoring

Purpose - To characterize the benthic community in the project area, to verify reestablishment of the community, to provide information on epibenthic colonization on the dike, to assure there is no accumulation of contaminants in the tissue of benthic organisms in and around Poplar Island due to project conditions.

Hypotheses

1. There will be achievement of the benthic restoration goal (an abundance and diversity goal for benthic systems developed as part of the Chesapeake Bay Program) in Poplar Harbor within two years of exterior dike construction.

2. There will be no accumulation of contaminants in benthic tissue as a result of project conditions.

3. The project will promote an epibenthic community on the exterior dikes and finger dikes. This will enhance the habitat restoration impacts of the project and may offset the loss of the snag field to the recreational fishery.

Brief Description - Eleven benthic infauna stations will be monitored once in the summer, once in the fall and once in the spring in the year prior to dike construction. Three replicate samples per station will be collected. Two stations will be located in the area where the created wetlands will be constructed. Community composition, abundance and diversity will be measured and recorded. After the dike is constructed, the eleven infauna stations will be monitored during three seasons, along with two stations on the exterior dike or finger dikes to evaluate epibenthic colonization. Evaluations will be made annually on whether monitoring should be continued.

Benthic tissue samples will be collected when the benthic sampling occurs. The tissue samples will be analyzed for a complete scan of organic contaminants and metals. These samples will be collected in the baseline year, then no more than three years after that, and then again one year after the first uplands have begun to dewater. At least two benthic tissue stations will be located within the created wetlands at Poplar, to measure contaminant concentrations in the tissue of the organisms most likely to be affected by any mobilization of metals from the dewatering of the uplands. Evaluations will be made after the results from each sampling event are known on whether monitoring should be continued.

E. Fisheries Use of Exterior Proximal Waters Monitoring

Purpose - To measure and evaluate differences in fish and decapod populations and densities before and after the project.

Hypotheses

1. There is no difference in fish or decapod species composition or density within the Poplar Island Harbor area prior to island construction compared to after island construction.

2. There is no difference in faunal species composition or density in areas immediately adjacent to the outside of the dike prior to construction compared to after construction.

Brief Description - Poplar harbor and areas on the reference islands east of the island footprint will be sampled using trawls, gill nets, throw traps and crab pots. Additionally, gill nets will be used in the snag area on the western side of the remnant islands. This monitoring will provide baseline data on fish and decapod utilization. Species composition, abundance and size will be recorded. Trawling will be performed in early spring, summer and fall; gill netting during spring and fall; crab pots will be set in early summer; throw trap sampling will be done during early fall. This monitoring will be performed in the baseline year, then after construction of the first cell, then every year for three years, then every three to five years.

F. Wetlands Use By Fish Monitoring

Purpose - To measure and evaluate differences in decapod and fish densities and community species composition over time in the restored marshes, the reference marshes and the remnant marshes at Poplar.

Hypotheses

1. There are no differences between decapod or fish densities, or community species composition among the Poplar Island restored wetlands compared to those prior to restoration.

2. There are no differences between decapod, or fish densities or community species composition among restored Poplar Island wetlands compared to nearby reference wetlands.

3. There are no differences in decapod, or fish densities or community species composition associated with age (seral stage) of restored Poplar Island wetlands.

Brief Description - Fish, shrimp and crab use of the wetlands will be sampled in reference marshes, created marshes and remnant marshes. Replicate block and fyke nets will be used, with six replicates per station where possible. Sampling for fauna will be performed during early spring, summer and fall. Environmental parameters will also be analyzed. Species, size and abundance data will be recorded. This monitoring will be performed in the baseline year, after completion of the first cell, then every year for three years, then every three to five years.

G. Wetlands Use By Wildlife Monitoring

Purpose - To measure and evaluate species and numbers of migratory waterbirds nesting on the island; to compare densities and species composition of migratory waterbirds on the restored marshes the remnant marshes and nearby reference marshes; to evaluate differences in wildlife utilization with the seral age of the marsh; to evaluate use of the island by terrapin.

Hypotheses

1. The species and numbers of migratory waterbirds nesting on the islands in the Poplar group show no numerical change or site relocation comparing pre- vs. post-restoration of Poplar Island.

2. Densities and species composition of migratory waterbirds using (feeding, roosting) the wetlands do not differ among restored wetlands on Poplar, remaining island reference wetlands or nearby mainland reference wetlands.

3. Age (or seral stage) or restored sites has no influence on their relative attractiveness as nesting sites (uplands) or feeding sites (wetlands to migratory waterbirds.

4. Use of restored upland sites by nesting terrapins is no difference from use at either remnant island or mainland reference wetlands.

Brief Description - The number of species and species densities of migratory waterbirds and terrapins on the remnant island marshes and in nearby reference marshes will be quantified. Nest counts will be conducted in the spring. Key indicator species will be used. Wetlands plots in reference wetlands, created wetlands and remnant wetlands will also be used to evaluate bird use in each plot. This will be performed 1-2 times per month in the spring and August-mid September. Uplands transects will also be established for terrapin searches, which will be conducted at weekly intervals from June 1 to July 15.

Indicator species are bald eagles, black ducks, little blue herons, least and common terns, snowy egrets, migrant shorebirds, and terrapins.

H. Shellfish Bed Sedimentation Monitoring

Purpose - To provide information on the change in sedimentation rates on nearby charted oyster bars.

Hypothesis - There is no increase in sedimentation rates on the charted oyster bars during construction of the exterior dikes at Poplar Island when compared to sedimentation rates prior to dike construction.

Brief Description - Sediment traps will be set up on the two charted Natural Oyster Bars and checked periodically by onsite personnel during the critical growth seasons for baseline sediment accumulation. This will then be repeated periodically during construction.

I. Technical Integration

Purpose - To integrate the studies with each other and the overall project design and schedule, to coordinate and monitor plan elements, to provide support to principal investigators and to communicate needs and findings to all participants.

Brief Description - The technical integrator will provide services to coordinate studies with principal investigators and to maximize efficiencies and exchange information during the study period. This will include periodic meetings of principal investigators, verification and tracking of cruises, deliverables and findings, production of an integrated annual comprehensive monitoring report, coordination of monitoring activities with dredging and construction activities, provision of overall program Quality Assurance/Quality Control to ensure that project elements are meeting stated technical objectives and are meeting the QA/QC goals of each study, provision of technical information and guidance as necessary for current and future Poplar Island placement actions, permits, certifications and specifications; and preparation of the next years' monitoring plan for the Poplar Island restoration project.

J. Project Management

Purpose - To administer and manage the agreements and funding for the principal investigators.

Brief Description - The project manager will prepare, administer and manage the agreements and funding arrangements for the principal investigators. The project manager will also prepare schedules and work plans, will coordinate activities between the investigators and the sponsors, will monitor progress on work tasks, will prepare and conduct meetings as necessary for relevant committees, the general public, and the principal investigators, will provide budget tracking service and subcontractor invoice payment approvals, will prepare monthly progress reports to clients, will prepare fiscal year budgets and schedules as required by project sponsors, will conduct budget reviews and projections as required by client, and will prepare scopes and agreements for monitoring plan elements for the next monitoring year.

V. STUDY ELEMENT SCHEDULE

See Table 1, attached, Page 10.

POPLAR ISLAND RESTORATION PROJECT

BASELINE MONITORING IMPLEMENTATION PLAN

A monitoring framework for the Poplar Island Habitat Restoration Project has been prepared by a collaborative, multi-disciplinary team of federal and state agencies. Some of the agencies on the framework development team have prepared implementation plans for monitoring elements which include in-kind services or grants provided by these agencies. In this way, costs could be contained and the monitoring process would continue the collaborative, multi-disciplinary approach which guided the development of the framework.

The agencies which have indicated their capability and availability to perform the monitoring elements of the baseline plans are listed on Table 1. As a State (MPA) funded project, MES would provide management and integration of the studies. The Corps may provide additional management and integration as part of a cooperative agreement and cost sharing if federal funding is obtained.

This implementation plan would meet the monitoring framework needs for the baseline year if the data collection effort is implemented using the agencies indicated in Table 1. The preliminary implementation plans for each element have been previously submitted and reviewed by the monitoring team. Detailed scopes of work will be prepared for each element by each agency after concurrence with the implementation plan is received. This implementation plan does not preclude changes as needed, but acknowledges that this implementation plan would meet the needs of the baseline year data collection at Poplar Island.

Table 1
Poplar Island Monitoring Framework
Baseline Monitoring

Study Task	Agency	Agency Type
Sediment Quality Monitoring	Maryland Geological Survey	State
Wetland Vegetation Monitoring	U.S. Fish and Wildlife Service	Federal
Water Quality Monitoring	Maryland Department of the Environment	State
Benthics Monitoring	Maryland Department of the Environment	State
Fisheries Use of Exterior Proximal Waters	National Marine Fisheries Service	Federal
Wetlands Use by Fisheries	National Marine Fisheries Service	Federal
Wetlands Use by Wildlife	National Biological Survey	Federal
Shellfish Bed Sedimentation	Department of Natural Resources	State
Technical Integration	Maryland Environmental Service	State
Project Management	Maryland Environmental Service	State

United States Senate

WASHINGTON, DC 20510

September 7, 1995

The President
The White House
Washington, D.C. 20500

Dear Mr. President:

We need your help!

As you may recall, we have communicated with you in the past about the importance and crucial need for construction of the Poplar Island, Maryland beneficial use of dredged material project -- a project that is vital to the Chesapeake Bay restoration efforts and Maryland's economy and maritime industry. Over the past year we have worked closely with officials in the U.S. Army Corps of Engineers, OMB, EPA and the U.S. Fish and Wildlife Service as well as the Senate authorizing and appropriations committees in an effort to move this important project forward. Throughout this process we have received strong support and encouragement from officials in your Administration at all levels, but have recently run into some roadblocks on the funding and policy issues associated with the project which require strong executive leadership and direction to resolve.

There is a great urgency to this matter. The State of Maryland will exhaust its dredged material disposal capacity in 1996 and it is imperative that construction of the Poplar Island project begin early next year to avoid any disruption in maintenance dredging of the Baltimore shipping channels and to prevent the rare coalition of business and environmental community interests which formed around the project from unraveling. Poplar Island is the only viable and most environmentally sound new dredge material disposal site.

We ask that you direct OMB and the Secretary of the Army to make Poplar Island a national priority and to identify the most appropriate and expeditious mechanism to initiate the project in fiscal 1996.

We greatly appreciate the support which you have given to us and to this important project and know that with your continued assistance, we can restore Poplar Island and show the nation how to successfully blend commercial maritime and environmental enhancement efforts.

Sincerely,

Barbara A. Mikulski
Barbara A. Mikulski
United States Senator

Paul Sarbanes
Paul S. Sarbanes
United States Senator

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Habitat and Protected Resources
Division
904 South Morris Street
Oxford, Maryland 21654

14 September 1995

Mr. Robert Smith
Maryland Environmental Service
2011 Commerce Park Drive
Annapolis, MD 21401-2995

Dear Bob:

We appreciate your providing us with the short time extension for commenting on this document to accommodate our logistical problems. My colleagues and I have examined the "Habitat Development Draft Report for Poplar Island", and we offer the following comments on the identified sections for your consideration.

2.5.1: It sounds like the low marsh will include the channels, moats, ponds, and 2-acre upland islands. How much actual low marsh is projected?. How much mudflat and open water?

It seems that the "moats" around the island will eventually fill in making the islands more susceptible to predator species, unless the moats are maintained. We assume that there will be open water areas within the cell other than just the ponds and that the cell will not simply be wall to wall marsh. Would it not be more practical to place the islands in open water areas within the cell instead of building moats and feeder channels? This should make it easier to maintain the integrity and isolation of the islands.

2.5.2: We suggest planting Scirpus spp. at the boarder of the upland and the high marsh as well as Juncus. Planting both species in a broken pattern parallel to the boarder (i.e., -a block of Scirpus, a block of Juncus, a block of Scirpus, etc.) will increase habitat complexity, which should be beneficial for both faunal and floral species. In lower portions of the high marsh, the typical "corn field" planting of Spartina patens is suitable.

Ponds that are only 18-24 inches deep where water exchange is provided exclusively by spring tides are subject to fish kills during drought conditions. A 3-foot deep reservoir for fish should be provided at the end or middle of each pond.

2.5.3: See comment above relative to high marsh ponds (2.5.2).

2.5.4, sentence 1: This should be revised to 551 acres of upland habitat with 543 acres being contiguous uplands and 8 acres being upland islands.

see the same growth data used for Spartina alterniflora, S. patens, and Scirpus spp.

5.1.3, paragraph 1 sentence 4: Is the cost differential between peat pot and bare root stock the same for S. patens as it is for S. alterniflora? No cost differential was stated in the discussion for smooth cordgrass on p. 16.

5.1.4, paragraph 1, sentence 4: Sod collection as described seems expensive. It would be interesting to see a cost analysis based on planting unit/work time and planting unit/cost for the different methods discussed.

7.2.1: It was our understanding that dikes would be constructed between the high marsh and the uplands. Is the transition zone to be established on dike bases? What will the dimensions be?

7.3.3.3.1: Tree and shrub seedlings could be planted with a tractor and tobacco planter, as is done for wind breaks in the midwest. This is an established, economical method that yields excellent results. Seedlings should be planted while dormant in early spring (rainy season). Planting saplings or larger trees and shrubs is expensive, and the added cost is not worth the few years it will take seedlings to reach similar size.

We appreciate having had the opportunity to comment on the subject document. If you have questions, or wish to discuss a specific issue or item, please call me at (410) 226-5771.

Sincerely,

Tim Goodger

Timothy E. Goodger
Assistant Coordinator

cc: Nick Carter-MD DNR
Michael Erwin-Nat'l. Bio. Survey
Stacey Brown-Corps of Engs.
Chris Doley-NMFS
Dave Meyer-NMFS
John Gill-US FWS
Lee Crockett-Chesapeake Bay Prog.
Kilho Park-NMFS

should be able to provide information on the studies that were conducted on Poplar, Jefferson and Coaches Islands during this period.

Again, we wish to thank you for the opportunity to provide comments on this project and hope that the proposed island restoration can be accomplished. Should you require additional information on this project, please feel free to contact Dr. Roland Limpert of my staff at (410) 974-2788.

Sincerely,

Ray C. Dintaman, Jr.

Ray C. Dintaman, Jr., Director
Environmental Review Unit

RCD:RJL

cc: E. Ghigiarelli, MDE
P. Slunt, DNR-RAS
C. Judy, DNR-FS

CC: Winstead
Peraino
Stek
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TDD (410) 333-3098

September 15, 1995

The Honorable William J. Clinton
President of the United States
The White House
Washington DC 20500

Dear Mr. President:

One of the hallmarks of your Administration has been the effort to protect and enhance the environment while at the same time improving economic competitiveness. The State of Maryland and the United States Army Corps of Engineers are prepared to embark on an effort -- the Poplar Island Beneficial Use Project -- which exemplifies these goals. This project, which involves the restoration of an eroded island in the Chesapeake Bay using materials dredged from ship channels serving the Port of Baltimore, is vital to Chesapeake Bay restoration efforts and Maryland's economy and maritime industry.

Officials of the U.S. Army Corps of Engineers, Office of Management and Budget, Environmental Protection Agency, U.S. Fish and Wildlife Service and the State of Maryland as well as members of our congressional delegation have worked closely to move this important project forward. Throughout, we have been supported by officials in your Administration and we are most appreciative of this cooperation. However, we now find ourselves at an impasse in regard to funding for this critical project. Despite concerted efforts, we have not been able to secure the necessary federal funding.

It is urgent that we devise a funding plan for the Poplar Island Beneficial Use Project. We will soon exhaust available sites which can be used to dispose of material dredged from shipping channels. We are facing a potential crisis in which we might be forced to curtail basic "maintenance dredging" needed to keep shipping channels at their existing depths. This would have significant consequences to the State of Maryland and the maritime industry that is essential to the economic health of the Baltimore metropolitan region. Construction of the Poplar Island project must begin in federal fiscal year 1996 if we are to have it ready for use when needed.

Your assistance is requested in assuring that the Office of Management and Budget and the Secretary of the Army are able to successfully develop a method by which federal funds can be made available for the project. With your leadership, we will be able to demonstrate to the nation how commercial maritime and environmental enhancement efforts can be successfully blended.

Sincerely,

Parris N. Glendening

Parris N. Glendening
Governor

cc: Maryland Congressional Delegation

R. CHRISTOPHER GOODWIN & ASSOCIATES, INC.

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September 25, 1995

Mr. Richard F. Thomas, PE
Project Manager
GBA - M&N A Joint Venture
9008-O Yellow Brick Road
Baltimore, Maryland 21237

RE: **Phase II Evaluations of Six Marine Anomalies at Poplar Island - Executive Summary Letter**

Dear Mr. Thomas:

This Executive Summary letter presents the preliminary results of Phase II evaluations of six marine anomalies identified during earlier underwater investigations for the Poplar Island Reclamation project. These investigations were carried out during August and September, 1995 by R. Christopher Goodwin & Associates, Inc. under contract to the Joint Venture of Gahagan & Bryant Associates, Inc. and Moffatt & Nichol, Engineers. This project was conducted in accordance with the National Environmental Policy Act (NEPA) of 1969, with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, and with Article 83B, Sections 5-617 - 618 of the Annotated Code of Maryland.

These investigations were conducted in support of plans to reclaim Poplar Island by restoring its shoreline by constructing a series of dikes to facilitate backfilling of the island area. Phase I marine investigations included magnetic, acoustic sub-bottom, and side-scan sonar survey in the aquatic portions of the project area. These investigations identified 28 magnetic and acoustic anomalies. Additional Phase II sub-surface testing was recommended for six (6) target areas within or adjacent to the Alternative Alignment #1 project area.

Phase II investigations included a combination of visual search, metal detecting, probing, and excavation. The purpose of this task was to provide data concerning the integrity and National Register potential of submerged cultural resources. Anomalies to be tested were 10-727, 10-755, 30-1151, 40-665, 48-819, and the cluster of targets at 58-1477, 60-579, and 62-1508.

Anomaly 10-727. The sub-bottom profile record of this anomaly showed a narrow, very hard, vertical target extending deep into the substrata. The magnetometer registered a 16 gamma magnetic anomaly in the same location. The anomaly was postulated to be a possible submerged well. Phase II investigations involved relocating the target by going over the area with the magnetometer on a 25 ft grid. Three separate circle searches were conducted at ten ft intervals for a distance of 70 ft from the buoy (140 ft diameter). The divers probed the bottom as they searched. No sign of the target, or of any other cultural material was located. This anomaly was too discrete to locate despite intensive bottom survey; no further work is recommended.

Anomaly 10-755. This target was identified as a small surface mound accompanied by a 32-gamma magnetic anomaly. The target was relocated with the magnetometer and the bottom was searched. A 6 x 30 ft concentration of amorphous ferrous material was identified. This material may represent either a pile of corroded sheets of very thin metal, or a deposit of bog iron. There was no indication that the material was man-made; no fasteners or fastening holes were identified. This target is not considered potentially eligible for listing in the National Register of Historic Places; no additional investigation is recommended.

Anomaly 30-1151. This sub-bottom profile target showed a hard, reflective surface curving downward from the surface of the bay floor to about 1 m below surface. This target was postulated to represent a shell midden. This target was relocated and a bottom search was made. The bottom was sandy and did contain a lens of oyster and clam shells. The shell was scattered throughout the upper 1 1/5 ft of sand. This shell lens overlay hard packed sand. This hard packed sand layer may have been what caused the initial sub-bottom profile reading.

Four dredge tests were excavated into this shell deposit and the shell was retained for analysis. Preliminary analysis does not suggest that the shell deposit has a human origin. The shell appears to be recent; it was scattered loosely in the sand and did not have the density of a cultural shell midden. The shell has been sent to a specialist for evaluation of its origin and integrity; final interpretation of this deposit awaits the results of that analysis.

Anomaly 40-665. This anomaly represented a moderately strong (60 g) magnetic target without accompanying acoustic signature. The anomaly was relocated with the magnetometer and the bottom was searched. The area was characterized by a one to two ft sand cap over clay. There was a scattering of stones in the area. Two lithic types were noted: blocky quartz stones and flat black sandstone. Some of the stones were large. A piece of rebar also was identified, which may account for the magnetic signature. No archeological site was identified; no further investigation is recommended.

Anomaly 48-819. This anomaly appeared as a U-shaped target on both the sub-bottom profile and fathometer records. The magnetic record displayed a moderately strong anomaly of significantly long duration and a multicomponent signature. The U-shaped signature commonly is associated with sunken vessels and the target was postulated to represent a small watercraft.

The target area was relocated with the magnetometer and two 70 ft circle surveys were conducted. The area was characterized by a clay bottom, however, sand had collected around two objects: an iron furnace remnant, and a dead tree that had collected miscellaneous debris (a brick fragment, a hunk of iron pipe) in its branches. The tree branch had a crescent shape, which may account for the U-shaped signature on the original sub-bottom profile and fathometer records. No other cultural material was identified. This collection of debris did not represent a coherent site; no further work is recommended.

Anomalies 58-1477, 60-579, and 62-1508. This was a cluster of acoustic and magnetic targets which included an acoustic target that resembled an open topped box with straight vertical sides and a flat bottom. This was surrounded by a large area of disturbed surface and a hard reflective layer approximately 1 m below the bottom. The size of the anomaly suggested the potential for a buried structure. The targets were relocated and diving searches were conducted on all 3 anomalies. The area was probed as it was searched. Nothing was found in the area except a flat, featureless clay bottom. It is possible that the hard reflective layer identified in the Phase I survey was the hard clay bottom. Perhaps the rectilinear feature was a crab pot that since has been removed. In any case, there was no evidence for the postulated structure; no cultural material of any kind was identified. No additional investigation in recommended.

This Executive Summary letter has presented the preliminary results and recommendations of Phase II evaluation of six marine anomalies at Poplar Island. No additional investigations are expected to be recommended as a result of this study. Analysis and report preparation are ongoing. The results of this investigation will be presented as an addendum to the Phase I report. Please do not hesitate to contact us should you have questions regarding this Executive Summary letter or progress on the project to date.

With best regards, I remain

Yours faithfully,

April L. Fehr

April L. Fehr, M.A.
Project Manager

ALF/slc

cc: Mr. Michael Hart, Maryland Port Administration
Mr. Kenneth Baumgardt, U.S. Army Corps of Engineers, Baltimore District

MARYLAND HISTORICAL TRUST

Office of Preservation Services

Parris N. Glendening, Governor
Patricia J. Payne, Secretary

October 3, 1995

Dr. James F. Johnson
Chief, Planning Division
Baltimore District
U.S. Army Corps of Engineers
P.O. Box 1715
Baltimore, MD 21203-1715

Re: Poplar Island Reclamation Project

Dear Dr. Johnson:

Thank you for your letter of 11 September 1995 and for the draft copy of the following report: Phase I Terrestrial and Marine Archeological Surveys for the Poplar Island Reclamation Project and Phase II Investigations of Site 18TA237, Talbot County, Maryland (September 1995). R. Christopher Goodwin & Associates, Inc., prepared the document.

The report describes the goals, methods, and results of the terrestrial and underwater archeological investigations. It contains informative illustrations and addresses most of the Standards and Guidelines for Archeological Investigations in Maryland (Shaffer and Cole 1994)(see comments below). Our discussion of the document is divided by survey location:

Terrestrial Archeology

In our opinion, the level of background research and fieldwork was sufficient to identify the full range of archeological properties in terrestrial sections of the area of potential effects. On **North Point Island**, shovel testing, augering, and dredging failed to reveal any traces of prehistoric site 18TA219. Erosion of the island apparently has destroyed the site. Lacking physical integrity, **18TA219** is ineligible for the National Register of Historic Places. The survey of this island did locate a number of nineteenth century artifacts, but these resources also lacked physical integrity, being mixed among modern artifacts and features. No further work is warranted at North Point Island due to the lack of National Register properties.

On **Middle Poplar Island**, surveyors sought traces of reported prehistoric site 18TA222. A concentration of shells at the northern end of the island may derive from the site, but no prehistoric artifacts were retrieved from testing. Due to a lack of research potential and integrity, **18TA222** is ineligible for the National Register. Other work on the island located historical site 18TA304 (MP.1). This site represents the location of former buildings, as seen in several clusters of bricks and brick foundation piers. Shoreline investigations found 37 artifacts, dating primarily from the late nineteenth century. Erosion had removed most of the soil in this area indicating a lack of physical integrity of the archeological resource. Therefore, **18TA304** is ineligible for the National Register; and Middle Poplar Island warrants no additional study.

Survey of **South Central Island** determined that erosion had destroyed reported prehistoric site 18TA218. Fieldworkers found only five stone flakes which might derive from the site. Due to a lack of physical integrity and research potential, **18TA218** is not eligible for the National Register. Historical site 18TA236 was represented by two concentration of bricks. Survey in this area found only one artifact: an eighteenth to nineteenth century, "glass tipped pontil" (pontil-marked glass?). The lack of diagnostic artifacts, research potential, and integrity in this eroding area mean that **18TA236** is ineligible for the National Register. Initial examination of historical site 18TA237 found three concentrations of bricks, mixed with a number of mostly kitchen-related artifacts dating from the nineteenth century. Evaluative testing of this property entailed excavation of shovel test pits, dredge tests, auger tests, and 5 x 5 ft units, as well as systematic trenching. This work characterized the brick features as water-disturbed structural remains probably dating from the nineteenth century. Most of the kitchen and architectural artifacts were of that time period, while other artifacts from as early as the seventeenth century and as late as the modern period were mixed in. The lack of integrity of the archeological materials indicates **18TA237** is ineligible for the National Register. No additional studies are warranted for South Central Island.

At **South Poplar Island**, archeologists found no trace of reported prehistoric site 18TA217. Shovel and dredge testing and pedestrian reconnaissance recovered only one sherd of stoneware (probably nineteenth century) and modern glass. Erosion evidently destroyed the prehistoric site. Due to the absence of physical integrity, **18TA217** is ineligible for the National Register. No additional studies area needed for this island.

Investigations on the shore of **Coaches Island** recovered two stone flakes, one chert bifacial tool fragment, and one jasper projectile point (Early or Middle Woodland?). These items are the only indication that prehistoric site 18TA216 was once in this location. Erosion apparently has destroyed the site; and wave and current action are redepositing the prehistoric artifacts on the present beach. Due to a lack of physical integrity, **18TA216** is ineligible for the National Register. No additional studies are necessary for Coaches Island.

__Underwater Archeology__

The investigations undertaken offshore of the remnant island within the Poplar Island footprint were adequately promulgated and are satisfactory for assessing the potential for significant resources and to support the determination that these do not have sufficient integrity to be eligible for the National Register. They do not warrant further investigation.

Studies focusing on the submerged marine anomalies not covered in this report were undertaken in close cooperation with the State Underwater Archeologist. We understand that these investigations will be addressed in a forthcoming report.

We have a few comments on the draft report which should be addressed in a revised volume:

1) Editing is needed for the following pages: 45 (shifted), 51 (Map), 69 (only), 91 (where a positive dredge hit is depicted by map, but is missing from the legend), 104 (site's), 109 (Sgraffito), and 112 (Sgraffito).

2) Figure 2 needs to outline the project's area of potential effects.

3) The last sentence in the last complete paragraph on page 73 should explain what is meant by "lacked context and may not represent a coherent collection."

4) A completed NADB-Reports Recording Form needs to be submitted.

We look forward to receiving the final version of the report and to reviewing the results of the remaining marine survey. If you have any questions or require further information, please contact Dr. Gary Shaffer (terrestrial archeology, 410-514-7638) or Dr. Susan Langley (underwater archeology, 410-514-7662).

Sincerely,

Elizabeth J. Cole

Elizabeth J. Cole
Administrator
Archeological Services

EJC/GDS/SL
9502353
cc: Mr. Thomas Williams
Mr. Victor MacSorley
Ms. Deborah Renshaw
Dr. Christopher Goodwin

MARYLAND
ENVIRONMENTAL
SERVICE

Parris N. Glendening
Governor

James W. Peck
Director

November 27, 1995

Ms. Carol Anderson-Austra
US Army Corps of Engineers
ATTN: CENAB/PL-EN
PO Box 1715
10 Howard Street
Baltimore, MD 21203-1715

RE: Poplar Island Preliminary Draft EIS Comments

Dear Ms. Anderson-Austra:

Please find enclosed some notes from a telephone conversation held with Art Spingarn, Bill Muir, Roy Denmark and Brigitte Farren of EPA Region III. Also included are the written questions which they sent me. In the telephone conversation, in addition to the EIS questions, I went over the Poplar Island Working Group structure and the two subgroups for Habitat Development and Monitoring which have been meeting for some time to provide agency input concurrent with the EIS preparation. There has apparently been a disconnect between the people representing EPA Region III on the Working Group and the rest of the Region III staff who review the EIS. Last week, we sent notification of the next meetings of the Habitat and Monitoring Subgroups and the Working Group meeting to Region III. We will now also send meeting notes from the working group and sub group meetings to several more people at Region III. In addition, Danielle Algazi, who was their representative, should be back from leave soon, and they should have increased representation at that time.

Please be aware that the attached comments are my notes frim the conversation. The Region III representatives should be able to clarify their questions and concerns. Please call me if there are any questions.

Sincerely,

Cecelia L. Donovan

Cecelia L. Donovan
Project Manager
Environmental Dredging Program

Attachment
cc: Bob Smith
Dave Bibo
Art Spingarn, EPA Region III

Telephone Conversation of November 21, 1995 on Preliminary Draft EIS, Poplar Island

MES Representative - Cece Donovan

EPA Region III Representatives - Roy Denmark, Bill Muir, Art Spingarn, Brigitte Farren

Written concerns are in bold. Notes from conversation follow.

Need a summary table comparing impacts, costs, etc. of each alternative. Phased construction should be compared with non phased construction.

Show which alternatives were screened out and why. All of the information doesn't need to be provided for every alternative, just until the 'fatal flaw' hits. (Bob mentioned that if beneficial use projects are the object of the action, all but beneficial use projects would screen out.)

Need to incorporate Habitat Document into general document in some way.

They were given the draft Habitat Document to review. I explained the EIS process versus the JV process and that the entire Habitat document wasn't originally meant to be included in the EIS. Region III indicated that at least some details of how the habitat will be developed are needed in the EIS to enable reviewers to understand the whole project concept. I also explained the time schedule, and how the habitat and monitoring frameworks were focussing on actions up to 20 years in the future, and thus needed to stay flexible in order to respond to knowledge gained on this project and others down the road. Region III suggested adding the Habitat Document, or some form of it as an Appendix.

Need remedial action plan for problems that arise during construction.

I again explained the EIS versus the JV processes, and that a Site Management plan was being developed to address construction issues, but they again indicated that certain site management related issues should be dealt with in the EIS. Some examples:

What are the precautions to reduce and protect erosion from unarmored, exposed faces if the project is phased?
What are comparisons and impacts of phased versus non-phased construction?
What will happen if dike breach occurs?

I said I thought that there would still be armoring of all exposed faces during phased construction. They did not think this was clear in the EIS.

Need more water quality monitoring stations extending southward in the Bay.

This question was related to confusion between the EIS data and the monitoring framework stations. I tried to explain the difference between the two. They would like to see more southward stations to enable review of nitrogen and phosphorous impacts during placement and construction. They would also like a description of the CBP mainstem stations that could be used for comparison.

There was also a question on the monitoring framework, specifically, could we look at winter monitoring to enable comparison of minimum recruitment achievements, as opposed to the apparent maximum recruitment we are now looking at. I said this could be discussed in the framework meetings.

Brigitte Farren asked if the reference stations and the regular stations could be more clearly identified on the maps.

Need more detailed wetland monitoring program.

They again asked for the Habitat Development Guidelines to be part of the report. A concern was relayed that vegetation monitoring on six plots every three years may not be enough to control nuisance species, and to revegetate adequately if necessary due to low survival. I said that there would be ongoing operations and maintenance and other people would be at Poplar and would be looking at issues like revegetation, Phragmites control, soil conditions, etc. They asked if that could be part of the document. I said it was hard to write hard and fast specs for something that wasn't going to happen for 5-10 years down the road.
Some of their basic concerns and suggestions:

- Ongoing maintenance should look at enough area of the entire island to get a good idea of what is going on. This should be expressed as a percent of the entire area that will be looked at. They recommend looking at the vegetation 2X a year during the first year, then when the area is stable, monitoring can be performed less frequently.

- They recommended use of photo stations, aerial, land or both, with pictures taken during all four seasons of each year to document changes.

- They recommend a plan for control of nutria, swans, geese and other herbivores so they don't tear up the seedlings before they are established in the wetlands.

- They recommend conducting a plant species inventory periodically, for detection of both problem and rare species.

- Put a budget for vegetation in the EIS to show that there are resources planned for this.

- They asked about sediment quality and assurances that the material was clean. I described the North Point-Rock Point line restrictions and the reference sediment quality monitoring and evaluating that Brian will be doing. They said that should be documented in the EIS.

Recommend university involvement in monitoring programs.

I told them that UMCEES would be involved in the benthic and water quality evaluations, they were happy to hear this and said that a lot of monitoring work could be done through graduate research projects.

EPA Region III may be able to provide assistance:

1. **Water quality monitoring**
2. **Wetland monitoring**

I said that we did have assistance from EPA CBPO, they said that wasn't the same as Region III. I also told them that we had USFWS, NMFS, NBS, MDE, DNR on the subgroups and that they would certainly be welcome on the subgroup. I described the process of developing the monitoring framework and habitat development guidelines, and that both of them would change over time in response to input from the state and federal agencies. They asked to have information faxed to them on the meetings, but said they had travel restrictions that might keep them from going.

KNAPP'S NARROWS
MARINA

December 5, 1995

Re: Comments on Poplar Island Project

Dr. James F. Johnson, Chief, Planning Division
District Engineer, U. S. Army Corps of Engineers
% CENAB-PL-PC
Baltimore District
P. O. Box 1715
Baltimore, Maryland 21203-1715

Dear Dr. Johnson:

I have read your *Notice of Availability* soliciting comments on the Poplar Island Project. I appreciate the opportunity to provide input.

Based on what is known to date, I can only offer support for the project, its rationale and intended purposes.

The only suggestion offered concerns the dredging plans. Again, I have no problems with the proposed use of spoils from the Baltimore Harbor channels. However, I would recommend serious consideration be given to capitalizing on the location, minimal expense involved, and economic benefits that would be derived if the Knapp's Narrows channels and slip areas along the Narrows would be dredged as well and the spoils added to the Poplar Island fill.

At this point I have not sought support from other businesses or users along the Narrows but would be more than willing to do so if appropriate. Please advise.

Sincerely,

Larry

Larry Lorton, PhD.
General Manager

cc: Bill Davis, Tilghman on the Chesapeake
Carl Griebel, Severn Marine Services
Jack Redmond, Tilghman Island Inn
Steuart Chaney, Tilghman Quay

(ltrpopis.dre)

P.O. BOX 277 ■ TILGHMAN, MARYLAND 21671 ■ (410) 886-2720 ■ FAX (410) 886-2716

HOUSE OF DELEGATES
ANNAPOLIS, MARYLAND 21401-1991

MARY ROE WALKUP
DISTRICT 36
KENT, QUEEN ANNE, CECIL,
CAROLINE AND TALBOT COUNTIES

ECONOMIC MATTERS COMMITTEE

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423 LOWE HOUSE OFFICE BUILDING
(410) 841-3449 (BALTIMORE METRO)
(301) 858-3449 (WASHINGTON METRO)
1-800-492-7122 EXT. 3449

DISTRICT OFFICE:
12836 STILL POND CREEK ROAD
WORTON, MARYLAND 21678
(410) 778-6635

December 6, 1995

Dr. James F. Johnson
Chief, Planning Division
U.S. Army Corps of Engineers
P.O. Box 1715
Baltimore, MD 21203

Dear Dr. Johnson:

I regret that I was unable to attend the public hearing on the Poplar Island Restoration Project that was held on November 28th. I have, however, been advised of the plans for placement of clean dredge material at Poplar Island and wanted to let you know of my support for this project.

Thank you for continuing to keep me informed and feel free to contact me anytime.

Sincerely,

Mary Roe Walkup

Mary Roe Walkup

MRW/bjc

United States Department of the Interior

OFFICE OF THE SECRETARY
Washington, D.C. 20240

ER 95/863

DEC 12 1995

Mr. Wesley E. Coleman, Jr.
AttN: CENAB-PL-PC
U.S. Army Corps of Engineers
Baltimore District
Baltimore, Maryland 21203-1715

Dear Mr. Coleman:

This is in regard to the request for the Department of the Interior's comments on the Draft Feasibility Report and Environmental Impact Statement for Popular Island Restoration Study, Chesapeake Bay and Talbot County, Maryland.

This is to inform you that the Department will have comments, but will be unable to reply within the allotted time. Please consider this letter as a request for an extension of time in which to comment on the statement.

Our comments should be available about February 9, 1996.

Sincerely,

Terence N. Martin

Terence N. Martin
Team Leader, Natural Resources Management
Office of Environmental Policy & Compliance

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Chesapeake Bay Field Office
177 Admiral Cochrane Drive
Annapolis, MD 21401

December 14, 1995

Colonel Randall R. Inouye, P.E.
District Engineer
Baltimore District, Corps of Engineers
P.O. Box 1715
Baltimore, MD 21203

Re: Poplar Island Integrated Draft Feasibility Report and Draft Environmental Impact Statement

Dear Colonel Inouye:

The U.S. Fish and Wildlife Service has reviewed the referenced Draft Feasibility Report and Draft Environmental Impact Statement. The recommended plan would create a 1,110 acre dredged material placement island in a configuration that would roughly follow Poplar Island's 1,847 footprint. Uncontaminated dredged material would be used to create low and high saltmarsh (50% of the footprint), of which 80% will be low marsh characterized by smooth cordgrass (*Spartina alterniflora)*. The remaining 50% of the historic island footprint would be filled with uncontaminated dredged material to an elevation of 20 feet above mean sea level, and planted with forest, shrub, and vine species of vegetation.

Offshore islands are a unique ecosystem component in the Chesapeake Bay watershed. Although similar vegetative communities may occur on the mainland, isolation, relative lack of human disturbance, and fewer predators make islands more desirable as nesting sites for colonial waterbirds and some endangered species. The remnant islands in the complex, which includes Poplar Island, support nesting snowy egrets (*Leucophoyx thula*), common egrets (*Casmerodius albus*), double-crested cormorants (*Phalacrocorax auritus*), terns, green herons (*Butorides virescens*), great blue herons (*Ardea herodias*), black ducks (*Anas rubripes*), and the Federally-listed threatened bald eagle (*Halioeetus leucocephalus*). Diamondback terrapins (*Malaclemys terrapin*) nest on the high marshes and beaches, and river otters (*Lutra canadensis*) fish from the island shore. From exacerbated erosion, ship wakes, land subsidence, and sea level rise are causing these valuable island habitats to be lost. In the last 150 years, in the middle eastern portion of Chesapeake Bay alone, 10,500 acres have been lost.

At the same time islands have been eroding, a lack of environmentally acceptable disposal sites has led to navigation projects being held up during the environmental and regulatory review process, and a continued reliance on overboard (unconfined) disposal. At a time when the Federal and state governments are spending millions of dollars to restore Chesapeake Bay's living resources, reduce nonpoint source pollution and sediment loadings, these same governments are funding the dumping of 1-2 million cubic yards of silt, muck, and sand into the Bay each year.

The Poplar Island proposal represents a partial solution to the dredged material management problem, while supporting habitat restoration objectives outlined in the Chesapeake Bay Agreement. This is the reason the Poplar Island Restoration project has gained such unprecedented approval from the entire Chesapeake Bay community. The proposal fully supports the Service's mission to "Protect, conserve, and enhance fish and wildlife resources and the habitats they are dependent upon....."

We look forward to the completion of the project design in January, and the initiation of construction next summer. Please contact Mr. John Gill of my staff at (410) 573-4529 if you require any assistance from this office.

Sincerely,

ACTING

John P. Wolflin
Supervisor
Chesapeake Bay Field Office

cc: Mr. Tay Yoshitani, Maryland Port Administration

United States Department of the Interior

National Biological Service
Patuxent Environmental Science Center
11410 American Holly Drive
Laurel, Maryland 20708-4015

December 18, 1995

Colonel Randall R. Inouye, P.E.
District Engineer
Baltimore District
U.S. Corps of Engineers
P.O. Box 1715
Baltimore MD 21203-1715

Dear Colonel Inouye:

The National Biological Service has reviewed the Integrated Draft Feasibility Report and Draft Environmental Impact Statement and supports the proposed plan to reconstruct Poplar Island. Implementation of this project will reestablish some essential habitat resources within the Chesapeake Bay. Tidal wetlands, which have declined markedly in the Bay, will be constructed and with them, feeding and nesting habitat for waterbirds and their prey will be added to the mid-Bay region.

We have actively supported this project over the past year when emergency measures were taken to protect the remaining island habitat from imminent destruction. The Poplar Island Project is important to our agency because it affords us an opportunity to evaluate a long-term restoration project using an adaptive resource management approach. It will be instructive to monitor how resource quantity and quality change through time.

The coordination between the Baltimore District, the Maryland Port Administration, and the resource agencies has been exceptional and has resulted in the completion of the Poplar Island design in record time. The beneficial aspects of this project, the inter-agency cooperation, and the wide support received from the Chesapeake Bay community should position this project as a model for other projects and other COE districts.

We look forward to the completion of the project design in January and the initiation of construction next summer. If you require any assistance from my office, please do not hesitate to call me at 301-497-5640.

Sincerely,
Michael Erwin
R. Michael Erwin, Ph.D.

cc: Tay Yoshitani, MPA

MDE

MARYLAND DEPARTMENT OF THE ENVIRONMENT
2500 Broening Highway ● Baltimore, Maryland 21224
(410) 631-3000

Parris N. Glendening
Governor

Jane T. Nishida
Secretary

Colonel Randall R. Inouye
Baltimore District, USACE
P.O.Box 1715
Baltimore, MD 21203-1715

December 21, 1995

Dear Colonel Inouye:

The Maryland Department of the Environment (MDE) has reviewed the **'Integrated Draft Feasibility Report'** and Draft **'Environmental Impact Statement'** and supports the proposed plan to reconstruct Poplar Island. Implementation of this project will provide the much needed Dredged Material Disposal Site for the placement of "clean " and uncontaminated dredged material while reestablishing an essential habitat resource within the Chesapeake Bay.

MDE has actively supported this project right from its inception back in 1992 when emergency measures were taken to protect the remaining island habitat from imminent destruction. The Poplar Island project will provide the capacity for the placement of clean and uncontaminated dredged material obtained from the Baltimore Harbor Shipping Channels. Maintenance of the appropriate depth in these channels allows the international carriers to bring business to the Baltimore Port thereby providing a boost to the Maryland economy.

The outstanding coordination between the Baltimore District, the Maryland Port Administration, and the resource agencies has resulted in the completion of the Poplar Island design in record time. The beneficial aspects of this project, the inter-agency cooperation, and the wide support received from the Chesapeake Bay Community should position this project as a model for other projects around the country.

We look forward to the completion of the project design in January '96 and the initiation of construction next summer. If you require any assistance from my office, please contact Mr. Visty Dalal or me at (410) 631-3680.

Sincerely,

Peter Tinsley, Deputy Director
Technical and Regulatory Service Administration

cc: Mr. Tay Yoshitani, Maryland Port Administration

Parris N. Glendening
Governor

Maryland Department of Natural Resources

Environmental Review Unit
Tawes State Office Building, B-3
Annapolis, Maryland 21401

John R. Griffin
Secretary

December 28, 1995

Mr. Wesley E. Coleman, Jr.
Attn: CENAB-PL-PC
U.S. Army Corps of Engineers, Baltimore District
P.O. Box 1715
Baltimore, MD 21203-1715

Subject: Draft Integrated Feasibility Report and Environmental Impact Statement; Poplar Island; Chesapeake Bay Area; Talbot County

Dear Mr. Coleman:

Thank you for the opportunity to reviewed the above referenced document. The Environmental Review Unit (ER) has coordinated a Departmental review of the document and proposed project. The following comments were generated by that review process:

1. The document should provide information on the current ownership of the Poplar, Jefferson and Coaches Islands and what, if any, changes in ownership are anticipated when the proposed project is completed.

2. Page 3-68, section **3.1.7.c <u>Avifauna</u>**. Has the composition of the colonial waterbird community changed as the islands have eroded? If some colonial waterbird species were lost as the islands have eroded would they be expected to recolonize the created island? The paragraph describing the existing Double-crested Cormorant colony fails to note that this colony is one of only two nesting colonies for this species in Maryland and that the Poplar Island colony is the larger of the two colonies.

Telephone: (410) 974 - 2788
DNR TTY for the Deaf: (410) 974-3683

3. Page 3-69, section **3.1.7.d <u>Waterfowl</u>**. EA reports that Common Eider (*Somateria mollissima*) were observed in the vicinity of Poplar Island. Common eider would be an unusual species to be observed in the Bay. When and how frequently was this species observed at Poplar Island? In addition, the sea duck species, Surf Scoter (*Melanitta perspicillata*) and Black Scoter (*Melanitta nigra*) are commonly found around Poplar Island but are not noted as being observed.

4. Page 5-18, section **5.4.2 Physiography, Geology, and Soils.** The final sentence in the final paragraph is incomplete.

5. Page 5-33, section **5.4.4.b <u>Long-Term Impacts</u>**. The 4th paragraph implies that aeration will be adequate to convert much of the ammonia to nitrate. This assumes that the pH will be keep in a neutral zone and that nitrifying bacteria will be present. Perhaps the second sentence should be modified to read, "........, it is expected that aeration, coupled with the maintenance of proper pH and the expected presence of nitrifying bacteria will be adequate to ....".

6. Page 8-5, section **8.2.4 Benthics Monitoring**. The relationship of the two stations to be located in the area where the created wetlands will be constructed needs to be clarified. Are these two stations two of the original 11 or two additional stations? This is not clear. If these two stations are of the original 11, then modify the sentence referring to these two station to read, "Two of the original 11 stations will be located in the area where ....constructed." If these two stations are two additional stations, the word "additional" needs to be added to the sentence referring to these two stations. Also, if these two stations are additional stations, a sentence will need to be included (between .....colonization. and Evaluation.......) which states the monitoring frequency of these two additional stations even if it is to say the monitoring frequency will be determined. This will separate the 11 stations from the two additional stations.

7. Page 8-7, section **8.2.8 Shellfish Bed Sedimentation**. If monitoring of the adjacent charted natural oyster bars indicates that impacts from sedimentation are occurring to the oyster bars, what is the proposed remedial action? Will mitigation for impacts from sedimentation and/or barge traffic (propeller wash, accidental groundings) be provided?

8. Poplar Island and Jefferson Island were owned by the Smithsonian Institution during the 1970's and early 1980's. Scientists from the Smithsonian Environmental Research Center (SERC) and National Zoo conducted ecological research on the islands at that time. The results of their research may provide historical documentation of the flora and fauna of the site. This information may be of use in guiding the restoration activities and goals. Drs. Jim Lynch and Dennis Whigham at SERC (410-798-4424)

MARYLAND DEPARTMENT OF THE ENVIRONMENT
2500 Broening Highway • Baltimore, Maryland 21224
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Parris N. Glendening
Governor

Jane T. Nishida
Secretary

Mr. Wesley E. Coleman, Jr.
Baltimore District, USACE
P.O.Box 1715
Baltimore, MD 21203-1715

January 3, 1996

Dear Mr. Coleman:

Re: Comments on the Poplar Island 'Draft Feasibility Report and Draft Environmental Impact Statement (November 1995)'.

I thank you on behalf of the 'Technical and Regulatory Services Administration (TARSA)' of the Maryland Department of the Environment, for giving us the opportunity to comment on the '*Integrated Draft Feasibility Report and Draft Environmental Impact Statement*' for the Poplar Island Beneficial Use Project, prepared jointly by the United States Army Corps of Engineers (Baltimore District) and the Maryland Port Administration. In my opinion the information in the report has been presented in a well organized manner. I also take this opportunity to provide the following comments and suggestions on certain topics in the report.

- **page 2-15; 4th. para, third line** should read: " ......shown to result *in* a substantial....".

- **page 2-18;** The Upland Placement Sites Grove Neck, Rocky Point, and Queenstown are not located in Fig. 2-6 as mentioned here.

- **page 3-2; 2nd. para.** The Poplar Island must have been formed during the Holocene Period (less than 10,000 years) instead of the Pleistocene Period (2 million - 10,000 years back). The melting of the Glaciers **after** the Pleistocene glaciation period produced sea level rises separating mainland highs from the mainlands resulting in the formation of the Poplar Island Complex.

- **page 3-19; last para:** There is no discussion of methods of collection for turbidity data in any of the quarterly data reports as stated in bottom of page.

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- **page 3-21;** If data for Turbidity (NTU) & Secchi Depth (mm) are not easily obtained from the Maryland's CB Water-Quality Monitoring Program (CBWQM) then do not include their column in the table. However, the Secchi Depth data for station MCB4.1 does exists on the CBP computer system.

- **pages 3-22 & 3-26;** The tables are not very clear due to the small font size. The information may be readily available if the tables are enlarged.

- **page 3-25;** Why was turbidity not measured at mid & bottom depths in the water column? Also, the Secchi depth numbers should be common for the whole water column, not just for the surface waters as it is shown in table 3-7.

- **page 3-27; 1st. para:** The first paragraph needs to be appropriately referenced.
  3rd. para: Sentence on "NTU values recorded in plumes ranged from 6.5-14.7". These values are too low to be in plumes emanating from remnant island erosion.

- **page 3-28;** Last sentence in section 3.1.4. "Although values of turbidity and suspended sediment were elevated.....". The NTU values presented show very low turbidity, not elevated values.

- **page 3-47; Section 3.1.6.d;** An attempt should be made here to calculate the **'Restoration Goals Index (RGI)'** developed by the Chesapeake Bay Program (Ref: Ches. Bay Benthic Community Restoration Goals, March 1994; CBP/TRS 107/94). Using these goals benthic data from any part of the Bay can be compared to determine whether conditions at that site met, were above, or were below expectations defined for reference sites in similar habitats. For the Poplar Island baseline monitoring, the Maryland Department of the Environment will include calculations for the RGI in their benthic monitoring efforts.

- **page 5-30; 2nd. para;** References should be provided for the sentences, "It is expected ....prevailing winds and currents".
  3rd. para; Each sentence is stating facts and therefore needs to be substantiated by appropriate references and/or monitoring data.

- **page 5-32;** Again, many references are made to the turbidity data from monitoring test dike but no data is presented. The 'Final' EIS should have these references and data included in it.

- **page 6-32; 1st. para;** Check spelling of **productivity.**

- **page 7-4; 3rd. para;** It should read " Construction is presently projected to **begin** ....".

We look forward to receiving the final version of the report and to reviewing the results of the **Poplar Island 'test dike' monitoring** work. If you have any questions or require further information, please feel free to contact me at 410-631-3689.

Sincerely,

V. P. Dalal

Visty P. Dalal
Staff Engineer/TARSA

cc: Mr. Peter Tinsley/MDE
Mr. Nauth Panday/MDE
Ms. Diana Reynolds/MDE
Mr. Frank Hamons/MPA

Parris N.Glendening
Governor

Maryland Department of Natural Resources

Tawes State Office Building
Annapolis, Maryland 21401

John R. Griffin
Secretary

Ronald N. Young
Deputy Secretary

January 3, 1996

Colonel Randall R. Inouye, P.E.
District Engineer
Baltimore District
U.S. Corps of Engineers
P.O. Box 1715
Baltimore, Maryland 21203-1715

Re: Integrated Poplar Island draft feasibility report and DEIS.

Dear Colonel Inouye:

The Chesapeake & Coastal Watershed Administration of the Department of Natural Resources has reviewed the integrated draft feasibility report and draft environmental impact statement for the reconstruction of Poplar Island as a beneficial use of dredged material. We support the plan as developed to date. As you are aware, Departmental representatives have been active since the outset in the development of the Poplar Island site, and have contributed several concepts for improving habitat value. We anticipate that the project will restore the egret rookery, provide breeding and rearing habitat for waterfowl, reduce erosion and sedimentation, and improve the surrounding area for sport fishing.

We have supported the Poplar concept since 1990, when we made initial computations of area and capacity and subsequently proposed emergency protection measures using barges for the remaining Poplar Island fragment. The resources to be enhanced and protected by a restored Poplar Island are a direct responsibility of the Department.

The successful integration of the needs of navigation with those of living resources management in Chesapeake Bay has provided an exceptional, in fact almost a rare opportunity for inter-agency cooperation. The compromises agreed to allowed the development of wide support for the project. These should be able to serve as a model for similar cooperation in other Corps districts.

Telephone: ____________________
DNR TTY for the Deaf: (410) 974-3683

Colonel Inouye
Poplar Island
Page 2

Our detailed comments on the integrated draft report and environmental statement follow under separate cover. We look forward to the early completion of the design phase and the onset of construction this summer. Please be assured of our continuing support and willingness to facilitate project progress.

Sincerely,

W. R. Carter, III
Biologist
Chesapeake and Coastal
WatershedAdministration

cc: Mr. Tay Yoshitani, Maryland Port Administration

ALLIANCE *for the* CHESAPEAKE BAY

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Chesapeake Regional
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January 16, 1996

Colonel Randall R. Inouye, P.E.
District Engineer
Baltimore District
U.S. Army Corps of Engineers
P.O. Box 1715
Baltimore, MD 21203-1715

RE: Poplar Island Restoration Project

Dear Colonel Inouye:

The Alliance for the Chesapeake Bay has reviewed the Integrated Draft Feasibility Report and Draft Environmental Impact Statement and supports the proposed plan for the referenced project. We believe that implementation of this project will provide essential habitat within the Chesapeake Bay. We also look forward to enhancing public awareness in the beneficial uses of dredged material and public involvement in the long term process of Chesapeake Bay island habitat restoration.

We have actively supported this project since 1994 when we felt our ability to provide public involvement and awareness were an important element to a successful and sustainable project. The project is important because it has many benefits in addition to dredged material disposal and habitat value. We feel that the public needs the opportunities for involvement in the long term process of habitat restoration in the Bay if it is to be a viable option for dredged material placement.

The coordination between the Baltimore District, the Maryland Port Administration and the resource agencies and the Alliance for the Chesapeake Bay has been exceptional. This collaborative effort should be a model for future efforts. Please contact me if you have any questions regarding our involvement in the process.

Sincerely,

Glenn G. Page
Watershed Restoration Program Director

cc: Mr. Tay Yoshitani, Maryland Port Administration

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
841 Chestnut Building
Philadelphia, Pennsylvania 19107-4431

January 17, 1996

Ms. Carol Anderson-Austra
U.S. Department of the Army
Baltimore District, Corps of Engineers
P.O. Box 1715
Baltimore, Maryland 21203-1715

Re: Poplar Island Environmental Impact Statement

Dear Ms. Anderson-Austra:

This is to follow up on our January 16 phone conversation. Several of us here at EPA Region III have been actively reviewing the Draft Environmental Impact Statement for the Poplar Island Project. Our work was unfortunately hampered by the three-week government shut-down from December 18 through January 10.

As I indicated on the phone, we would like to meet with you and the Maryland Environmental Service to go over our comments before we finalize our comment letter. It is our hope that such a meeting will lead to a more constructive letter, and will help enhance the overall success of the Poplar Island project. We look forward to setting a mutually agreeable date for this meeting in the next few days.

In light of the government shut-down and this requested meeting, we are also requesting an extension of the comment deadline for this project until February 2, 1996.

Thank you for your consideration in this matter.

Sincerely,

Arthur L. Spingarn

Arthur L. Spingarn, Ph.D.
Environmental Scientist

cc: Ms. Cece Donovan, Maryland Environmental Service
Mr. William Matuszeski, Chesapeake Bay Program

Celebrating 25 Years of Environmental Progress

Parris N. Glendening
Governor

Maryland Department of Natural Resources
Maryland Geological Survey
The Kenneth N. Weaver Building
2300 St. Paul Street
Baltimore, MD 21218-5210

John R. Griffin
Secretary

Ronald N. Young
Deputy Secretary

January 18, 1996

Mr. Wesley E. Coleman
U.S. Army Corps of Engineers
Baltimore District
P.O. Box 1715
Baltimore MD 21203-1715

RE: Comments on the Poplar Island Integrated Draft Feasibility Report and Draft Environmental Impact Statement, November 1995

Dear Mr. Coleman,

We have read the Draft Report with great interest, however, our comments are limited to the sections pertaining to sediment quality. They are as follows:

Section 3.1.5, pages 3-28 and 3-29
paragraph 1 - Although shoreline erosion is a significant source of sedimentation in this part of the Bay, bottom erosion is significant, and the Susquehanna is still an important source of material, especially trace metals. (See the works of: Helz; Cantillo; and Sinex).

paragraph 2 - Sediments in the mainstem Chesapeake Bay have low concentrations of *metals* - these may be naturally occurring and not *contaminants*. Other anthropogenic chemical species such as pesticides could be considered contaminants. No distinction was made.

paragraph 3 - Aluminum levels in the Bay reflect primarily the clay mineral content of the sediment. Areas with "elevated aluminum levels" most likely reflect sediments of high clay content and are a natural occurrence. Consequently, these areas should not be singled out as significant. High concentrations of aluminum, or any other metal, are significant only when there is compelling corroborating evidence to indicate loading different from regional baseline behavior.

paragraph 4 - Although there is no reason to believe that the sediments around Poplar Island are anything but clean Bay sediments, the concluding sentence does not follow from the preceding line of reasoning. Diverse and productive benthic communities alone are not adequate indicators of sediment quality. Framing an argument in this manner has many potential pitfalls. It would be better to discuss diversity and productivity in a different section, than to use it in the manner presented.

Section 5.4.2, page 5-18
paragraph 2 - The last sentence was not completed.

Section 5.4.5, page 5-34
This section is internally inconsistent. Paragraph 2 contradicts paragraph 1. The main point to be made is that there is a potential impact to the surrounding environment whenever *sulfidic* (not *sulfitic* as stated in paragraph 2, second sentence) sediments are exposed to subaeral conditions. This potential impact is *lessened* by the disposal of "clean" material. Furthermore, design and operation protocol of the site were proposed in order to mitigate this impact.

paragraph 1 - What tests are going to be used and at what frequency to ensure sediment suitability for placement in Poplar Island? Please specify.

Section 8.2.1, page 8-2
paragraph 3 - The second sentence should read " The second sampling event will take place no longer than 3 years after the first event..." rather than "The second sample event will tale place no fewer than 3 years..."

General Comment
At the monitoring sub-group meetings, Brian Walls discussed the Corps of Engineers' reference sediment monitoring requirements. There was no mention of these requirements in the DEIS. A discussion of these requirements should be included.

Sincerely,

James M. Hill

James M. Hill, Ph.D.
Geochemist

William Panageotou

William Panageotou
Geologist

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Habitat and Protected Resources Division
904 South Morris Street
Oxford, Maryland 21654

22 January 1996

Colonel Randall R. Inouye, P.E.
Chief, Planning Division
Baltimore District
Corps of Engineers
P. O. Box 1715
Baltimore, Maryland 21203

Dear Colonel Inouye:

The National Marine Fisheries Service (NMFS) has reviewed the Integrated Draft Feasibility Report and Draft Environmental Impact Statement for the Poplar Island, Maryland, Environmental Restoration Project. The following compilation of comments, prepared collectively by the NMFS Southeast Fisheries Science Center, Beaufort Laboratory; NOAA Chesapeake Bay Program Office, Annapolis; NOAA Restoration Center, Silver Spring; and NMFS Northeast Region, Habitat and Protected Resources Division, Oxford, is offered for your consideration.

In general, we found that the document satisfactorily describes fisheries, living estuarine resources and habitat in the project area. Although we consider the potential impacts to shellfisheries to be understated, we concur that overall adverse environmental effects associated with the project will not be significant and should, in the long-term, provide substantial benefits to fish and wildlife resources of Chesapeake Bay. Specific comments addressing technical issues or minor deficiencies are enclosed.

We appreciate having had the opportunity to comment on the subject document. If you have questions, or wish to discuss a specific issue or item, please call me at (410) 226-5771.

Sincerely,

Timothy E. Goodger

Timothy E. Goodger
Assistant Coordinator

Enclosure

cc: Nick Carter, Bob Smith, Visty Dalal, Lee Crockett, Chris Doley, Kilho Park, Dave Meyer, Gordon Thayer

Specific Comments

Executive Summary (p. iii): Why is the Deep Trough ($74 million) used as the "base plan"? Although the least cost alternative, it is not necessarily a foregone conclusion that Deep Trough will be implemented (e.g., current statutory constraints). A diked containment site, similar to Hart-Miller Island, is also a likely alternative, the cost of which will greatly exceed $74 million. To represent a more balanced cost comparison between the proposed design at Poplar Island and a base plan, a range of costs would be more realistic varying from $74 million at Deep Trough and the cost of a Hart-Miller type facility at Poplar Island.

2.3.2 (pp. 2-20 - 2-22): This section focuses on the beneficial aspects of the Poplar Island proposal without acknowledging the detrimental ones. Although we concur with the benefits delineated, we recommend that the discussion be balanced with the adverse impacts associated with the project, such as loss of productive shellfish habitat and displacement of fisheries activities.

3.1.3.c (p. 3-4): The bounds of the intertidal zone are critical in determining the elevations for planting and successful establishment of wetland plants. Consequently, the discussion should include the rationale as to why MLLW and MSHW were selected as the bounds of the intertidal zone. For example, why were not MLW and MHW or some other set of bounds used? MLW and MHW encompass a tidal range of 1.5 feet, which is the average tidal range for the area.

3.1.5, paragraph 3 (top of p. 3-29): The sentence beginning with "Aluminum" needs clarification. Does the statement mean "with a low probability of dissolution"?

3.1.6.a, paragraph 1 sentence 3 (p. 3-29): This sentence is unclear. Does it mean that phytoplankton productivity within the vicinity of the Bay Bridge is the maximum for the entire Chesapeake Bay, or for a more restricted geographic area?

3.1.6.a, paragraphs 2 and 3 (p. 3-29): The phytoplankton taxonomic groups that are considered to dominate the Chesapeake Bay are listed; how does the composition of the groups collected during the EIS compare to this list. What were the dominant groups and species collected and is there a list of the species observed? If this information was collected, even through personal observations, it would be useful and should be presented.

3.1.6.a, paragraph 7 (p. 3-30): The razor clam (Tagelus sp.) should be included as a commercially important bivalve species.

3.1.6.a, paragraph 8 (p. 3-30): The listing of the different taxonomic zooplankton groups collected in the ichthyoplankton surveys is useful, but a list of individual genera and species, as shown for fish and benthic invertebrate species, would be more informative.

3.1.6.b (p. 3-44): A number of reasons are offered to explain the relatively low number of species and abundance of ichthyoplankton observed near Poplar Island. One reason, which may have been a factor in the perceived low species numbers and abundance, was the diurnal and tidal timing of the collections. According to the information we received on the EIS ichthyoplankton collections, these collections were performed during daylight hours with no coordination with the lunar phase. Although this scheme may make collection easier, the timing is not best for collecting data on the species present within the area, or determining their perceived abundances. Night collections during flood spring tides would have provided better information on species present and their perceived abundances. If explanations on the quality of the data are going to be offered, than the effect of sample collection during less than optimal times (as was performed) should also be included.

3.1.7.b, paragraph 5 (p. 3-63): The high marsh at Coaches Island also contains tide pool habitat.

3.3.1, paragraph 2, sentence 4 (p. 3-82): In our surveys, juvenile blue crabs were observed using the remaining salt marsh at Coaches, South Central Poplar, Middle Poplar and North Point. Consequently, the remnants of Poplar have some, although limited, economic value.

3.4.2, paragraph 2, sentence 2 (p. 3-91): Barges were placed on the west side of Middle Poplar Island, not South Central Poplar.

3.5, paragraph 2 (p. 3-92): According to the EIS (3.1.7.c and d), only nesting of snowy egrets, cormorants, little blue herons, black ducks and willet occurred on the four remnant islands. Therefore, it must be concluded that common egret, cattle egret, tern, great blue heron, green heron and threatened bald eagle nesting will not be affected if the 5 acres of remnant islands are not protected.

4.3 (p. 4-8): The blue crab (Callinectes sapidus) should be included as an invertebrate on the list of indicator species that will benefit from creation of low marsh.

5.3.3, paragraph 8 (p. 5-17): It should be noted that the caveats associated with the 50/50 wetland/upland design (i.e. 80% low marsh and stone jetties) was the consensus position expressed by MD DNR, USFWS, and NMFS for the project to advance with modified Alignment Number 3.

5.4.2, paragraph 2 (p. 5-18): Part of the last sentence is missing.

5.4.4.a, paragraph 4 and 5 (pp. 5-30 - 5-31): With approximately half of the mixing zone located over oyster reefs during construction of the northwest and southern perimeter of the dike, the potential impact to oyster reefs may be substantially greater than anticipated in the discussion. Also, sedimentation may be exacerbated by the north-south orientation of the tidal currents.

5.4.4.a, paragraph 5 (p. 5-31): It should be noted that "Restrictions within the Bay may preclude dredging..." are administrative, not natural. Time of year restrictions are routinely imposed through the regulatory process to protect sensitive life stages of oysters and other species.

5.4.4.b (p. 5-33): The discussion of "Long-term Impacts" does not address the potential effects of discharges from developing uplands on wetlands established on the east side of Poplar Island. It is anticipated that these discharges may have widely fluctuating salinities, which may adversely impact plant growth and vigor in established wetland cells. This potential impact was discussed at workgroup meetings, and should be addressed in the subject document. Channelizing the discharge to facilitate its release directly into the Bay with minimal impact on wetland plants, also discussed in workgroup meetings, should be included.

5.4.6.b, paragraph 2 (p. 5-36): The estimates of species composition and abundances within the ichthyoplankton portion of the EIS were not appropriately measured to support statements relative to the impact of the project on ichthyoplankton (see comment 3.1.6.b). Even with the EIS study, the importance of the Poplar Island area, in terms of ichthyoplankton use, is still not understood, and the impact of turbidity caused by the project to ichthyoplankton cannot be determined.

5.4.6.b, paragraph 3, sentence 8 (p. 5-36): It is recommended that the sentence be changed to read: "Moreover, the protected cove created by Poplar Island may create conditions conducive to the recruitment and growth of SAV, a habitat type that is currently areally restricted in Poplar Harbor." As presently written, the sentence implies that SAV will establish, even though there are no data to support that assumption, and that SAV provides habitat comparable to the existing snags. The snags seem to be providing habitat for larger fish, whereas any SAV that develops will provide habitat primarily for juveniles. Additionally, it was previously stated that stone jetties will be constructed in an attempt to offset the loss of the snag field; recruitment by SAV would be a secondary benefit.

5.4.6.c, paragraph 2 (p. 5-39): The statement that declining clam harvests may diminish the ability of the clams to repopulate the area is not documented. Although clam densities may be reduced well below those needed to be harvested economically, there will likely be sufficient numbers to repopulate the area. Individual clams produce millions of eggs and larvae. Additionally, planktonic larval stages may remain in the water column for as long as a month, so larval sources for Poplar Island can be from distant areas. It was stated previously (p. 3-47) that recent sampling indicates active recruitment of juvenile soft clams occurring within the area of the proposed dike. These recruits could serve to replenish harvestable stocks in the future. A major factor affecting clam density is habitat availability. The footprint of the restored Poplar Island will permanently eliminate more than

1000 acres of clam habitat, and changes in sedimentation patterns may further reduce available habitat in the area in the future.

5.4.6.c, paragraph 3 (p. 5-39): The statement that wetland productivity will increase shellfish populations should be qualified. Bivalves feed primarily on phytoplankton, not detritus.

Second sentence: How many feet?

5.4.6.d paragraph 3 (p. 5-40): Last sentence: How many feet?

5.4.6.d, paragraph 8 (p. 5-41): It is not likely that "seed" organisms in the dredged material placed in the wetlands cells will significantly contribute to repopulating the area. How many organisms will survive being dredged, transported by barge, pumped into the wetland, and subsequently sculpted with machinery? Meroplankton is the more likely source of early recruitment.

5.6.2., **Economic Impact to Aquatic Resources** (p. 5-50): The razor clam fishery should be discussed in this section.

5.6.2.a, Soft Clam Fishery (p. 5-51): As noted previously, bivalves are not likely to benefit directly from marsh creation or SAV recruitment. Habitat conversion and modification are likely to adversely affect local soft clam populations.

5.6.2.b, paragraph 1, sentence 9 (p. 5-52): It has been stated that reconstruction of Poplar Island may, in the long-term, be beneficial to nearby oyster beds. If the anticipated benefits are derived solely through erosion abatement of the remaining island remnants, the 5+ acres is an insignificant sediment source when considering that the oyster beds remain intact, despite the previous erosion of 1,000 acres.

5.7.2.b. (p. 5-55): It is stated that boat access will be provided to the island. It was our understanding that direct access to the island would not be provided, so as to preserve the quality of isolation afforded by islands to optimize wildlife habitat value.

6.1.2.e., paragraph 2 (p. 6-16): Earlier comments (5.4.4.b above) relative to the need to protect created wetlands from high and low salinity water discharged from the upland cells also applies here.

6.1.2.f, paragraph 6 (p. 6-21): Again, it was our understanding that public access would be discouraged to enhance the value of the island for wildlife.

6.1.2.g, paragraph 5 (p. 6-21): Collection of sod mats from existing, natural wetlands is strongly discouraged. Availability of nursery-grown stock obviates the need for this ecologically disruptive practice. We do, however, support the concept of establishing wetland nurseries on-site, using commercial stock, as was discussed during workgroup meetings.

8.2.6, last paragraph, sentence 2 (p. 8-6): This sentence should read "Replicate fyke nets will be used, with six replicate stations per treatment type (reference, remnant, created) where possible." Please note that block nets were not used for collecting baseline samples and will not be used for future collections.

Parris N. Glendening
Governor

John R. Griffin
Secretary

Ronald N. Young
Deputy Secretary

Maryland Department of Natural Resources
Environmental Review
Tawes State Office Building
Annapolis, Maryland 21401

January 26, 1996

Mr. Wesley E. Coleman, Jr.
Attn: CENAB-PL-PC
U.S. Army Corps of Engineers, Baltimore District
P.O. Box 1715
Baltimore, Maryland 21203-1715

RE: Draft Integrated Feasibility Report and Environmental Impact Statement; Poplar Island; Chesapeake Bay Area; Talbot County

Dear Mr. Coleman:

The Environmental Review Unit has received the following additional comments from the Department's Wildlife Division regarding the above referenced document:

1. Page 5-44, section **5.4.7.b Avifauna, Colonial Waterbirds**. The heron rookery on Coaches Island extends throughout most of Coaches Island and not just the extreme southeastern tip of the island. Therefore, the proposed buffer between the rookery and the construction activities adjacent to Coaches Island is not to minimize impacts to nesting birds. To adequately protect this colony, a time of year restriction on construction activities should be maintained for the entire southern shoreline of Coaches Island. Because Coaches Island is a Great Blue Heron rookery, the time of year restriction period would need to February 15 through July 15 of any year. Great Blue Herons begin to nest earlier than other colonial waterbirds and thus require the earlier start on the time of year restriction period.

2. Page 5-46, section **5.4.8 Rare, Threatened, and Endangered Species**. Although the proposed construction activities are to be conducted over 1000 feet from the Bald Eagle nest site, those activities would be clearly visible from the nesting eagles. Bald

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Eagles are disturbed more by human activity that they can see than by noise. Numerous studies have documented eagles being flushed at great distances by approaching boats. Since their is no visual buffer between the construction activities and the nest site a time of year restriction on the proposed activity is needed to minimize impacts to the nesting eagles. The usual time of year restriction to avoid and minimize impacts to Bald Eagles is December 15 through June 15. However, in recent years the Bald Eagle pair that nests on Jefferson Island has initiated their nesting attempt later than most Bald Eagles in that region of the Chesapeake Bay. Therefore, the time of year restriction period could be shortened to January 15 through June 15. If the eagles fail to nest or produce young, the time of year restriction could be waived for that particular season. However, an annual determination of the reproductive status of the nesting pair could not be made until end of March for any year.

Should you require additional information regarding these comments, please feel free to contact Dr. Roland Limpert of my staff at (410) 974-2788.

Sincerely,

Ray C. Dintaman, Jr.

Ray C. Dintaman, Jr., Director
Environmental Review Unit

RCD:RJL

cc: E. Ghigiarelli, MDE
G. Therres, DNR-FWHS

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
Custom House, Room 244
200 Chestnut Street
Philadelphia, Pennsylvania 19106-2904

IN REPLY REFER TO:

January 30, 1995

ER 95/0863

Colonel Randall R. Inouye, P.E.
District Engineer
Baltimore District, Corps of Engineers
P.O. Box 1715
Baltimore, MD 21203

Attn: Mr. Wesley E. Coleman, Jr.

Dear Colonel Inouye:

The Department of the Interior (Department) has reviewed the Poplar Island Integrated Draft Feasibility Report and Draft Environmental Impact Statement (DFR/DEIS) and offers the following comments for your consideration.

These Departmental comments include the report of the Fish and Wildlife Service on the recommended plan, and are submitted in accordance with the provisions of Section 2 (b) of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.) and Section 7 of the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.).

GENERAL COMMENTS

The DFR/DEIS recommends implementing a plan to create a 1,110 acre dredged material placement island within a 35,000-foot perimeter in a configuration that would roughly follow Poplar Island's historical footprint of 1847. Uncontaminated dredged material would be used to create low and high saltmarsh (50 percent of the footprint), of which 80 percent will be low marsh characterized by smooth cordgrass (Spartina alterniflora). The remaining 50 percent of the historic island footprint would be filled with uncontaminated dredged material to an elevation of 20 feet above mean sea level, and planted with forest, shrub, and vine species of vegetation.

Offshore islands are a unique ecosystem component in the Chesapeake Bay watershed. Although similar vegetative communities may occur on the mainland, isolation, relative lack of human disturbance, and fewer predators make islands more desirable as nesting sites for colonial waterbirds and some endangered species. The remnant islands in the complex which includes Poplar Island support nesting snowy egrets (Leucophoyx thula), common egrets (Casmerodius albus), double-crested cormorants (Phalacrocorax auritus), several species of tern, green herons (Butorides virescens), little blue herons (Florida coerulea), great blue herons (Ardea herodias), black ducks (Anas rubripes), and the Federally-listed threatened bald eagle (Halioeetus leucocephalus). Diamondback terrapins (Malaclemys terrapin) nest on the high marshes and beaches, and river otters (Lutra canadensis) fish from the island shore. Ship wakes, land subsidence, and sea level rise are causing these valuable island habitats to be lost from exacerbated erosion. In the last 150 years, in the middle eastern portion of Chesapeake Bay alone, 10,500 acres have been lost.

At the same time islands have been eroding, a lack of environmentally acceptable disposal sites has led to navigation projects being delayed during the environmental and regulatory review process, and a continued reliance on overboard (unconfined) disposal. At a time when the Federal and state governments are spending millions of dollars to restore Chesapeake Bay's living resources, reduce nonpoint source pollution, and reduce sediment loadings, those same governments are funding the dumping of 1-2 million cubic yards of silt, muck, and sand into the Bay each year.

The Poplar Island recommended plan represents a partial solution to the dredged material management problem, while supporting habitat restoration objectives outlined in the Chesapeake Bay Agreement. This is the reason the Poplar Island Restoration project has gained widespread support from the Chesapeake Bay government community. The Department also offers its support for the project, subject to your agency's careful consideration of the following comments and recommendations.

SPECIFIC COMMENTS

Section 2.3.1.a. Open Water Placement

The Department has expressed specific concerns relative to dredged material placement in sinks such as the Deep Trough. These concerns include nutrient releases and bay eutrophication, loss of thermal refugia, and potentially eliminating government incentive to use dredged material for beneficial purposes such as habitat restoration. During the proposed 1990 demonstration project, the U.S. Environmental Protection Agency calculated significant nutrient releases from dredged material placement into the anaerobic zone during the summer. These concerns should be noted in the final document.

Section 3.1.2. Physiography, Geology, and Soils

We question whether elevations on Coaches Island only reach a maximum of about 4 feet mean low water. Please review this information for accuracy.

Section 4.3 (pg. 4-7) Formulation and Evaluation Criteria

Use of the term "bottomland" when describing non-wetland habitats is misleading (e.g. sounds like a palustrine forested wetland). Forest and shrub would be a more accurate description. Please modify the text of the final document.

Section 5.3.2 Wetland/Upland Ratios

If the sole project objective is to provide the most productive fish and wildlife habitat possible, a mix of upland, beach, aquatic, and wetland habitats is preferred. Although development of 100 percent low marsh would provide greater benefits to fish, it would not provide habitat for species requiring upland nesting sites in close proximity to wetland feeding and brooding areas (e.g. waterbirds). Restoring a mix and interspersion of habitat types will recreate the type of island ecosystem endemic to the middle, eastern portion of Chesapeake Bay. This information should be included in the final document.

Section 5.4.7.a. Terrestrial Resources

Recent designs have included alternative alignments and operations which might affect vegetation on the remnant Poplar Islands (through inundation during filling). The Department's believes that if such an impacting alignment is chosen, the wetlands to be created will compensate for the loss. Without the project the islands will definitely be lost. We have no objection to alignments that do not affect remnant islands.

We recommend dredged material placement volumes per lift that do not inundate the double-crested cormorant rookery on Middle Poplar Island. If this is not possible, we recommend artificial nesting structures (e.g. pilings with attached platforms) be erected adjacent to Middle Poplar Island prior to initial inflow to mitigate the loss. Double-crested cormorants are known to readily utilize artificial structures.

Section 5.4.7.b. Colonial Waterbirds

The proposed buffer zone around the great blue heron rookery on Coaches Island is insufficient. The rookery extends along the entire forested portion of the southern shore of Coaches Island. We recommend time-of-year restrictions for construction of the containment berm and human activities along the entire forested portion of the southern shoreline, where that construction or human activity will occur within 660 feet. The time-of-year restriction for this portion of Coaches Island should be February 15 through July 15. This recommended time-of-year restriction will not be necessary for inflow operations.

The double-crested cormorant colony on Middle Poplar Island could be impacted by construction activities if the activities occur within 500 feet. The Department recommends a time-of-year restriction on berm construction from March 1 through July 15.

Section 5.7.2.d. Other Recreational Activities

Time-of-year restrictions should avoid displacement of nesting waterbird colonies.

Figure 6-1

This figure is illegible. In addition, the proposed interior islands are not shown. A revised figure should be included in the final document.

Section 6.1.2.f. Habitat Areas (High Marsh)

Black needlerush (Juncus roemerianus) should not be encouraged by planting. This species will more than likely colonize on its own, thereby diversifying the planted wetland community. However, introducing black needlerush before the cordgrasses have become established could result in large monotypic stands of this species, thereby lowering plant diversity.

Page 6-22 Island Habitat (Section 4.5.4.)

The section number appears to be wrong. Also, the islands should not be located in close proximity to upland areas or the containment dikes in order to deter access by predators.

THREATENED AND ENDANGERED SPECIES COMMENTS

A bald eagle nest is located on Jefferson Island. A breeding pair of eagles used this nest in 1994, although no young were fledged. Bald eagles are currently listed as Federally threatened. Although construction will occur over 1,000 feet from the nest site, activities will be clearly visible to nesting eagles. As discussed with Mr. Satiate Therres (Supervisor, Wildlife Diversity Program within the Maryland Department of Natural Resources), numerous studies have documented eagles being flushed from their nests by boats approaching from large distances. Therefore, we recommend (in concurrence with Mr. Therres) a time-of-year restriction from January 15 through June 15 prohibiting construction and human activities within the quarter mile bald eagle protection zone surrounding the nest. This recommended time-of-year restriction will not be required for inflow operations. If the eagles fail to nest or produce young, the recommended time-of-year restriction may be reconsidered.

The West Coast and Central Plains populations of least terns (Sterna albifrons) are listed as Federally endangered, but its Atlantic Coast breeding population is not Federally listed. Least terns are colonial nesters that prefer sand, rock, and shell substrates with sparse vegetation. A cooperative least tern habitat restoration effort was undertaken at Poplar Island during the spring of 1994. Crushed clam shell was spread on one of the breakwater barges in the vicinity of Middle Poplar Island. Monitoring has not documented least tern nesting on the restoration attempt.

Except for occasional transient individuals, such as the much publicized manatee (Trichechus manatus), the Poplar Island complex is not known to support any other Federally listed, proposed, or candidate species. This response relates only to threatened and endangered species under our jurisdiction. For information on other rare species, including state-listed species, Maryland Natural Heritage Program should be contacted at (410) 974-2870.

Thank you for coordinating this environmental review with the Department. Questions regarding these comments should be addressed to Mr. John Gill of the U.S. Fish and Wildlife Service's Chesapeake Bay Field Office at (410) 573-4529.

Sincerely,

Don Henne

Don Henne
Regional Environmental Officer

c:\wp51doc\ER-95-863.fin

OYSTER RECOVERY PARTNERSHIP

January 30, 1996

Mr. Robert Smith, Chair
Poplar Island Workgroup
Maryland Environmental Services
2011 Commerce Park
Annapolis, MD 21401

Dear Mr. Smith:

As the Poplar Island project moves from the drawing board to implementation, I would like to encourage the use of all known "technologies" in association with the work. Studies conducted on the intertidal oyster reefs of the Carolinas show that there is a positive correlation between the existence of oyster reefs and the resistance to erosion by the associated grasses behind these structures. In short, if the restoration of Poplar island is to enjoy long-term success, perhaps we should investigate the introduction of intertidal reef communities at a minimum on the leeward side.

Without engaging in an involved treatise on the historic role of the oyster, early settlers noted the existence of intertidal oyster reefs in their explorations of the Chesapeake Bay. Long vanished due to harvest and navigational pressures of the colonial period, today, we mistakenly associate intertidal oyster populations as a Carolina phenomena. The Poplar Island project offers an outstanding opportunity to restore these historic structures to the ecology of the Chesapeake Bay.

I would welcome the opportunity to discuss this further, and if there is interest, facilitate the process by proving oysters from our hatchery program. I look forward to hearing from you.

Sincerely,

Robert M. Pfeiffer,
Executive Director

cc: M. Mendelsohn, ACOE
L. Crockett, NOAA
G. Thayer, NMFS

Chesapeake Appreciation, Inc. • P.O. Box 6775, Annapolis, Maryland 21401 • (410) 269-5570 • fax (410) 269-6635

MDE

MARYLAND DEPARTMENT OF THE ENVIRONMENT
2500 Broening Highway • Baltimore, Maryland 21224
(410) 631-3000

Parris N. Glendening
Governor

Jane T. Nishida
Secretary

January 31, 1996

Mark Mendelsohn
12 S. Howard Street
U. S. Army Corps of Engineers
CENAB - PL - E
P. O. Box 1715
Baltimore MD 21203-1715

Dear Mr. Mendelsohn:

In recent phone conversations we have discussed whether two projects the Corps of Engineers is pursuing will need to have general conformity determinations. The projects are the dredging operations at Poplar Island and creation of various oyster bars in several area rivers.

Neither project involves the creation of substantial air pollution emissions. The threshold level requiring a general conformity determination in the area of the projects is 50 tons per year of VOC or NO_x emissions. It is unlikely that any of the projects will even approach this threshold. I do not believe that a quantitive analysis is necessary.

The Corps of Engineers is familiar with the Department's air quality regulations especially those concerning construction projects and will certainly comply with them during these projects. If you have any further questions concerning general conformity or the Department's regulations, please let me know.

Sincerely,

Diane L. Franks

Diane L. Franks, Chief
Air Quality Planning Division
Air and Radiation Management Administration

DLF\sf

MDE

MARYLAND DEPARTMENT OF THE ENVIRONMENT
2500 Broening Highway ● Baltimore, Maryland 21224
(410) 631-3000

Parris N. Glendening
Governor

Jane T. Nishida
Secretary

February 1, 1996

Mr. Wesley E. Coleman, Jr.
Baltimore District, Corps of Engineers
P.O. Box 1715
Baltimore, Maryland 21203-1715

RE: Poplar Island, Draft Integrated Feasibility Report and Environmental Impact Statement, November, 1995

Dear Mr. Coleman:

The Department of the Environment (MDE) has reviewed the referenced document for consistency with the State's Coastal Zone Management Program. The draft document presents the findings of the cooperative study between the Corps of Engineers and the Maryland Port Administration to determine the feasibility of using uncontaminated dredged material from the approach channels to Baltimore Harbor to recreate and restore ecological habitat at Poplar Island.

The Department of the Environment and the Department of Natural Resources (DNR) have provided detailed comments on the draft report and DEIS (letters from Mr. Visty Dalal, MDE, and Mr. Ray Dintaman, DNR, dated 1/3/96 and 12/28/95, respectively). As you are aware, the State supports the environmental restoration effort to restore Poplar Island to its approximate size in 1847 through the use of uncontaminated dredged material. This beneficial use project provides a solution to the Port of Baltimore dredged material placement problems, and will result in ecological benefits through the creation of wetland and upland habitats.

Based on these considerations and the information presented in the draft feasibility Report and DEIS, the proposed project is consistent with the State's Coastal Zone Management Program, as required by Section 307 (c)(1) of the Federal Coastal Zone Management Act of 1972, as amended.

If you have any questions, please contact me at (410) 974-2156.

Sincerely,

Elder A. Ghigiarelli, Jr.

Elder A. Ghigiarelli, Jr.
Chief, Coastal Zone Consistency

EAGJr:cma

cc: Gary Setzer, MDE
Visty Dalal, MDE
Ray Dintaman, DNR

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
841 Chestnut Building
Philadelphia, Pennsylvania 19107-4431

February 2, 1996

Colonel Randall R. Inouye, P.E.
District Engineer
Baltimore District, Corps of Engineers
P.O. Box 1715
Baltimore, MD 21203

Dear Colonel Inouye:

The Environmental Protection Agency has reviewed the Draft Feasibility Report and Environmental Impact Statement (EIS) for the proposed Poplar Island Restoration project. Due to the federal government shutdown from December 18, 1995 through January 5, 1996, we were unable to meet the original December 28 comment deadline for this document.

This proposed 350 million dollar project would provide disposal capacity for 38 million cubic yards of clean dredged material from the Federal navigation channels serving the Port of Baltimore. At the same time, an island containing 1,100 acres of wetlands and uplands would be restored in the Chesapeake Bay during the 22-year lifespan of the project.

The proposed Poplar Island Project is the result of several years of coordinated efforts on the part of more than 12 federal, state, and local agencies, including the Environmental Protection Agency, as well as several private organizations. It represents a partial solution to the dredged material management problem, and supports habitat restoration objectives outlined in the Chesapeake Bay Agreement. The Environmental Protection Agency supports these dual beneficial use/habitat restoration goals of the Poplar Island Project.

Based on our review of the draft Environmental Impact Statement, we have assigned an "EC-2" rating (Environmental Concerns, Insufficient Information) to the document. A copy of our rating system is enclosed. Our principle concerns regarding the document pertain to the monitoring, maintenance, and remedial action components of the project. While it is apparent that the working groups have spent many dozens of hours discussing the budgets, levels of effort, agency participation, and data management that will be required to assure successful habitat restoration, these plans are not adequately described or referenced in the draft document.

Specifically, we recommend that the Final Environmental Impact Statement (FEIS) include the following:

• **SUMMARY TABLE** The FEIS should include a summary table comparing impacts, costs, etc. of each alternative. This table should include the no-build option, and should compare phased vs. non-phased construction.

• **HABITAT RESTORATION PLAN** The document should provide more detailed information on:

a. Revegetation methods and goals.
b. Budget for revegetation efforts.
c. Lead agency/agencies.

• **MAINTENANCE & REMEDIAL ACTION PLAN** The document should outline what steps will be taken in the event of storm damage to the dikes or restored habitat areas during and after construction. In addition, steps to minimize and remediate potential vegetation damage from deer, geese, and other waterfowl should be documented.

• **SCIENTIFIC MONITORING** The document needs to be more specific about the vegetation and wildlife monitoring methods that will be used in order to assure statistical and scientific validity.

• **MONITORING AGREEMENTS** The FEIS should stipulate that a written interagency agreement will be prepared, committing both the necessary personnel and funds to assure that the 20 years of monitoring required to document the environmental benefits and impacts of this project will be performed.

• **PHASED CONSTRUCTION** It appears likely that due to funding constraints, a phased approach to construction will be used. Better documentation and diagrams of the phased construction process are needed.

• **DATA MANAGEMENT** Chapters 7 ("Plan Implementation") and 8 ("Monitoring Framework") should contain sections on data management. Budgets and lead agencies should be stipulated. In addition, the FEIS should contain a schedule for periodic summary reports with appropriate distribution to agencies and concerned parties.

• **TIMELINE** The document should provide a detailed timeline laying out the proposed implementation of all phases of the project. The timelines should stipulate deadlines and responsible parties for all aspects of the project, including planning, design, construction, monitoring, and maintenance.

In addition to these concerns, we have identified a number of issues in the draft EIS which should be corrected in the FEIS. Our comments and recommendations are discussed in greater detail in the enclosed "Technical Comments."

We appreciate this opportunity to comment, and look forward to continued coordination with you and your staff on this project. Please feel free to contact Dr. Arthur Spingarn (215-597-3360) or Mr. Roy Denmark (215-597-1177) of my staff if you have any further questions.

Sincerely,

John R. Pomponio, Director
Environmental Assessment and Protection Division

Enclosures

cc: Tim Goodger, National Marine Fisheries Service
Bill Matuszeski, EPA Chesapeake Bay Program
Bob Smith, MD Environmental Service
John Wolflin, U.S. Fish and Wildlife Service

POPLAR ISLAND DRAFT ENVIRONMENTAL IMPACT STATEMENT EPA REGION III TECHNICAL COMMENTS

I. KEY CONCERNS

• **SUMMARY TABLE** The Final Environmental Impact Statement (FEIS) should include a summary table comparing impacts, costs, etc. of each alternative. This table should include the no-build option, and should compare phased vs. non-phased construction.

• **HABITAT RESTORATION PLAN** The document should provide more detailed information on:

a. Revegetation methods and goals: The document should stipulate that a permanent interagency scientific monitoring committee will be created, and that this committee will review the most current monitoring data available to determine which revegetation method(s) should be used to maximize the success of the wetland and upland restoration efforts.
b. Budget for revegetation efforts.
c. Lead agency/agencies.

• **MAINTENANCE & REMEDIAL ACTION PLAN** The document should outline what steps will be taken in the event of storm damage to the dikes or habitat areas during and after construction. In addition, the document should specify what actions will be taken to minimize and remediate potential vegetation damage from deer, geese, and other waterfowl.

• **SCIENTIFIC MONITORING** The document needs to be more specific about the vegetation and wildlife monitoring methods that will be used in order to assure statistical and scientific validity. Intended lead agencies for each aspect of the monitoring effort should be specified.

• **MONITORING AGREEMENTS** On p. 8-1, eight federal and state agencies that will be involved with monitoring are listed. The EIS should stipulate that a written interagency agreement will be prepared, committing both the necessary personnel and funds to assure that the 20 years of monitoring required to document the environmental benefits and impacts of this project will be completed.

• **PHASED CONSTRUCTION** It appears likely that due to funding constraints, a phased approach to construction will be used. Better documentation and diagrams of the phased construction process are needed.

• **DATA MANAGEMENT:** Chapters 7 ("Plan Implementation") and 8 ("Monitoring Framework") should contain sections on data management. Budgets and lead agencies should be stipulated. In addition, the FEIS should contain a schedule for periodic summary reports with appropriate distribution to agencies and concerned parties.

• **TIMELINE** The document should provide a detailed timeline laying out the proposed implementation of all phases of the project. The timelines should stipulate deadlines and responsible parties for all aspects of the project.

II. ADDITIONAL COMMENTS

• The print on a number of figures and tables is too small to read (e.g. Table 3.6, "Summary of Water Quality Conditions"; Table 3-8, "Summary of Existing Water Quality Conditions"; Fig. 6-1, Habitat Map; Fig. 6-10, "Typical Cell Layout"). These should be reprinted using larger fonts or 11 X 17 pages.

• Section 3.1.3g, "Residence Times" is missing from the DEIS.

• The scales shown on figures 3-17 and 3.18 (pp. 3-60 and 3-61) have been skewed by photo-reduction and are incorrect.

• The list of legal authorities on p. 4-3 lists the "Emergency Wetlands Resources Act of 1986" twice.

• Table 5-1, "Incremental Cost Comparison."

a. Units are not specified. It is not clear whether the costs are monthly totals, tonnage estimates, or based on some other unit of measure. It is also not clear whether these figures include:

1. dike construction costs,
2. budgets for monitoring and maintenance,
3. budgets for remedial actions.

• Table 5-1 (p. 5-11). Total cost/cubic yard for Poplar Island is quoted as $4.73. How does this relate to the total site development cost of $3.22/cy quoted in table 5-2 (p. 5-16)? Should they be added together to compute total costs?

• Table 5-2 indicates that the Initial Construction Cost of the preferred alternative (#3) will be $49.6 million and Total Site Development Costs will be $122.1 million. How are these figures related to the overall project cost of $297 million?

• Section 5.4.2 (p. 5-18). This section ends with an incomplete sentence.

• Blank spaces on pages 5-38, 5-39, and 5-40 should be filled in.

• Section 5.4.4(b), p. 5.33. The discussion of long-term impacts should include a discussion of impacts from discharges from the upland portions of the project into the created wetlands. Techniques for minimizing these impacts should also be discussed.

• Table 5-6, "Environmental Outputs Summary" provides primary productivity estimates ranging from 41,000 gm/m2/yr to 938,000 gm/m2/yr. These numbers should be checked:

a. These estimates disagree with the primary productivity estimates in table 5-5, "Ecosystem primary productivity values." Total primary productivity estimates for the site should be in the thousands of metric tons per year.

b. A 23-fold difference in productivity among the build alternatives seems unlikely.

• The cells shown in Fig. 6-10 (p. 6-18) do not correspond to those listed in table 6-3. Are all the cells in 6-10 supposed to labelled "w"?

• The text on p. 6-19 says, "An estimate of cell life and cell capacity for the 7 cells is contained in table 6-3." Table 6-3 does not provide information on cell life.

• Section 6.1.2d (p. 6-16) Water Level Control Structures. This section states, "The wetland cell control structures discharging through the eastern perimeter dike will be deactivated after the perimeter dike has been breached to introduce tidal flows."

a. How large will be breached areas be?

b. Will they be armored to withstand storm events?

• Section 6.1.2.f. Habitat Areas.

a. We recommend that the Habitat Document be incorporated into general document, at least by reference.

b. The proposed artificial reef construction should also be described in the FEIS.

• The text on p. 6-24 reads, "Since phased construction will not enclose the borrow area, the area will only be marginally protected from turbidity effects during construction." Where is the borrow area? How large is it? How long will be exposed?

• Section 6.1.2g (p. 6-21). "Saltmarsh cordgrass will be established by ...placing field collected sprigs or mats." EPA strongly discourages the collection of sod mats from natural wetlands.

• Section 6.1.3 (p. 6-23) states, "The total project cost is estimated to be $297 million. This includes costs for maintenance dredging, placement, shaping and planting of the island, supervision and inspection, execution of the feasibility study, review of the plans and specifications, and advertisement and award of the construction contract (Table 6-4)." Earlier documentation estimated wetland seeding costs at $1,278,000, wetland maintenance costs at $50,000/year, and annual environmental monitoring costs at $300,000 per year. Environmental monitoring, maintenance, and remediation costs should be specifically broken out in the FEIS, along with proposed lead agencies and potential funding sources.

• The text on p. 6-29 states, "Each habitat cell will be evaluated twice a year: once early and once late in the growing season." EPA strongly supports twice a year monitoring during the first few years of revegetation efforts. This monitoring frequency is not reflected in table 8-1, "Poplar Island Proposed Monitoring Schedule."

• Project costs are stated as $223 million on p. 7-2 and as $297 million on p. 10-3. The current projected cost should be consistently displayed throughout the FEIS. Section 7-4 should provide a clearer explanation of incremental costs.

• Section 8.2. Monitoring Elements. We commend the approach of presenting scientific hypotheses with regard to wetland vegetation, water quality, benthics, fisheries, and wildlife monitoring. However, the document should also provide information on what actions will be triggered by the acceptance or rejection of these hypotheses.

• Section 8.2.2. Wetland Vegetation Monitoring: The FEIS should provide a more detailed wetland monitoring program. Frequent monitoring during the first few years is vital. A permanent monitoring committee should be established to review data, oversee monitoring efforts, and make recommendations regarding revegetation and other habitat needs.

a. What is the size of the 6 permanent plots? What % of total created wetland acreage is being sampled? A statistically valid approach to sampling should be implemented.
b. Fixed photo stations should be included.
c. Annual monitoring overflights/aerial photographs should be included.
d. Plant species inventories should be conducted.
e. A vegetation monitoring budget should be included.
f. What actions will be taken in the event of significant plant damage by deer, geese, or other waterfowl? A remedial action plan should be included.
g. University involvement in monitoring programs should be solicited.
h. A potential role for trained citizen volunteers in monitoring programs should be considered.
i. A lead agency should be designated for data management and analysis.

• We recommend that annual monitoring reports and presentations be provided to federal, state, and local agency officials.

• Section 8.2.3. Water Quality Monitoring: The use of existing Bay mainstem water quality monitoring stations as reference stations should be documented in the FEIS.

• SAV monitoring should be added to Section 8, in order to determine whether the SAV goal stipulated on p. 2-21 and p. 5-36 is met.

• Annex A, Clean Water Act Section 404(b)(1) Evaluation: Section I (b-f) does not provide any specific information regarding the volumes of material being placed (subject to section 404). Additional details should be provided including estimates of material being disposed as a result of approach channel dredging, material being disposed as a result of excavation (dredging) of a portion of the dike alignment, disposal of dredged material to create the dikes, etc. Also, since all material used to armor the dikes which is placed below the high tide line is subject to Section 404 some estimate of the volume of this material should be provided.

• Annex B, the Index, needs to have page numbers inserted.

• Annex B, Attachment A, "Public Involvement and Program Schedule and Outline" is missing, and should be included in the FEIS.

• Annex B, Attachment C, "Public Meetings, Agendas, Attendance Lists, Handouts" is missing, and should be included in the FEIS.

• Annex B, Attachment D, "Public Comments" is missing, and should be included in the FEIS.

• Annex C, Attachment F, "News Releases, Articles and Advertisements" is missing, and should be included in the FEIS.

SUMMARY OF RATING DEFINITIONS AND FOLLOW UP ACTION*

Environmental Impact of the Action

LO--Lack of Objections
The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC--Environmental Concerns
The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

EO--Environmental Objections
The EPA review has identified significant environmental impacts that must be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU--Environmentally Unsatisfactory
The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the CEQ.

Adequacy of the Impact Statement

Category 1--Adequate
The EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2--Insufficient Information
The draft EIS does not contain sufficient information for the EPA fully assess the environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

Category 3--Inadequate
EPA does not believe that draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From EPA Manual 1640 Policy and Procedures for the Review of the Federal Actions Impacting the Environment.

Attachment F

News Releases, Articles, and Advertisements

By David Challinor

But islands too are only clay

A Smithsonian scientist discusses Man's license or ability to intervene here and weighs the alternative of studying nature taking its course

island had long since been cut by wide channels into three separate islands totaling more than 200 acres: Coaches Island to the southeast, Jefferson to the northeast and, to the west, Poplar Island proper (according to modern nomenclature). Over the next 20 years this windward land dwindled to a narrow wooded strip that winter storms chopped into four smaller pieces. The total land area of Poplar Island proper shrank to less than 100 acres. It now comprises barely 54.

On my first exploration in 1963, masses of poison ivy grew to 15 feet, reducing air circulation and inten-
Continued on page 70

There are tides in the affairs of nature that Man frequently tries to stem—usually for his own purposes, especially in the name of "progress," and sometimes for altruistic reasons. The Poplar Islands dilemma, if resolved to favor a *status quo ante,* will exemplify the latter, that is, well-meaning human intervention in a natural process.

Millennia ago these islands constituted a single landmass of some 2,000 acres; then they began to erode. Without artificial rebuilding they will disappear as inevitably as every biological organism, or even as mountains do in the course of eons. It is easy to argue that the islands must be rescued, if only as some sort of ransom against human plunder elsewhere in the world. But a germane question remains: By what right (or to what purpose) should Man seek to mitigate a process as inexorable as the wearing down of the once tall Appalachians, or the extinction of the woolly mammoth, or the demise of some other species doomed by nature?

Chesapeake Bay, a comparatively young estuary, was evidently formed about 8,000 years ago and will probably disappear in a like time. It was largely created by erosion, from the runoff of melting glaciers; and the companion process of siltation will probably fill it until a river meanders through Maryland to a delta near Norfolk, Virginia. The process is a viable one and largely immutable by Man—thus far. Several islands of recent memory are gone, eroded and become silt. Parts of the Eastern Shore have lost two-thirds of an acre per mile *annually* for more than a century.

There are several reasons—environmental, economic
Continued on page 72

Dr. Challinor, a concerned conservationist, is the Institution's assistant secretary for science.

Reese, continued from page 69

sifying the June heat. Hundreds of herons, nesting in the 40-foot loblolly pines year after year, had covered the vines below with their droppings. Biting flies made my life miserable and snakes slithered through the snarl of fallen trees and vines. Kingbirds, crested flycatchers and house wrens were abundant, as were spiders, robber flies, dragonflies and five-lined skinks.

At scattered locations, too, I found the vine-covered remnants of past human habitation. Vast beds of flowering lilies, a razed building, broken foundations, an orchard, piles of bricks and bottles, great heaps of oyster shells, stump-cleared alleyways where roads and lanes once ran through the trees, a graveyard.

Poplar Island has known many owners and many names. John Smith called it one of the Winstones. In 1631 Captain William Claiborne, a Virginia Puritan who established a trading post on nearby Kent Island, became the first white man to visit and claim it. According to most Talbot County histories he named it Poplin's Island for an associate. One of his followers, Richard Thompson, settled his family there; a few years later Nanticoke Indians massacred the household while he was away.

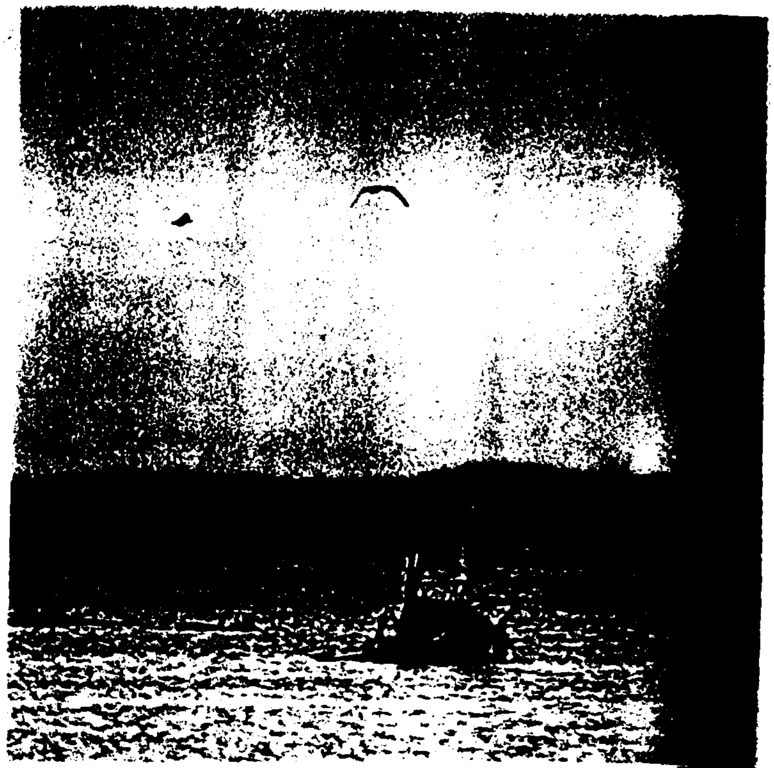
By 1654 the name had been corrupted to Popeley's and a former Maryland governor had sold it for 10,000 pounds of tobacco to one Thomas Hawkins. He sold half to Seth Foster and deeded the other half to his wife Elizabeth and his son. Hawkins died and Elizabeth married Foster. "Foster Island" became a sanctuary for Alexander D'Hynoisa, Dutch governor of what was to become Delaware.

Bootleggers and presidents

When Charles II captured the Dutch colonies in North America, D'Hynoisa received asylum on the island from Lord Baltimore. The Dutchman then bought it from Foster for 300 pounds sterling in 1699 and lived there as a naturalized citizen. Early in the 18th century the place became the property of the father of the famous Charles Carroll of Carrollton, a signer of the Declaration of Independence and one of the richest men in America. By that time Popeley's had been further corrupted to Poplar.

In the 19th and early 20th centuries, Poplar Island supported a thriving little community peopled chiefly by watermen who made their living from oysters, fish and crabs. It had several small farms, a school, general store and mail service—weather permitting. Harvests of grain and seafood were shipped north to Annapolis, Baltimore and other ports in barges and skipjacks, the sloops unique to Chesapeake waters.

Each year, however, existence grew more difficult as the hungry bay claimed more land through erosion.



Gulls clutter the early morning sky over the shallows, a heron flies from fishing and an osprey waits.

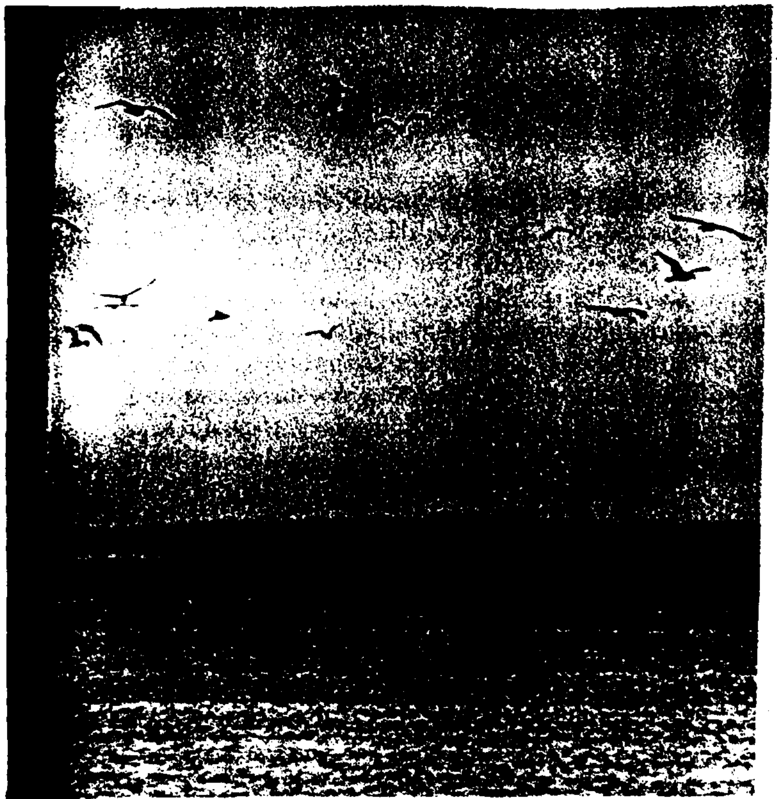
The acreage, given as 806 in 1847, was down to about 500 in 1912 and 485 a few years later. In the mid-1920s the remaining inhabitants gave up and moved away.

Though the island was fragmenting, it was not completely abandoned. In 1929 federal agents determined that suspicious characters were frequenting the place; the revenuers made a visit, captured five bootleggers and broke up a 1,000-gallon still. Two years later, a group of influential Washington Democrats acquired the small, deserted northeast island which they renamed Jefferson. They built a spacious lodge and established the exclusive Jefferson Islands Club. In the heyday of the New Deal, President Franklin D. Roosevelt was a visitor, eating Maryland oysters, crabs, wild duck and terrapin.

President Truman also enjoyed the club, but by 1950 the lodge had burned and the members disbanded. They sold out to executives of a Delaware corporation who built a new clubhouse as a base for goose and duck shooting. This clubhouse also burned.

The most recent man-made venture—and perhaps the last—was an attempt by an individual to establish a yacht club in 1960. After building a third clubhouse, he sold the islands to Dr. William L. Elkins of Philadelphia for a summer retreat. In 1966, Dr. Elkins began deeding the islands to the Smithsonian in the hope that measures might be taken to halt the erosion and save the birds. The lodge and its outbuildings on Jefferson Island are now used as shelter for visiting scientists and as the caretaker's home.

Today, erosion remains Poplar Island's most savage enemy. No shoring or bulkheading has been attempted



on the western shore. Timber enough to build a small house rumbles into the bay annually. Along with the trees go the nests of a few more great blue herons.

In 1964, I started driving stakes and marking trees at various exposed locations to measure annual erosion. Of ten sites marked, three have averaged inland losses of 14 feet a year and all have lost more than two feet annually. Worst of all, new wash-throughs occur almost every winter; the pace of erosion is increasing.

If nothing is done, it is only a matter of time until Poplar Island proper dissolves into a series of tiny, barren hummocks. At the present rate, it probably will be denuded of trees within a decade. When that happens, little Jefferson Island, now partly sheltered by Poplar, will be at the mercy of the bay's winds, waves and currents. (Coaches Island, most shoreward and southerly of the three, already is eroding steadily, though at a somewhat slower pace than Poplar.)

What then becomes of the ospreys and the great blue herons? If their future is not something with which we human beings are concerned, it should be. For the Poplar Island colonies of these two species are among the finest remaining in America.

Some 30 pairs of ospreys nest annually here and in the immediately adjacent waters. This is the largest osprey concentration in so small a space on Chesapeake Bay, and it is part of an even larger community in and around Talbot County that constitutes the most successful osprey colony north of Florida.

Or would it be more accurate to say "least unsuccessful" in this context? Talbot County's ospreys are not being wiped out as they are in New England and the Great Lakes region, where the once-large populations have been reduced to a few individuals or obliterated by chemical pesticides and the destruction of breeding sites. But neither are they doing more than, at best, holding their own. My annual studies of osprey breeding in the Talbot County area since 1963 show a slight decline in the number of fledglings produced per nest during the period. Although the success rate remains substantially above those of most other well-documented U.S. bird populations, it is less than half that of Chesapeake Bay ospreys before 1947, when hard pesticides such as DDT were introduced.

As for the Poplar Island birds, their future is uncertain. Their reproduction rate seems to have been impaired by chlorinated hydrocarbons which they absorb from live fish, their chief food. Their nests and young are subject to human depredations, some innocent, some deliberate, which wipe out a disgraceful number of eggs and hatchlings each year.

These range from picnicking pleasure boaters, whose mere presence keeps the adult bird off the nest (while the sun cooks eggs or young), to Coast Guard personnel who often must destroy nests on lighted navigation markers. Most important, their island is dying. My artificial platforms cannot offset this erosion. Poplar Island's sheltering landmass, however diminished, provides snags and dead trees for nesting sites, building material and protection against storms.

Threatened herons

Poplar Island's other magnificent breeding birds, the great blue herons, face an even more immediate threat Here in one of the largest heron colonies on the eastern seaboard, I estimated nearly 500 active nests in 1963; in 1971, about 120.

Like the osprey, the great blue heron is a fish eater and so is endangered by the persistent pesticides it absorbs. More important, the great blue heron—even more than the osprey—must have an isolated, undisturbed breeding site to survive. Herons build huge, untidy nests of sticks in the branches and high forks of trees; they stay as far away as possible from human habitation. Shy and wary creatures, they flush from the nest at the slightest disturbance, exposing eggs and nestlings to predators and the sun. If frequently disturbed, they abandon the nest. And they cannot be induced to adapt themselves to a man-made platform.

On Poplar Island the great blues nest in the branches of the loblolly pines that cluster along the eroding western shore, congregating in late March and early April to lay four or five blue eggs and brood their young. Some stay all year, roosting in the loblollies by night and fishing in the shallow waters by day. To see one of these great slate-blue birds, more than three

Reese, continued

feet tall, towering above its nest like a giant sentinel outlined against the sky, is to recapture a vision of an earlier and more beautiful America.

Already their nesting trees are being washed away—as many as 40 a year. Many displaced birds seek breeding sites elsewhere. When the island is gone, the sad prospect is that the herons—at least in anything like their present numbers—will be gone from the bay also. So too, the hundreds of swans, geese, ducks, grebes and loons that winter each year in the island's lee.

I believe Poplar Island can be saved, but it will cost a good deal of money. High-sounding talk, the only weapon applied so far, certainly won't stop the tireless Chesapeake. Last winter a state survey was finally made that estimated the minimum cost of erosion control on the windward shore of Poplar Island to be about $800,000.

Unfortunately but predictably, Maryland is not primarily concerned with the fate of the herons and ospreys. The Department of Chesapeake Bay Affairs' mandate was to consider how "to develop shore recreational facilities for the benefit of the boating public." One plan reportedly called for the state to take title of the entire island group, lease part of it back to the Smithsonian for wildlife studies, and establish a boating center on Jefferson Island. The state would pay for erosion control.

Disaster for the birds

This might be nice for the boating public, but it would be disastrous for the birds. If the island group is turned into a playground for people, there will be little wildlife for the Smithsonian or anyone else to study. Boaters, campers and picnickers would drive away the nesting colonies as surely—and a lot more quickly—than continued erosion.

But can the legislature be convinced that a chunk of land is worth saving without regard to its dollars-and-cents value to Maryland voters? Or that funds should be voted to benefit a few birds? This is a difficult concept for most Americans to grasp.

I have lived within sight of this jewel in the Chesapeake all my life, have known it intimately for the past eight years. I have watched it blossom in the spring, listened to the eerie clicking voices of hundreds of incubating herons, marked the joyous growth of new, young living creatures through the summer. I have watched them mature and have seen the islands dormant in the harsh blast of winter. I, for one, will mourn this island if it dies. But it will be equally tragic if the island ends its long and stubborn battle against the Chesapeake as a piece of kept land, a parking place for Sunday speedboats.

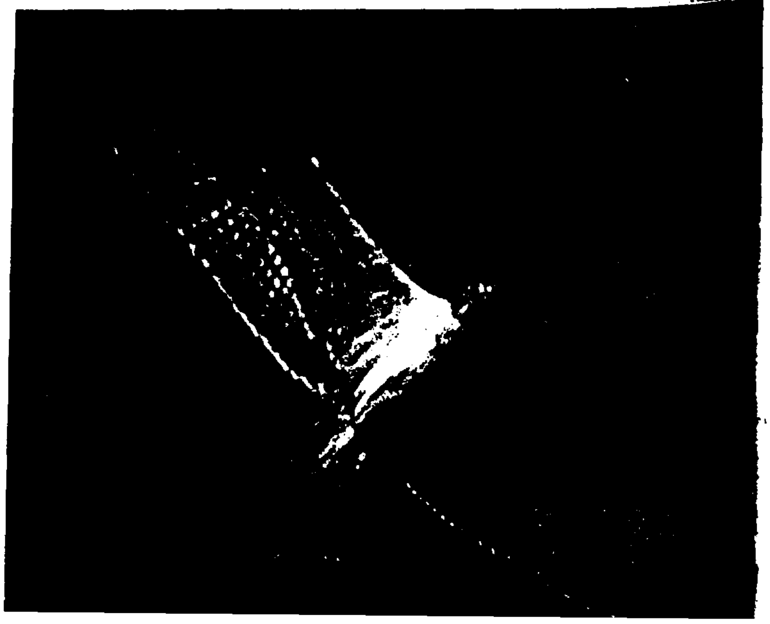
Challinor, continued

and emotional—that at an easy glance justify strenuous efforts to save the islands. They protect part of Talbot County's eroding mainland from the full force of tides and waves. They provide a safe harbor for watermen and winter feeding grounds for thousands of waterfowl. They constitute esthetic and sentimental landfalls in the protean bay. A most important consideration is the plight of the ospreys and great blue herons. Could they survive without these nesting grounds? Would they relocate? They have done so before and we can assume they would again. They probably did not frequent Poplar when it supported a human community, but presumably nested in the loblolly pines only after men abandoned the dwindling land.

Is there a cogent argument for letting the islands die? Yes, the rationale of scientific study and discovery. Knowing these islands are victim to relentless processes of decay, we can use them as a natural laboratory for examining these mechanics against the time another island is threatened. Watching these islands give up their ghosts could provide copious and useful data.

In economic terms it is certainly easier to study the decline and death of the islands than it is to save them, an effort that might cost upwards of four million dollars. That price tag—for filling the breaches, widening the shoreline by 100 feet and building a protective revetment (after cutting some trees to provide access for heavy equipment!)—comes from the Corps of Engineers, the organization with, perhaps, the greatest experience in trying to bend natural forces to human design. In terms of the GNP or the federal budget, this might seem a paltry sum, but it is naive to argue that moot point. In terms of realistic alternatives, should the national government save these islands rather than cure urban blight?

Should Maryland spend tax revenues here that



might otherwise cleanse the polluted upper Chesapeake? Should the Smithsonian discontinue astrophysical research or abandon its Chesapeake Bay Center for Environmental Studies to preserve 54 acres of languishing island that have debatable scientific, human and ecological importance? It is all very well to hope that public money used for some ignoble cause be applied to island conservation, but the fact remains that funds once spent on biological warfare, for instance, probably won't be diverted to Chesapeake Bay this fiscal year, or next.

Priorities aside, the feasibility of preserving the islands without adverse side effects has not been proved. Some seemingly attractive solutions had to be abandoned after thorough study, such as using baled solid waste to protect the shoreline. (The bales themselves might erode, causing new pollution.)

The most promising proposal, from a professor of environmental engineering at the California Institute of Technology, involves a project twice as expensive as the Corps'—but one that would pay for itself. A rock breakwater would be built 1,000 feet to windward of the existing Poplar islets. Inert refuse would be dumped in the man-made lagoon to a level above high tide, covered with solid waste and topped off with a [illegible] layer of sanitary landfill and soil, which would support new flora. The result: a larger, stabilized, fertile island. The project could be self-supporting since nearby Baltimore, for one, faces increasing difficulties in disposing of both its municipal waste and the demolition debris from buildings razed for urban renewal. Using Poplar Island as a carefully managed, selective dumping ground would be cheaper and cleaner than present disposal methods. (But such a practice must not become widespread, or the Chesapeake will be subject to such landfill pressures as San Francisco Bay.)

This last caveat points up why we must take such care; the solution to this dilemma must not cause worse ancillary problems. So the Caltech engineer's preliminary plan is now being reviewed by federal, state and private agencies prior to a final proposal.

If such a project is ecologically sound, technologically feasible and economically possible, almost all interested parties could accept the abandonment of a natural laboratory and the halting of a natural process. The sanctuary of these islands, which will *not* be converted to a marina at the expense of wildlife, will then be saved—nay, restored and expanded—for the perpetual use of birds that may remain there.

A soaring osprey hovers over Poplar Island (left). The stately heron guarding a treetop nest (right) is threatened by pesticides, pleasure boats and the tides.

POPLAR ISLAND RECLAMATION AND BENEFICIAL USES OF DREDGED MATERIAL

Edward T. Fulford, P.E.[1]

INTRODUCTION

Poplar Island is located near the mouth of the Choptank River, approximately two miles southwest of Knapps Narrows as shown in Figure 1. The island has historically been a rookery for blue herons and other wildlife and is one of the few remaining islands on the main body of the Chesapeake Bay that is not currently developed.

As a result of its exposed location, the island has in the past and is continuing to experience significant erosion. The island, which had an area in the middle 1800's on the order of 750 acres (not including Coaches and Jefferson Island), has eroded to approximately 4.7 acres in the last 150 years and has split into four separate smaller islands. The two largest islands are now identified as Poplar Island and North Point, respectively. Continued erosion of North Point will result in the loss of the remainder of the island in the next several years.

The area has been identified as a site for restoration through the beneficial use of dredged material. Materials dredged from nearby navigation channel projects could be used to reclaim the island to its 1847 footprint by constructing breakwaters and/or other structures and backfilling the enclosed areas with clean dredged material from the Baltimore Harbor approach channels. The backfilled areas are to be developed into intertidal wetlands and upland habitat which will serve as valuable nesting and nursery area for many wildlife species. This habitat is now in imminent danger of completely eroding within the next few years. Thus, the proposed project will utilize clean dredge material as a "beneficial resource" to restore and protect the habitat.

CONCEPTUAL PLANS

GENERAL

The primary objective was to develop alternative conceptual plans for the reclamation of Poplar Island using dredged material. A key concern was to develop alternatives that would maximize the stability of the placed dredged material, maximize the

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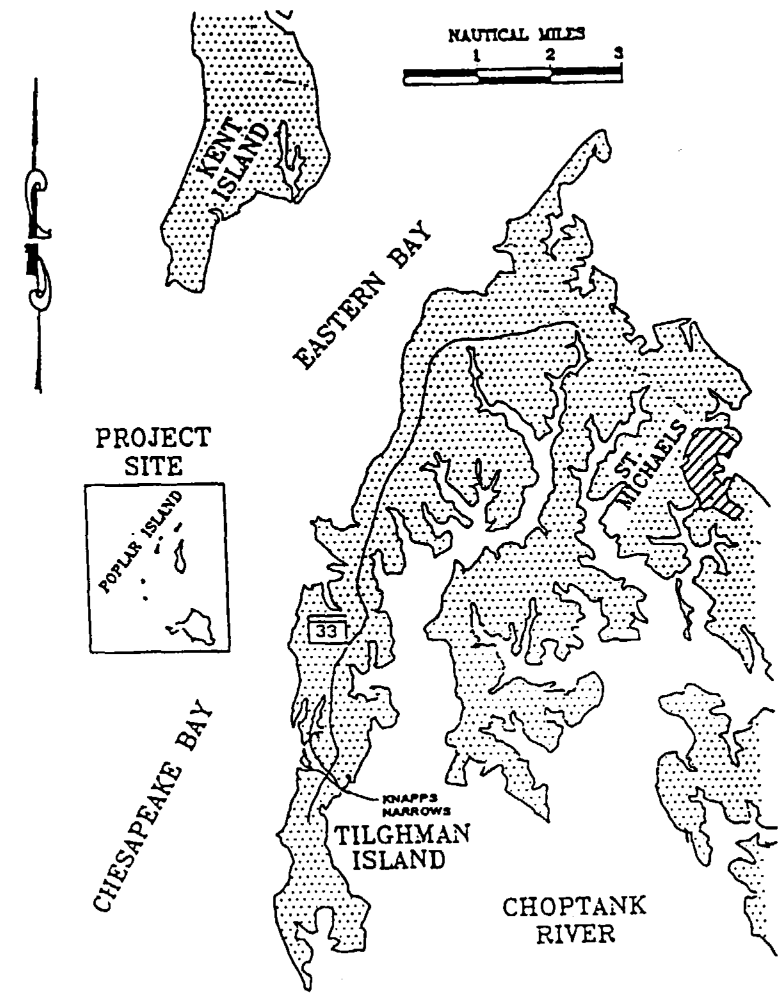
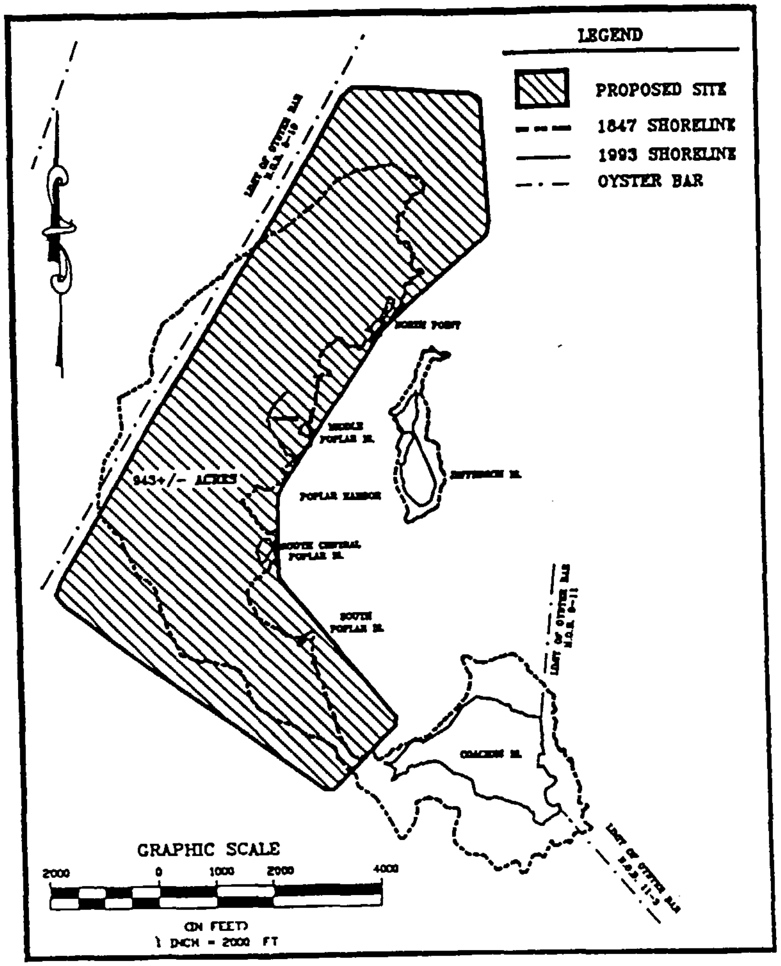
PRESENTED AT DREDGING '94 CONFEREN

success of the created intertidal wetland and upland habitat and minimize the construction costs. The goal was to develop practical and constructable alternatives that are both operationally and economically feasible.



Location Map
Figure 1

As a starting point, an overall dredged material placement area footprint, based on preliminary Maryland Environmental Service studies, was selected as shown in Figure 2. This containment area consists of four (4) individual dredged material placement cells with a total area of 943 acres.



Dredged Material Placement Area
Figure 2

DREDGED MATERIAL PLACEMENT SITE CONSIDERATIONS

The basic concept for dredged material placement in the proposed site consists of initial mechanical dredging in the Baltimore Harbor navigation channels and transport of the dredged material by barge to the site. At this point, the material will be hydraulically dredged/unloaded and discharged into the site. As a result, containment dikes will be required during the placement operation and will be subsequently required to provide protection to the placed dredged material and habitats created.

Dredged Material Placement Requirements

In order to achieve acceptable effluent water quality, the proposed dredged material

placement site must have sufficient area to permit proper settling, adequate effluent weir length and ponding depth, and a flow pattern to minimize short-circuiting. A discussion of these design parameters is presented in the following paragraphs.

Containment Area Required - Guidance on the determination of the required containment area is presented in WES Technical Report D-78-56 entitled "Methodology for Design of Fine-Grained Dredged Material Containment Areas for Solids Retention". Lacking specific data on the proposed dredged material, the design solids loading, S_d, was varied from 1.0 to 4.0 lb/hr - ft² (typical range for fine-grained sediment dredging operations) to determine the range of containment areas required. These results are shown in Table 1.

Table 1
Containment Area VS. Solids Loading

Solids Loading, S_d (lb/hr - ft²)	Area (Acres)	Design Area, A_d (Acres)
1.0	17.6	39.7
2.0	8.8	19.8
3.0	5.9	13.2
4.0	4.4	9.9

Since the proposed areas for the dredged material containment cells range from 158 acres to 298 acres, more than sufficient area will exist to insure adequate settling and effluent water quality.

Ponding Depth and Weir Length - Sufficient weir length and ponding depth near the weir must be provided in a containment area to prevent water with high suspended solids concentrations from flowing out of the basin. The ponding depth provides a parameter through which effluent quality can be controlled. Essentially, it is the depth of ponded water above the solids interface that is required for sedimentation in a containment area. Insufficient ponding depth is a major cause of short-circuiting. The optimal range for this parameter is from 1 to 3 feet.

WES Technical Report D-78-18 entitled "Weir Design to Maintain Effluent Quality From Dredged Material Containment Areas" provides a design procedure that uses nomograms for selecting weir length and ponding depth at the weir to maintain effluent quality, given the material type and design flows.

The design procedure using the nomogram is an iterative procedure with four variables that can be manipulated to achieve an optimal design. These are design flow (Q), weir length (B), ponding depth (y_o), and the effluent suspended solids (SS). Any three variables (Q, B, y_o, or SS) can be selected and solve for the fourth. Using this analysis, ponding design depths at the weir ranging from 2 feet to 4 feet were determined to meet typical effluent water quality criteria.

Short-Circuiting - Short-circuiting is by far the most common and significant problem with dredged material containment structures. The overall effect of short-circuiting is to reduce the effective residence time of a major portion of the flow. Short-circuiting can be caused by insufficient ponding depth, improper location of the dredged material inlet pipeline in relationship to the discharge weirs, the location of the discharge weirs, topography, and vegetation in the basin. All of these factors can cause an improper distribution of velocity vectors resulting in shortened detention periods and increased velocities with resultant scouring of settled solids. Short-circuiting and dead zones can be reduced by the proper placement and number of weirs. For the proposed site, the concept of using the entire west side of the dike as a weir is possible. With this concept, the potential dead zones would be reduced even further, if not eliminated entirely.

Wave Erosion Protection

Due to the exposed location of the site, armoring of the impermeable core dikes with stone will be required to prevent erosion and possible failure of the dikes due to wind generated wave conditions. For the purposes of this study, a design analysis was conducted to determine the weight, size and layer thickness of stone required to protect the core dikes from erosion. The design level selected for this analysis was the 25 year storm event with a wave height of 6.4 feet. This analysis indicated that armor stone weights ranging from 1,000 lbs. to 1,700 lbs. with a double layer thickness of 4 feet are required to protect the clay dikes along the southwest through northeast sides of the site. From the east-northeast through the south side of the site, an armor stone weight of 500 lbs. with a double layer thickness of 2 feet is required.

Wave Overtopping Analysis

An analysis of the effects of waves overtopping the dikes was conducted to determine the dike height required to prevent erosion damage along the back slope of a dike section without armoring. The objective of this analysis was to identify the crest elevation of the containment dike to minimize overtopping for wave conditions corresponding to a 25 year storm event. Tolerable overtopping rates for an unprotected back slope (i.e. clay, compacted soil, grassed) are 0.05 C.F./sec./ft. (Hydraulic Research Station, 1990). Overtopping rates greater than this will result in damage to the unprotected back slope.

Irregular wave runup and overtopping rates were computed using the Corps' Automated Coastal Engineering System (ACES) Version 1.07 Irregular Wave - Rough Slope Runup and Overtopping. Overtopping rates were calculated for both the exposed (SW to NE) and sheltered (ENE to S) sections of the containment site to determine the appropriate crest elevations. Rough slope coefficients for a riprap structure were applied for runup calculations. Overtopping coefficients were a function of structure slope, water depth at the structure, and wave height and period. This analysis indicated that dike heights of +8.0 feet MLW and +6.0 feet MLW are required to prevent erosion damage along the unarmored back slope of the dike along the south-southwest to northeast and east-northeast to south sides of the containment site, respectively. Dike elevations lower than these would require the placement of protective stone armor on both the exterior and back slopes of the dikes.

Conceptual Dike Cross-Sections

A range of initial concepts for the containment area dikes were considered to include the following:

Water Structures - Water Structures are a patented product that combines three or more polyethylene or woven geo-tech tubes that are filled using an available water supply.

Sediment Filled Geotextile Tubes - Geotextile tubes filled with sediment have been used to provide dikes up to 4 feet high within dredged material storage areas. Geotextile tubes are constructed of woven geosynthetic materials and are pumped full of dredged material, preferably sand.

Clay Core Dike With Armor Stone Protection - This concept consists of the construction of a clay core dike covered by filter cloth and a bedding stone layer and then covered with several layers of armor stone. Geotechnical investigations indicated that the hard clay bottom in the proposed project area will provide suitable material for dike construction. Because of the exposed location of the area, it will be necessary to protect the clay dike from wave action by placing armor stone on the bayside slope and possibly the back slope (due to wave overtopping).

Stone Dike - Consideration was given to the construction of the containment dikes with a core of small stone, covered by an impermeable filter cloth/liner and then covered with a stone bedding layer and several layers of armor stone. Although this concept would provide a functional dike, the cost of the structure would be extremely high.

Conceptual Dike Cross-Sections Considered Further

Based on an evaluation of the above concepts, several containment dike sections were developed that would satisfy each of the design requirements for the dredged material placement operation (i.e. adequate ponding depth), wave erosion protection (i.e. adequate stone armoring) and wave overtopping protection (i.e. adequate crest height or stone armoring to prevent back slope erosion). The typical sections are shown in Figure 3 for the 1V:2H mechanical dredging option.

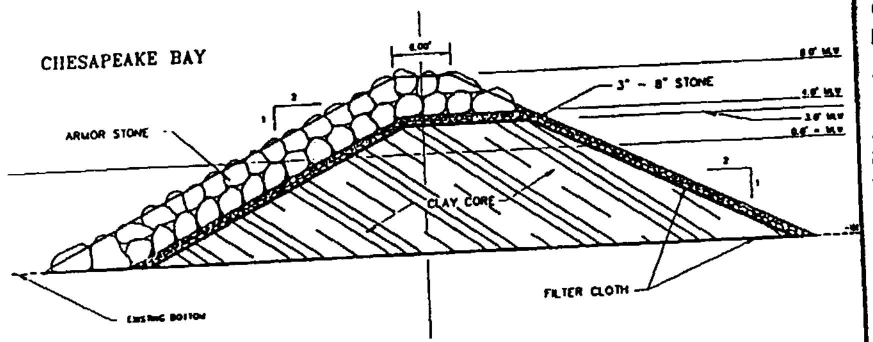
Dike Section Alternative for High Energy Areas - This dike section, shown in Figure 3a, for the higher wave energy sides of the site (southwest through northeast) incorporates a clay core with a design elevation of +3.0 feet MLW which will provide sufficient ponding depth to achieve adequate effluent water quality. The clay core will be covered with filter cloth and a 12 inch layer of 3 inch to 8 inch stone. The armor stone design elevation is +8.0 feet MLW which will eliminate the requirement for armoring of the back slope for wave overtopping protection. However, to prevent erosion along the back slope due to wind generated waves within the containment cells, a 12 inch layer of 3" to 8" stone will be placed along the back slope.

Dike Section Alternative for Low Energy Areas - This dike section, shown in Figure 3b, incorporates a clay core elevation ranging from +4.0 feet MLW to +5.5 feet MLW and an armor stone design elevation of +7.0 feet MLW. An access roadway is also incorporated in this section. The increase in the elevation of part of the clay core to +5.5 feet MLW is due to the incorporation of the access roadway section.

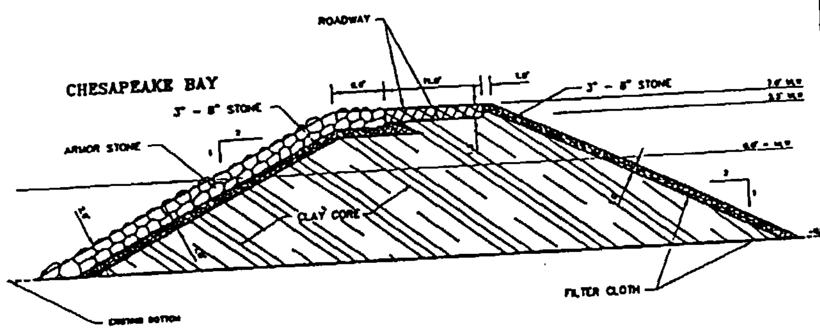
CONTAINMENT DIKE DESIGN FUNCTION

Effluent Water Quality and Flow

The proposed containment dikes are designed with a +3.0 Ft. MLW clay core elevation along the west side of the site, +4.0 feet MLW core dike elevation along the north and south sides of the site and +5.5 feet MLW clay core elevation along the east side with an access road. This elevation differential will result in the west side dike length acting as a weir for dewatering the site during the disposal operation.



Dike Section for High Energy Areas
Figure 3a



Dike Section for Low Energy Areas
Figure 3b

This concept is illustrated in Figure 4. It is assumed that the proposed structure would act as a broad crested weir with restricted flow which is dependent on the permeability of the bedding stone material. Preliminary analyses indicates that the proposed containment dike weir section would be adequate to provide the required effluent water quality and flow. Additional analyses will be conducted during the project design phase to verify this conclusion.

Tidal Exchange

Sections would be incorporated in the initial containment dike construction that would be modified after the dredged material placement operation is complete to provide for the tidal exchange required to support the proposed wetland vegetation areas. This concept is illustrated in Figure 5 and consists of sections along the west side of the site that could be "notched" out of the dike after the site is dewatered. These sections would initially be constructed by placing core stone up to the +3.0 feet MLW elevation of the adjacent clay core and placing an impermeable filter cloth or liner material over the core stone in the same manner as the adjacent clay core. A 12 inch layer of 3 inch to 8 inch stone would then be placed over the filter cloth followed by the addition of the two layers of armor stone. This section would then function as an impermeable core similar to the adjacent clay core sections.

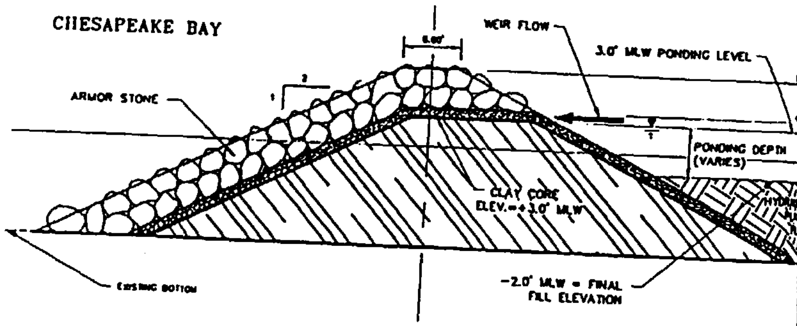
Following the dewatering of the site, the armor stone and the 3 inch to 8 inch stone in these sections would be removed down to the filter/liner material which would then be removed. To provide tidal flow into and out of the site and also provide fish passage areas through the containment dike an "open" notch down to an elevation of -1.0 feet MLW would be provided.

DREDGED MATERIAL PLACEMENT CONCEPTS

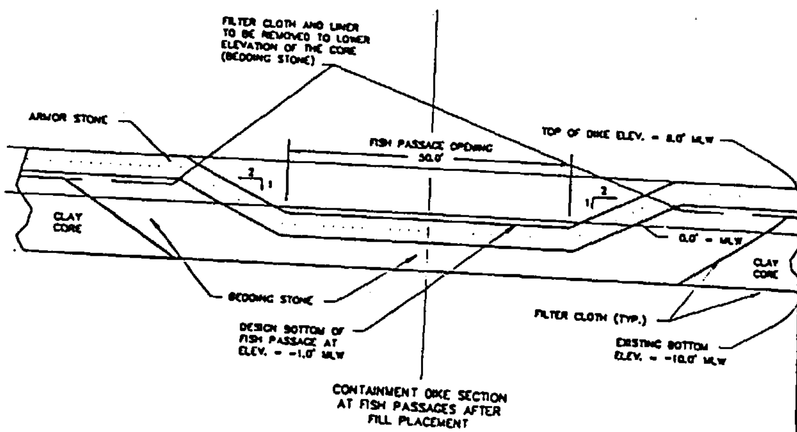
A primary consideration in the development of plans for placing the dredged material is the need to achieve the final elevations of the dredged material required for wetland vegetation success through the dredged material discharge process. This accomplishment is necessary since the loosely consolidated, deposited dredged material will not support conventional grading equipment for an indefinite period of time. In addition, the cost of the grading operation would probably be cost prohibitive. As a result, based on experience from the Hart-Miller Island dredged material disposal area, it is assumed that slopes of 1V:200 H to 1V:400H and 1V:500H to 1V:800H for subaqueous and subaerial fill, could be achieved through the dredged material discharge process. Subaqueous fill placement could be enhanced by using a floating pipeline that could be moved during the disposal operation. Dredged material fill elevations to higher elevations will have to be achieved through the "mounding" process and selective placement of the discharge line.

RECOMMENDED PLAN

Based on the preceding analyses and evaluations, the recommended dredged material placement concept is shown in Figure 6. Dredged material placement contours at elevations of +1.0 Ft. MLW and lower would be achieved using an anticipated natural slope of 1V:200H to 1V:400H for subaqueous disposal. For proposed elevation contours higher than +1.0 feet MLW, a natural slope of 1V:500H to 1V:800H is anticipated. The recommended plan would provide a dredged material placement capacity of 11.0 MCY and would provide 943 acres of diverse habitat including a shallow water area around the interior perimeter of the containment dike.

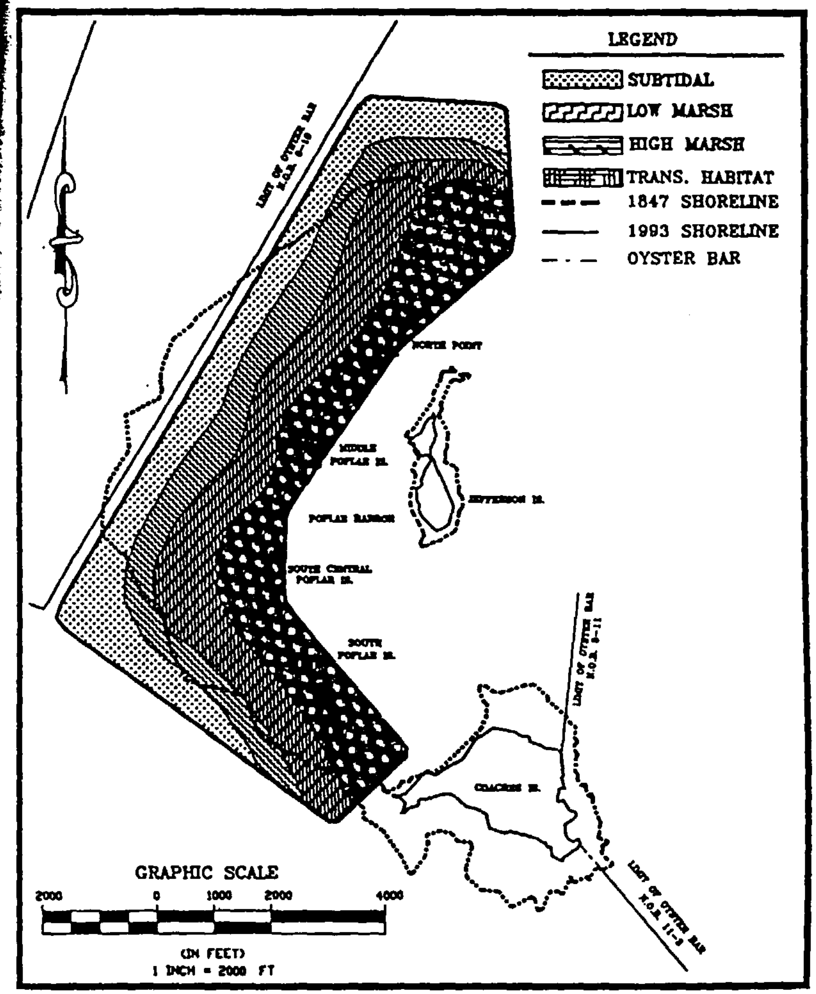


Weir Dike Concept
Figure 4



Fish Passage/Tidal Flow Section
Figure 5

This area could be used to establish submerged aquatic vegetation and support the associated marine life. The second habitat zone would provide a low marsh area from +0.5 ft. MLW to +1.5 ft. MLW with the establishment of spartina alterniflora. Daily inundation of this zone would be required to maintain this vegetation. From +1.5 ft. MLW up to elevation +3.5 ft. MLW, a high marsh zone could be provided with the establishment of spartina patens. Periodic inundation of this area during higher tide occurrences would be required to maintain this habitat. The last habitat zone would be established from +3.5 ft. MLW up to +5.0 ft. MLW with the planting of upland shrubs, bushes and trees. This area would provide needed habitat for migratory waterfowl. The estimated construction cost for the recommended plan is $52,000,000.



Recommended Plan
Figure 6

By Jan Reese

Doomed island and a lament

An osprey expert and experienced bird watcher decries the natural death by erosion of Poplar Island in Chesapeake Bay

A young osprey, eyed by its nesting parent, alights on a broken wreck in the shoals of Poplar Island.

For eight years I have watched ospreys occupy an island that may not be there in eight more.

One pair used to nest in a dead tree snag near the wreck of a fishing boat. In the winter of 1966 the snag disappeared into Chesapeake Bay, and the nest with it, so I built a platform above the reach of summer tides on the rotting *Arabelle's* bow. Twelve days later it held a nest with two brown-and-white eggs. All was well in 1967, but the next year I returned to find the platform collapsed. The same ospreys greeted me with shrieks and withdrew to a nearby tree while I hammered together a new platform. Three hours later one bird was breast deep in sticks while the mate brought more from shore. The next year I had to remove the nest; the birds screamed at this sacrilege but resumed homemaking when I had repaired the platform and replaced the nest. In 1970 the ospreys were on hand when I arrived; again winter had destroyed the scaffold. As I reconstructed it, the silence from their treetop perch was broken only by an occasional call. The ospreys watched intently, then burst into a screaming chorus as I finished. They went to work building a new nest before I'd gathered up my tools.

Next spring the platform may be gone again, perhaps even the *Arabelle's* hulk—victim of the Chesapeake's tireless tides and storms. Why? Because the bay is devouring Poplar Island and Man has not stayed the hungry erosion. I have done what I can to help the birds, but the Chesapeake is winning, eroding the windward shoreline 14 feet a year in places. Wild animals and birds are not alone in being threatened with extinction; here, two-and-a-half miles off Maryland's Eastern Shore, part of the earth itself is vanishing, vanquished by the tides, tempest and human indifference.

Once a single island, the place comprised more than a thousand acres when Captain John Smith first sighted it in 1608. For three centuries it supported watermen and farmers. Today it has been battered into several islets—owned in large part by the Smithsonian Institution—totaling no more than 163 acres. The timid tenants, wild breeding colonies of osprey and great blue heron, will be hard pressed to find new nesting sites in the densely developed bay region if this sanctuary disappears, as it easily may.

Formerly a horseshoe of land open to the east, the

Reese studied the subject islands under the aegis of the Smithsonian and the Interior Department.

SMITHSONIAN — DEC, 1971 pp 68–73

BAY JOURNAL

. 4 No. 7 | A public education service of the Chesapeake Bay Program | October 1994

New view of Bay comes from high above the Earth

By Karl Blankenship

A new image of the Chesapeake watershed has been pieced together; taken from hundreds of miles in the sky and computer enhanced, it identifies all major land uses in the 64,000-square-mile drainage basin down to a fraction of an acre in size.

It is not a photograph, but a mass of more than [illegible] million color-coded squares. Each depicts the dominant land use in a 25.8- by-25.8 meter area (roughly one-sixth of an acre).

Stored on a computer at the EPA's Chesapeake Bay Program Office, users can look at the entire watershed, or smaller chunks to locate wetlands, forests, and suburban developments in a specific area.

The Chesapeake Bay Program Land Use Database identifies activities so small that officials were at first stumped by what appeared to be a heavily urbanized island sitting in the water near Norfolk. They zoomed in for a closer look.

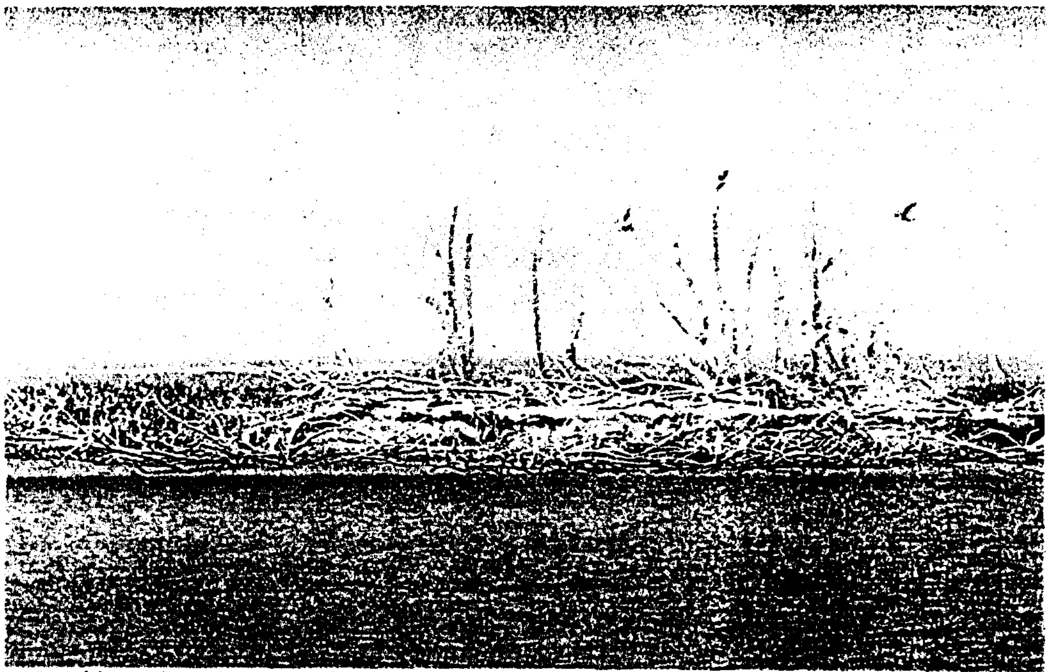
"It was pointy in one end and square at the other," said Lewis Linker, modeling coordinator for the EPA's Bay Program Office. "It happened to be in the middle of the shipping channel. It turned out to be a freighter."

On the computer, users can zoom in and locate the reflecting pools on the mall in Washington, or the two concrete ribbons that make up the Bay Bridge outside Annapolis.

Like giant aerial photos, the maps reveal forested ridges separated by agricultural valleys. There are urban centers with spider-web networks of roads that lead out of them into less-dense sprawled development which, in turn, tapers into farmland and forests. "You can really tell the interaction between the land and the people," Linker said.

The database's main purpose, though, is to improve the accuracy of the Bay Program's Watershed Model. That computer model is used to estimate the amount of nutrients flushed into the Bay from different parts of the watershed. Such information helps managers put together nutrient

Please see MAPS — page 8



One of the rapidly eroding Poplar Island remnants has become a major breeding ground for several bird species.

Rising from the depths:

Plan would use dredged sediment to rebuild island for Bay wildlife

By Karl Blankenship

THE remains of what was once Poplar Island today rise above the waters of the Chesapeake Bay only in fragmented bits and pieces. Some remnants are mounds of nearly barren soil less than an acre in size.

Only a century ago, it was an active farming community. The island was more than 700 acres in size. By the 1940s, it had shrunk to a third of that, but it still served as a retreat for presidents Franklin D. Roosevelt and Harry S. Truman. What's left totals less than 100 acres.

Gone with the land are the farms and the settlers. But while the remnant islands have lost much of their value to humans, the same can't be said of the wildlife that inherited them.

"They're valuable simply because they are islands," said John Gill, a biologist with the U.S. Fish and Wildlife Service. "They are isolated from human disturbance and they support many fewer predators."

In the past two decades, they have been a haven for certain birds, including great blue herons and bald eagles. Now, to make the site even more valuable for wildlife, plans are in the works to make Poplar Island again rise above the waves.

In what proponents consider a win-win proposal, state and federal agencies are planning to rebuild the island with sediment dredged from shipping channels. Eventually, they envision a network of wetlands and uplands that would provide more than 1,000 acres of wildlife habitat.

The idea is championed by the Bay Program and a wide array of state and federal agencies, as well as environmental groups, commercial interests, and local land owners.

Proponents believe the multimillion dollar project

Please see ISLAND — page 6

ISLAND —*from page 1*

would become a showcase for the nation as the largest attempt to use dredge materials for habitat construction. "We're basically looking at the stuff as a resource as opposed to a waste by-product of dredging," Gill said.

It could also solve a major problem for the Maryland Port Administration. The Port of Baltimore generates about 85,000 jobs and between $1 billion and $2 billion in economic activity annually.

But keeping it competitive requires that shipping channels be dredged so they remain deep enough for giant freighters. Each year, an estimated 3.2 million cubic yards of sediment is dredged in Maryland's Bay and harbor channels. During the next two decades, the port administration estimates that more than 90 million cubic yards will be dredged from all channels that serve the Port of Baltimore, including some in Virginia and the C&D Canal.

Finding ways to get rid of that sediment is increasingly difficult. The port administration projects a 75 million cubic yard shortfall in storage capacity over the next two decades.

Resource agencies and environmental groups have often opposed dumping dredge material back into the Bay because of concern about its impact on bottom habitats. Though about a million cubic yards of "open water" disposal still takes place in Maryland waters, the port administration has increasingly sent much of the dredged material to Hart-Miller Island, a containment site near the head of the Bay. But that site may be filled by 1998. Hart-Miller has long been controversial with many local residents, and officials do not envision building another facility of that size.

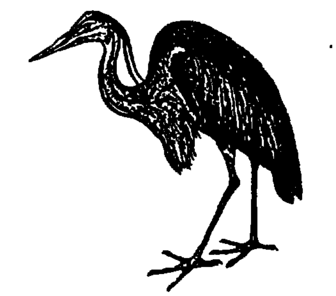
As one alternative, officials are turning to the idea of using the dredged material to rebuild small islands, wetlands, and other habitats — a concept dubbed "beneficial use."

The concept was endorsed regionally in a Chesapeake Bay Ecosystem Management recently signed by more than two dozen federal agencies, which called for "assuring the beneficial use of clean dredged material to support fish, migratory waterfowl, and other wildlife habitat in the Bay." The Army Corps of Engineers, which pays for much of the dredging, is the lead agency on the commitment.

With such broad support for the beneficial use concept, the port administration has put plan development for the Poplar Island project on a "fast track," which could allow construction to begin in about a year-and-a-half, said Frank Hamons, manager of harbor development for the port administration. "We've got a lot of support for this site," he said. "It's a good project from an environmental perspective."

UNDER the concept that Gill helped to devise, a series of three dikes would be built to roughly correspond with the historical "footprint" of Poplar Island. One-by-one, those dikes would be filled during the next decade with dredged material.

Inside the containment site, the sediment would be sculpted to form a variety of habitats: permanently flooded subtidal areas, low marshes, high marshes, pools, rivulets, small beach islands, and uplands. About 70 percent of the restored area would be wetlands, and about 30 percent would be uplands.



Much of the island system, it is anticipated, would be a sanctuary for colonial waterbirds, such as herons and egrets.

Many species would benefit. The marshes would be breeding grounds for fish and waterfowl. Small sandy islands within the diked area would be created as habitat for least terns, which are about to be listed as a threatened species in Maryland. With a declining amount of beach around the Bay, 75 percent of the least terns in the state now nest on top of buildings with flat, pebble-covered roofs.

Much of the island system, it is anticipated, would be a sanctuary for colonial waterbirds, such as herons and egrets. While these birds — which live in large colonies — have had stable populations in recent years, they have gradually been crowded into fewer, but larger, colonies. That makes them more susceptible to disease, predation, and catastrophic impacts from tornadoes or storms.

"That crowding is an ecological threat to them," said Dave Brinker, colonial waterbird project leader with the Maryland Department of Natural Resources. The new island, he said, will "give more opportunities to provide more nesting sites."

A number of those species had flourished on the remnant islands in recent years, largely because of the lack of predators. But their numbers have gradually declined as the islands eroded and the trees used for nesting gave way to advancing water.

The port administration and the Bay Program recently arranged to ground 10 scrap barges as a breakwater around the island most used by the birds to stem further erosion. The idea is to protect a remnant bird population to speed the colonization of the rebuilt island. "If there's no tradition left," Brinker said, "it could take a while to attract the birds back."

But Brinker has no doubt the project will succeed. "It's sort of like, you build it, and they will come."

The new habitat would be protected from erosion by the dike built to contain the dredge material. When completed, though, openings would be created in the dike to allow water to flow in and out.

In addition to providing habitat inside the dike, Gill said restoring Poplar Island's historic shape will offer more protection for the adjacent Poplar Harbor. "The old timers tell me that in the old days, that cove supported quite a bit of grass," Gill said. "We're hoping — in fact we're expecting — that if we can reconfigure the island back into the shape of a kidney, that grass will come back. That's going to have obvious benefits to all the crabs and all the fish associated with grass beds."

If successful, the tactic may be put to work for some of the Bay's other vanishing islands: A study done for the USF&WS showed that since colonial times, 12 of 35 islands in the middle portion of the Bay along the Eastern Shore had disappeared entirely as the result of erosion caused by rising water levels over the past century. The total amount of land lost was 10,500 acres.

BUT beneficial use is also more expensive than more conventional options. Disposing of the material into deep portions of the Bay is relatively inexpensive, though it raises environmental concerns.

Even disposal at Hart-Miller Island is far less costly. Hart-Miller cost about $60 million to build. Its containment dikes rise 28 feet above the water surface and enclose a 1,100-acre disposal area which can hold about 70 million cubic yards of dredged material.

Beneficial use sites, which seek to restore wetlands and low-lying uplands, can barely rise above the water. So the low dikes around Poplar Island will hold only about 11 million cubic yards of dredged material even though they will enclose an area almost as large as Hart-Miller. And because of the setting and the types of dikes needed at Poplar Island, construction costs would be almost the same while storing only a fraction of the material.

In addition, Poplar Island — located south of Kent Island — is about 20 miles farther from the dredged shipping channels than Hart-Miller. As a rule of thumb, Hamons said, transporting dredged sediment costs about 10 cents per cubic yard per mile. That translates to about $40 million to $48 million in additional costs over the project's life.

"Someone has got to pay for that," Hamons said. Also, the project does not come close to handling all the port's disposal needs. It will have to continue searching for more places to dispose of the material.

"But," Hamons added, "when you have an enhancement project that is making a positive contribution to the biological systems out in the Chesapeake Bay, that's a value too. It's not as easy to calculate as some others, but that also has to be part of your consideration."

In fact, it is something that is being increasingly considered nationwide. A push toward beneficial use is gaining momentum as port administrations across the country are faced with similar difficulties in locating places to put dredged materials. The Clinton administration has established a federal interagency task force to study dredging issues, and port authorities are asking that it recommend making beneficial use of dredge materials a priority.

Generally, the Corps of Engineers — which pays for dredging — is supposed to pursue the low-cost option on a project, though the law does allow exceptions. If the sponsor of the program, usually the local port administration, does not choose the lowest cost siting option, the corps can require them to make up the difference.

Senators from Virginia and Maryland are seeking funds that will help pay for Poplar Island and other habitat restoration activities which they say will help demonstrate the environmental value of using dredged materials.

"There's a growing recognition that instead of dumping this stuff overboard, it should be put to an environmentally beneficial use when the stuff is clean and you can do something else with it," said Charlie Stek, an aide to Sen. Paul Sarbanes of Maryland, who has advocated that such alternative uses be encouraged by the federal government.

Sarbanes has introduced a bill, also backed by Sens. Chuck Robb and John Warner of Virginia and Barbara Mikulski of Maryland, that would provide $30 million to the corps as a pilot program to design and construct habitat projects related to the Bay in Maryland, Virginia, and Pennsylvania. The measure, part of the Water Resources Development Act, was expected to pass in early October.

"The cost is high, there's no question about it," Stek said. "But the benefits can be great as well."

One of the benefits, said Gill, is that the beneficial use concept has allowed agencies which historically squared off against each other — and often worked at cross-purposes — to begin working side-by-side on creative solutions.

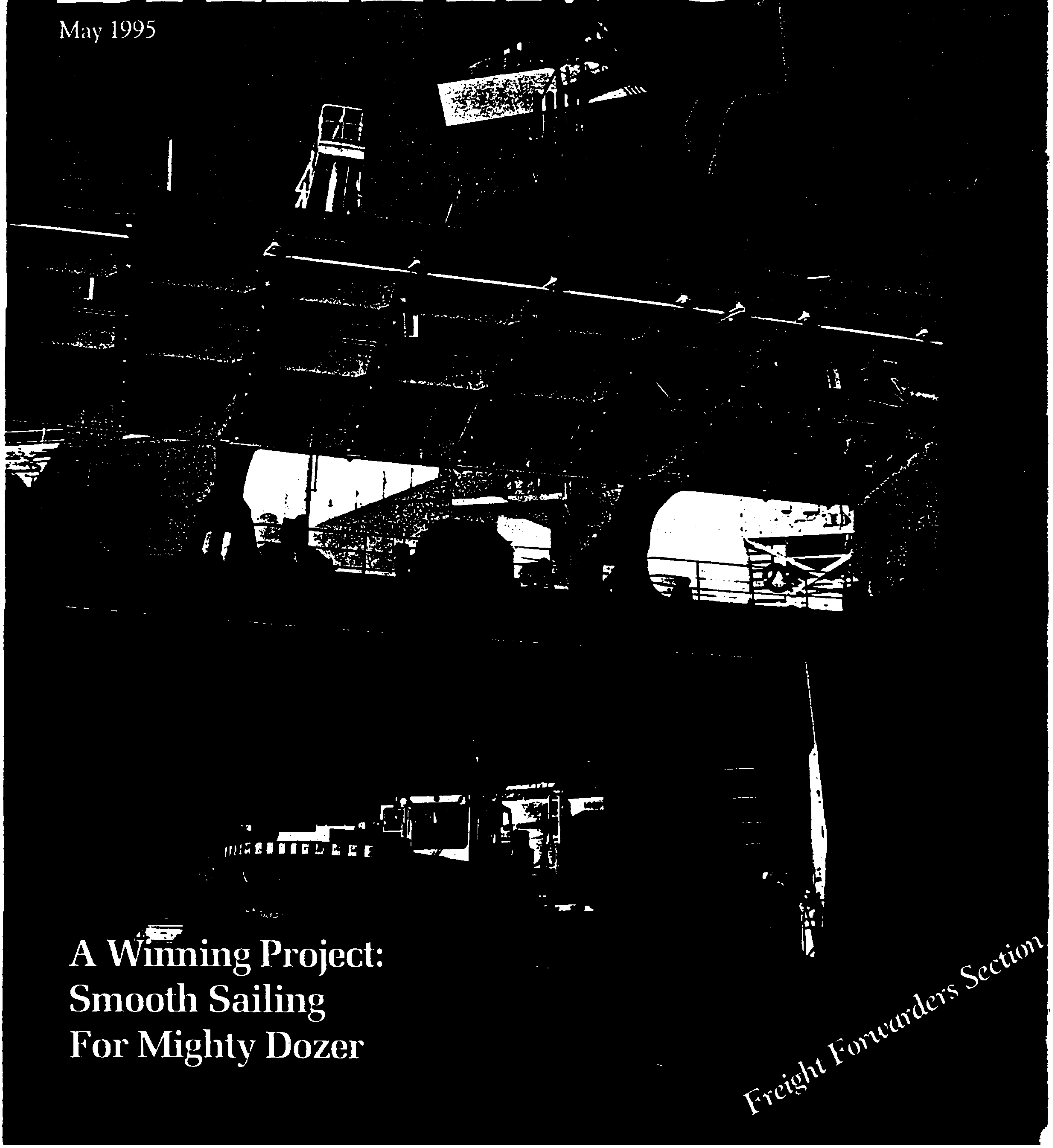
"At a time when the government was spending millions of dollars to restore Chesapeake Bay resources, reduce nonpoint source pollution, and reduce sediment loadings, that same government was dumping 1 to 2 million cubic yards of dredged sediment over the sides," Gill said.

"Rather than butting heads, we — the environmental advisory agencies — went to the corps and the port and said 'why don't we try to support Chesapeake Bay Program goals and give you a placement site by pursuing beneficial use opportunities?'

"They bought into it. At present, it seems to be the way to go."

THE • PORT • OF BALTIMORE

May 1995



A Winning Project: Smooth Sailing For Mighty Dozer

Freight Forwarders Section

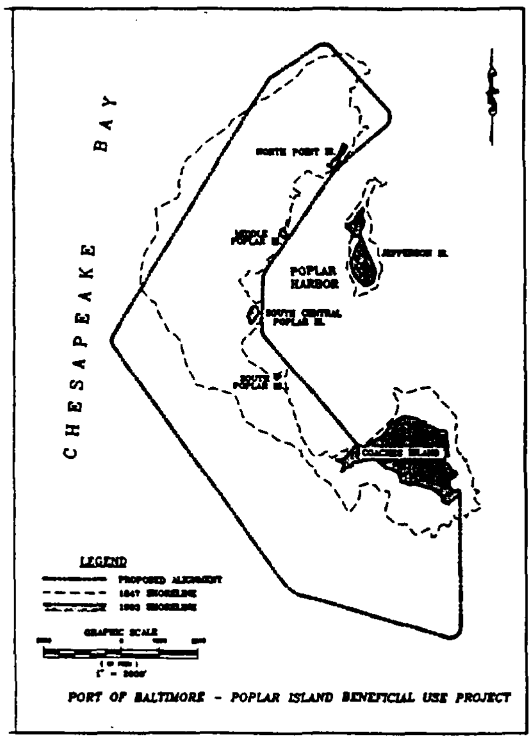
Beneficial Use Projects Create A "Win-Win"

By Helen D. Bentley

The Port of Baltimore proudly touts that it is one of the few United States ports that has a 50-foot channel leading directly into its terminals.

All of the highways leading through the Chesapeake Bay to the Patapsco River must be maintained constantly to prevent any interruption to the flow of the giant behemoths coming out of U.S. graving docks and down shipways, as well as the world's shipyards. Today, these vessels transport cargoes in amounts they would never have transported in the past — football field size quantities.

So we are working hard to emphasize the need to secure Federal funding for beneficial use projects. It is more difficult these days because of the challenges to develop affordable and environmentally sound means of disposing of material dredged from those ship channels. New sites must be developed in the near future.



The placement of dredged material can restore Poplar Island, making it a positive habitat for the Chesapeake Bay.

The hottest project on the table for funding at the moment is the Poplar Island Beneficial Use Project. This tiny chain of pieces of Poplar Island, together with the sister islands of Coaches and Jefferson, sits in the Chesapeake Bay directly opposite Talbot County. It will become a nonentity over the next decade or two if steps are not taken to preserve it. This is where the Port of Baltimore enters — we can save this rapidly eroding group of tiny island segments, restoring the area to its original size and at the same time provide a home for the placement of material dredged from shipping channels.

It's a win-win situation all around, which is why the Poplar Island project has developed support from a diverse range of interest groups. The total cost of the project, including construction, operation and transportation costs will exceed $100 million over 15 years.

Congressional assistance is vital to secure the Federal funding needed ($50-$55 million) and Maryland's Congressional delegation is working with the Maryland Port Administration and Department of Transportation staffs to make it happen.

Not only is the port facing environmental challenges for disposal sites, but also the challenge to plan affordable projects — doubly difficult in this tough era of budget cutting on Capitol Hill.

We expect the good fairy to wave its wand on the Port of Baltimore because both Port and political officials are well aware of the importance of the cargo to the economy of the entire state. Decisionmakers are equally aware of the value of the 350,000 containers of precious cargo that move to and from Dundalk Marine and Seagirt Terminals and South Locust Point.

This importance to the entire state cannot be underestimated. Today, the Port's economic impact generates 87,000 jobs, an estimated 45,000 held by Maryland residents. A total of 18,051 are direct jobs; 6,625 are induced jobs (support local purchases made by direct jobs); and there are a total of 62,500 jobs indirectly related to activities at the Port.

Revenue impact from the Port resulted in earnings of $1.3 billion for firms in the maritime sector.

We are also asking for Congressional action on other channel-related projects. These include:

- Modification to Tolchester Channel S-Turn: This difficult-to- navigate turn needs straightening immediately.
- Brewerton Extension Channel: Designs must be updated for the uncompleted portion of the deepening and widening of the Brewerton Channel-Eastern Extension ($750,000).
- C&D Canal: Funds are needed for the stabilization of the shoreline at Sandy Point ($1.5 million).
- Chesapeake and Delaware Canal Study: Continuing studies of navigational improvements to the C&D Canal, improving the Reedy Point Flare, and relocation of the Arnold Point Anchorage to Howell Point ($112,000).
- Operation and Maintenance Dredging: Congress is being asked to appropriate funds for our routine dredging activities, an essential part of the total picture. Baltimore Harbor ($14 million), C&D Canal ($17.5 million).

In Congress, we are working hard to emphasize the need to secure beneficial use project funding. Current facilities for the disposal of dredged materials are nearing capacity, and unless a solution is found, as early as 1996 or 1997 we may have to reduce maintenance dredging and delay new dredging work. And that is something I — and anyone who knows the vitality provided by the Port of Baltimore — do not want to see happen.

Helen D. Bentley is a maritime consultant and former Congresswoman.

Recycling may save bay isle

Sand dredged from Balto. shipping lanes could find model use

By Dail Willis
Eastern Shore Bureau of The Sun

An innovative plan to restore a vanishing island in mid-Chesapeake Bay to its turn-of-the-century shape would use material dredged from shipping channels leading to Baltimore's harbor.

Advocates include an array of state, federal and private organizations. They say the plan could become a national model of how to turn environmental lemons into lemonade by providing an ecologically positive use for the material created by channel maintenance.

"This will be an example for the rest of the country," said John Gill, a biologist for the U.S. Fish and Wildlife Service, one of the agencies involved in the project.

"Placement of dredged material is a problem nationally. . . . I think you'll see a lot of ports looking at this."

The project, now in the feasibility-study stage, would take clean material dredged from the Baltimore harbor's southern approaches and deposit it on what remains of Poplar Island, about 50 miles to the south. Poplar Island is northwest of Tilghman Island on the Eastern Shore, roughly opposite southern Anne Arundel County.

The dredged materials would restore the island to its shape, or "footprint," of a century ago. Until 1929, the island supported a thriving farming community. Now, time and tide have reduced it to a handful of land shards.

The restoration plan is notable for the high level of cooperation and enthusiasm it has generated among a multitude of agencies, many with a history of being at odds with each other.

Among those agencies are the Maryland Port Administration, Army Corps of Engineers, U.S. Fish and Wildlife Service, National Fisheries Association, Chesapeake Bay Foundation, Maryland Waterman's Association and the Environmental Protection Agency.

See ISLAND, 3B

ISLAND: Sand dredged fro

From Page 1B

"It's a give-and-take; we're going to work with everybody," said Tricia Slawinski, the Maryland Port Administration's environmental and governmental affairs coordinator. "That's the uniqueness of this project."

'Lively, thrashing situation'

Numbers — costs, cubic yards of dredged material, the size of the finished Poplar Island — are still fluid, as engineers, biologists and shipping interests negotiate the details.

"It's still in a lively, thrashing situation," said Nick Carter, a fisheries biologist with the Maryland Department of Natural Resources. "But I imagine we will reach some kind of compromise."

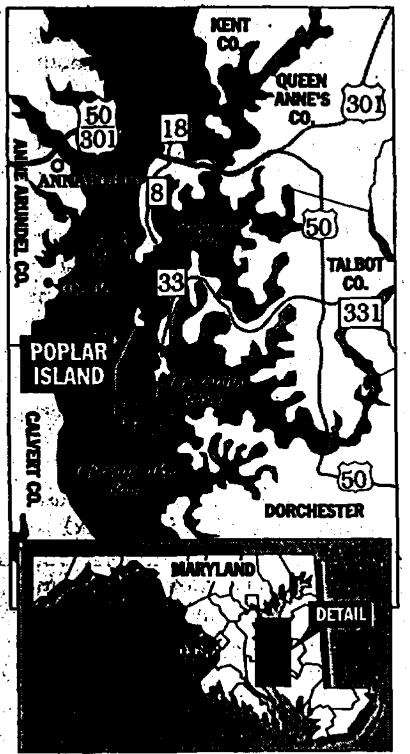
To date, a rough outline has been agreed upon, and the process would work this way:

The approaches to Baltimore's harbor are dredged each year to a maximum depth of 50 feet, part of the maintenance necessary to keep ships moving through the port — about 3,000 of them a year.

Dredged material would be taken by barge south on the Chesapeake Bay and deposited in the area of Poplar Island, eventually building up and linking the island remnants into a single land mass of 820 to 1,370 acres.

The re-created island would become a mix of uplands, which are relatively high and dry, and wetlands, the marshy tidal areas that support so much of the bay's fragile ecologies, particularly bird life. How much of each is still being worked out, Mr. Carter said.

Environmental interests want lots of wetlands, which are better for birds, turtles and other bay life. Engineers and shippers would like to have lots of uplands because that would put more dredged material into the site.



SUN STAFF GRAPHIC

Cost, duration unknown

Uncertainties include how much material would be dredged and how high and wide it would be stacked at Poplar Island.

Those decisions will determine the project's cost and duration, said Stacey E. Brown, who is the Poplar Island project manager in the Army Corps of Engineers.

Preliminary price estimates for the project, which could take nine to 20 years, range from $39 million to

MAY 22, 1995 BALTIMORE SUN

›m Baltimore shipping lanes may restore bay isle

PHOTO COURTESY OF THE U.S. FISH AND WILDLIFE SERVICE

These bumps of land originally were part of Poplar Island, about 50 miles south of Baltimore.

$100 million. The costs are expected to be shared, with the federal government assuming 75 percent and state government paying the remaining quarter, Ms. Brown said.

She said the dredged material would not come from the Patapsco River. Material from there is classified as contaminated.

"It's mainly clean sand — we don't anticipate any metals or contaminants," and it would be tested regularly, she said of the Poplar Island material.

"It's stuff running off farmland and residential material," added Mr. Gill, the fish and wildlife biologist. "It's upland runoff, coming down the Susquehanna River."

He and others pointed to something they consider a key aspect of the plan: By finding an environmentally positive use for uncontaminated dredge material, less of it will eat up areas designed to take dirty material, such as Hart-Miller Island off eastern Baltimore County.

Hart-Miller is filling up — Army corps estimates are that it will be filled to capacity by 1998.

Although the Poplar Island plan would solve a thorny problem at the port — where to deposit the dredged material — the idea originally came from environmental advocates.

"This wasn't originally proposed by the port," said Mr. Gill. "We went to the port and proposed Poplar Island as an alternative to 'overboard disposal.'"

Overboard disposal, the traditional way to get rid of dredged materials, just piles it up elsewhere in the bay, he said. It uses the bay as a dumping ground — a practice abhorred by many — and eventually the material moves back to the original site anyway.

Poplar Island, which will have dikes to contain the deposited material, solves that problem, he said.

"This particular project is win-win," said Frank Hamons, the Maryland Port Administration's harbor development manager.

"It enables us to perform a service for the channels that we have to do — keep them clear — and it's beneficial to the ecosystem."

Critics are few and remarkably faint.

"We have a few watermen who are a little bit concerned, but we're trying to accommodate them," said Mr. Hamons.

"It's hard to explain to a waterman that works that area [Poplar Island]," agreed Larry Simns, president of the Maryland Waterman's Association.

"If you look at the individual, it's going to hurt them in the short term. It's not easy for the people who are directly affected."

Mr. Simns, whose group supports the project, said the Poplar Island project will directly affect about 50 watermen who clam and crab in the area.

"People who work that area are making a sacrifice," he said. But long term, he said, the Poplar Island project can serve everyone, particularly those who earn a living from the bay waters.

"The watermen really have a broader view, a longer view, than anyone else," he said. "It's a sacrifice on the waterman's part in the short haul, but if you look at the long term, it will help the bay."

SEPT 30, 1995
WASHINGTON POST

Poplar Island To Undergo Restoration

State, Federal Groups Plan Wildlife Habitat

Associated Press

COACHES ISLAND, Md.—Only tiny remnants are left of a Chesapeake Bay island that was a presidential playground as recently as the 1940s.

But state and federal agencies are working on a plan to use sand and silt dredged from bay shipping channels to rebuild Poplar Island, now just four acres, into a 1,100-acre haven for wildlife.

Over the next 20 years, the Maryland Port Administration expects to pump 30 million to 40 million cubic yards of sand and silt dredged from bay shipping channels onto the island. Sand berms reinforced with stone will be built on the west side of the island to keep the dredge materials from eroding.

The island, a few miles west of Sherwood, will be restored roughly to its size in the mid-1800s, said Mike Hart, project manager for the port administration.

In the 1600s, the island measured about 1,500 acres. It was briefly occupied by the British during the War of 1812 and was for a short time, according to legend, the residence of Charles Carroll, a signer of the Declaration of Independence.

In the 1800s and early 1900s, there was a thriving settlement with farms, a school and a store. But by that time, storms had divided the island into three islands—Poplar, Jefferson's and Coaches.

In the 1900s, a Democratic club was built on Jefferson's Island, and Presidents Franklin D. Roosevelt and Harry S Truman both made trips to the islands for hunting, fishing and recreation.

Without the restoration project, an island with a rich history would soon disappear, said Lee Crockett of the National Oceanic and Atmospheric Administration.

Under the plan to rebuild the island, half of the 1,100 acres will be wetlands and half will be elevated 10 to 30 feet or more and will be planted with trees, such as pines, that typically grow on islands in the Chesapeake Bay.

The forests will provide safe nesting areas for such birds as herons, eagles and snowy egrets, said John Gill of the U.S. Fish and Wildlife Administration.

With many bay islands steadily eroding away, habitat is slowly disappearing, forcing birds to the mainland, where they are under pressure from people and natural predators, he said.

The port administration's practice of dumping dredged spoils into bay waters has been criticized by environmentalists, who say the silt and sand smother oyster and clam beds and damage underwater vegetation.

The proposal to use Poplar Island, by contrast, has backing from such groups as the Chesapeake Bay Foundation, the Alliance for the Chesapeake Bay, the Maryland Waterman's Association, the Maryland Saltwater Sporting Association and the Maryland Charter Boat Association as well as state and federal agencies.

"It's an unprecedented coalition that has found an innovative solution to a nagging problem in the bay," said Rod Coggin, spokesman for the bay foundation.

"It may not be the best solution, but it's a pretty good one to restore some habitat and restore some wetlands," he said.

Funding for the $50 million project is not settled. Originally, the federal government was to pay 75 percent of the cost, but it is now unlikely that funds will be available from the Republican-controlled Congress.

The port administration is now seeking state funding for the project, Hart said.

ANGUS PHILLIPS

Dredging Up the Facts on Poplar Island

Myths have a way of spreading when people want something really badly. Thus has the myth developed that if the Port of Baltimore gets its way and turns 37 million cubic yards of dredge spoil into a rock-lined, 1,100-acre island in the middle of Chesapeake Bay, the result will somehow be a handsome recreation of lost bay glory.

That's what federal and state authorities are hinting as they rush to sell the proposed Poplar Island "habitat restoration project," which in fact is a dredge-spoil dump in a wild and already beautiful place.

News stories this spring when the project first popped up suggested the objective of the $50 million to $100 million project is to "restore a vanishing island in the middle of Chesapeake Bay to its turn-of-the-century shape."

In fact, the objective is to find a handy place to dump barge-loads of silt, sand and muck that are sucked continually from the harbor approaches to Baltimore to keep the channels deep enough for big commercial ships.

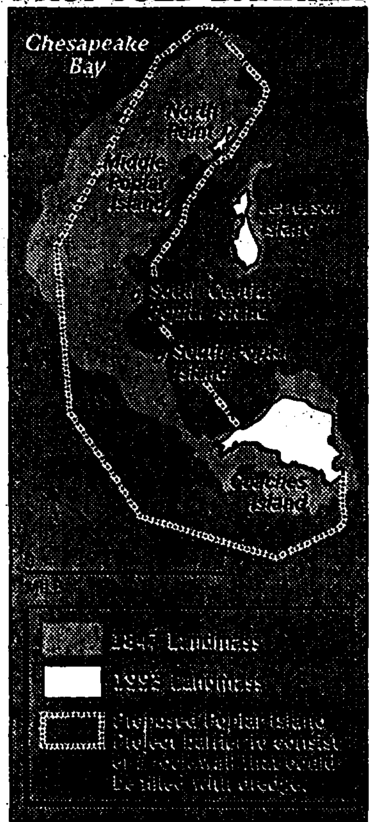
The 2½-mile-long island that the Port of Baltimore, Corps of Engineers, U.S. Fish & Wildlife Service, state Department of Natural Resources and a host of other government agencies want to see built would, said Nick Carter, a DNR biologist familiar with the project, "look vaguely like a large crescent," but not at all like the original island, which bore the stamp of nature in all its timeless irregularity.

"If I set myself up as an arbiter of beauty," said Carter, "I wouldn't build it this way. But wildlife doesn't care," he added, "and I think it will solve some serious problems."

BY ANGUS PHILLIPS—THE WASHINGTON POST

John Gill, with Leslie Gehrlich, says of Poplar Island project: "If done right, this could protect existing bird habitat [and] help water quality. . . ."

PROPOSED BARRIER



willing to float start-up costs with state money, said Hart, if it can wring the funds from the legislature.

The Corps has completed a required environmental impact statement, due for release in November. And opinion leaders and news types are being led out to the site for tours in an effort to build public approval.

I was on such a foray last week, led by John Gill of the U.S. Fish & Wildlife Service, a Chesapeake specialist who is a key promoter of the project.

Standing on the squishy ground of a sweet-smelling Coaches Island marsh, Gill described his vision of a day to come when the great, rock-faced crescent island would be done. Angling off its stony front, facing the northerly storms that have wracked Poplar for centuries, he described underwater structures to attract rockfish and perch; on the back, man-made channels directing tidal flow to a broad marsh planted in lowland grasses and full of birds and muskrats and peeler crabs.

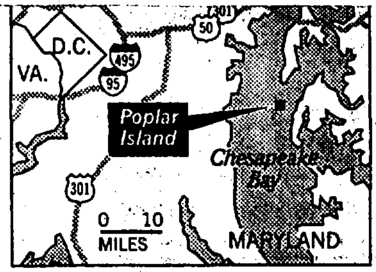
Carter's is a welcome dispassionate voice in the one-sided nondebate over the Poplar Island Project, which everyone seems to favor wholeheartedly. By all official accounts Poplar is a "win-win" situation in which the port, the ducks, fish and birds all profit, as do owners of adjacent islands that for decades have been eroded by pummelings from westerly storms.

The Poplar Project's aim is to build a huge, crescent-shaped, stone-faced barrier just west of weather-beaten Coaches and Jefferson islands. It would reflect the ancient outlines of Poplar Island, the original, natural barrier, which in colonial times measured more than 1,000 acres but has washed away to just a few muddy remnants.

According to the plan, the front half of the new island behind a 10-foot monolithic rock face would be high ground supporting trees while the back half would be low marsh for ducks and shorebirds and little fishes. Behind that, sea grasses would grow in a broad, protected bay as they did before the original Poplar washed away.

The barrier island also would protect private Jefferson Island, an 18-acre marshy tract owned by a group of Washington-area professionals whose clubhouse is continually imperiled by wind and tide, and larger Coaches, owned by a Philadelphia waterfowl hunter. Also, it would protect Tilghman Island, a substantial waterman's community three miles to the east.

But mostly, once the rock



BY DAVE COOK—THE WASHINGTON POST

perimeter is in place, it would provide a hole into which dredge spoil could be pumped for the next 20 years, if not longer. Poplar would get relatively clean spoil from the 50-foot-deep ship approaches outside Baltimore Harbor. Contaminated harbor spoil would continue to go to fully contained Hart-Miller Islands north of Baltimore.

The Port of Baltimore has faced a dilemma over where to put its clean dredge spoil since the Maryland legislature a few years ago banned a plan to free-dump it in the deep trench that runs down the middle of the Chesapeake. Hart-Miller Islands are two or three years from being full and other dumping areas are likewise topping up.

So Poplar looked terrific, according to port spokesman Mike Hart, particularly when the remnants of the barrier island were deeded over to the project for free by the Jefferson Island owners, and the Army Corps of Engineers expressed hope that $15 million in federal construction funds could be used for the rock perimeter.

Congressional cutbacks since have knocked down the Corps funding for the novel dredge-spoil project to about $2½ million, Carter said. The port itself is now

Beyond that he saw an 800-acre grass-choked bay providing refuge and food for aquatic critters, and on the protected high ground of Coaches and Jefferson islands egrets, herons and eagles continued to nest in tall trees that might otherwise have fallen to the ravages of erosion.

"If done right," said Gill, "this could protect existing bird habitat, help water quality by confining dredge spoil rather than just dumping it, and restore aquatic habitat that's being lost to erosion."

It's a big if, of course, and a long wait-and-see. If the Poplar Project survives its current budgetary troubles, 18 months of perimeter construction could start next spring. Already, dredges and barges are strung in the shallows, building test structures and pumping sand for fill.

For at least 20 years the place will be filling up, and it'll be years after that before vegetation is complete.

Construction is never pretty, and anyone who has seen finished, man-made dredge islands knows they are utilitarian at best in appearance. At 1,100 acres, Poplar would be the dredge spoil island to end all dredge-spoil islands. The Poplar Project may indeed be the best possible solution to a thorny problem, as its government proponents say. But every benefit has a price.

Restored jewel in the Chesapeake's crown? Not too likely. How about innovative, moderately inoffensive dredge-spoil dump. And don't look too close.

LIGHT · FOR · ALL
THE BALTIMORE SUN
BALTIMORE, MARYLAND 21278-0001

Feb 13 19 95

WE HEREBY CERTIFY, *that the annexed advertisement of*

US Army Corps of Engineers

was published in "THE BALTIMORE SUN" *a daily newspaper printed and published in the City of Baltimore* Feb 11, 1995

The Baltimore Sun Company,

4070

By P. Reilly

NOTICE OF PUBLIC MEETING
POPLAR ISLAND RESTORATION

The Baltimore District of the U.S. Army Corps of Engineers (COE) issued a Notice of Intent in the Federal Register, [illegible] February [illegible], 1995, to prepare an Environmental Impact Statement (EIS) to assess the environmental effects of using dredged material to enlarge Poplar Island. The project would restore Poplar Island to its approximate size in 1847, thereby adding approximately 1,000 acres of wildlife habitat in the Upper Chesapeake Bay. The COE invites interested agencies, organizations, and individuals to a public scoping meeting to submit comments or suggestions on the environmental issues or recommended scope of this EIS. The public scoping meetings are to be held as follows:

February 21, 1995 (7:00 pm)
Tilghman Elementary School
Tilghman, Maryland

February 23, 1995 (7:00 pm)
Beach Elementary School
Chesapeake Beach, Maryland

[illegible] will be [illegible] format and [illegible] provide [illegible] opportunities for [illegible] Eastern and Western Shore [illegible] to take part in the public involvement program.

Comments [illegible] at the meeting or [illegible] following address:

U.S. Army Corps of Engineers
Poplar Island Restoration Study
Attn: CENAB-PL-PC
P.O. Box 1715
Baltimore, Maryland 21203-1715

NOTICE

OF PUBLIC SCOPING MEETING
POPLAR ISLAND RESTORATION

The Baltimore District of U.S. Army Corps of Engineers (COE) issued a Notice of Intent in the Federal Register, February 6, 1995, to prepare an Environmental Impact Statement (EIS) to assess the environmental effects of using dredged material to enlarge Poplar Island. The project would restore Poplar Island to its approximate size in 1847, thereby adding approximately 1,000 acres of wildlife habitat in the Upper Chesapeake Bay. The COE invites interested agencies, organizations, and individuals to a public scoping meeting to submit comments or suggestions on the environment issues or recommended scope of this EIS. The public scoping meetings are to be held as follows:

February 21, 1995 (7:00 pm) Tilghman Elementary School
Tilghman, Maryland

February 23, 1995 (7:00 pm) Beach Elementary School
Chesapeake Beach, Maryland

The two meetings will be identical in format and are being held to provide equal opportunities for residents on both the Eastern and Western Shores of the Chesapeake Bay to take part in the public involvement program.

Comments may be presented at the meeting or sent to the following address:

U.S. Army Corps of Engineers
Poplar Island Restoration Study
Attn: CENAB-PL-PC
P.O. Box 1715
Baltimore, Maryland 21203-1715

2/18

No. E. C. ______________

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Annapolis, Md., February 18, 1995

We hereby certify, that the annexed Notice

Poplar Island Restoration

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a newspaper published in the City of Annapolis, Anne Arundel County, Maryland, once a week for Two successive weeks before the ______ day of ______, 19____

The insertions being made the 15TH, 18TH February, 1995

THE CAPITAL-GAZETTE NEWSPAPERS, INC.

By T. Blattenberger

ANNEX D

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Annex D

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ANNEX E

REFERENCES

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APPENDIX A

REAL ESTATE PLAN

APPENDIX A
REAL ESTATE PLAN (REP)

1. The study area for the Poplar Island Restoration Project, Maryland, Section 204 feasibility study encompasses the immediate area around an island chain, the remnants of Poplar Island, located 1 mile northwest of Tilghman Island in Talbot County, Maryland, and 50 miles south of Baltimore, Maryland. The Section 204 Initial Appraisal Report, dated 31 August 1994, documented the results of preliminary evaluations for habitat restoration at the island.

2. Various project alternatives have been studied pertaining to restoration of the island, but all have basically the same real estate requirements. The real estate requirements are as follows:

Fee ownership interests are required for land above the ordinary high water mark within the "footprint" of the project. The navigation channels to be dredged for placement material to create the island are below the ordinary high water mark, are under navigational servitude, and will require no acquisition. The habitat restoration site will come in contact with five small remnant islands; North Point Island, Middle Poplar Island, South Central Poplar Island, South Poplar Island, and Coaches Island. The first four islands are all 500 feet or less in width and have previously been acquired in fee by the State of Maryland. They are in danger of completely eroding away in the next few years. Therefore, they are not considered to have any real estate value for crediting purposes. The larger, privately-owned Coaches Island, approximately 162 acres in size as stated in the 1982 deed of the current owner, is adjacent to, and will have its entire southern shore and a portion of the northwestern shore protected by the project. The current size of Coaches Island is estimated to be approximately 74 acres. The project is being designed such that the fill will abut and may overlap the ordinary high water mark along a portion of the Coaches Island shore. Under Maryland state law, the owner of Coaches Island could conceivably become the owner of the entire restored island by rights of accretion. To prevent this, the Non-Federal Sponsor will acquire a total of approximately 2.83 acres. A 5 foot wide perimeter of Coaches Island, containing approximately 0.6 of an acre, adjacent to the project to establish ownership of the entire project, and a small peninsula at the southwest corner of the island will be acquired, containing approximately 2.23 acres, to shorten the dike construction around that portion of the project. The Non-Federal Sponsor intends to operate and maintain the project lands in perpetuity under an agreement and with the support of the Maryland Environmental Trust, a non-profit organization established for the preservation and proper management of environmentally sensitive properties in Maryland. There is currently no federally-owned land at the project site.

3. No P.L. 91-646 relocations will be necessary for this project.

4. The Maryland Port Administration, the Non-Federal Sponsor, has the necessary experience, manpower and resources to acquire any real estate required for the project. They also have condemnation authority.

5. A real estate cost estimate is enclosed as Exhibit "A". The gross appraisal indicates $65,000 for 0.6 of an acre of fast land in the 5 foot perimeter, and $1,100 for 2.23 acres of marsh land in the peninsula, for a total estimated fair market value of $66,100. Including a 15% contingency, the total real estate costs are estimated to be $74,059. The gross appraisal also determined the remainder of the island will not be affected by the severing of the 5 foot perimeter and peninsula. Therefore, no severance damages were provided in the gross appraisal.

6. A real estate map of the project is enclosed as Exhibit "B".

7. There is no present or anticipated mineral activity in the vicinity of this project.

8. A description of the estate required for this project for wetland creation and fish and wildlife enhancement is as follows:

Estate No. 1, Fee simple title to the land described in schedule A, subject, however, to existing easements for public roads and highways, public utilities, railroads and pipelines. A reservation for a riparian access easement across the 5 foot perimeter will be provided to the owner.

9. The Non-Federal Sponsor is aware that due to the time required to acquire the real estate, a Right-of-Entry (ROE) for construction will first have to be acquired to meet a mid-1996 construction initiation date. The owner of Coaches Island is supportive of the project, and we do not foresee any problems in acquiring either an ROE or the required real estate in fee. The schedule for real estate acquisition is as follows:

	COE Initiate	COE Complete	LS Initiate	LS Complete
Receipt of final drawings from Engineering/PM.	12/15/95	02/27/96		
PCA Execution.	02/27/96	04/06/96		04/06/96
Formal transmittal of final ROW drawings to LS and instruct to acquire LERRD.	04/06/96	04/08/96		

Conduct landowner meetings.			05/01/96	07/29/96
Prepare mapping and legal description.			05/10/96	05/31/96
Obtain title evidence.			04/08/96	04/19/96
Review title evidence.	04/22/96	04/26/96		
Obtain tract appraisal.			06/01/96	06/15/96
Review tract appraisal.	06/15/96	06/30/96		
Conduct negotiations.			07/01/96	07/29/96
Perform closing.			08/15/96	09/14/96

10. There are no utilities or other facilities to be relocated for this project.

11. Surveys conducted at both the proposed dredge site and the placement site have shown that there is little potential for HTRW or other environmental contaminants on lands within the project area.

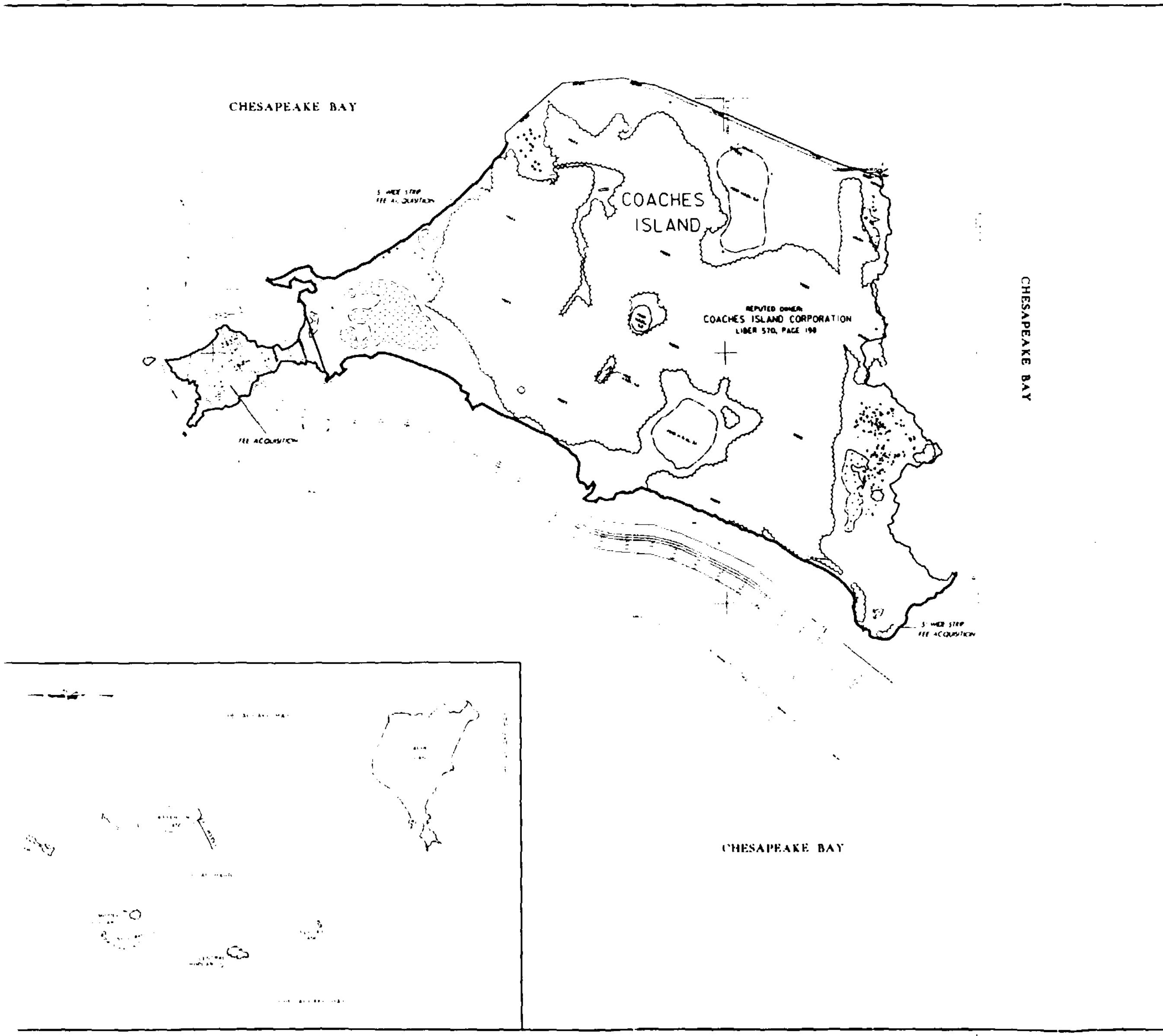
12. One private landowner is being positively affected and the project is supported by various state, local, Federal, and private interests. The owner of Coaches Island is agreeable to the project and the acquisition, since it will provide protection to his property from continued erosion. Therefore, the project is considered non-controversial.

REAL ESTATE DIVISION
COST ESTIMATE RATES
November 1995

		AMOUNT	CONTINGENCY	SUBTOTAL
01010401	Real Estate Acquisition Documents (Cadastral prep. of R. E. Requirements Mapping)			
0102----	ACQUISITIONS			
010201--	By Gov't			
010202--	By Local Sponsor (LS)			
01020201	Survey & Legals	$ 700	$ 105	$ 805
01020202	Title Evidence	$ 600	$ 90	$ 690
01020203	Negotiations	$ 1,000	$ 150	$ 1,150
010203--	By Gov't on behalf of LS			
010204--	Review of LS			
01020401	Survey & Legals	$ 75	$ 11	$ 86
01020402	Title Evidence	$ 75	$ 11	$ 86
01020403	Negotiations	$ 75	$ 11	$ 86
0103----	CONDEMNATIONS			
010301--	By Gov't			
010302--	By Local Sponsor (LS)			
010303--	By Gov't on behalf of LS			
010304--	Review of LS			
0105----	APPRAISALS			
010501--	By Gov't			
010502--	By Local Sponsor (LS)	$ 750	$ 113	$ 863
010503--	By Gov't on behalf of LS			
010504--	Review of LS	$ 180	$ 27	$ 207
0106----	PL 91-646 ASSISTANCE			
010601--	By Gov't			
010602--	By Local Sponsor (LS)			
010603--	By Gov't on behalf of LS			
010604--	Review of LS			
0107----	TEMPORARY PERMITS/LICENSES/RIGHTS-OF-WAY			
010701--	By Gov't			
010702--	By Local Sponsor (LS)			
010703--	By Gov't on behalf of LS			
010704--	Review of LS			
0115----	REAL ESTATE PAYMENTS			
011501--	Land Payments			
01150101	By Gov't			
01150102	By Local Sponsor (LS)	$66,100	$ 3,900	$70,000
01150103	By Gov't on behalf of LS			
01150104	Review of LS	$ 75	$ 11	$ 86
011502--	PL 91-646 Assistance Payments			
01150201	By Gov't			
01150202	By Local Sponsor (LS)			
01150203	By Gov't on behalf of LS			
01150204	Review of LS			
011503--	Damage Payments			
01150301	By Government			
01150302	By Local Sponsor (LS)			
01150303	By Government on behalf of LS			
01150304	Review of LS			
	TOTALS	$69,630	$ 4,429	$74,059

EXHIBIT A

OF ENGINEERS U. S. ARMY



REAL ESTATE PLANNING MAP

EXHIBIT B

REAL ESTATE

POPLAR ISLAND
ENVIRONMENTAL RESTORATION
TALBOT COUNTY, MARYLAND

R 1

APPENDIX B

ENVIRONMENTAL DATA

COMMON/LEAST TERN HABITAT EVALUATION PROCEDURE

USED HABITAT SUITABILITY INDEX (HSI) FOR REPRODUCTION WHICH FOCUSES UPON VEGETATIVE COVER.
FORAGING CONDITIONS ASSUMED TO BE NON-LIMITING TO TERNS.
ACCORDING TO MODEL NESTING IS RESTRICTED TO SPARSELY- AND NON-VEGETATED AREAS.
VEGETATED AREAS NOT INCLUDED SINCE THEY ARE OF NEGLIGIBLE VALUE AS NESTING HABITAT.

Alignment No./ Area/ % Wetlands/ Upland Elev.	No. of bare substrate islands (within placed material, one per wetland cell)	Bare substrate islands (acres) (2 acres /island)	Variable A: %veg cover	Suitability Index (SI) of A	Variable B: avg veg height "	SIB	HSI = SIA x SIB	Least Tern HUs (= HSI x total bare island acres)
No Action	0	0						0
1/820/50/10	3	6	0-20	1	0-10	1	1	6
1/820/70/10	3	6	0-20	1	0-10	1	1	6
1/820/100	3	6	0-20	1	0-10	1	1	6
3/1110/50/10	4	8	0-20	1	0-10	1	1	8
3/1110/70/10	4	8	0-20	1	0-10	1	1	8
3/1110/100	4	8	0-20	1	0-10	1	1	8
2/1340/50/10	5	10	0-20	1	0-10	1	1	10
2/1340/70/10	5	10	0-20	1	0-10	1	1	10
2/1340/100	5	10	0-20	1	0-10	1	1	10
1/820/50/20	3	6	0-20	1	0-10	1	1	6
1/820/70/20	3	6	0-20	1	0-10	1	1	6
3/1110/50/20	**4**	**8**	**0-20**	**1**	**0-10**	**1**	**1**	**8**
3/1110/70/20	4	8	0-20	1	0-10	1	1	8
2/1340/50/20	5	10	0-20	1	0-10	1	1	10
2/1340/70/20	5	10	0-20	1	0-10	1	1	10

LEAST TERN COST EFFECTIVENESS ANALYSIS

STACKED IN ORDER OF ASCENDING OUTPUTS

COST INEFFICIENT SOLUTIONS STRUCK THROUGH

Alignment No./ Area/ % Wetlands/ Upland Elev.	Least Tern HUs (= HSI x total bare island acres)	Initial Total Cost ($ million)	Alignment No./ Area/ % Wetlands/ Upland Elev.	Least Tern HUs (= HSI x total bare island acres)	Initial Total Cost ($ million)	Alignment No./ Area/ % Wetlands/ Upland Elev.	Least Tern HUs (= HSI x total bare island acres)	Initial Total Cost ($ million)
No Action	0		No Action	0		No Action	0	
1/820/50/10	6	78.0	1/820/100	6	59.1	1/820/100	6	59.1
1/820/70/10	6	74.9	1/820/70/10	6	74.9	~~1/820/70/10~~	~~6~~	~~74.9~~
1/820/100	6	59.1	1/820/50/10	6	78.0	~~1/820/50/10~~	~~6~~	~~78.0~~
3/1110/50/10	8	104.7	1/820/70/20	6	81.6	~~1/820/70/20~~	~~6~~	~~81.6~~
3/1110/70/10	8	100.0	1/820/50/20	6	88.6	~~1/820/50/20~~	~~6~~	~~88.6~~
3/1110/100	8	76.3	3/1110/100	8	76.3	3/1110/100	8	76.3
2/1340/50/10	10	124.7	3/1110/70/10	8	100.0	~~3/1110/70/10~~	~~8~~	~~100.0~~
2/1340/70/10	10	116.9	3/1110/50/10	8	104.7	~~3/1110/50/10~~	~~8~~	~~104.7~~
2/1340/100	10	89.4	3/1110/70/20	8	110.8	~~3/1110/70/20~~	~~8~~	~~110.8~~
1/820/50/20	6	88.6	**3/1110/50/20**	**8**	**122.1**	**~~3/1110/50/20~~**	**~~8~~**	**~~122.1~~**
1/820/70/20	6	81.6	2/1340/100	10	89.4	2/1340/100	10	89.4
3/1110/50/20	**8**	**122.1**	2/1340/70/10	10	116.9	~~2/1340/70/10~~	~~10~~	~~116.9~~
3/1110/70/20	8	110.8	2/1340/50/10	10	124.7	~~2/1340/50/10~~	~~10~~	~~124.7~~
2/1340/50/20	10	147.3	2/1340/70/20	10	131.0	~~2/1340/70/20~~	~~10~~	~~131.0~~
2/1340/70/20	10	131.0	2/1340/50/20	10	147.3	~~2/1340/50/20~~	~~10~~	~~147.3~~

GREAT EGRET HABITAT EVALUATION PROCEDURE

USED HSI FOR REPRODUCTION
ACCORDING TO MODEL NESTING IS RESTRICTED TO VEGETATED AREAS
BARE AND SPARSELY VEGETATED ISLANDS AS WELL AS MARSH ARE OF NEGLIGIBLE VALUE AS NESTING HABITAT
FORAGING CONDITIONS ASSUMED TO BE NON-LIMITING
ALL CREATED AND REMNANT ISLAND HABITATS ARE INCLUDED SINCE IT IS ASSUMED THAT WITHOUT A PROJECT ALL WILL BE LOST TO EROSION

Alignment No./ Area/ % Wetlands/ Upland Elev.	Variable A: cover as % of island w/ >=1 m height woody veg	Suita-bility Index (SI) of A	Placed material added to isolated vegetated small (<5) islands (acres)	Natural island upland acreage < 25 acres in size (Poplar & Jefferson)	Total acreage of islands < 25 acres in size (full acreage value)	Total acreage of natural islands 25 to 50 acres in size	Total upland acreage of natural islands 50 to 250 acres in size (Coaches)	Prorated acreage value of Coaches Island (acres x 0.3)	Uplands of contiguous placed material (acres) (> than 250 acre size)	Prorated value of contig-uous placed material (acres x 0.1)	Total veg islands acres (incl prorated)	Habitat Units (= SI x Total acres)
No Action				0	0	0	0				0	0
1/820/50/10	100	1	6	9	15	0	52	15.6	410	41	71.6	72
1/820/70/10	100	1	6	9	15	0	52	15.6	246	24.6	55.2	55
1/820/100	100	1	6	9	15	0	52	15.6	0	0	30.6	31
3/1110/50/10	100	1	8	9	17	0	52	15.6	555	55.5	88.1	88
3/1110/70/10	100	1	8	9	17	0	52	15.6	333	33.3	65.9	66
3/1110/100	100	1	8	9	17	0	52	15.6	0	0	32.6	33
2/1340/50/10	100	1	10	9	19	0	52	15.6	670	67	101.6	102
2/1340/70/10	100	1	10	9	19	0	52	15.6	402	40.2	74.8	75
2/1340/100	100	1	10	9	19	0	52	15.6	0	0	34.6	35
1/820/50/20	100	1	6	9	15	0	52	15.6	410	41	71.6	72
1/820/70/20	100	1	6	9	15	0	52	15.6	246	24.6	55.2	55
3/1110/50/20	**100**	**1**	**8**	**9**	**17**	**0**	**52**	**15.6**	**555**	**55.5**	**88.1**	**88**
3/1110/70/20	100	1	8	9	17	0	52	15.6	333	33.3	65.9	66
2/1340/50/20	100	1	10	9	19	0	52	15.6	670	67	101.6	102
2/1340/70/20	100	1	10	9	19	0	52	15.6	402	40.2	74.8	75

	Jefferson Island (acres)	Coaches Island (acres)	Poplar Island remnants (acres)
Total area	17	74	5
Tidal marsh	9	22	4

GREAT EGRET COST EFFECTIVENESS ANALYSIS

STACKED IN ORDER OF ASCENDING OUTPUTS THEN COSTS

COST INEFFICIENT SOLUTIONS STRUCK THROUGH

Alignment No./ Area/ % Wetlands/ Upland Elev.	Great Egret Habitat Units (= SI x Total acres)	Initial Total Cost ($ million)		Alignment No./ Area/ % Wetlands/ Upland Elev.	Great Egret Habitat Units (= SI x Total acres)	Initial Total Cost ($ million)		Alignment No./ Area/ % Wetlands/ Upland Elev.	Great Egret Habitat Units (= SI x Total acres)	Initial Total Cost ($ million)
No Action	0			No Action	0			No Action	0	
1/820/50/10	72	78.0		1/820/100	31	59.1		1/820/100	31	59.1
1/820/70/10	55	74.9		3/1110/100	33	76.3		3/1110/100	33	76.3
1/820/100	31	59.1		2/1340/100	35	89.4		2/1340/100	35	89.4
3/1110/50/10	88	104.7		1/820/70/10	55	74.9		1/820/70/10	55	74.9
3/1110/70/10	66	100.0		1/820/70/20	55	81.6		~~1/820/70/20~~	~~55~~	~~81.6~~
3/1110/100	33	76.3		3/1110/70/10	66	100.0		3/1110/70/10	66	100.0
2/1340/50/10	102	124.7		3/1110/70/20	66	110.8		~~3/1110/70/20~~	~~66~~	~~110.8~~
2/1340/70/10	75	116.9		1/820/50/10	72	78.0		1/820/50/10	72	78.0
2/1340/100	35	89.4		1/820/50/20	72	88.6		~~1/820/50/20~~	~~72~~	~~88.6~~
1/820/50/20	72	88.6		2/1340/70/10	75	116.9		2/1340/70/10	75	116.9
1/820/70/20	55	81.6		2/1340/70/20	75	131.0		~~2/1340/70/20~~	~~75~~	~~131.0~~
3/1110/50/20	**88**	**122.1**		3/1110/50/10	88	104.7		3/1110/50/10	88	104.7
3/1110/70/20	66	110.8		**3/1110/50/20**	**88**	**122.1**		**~~3/1110/50/20~~**	**~~88~~**	**~~122.1~~**
2/1340/50/20	102	147.3		2/1340/50/10	102	124.7		2/1340/50/10	102	124.7
2/1340/70/20	75	131.0		2/1340/50/20	102	147.3		~~2/1340/50/20~~	~~102~~	~~147.3~~

GREAT EGRET COST EFFECTIVENESS ANALYSIS

ECONOMICALLY EFFECTIVE SOLUTIONS

ECONOMICALLY INEFFECTIVE SOLUTIONS STRUCK THROUGH

Alignment No./ Area/ % Wetlands/ Upland Elev.	Great Egret Habitat Units (= SI x Total acres)	Initial Total Cost ($ million)
No Action	0	
1/820/100	31	59.1
3/1110/100	33	76.3
2/1340/100	35	89.4
1/820/70/10	55	74.9
3/1110/70/10	66	100.0
1/820/50/10	72	78.0
2/1340/70/10	75	116.9
3/1110/50/10	88	104.7
2/1340/50/10	102	124.7

Alignment No./ Area/ % Wetlands/ Upland Elev.	Great Egret Habitat Units (= SI x Total acres)	Initial Total Cost ($ million)
No Action	0	
1/820/100	31	59.1
~~3/1110/100~~	~~33~~	~~76.3~~
~~2/1340/100~~	~~35~~	~~89.4~~
1/820/70/10	55	74.9
~~3/1110/70/10~~	~~66~~	~~100.0~~
1/820/50/10	72	78.0
~~2/1340/70/10~~	~~75~~	~~116.9~~
3/1110/50/10	88	104.7
2/1340/50/10	102	124.7

Alignment No./ Area/ % Wetlands/ Upland Elev.	Great Egret Habitat Units (= SI x Total acres)	Initial Total Cost ($ million)
No Action	0	
1/820/100	31	59.1
1/820/70/10	55	74.9
1/820/50/10	72	78.0
3/1110/50/10	88	104.7
2/1340/50/10	102	124.7

COASTAL WETLANDS HEP
VALUE ASSESSMENT BRACKISH MARSH COMMUNITY MODEL

Alignment No./ Area % Wetlands Upland Elev.	Tidal Wetlands (acres)	Total open water (acres) (within tidal marsh)	Tidal ponds (no.) (within placed material of low marsh: 1/cell))	Tidal ponds (acres) (within placed material of low marsh)	Acres of Tidal Ponds >= 1.5 ft deep @ low tide (10% of total pond area)	Acres of total open water within tidal marsh <=1.5 ft deep at low tide	V1: %of wetland area covered by emergent vegetation	SI1: 0.009 x V1+ 0.1	V2 % of open water area w/ SAV (assume 10%)	SI2 (= 0.007 x V2) + 0.3	SI3: marsh edge and interspersion (pictorial interpretation)	V4: %open water <= 1.5 ft deep	SI4: if % >= 80, then SI = (-0.02 x V4) + 2.6	SI5: avg annual salinity	V6: aquatic organism access (narrative)	HSI*	HUs
Created marsh																	
No Action																	
1/820/50/10	410	21.3	3.0	6.0	0.6	20.7	94.80804	0.953272	10	0.37	0.4	97.18138	0.656372	1	0.85	0.75199	308
1/820/70/10	574	22.8	3.0	6.0	0.6	22.2	96.02149	0.964193	10	0.37	0.4	97.37264	0.652547	1	0.85	0.75582	434
1/820/100	820	24.4	3.0	6.0	0.6	23.8	97.02607	0.973235	10	0.37	0.4	97.5396	0.649208	1	0.85	0.758953	622
3/1110/50/10	555	28.4	4.0	8.0	0.8	27.6	94.88599	0.953974	10	0.37	0.4	97.18139	0.656372	1	0.85	0.752255	418
3/1110/70/10	777	30.4	4.0	8.0	0.8	29.6	96.08123	0.964731	10	0.37	0.4	97.37264	0.652547	1	0.85	0.756022	587
3/1110/100	1110	32.5	4.0	8.0	0.8	31.7	97.07072	0.973637	10	0.37	0.4	97.53959	0.649208	1	0.85	0.759113	843
2/1340/50/10	670	35.5	5.0	10.0	1.0	34.5	94.70471	0.952342	10	0.37	0.4	97.18139	0.656372	1	0.85	0.751639	504
2/1340/70/10	938	38.1	5.0	10.0	1.0	37.1	95.94232	0.963481	10	0.37	0.4	97.37264	0.652547	1	0.85	0.755552	709
2/1340/100	1340	40.6	5.0	10.0	1.0	39.6	96.96689	0.972702	10	0.37	0.4	97.53959	0.649208	1	0.85	0.758764	1017
1/820/50/20	410	21.3	3.0	6.0	0.6	20.7	94.80804	0.953272	10	0.37	0.4	97.18138	0.656372	1	0.85	0.75199	308
1/820/70/20	574	22.8	3.0	6.0	0.6	22.2	96.02149	0.964193	10	0.37	0.4	97.37264	0.652547	1	0.85	0.75582	434
3/1110/50/20	**555**	**28.4**	**4.0**	**8.0**	**0.8**	**27.6**	**94.88599**	**0.953974**	**10**	**0.37**	**0.4**	**97.18139**	**0.656372**	**1**	**0.85**	**0.752255**	**418**
3/1110/70/20	777	30.4	4.0	8.0	0.8	29.6	96.08123	0.964731	10	0.37	0.4	97.37264	0.652547	1	0.85	0.756022	587
2/1340/50/20	670	35.5	5.0	10.0	1.0	34.5	94.70471	0.952342	10	0.37	0.4	97.18139	0.656372	1	0.85	0.751639	504
2/1340/70/20	938	38.1	5.0	10.0	1.0	37.1	95.94232	0.963481	10	0.37	0.4	97.37264	0.652547	1	0.85	0.755552	709
Existing tidal marsh on Coaches, Jefferson, and Poplar Island Remnants																	
	35	0.5	3	0.5	0.05	0.45	98.57143	0.987143	10	0.37	0.4	90	0.8	1	0.85	0.775324	27

*HSI =[[3.5 X (SI1 cubed x SI2 X SI6) exp1/5] + [(SI3 + SI4 + SI5)/3]]/4.5

COST EFFECTIVENESS ANALYSIS
COASTAL WETLANDS HABITAT UNITS

Alignment No./ Area/ % Wetlands/ Upland Elev.	Total HUs (Created plus Existing)	Initial Total Cost ($ million)
No Action	0	0
1/820/50/10	335	78.0
1/820/70/10	461	74.9
1/820/100	649	59.1
3/1110/50/10	445	104.7
3/1110/70/10	614	100.0
3/1110/100	870	76.3
2/1340/50/10	531	124.7
2/1340/70/10	736	116.9
2/1340/100	1044	89.4
1/820/50/20	335	88.6
1/820/70/20	461	81.6
3/1110/50/20	**445**	**122.1**
3/1110/70/20	614	110.8
2/1340/50/20	531	147.3
2/1340/70/20	736	131.0

STACKED IN ORDER OF ASCENDING OUTPUTS

Alignment No./ Area/ % Wetlands/ Upland Elev.	Total HUs (Created plus Existing)	Initial Total Cost ($ million)
No Action	0	0
1/820/50/10	335	78.0
1/820/50/20	335	88.6
3/1110/50/10	445	104.7
3/1110/50/20	**445**	**122.1**
1/820/70/10	461	74.9
1/820/70/20	461	81.6
2/1340/50/10	531	124.7
2/1340/50/20	531	147.3
3/1110/70/10	614	100.0
3/1110/70/20	614	110.8
1/820/100	649	59.1
2/1340/70/10	736	116.9
2/1340/70/20	736	131.0
3/1110/100	870	76.3
2/1340/100	1044	89.4

COST INEFFICIENT SOLUTIONS STRUCK THROUGH

Alignment No./ Area/ % Wetlands/ Upland Elev.	Total HUs (Created plus Existing)	Initial Total Cost ($ million)
No Action	0	0
1/820/50/10	335	78.0
~~1/820/50/20~~	~~335~~	~~88.6~~
3/1110/50/10	445	104.7
~~3/1110/50/20~~	~~445~~	~~122.1~~
1/820/70/10	461	74.9
~~1/820/70/20~~	~~461~~	~~81.6~~
2/1340/50/10	531	124.7
~~2/1340/50/20~~	~~531~~	~~147.3~~
3/1110/70/10	614	100.0
~~3/1110/70/20~~	~~614~~	~~110.8~~
1/820/100	649	59.1
2/1340/70/10	736	116.9
~~2/1340/70/20~~	~~736~~	~~131.0~~
3/1110/100	870	76.3
2/1340/100	1044	89.4

COST INEFFICIENT SOLUTIONS RE
COST INEFFECTIVE SOLUTIONS S

Alignment No./ Area/ % Wetlands/ Upland Elev.	Total HUs (Created plus Existing)	Initial Total Cost ($ million)
No Action	0	0
~~1/820/50/10~~	~~335~~	~~78.0~~
~~3/1110/50/10~~	~~445~~	~~104.7~~
~~1/820/70/10~~	~~461~~	~~74.9~~
~~2/1340/50/10~~	~~531~~	~~124.7~~
~~3/1110/70/10~~	~~614~~	~~100.0~~
1/820/100	649	59.1
~~2/1340/70/10~~	~~736~~	~~116.9~~
3/1110/100	870	76.3
2/1340/100	1044	89.4

PRIMARY PRODUCTIVITY ANALYSIS

Alignment No.	Site Area (acres)	Percent Tidal Wetlands	Tidal Wetlands (acres)	Upland Elevation (ft)	Wetlands Primary Productivity Output (+) (grams dry org matter / m2/ yr)	Uplands Primary Productivity Output (+) (grams dry org matter / m2/ yr)	Lost Estuarine Primary Productivity (-) (grams dry org matter / m2/ yr)	Total Gain in Primary Productivity Output (grams dry org matter / m2/ yr)	Initial Total Cost ($ million)
Created Island Habitats									0
1	820	50	410	10	1025000	492000	1476000	41000	78.0
1	820	70	574	10	1435000	295200	1476000	254200	74.9
1	820	100	820		2050000	0	1476000	574000	59.1
3	1110	50	555	10	1387500	666000	1998000	55500	104.7
3	1110	70	777	10	1942500	399600	1998000	344100	100.0
3	1110	100	1110		2775000	0	1998000	777000	76.3
2	1340	50	670	10	1675000	804000	2412000	67000	124.7
2	1340	70	938	10	2345000	482400	2412000	415400	116.9
2	1340	100	1340		3350000	0	2412000	938000	89.4
1	820	50	410	20	1025000	492000	1476000	41000	88.6
1	820	70	574	20	1435000	295200	1476000	254200	81.6
3	**1110**	**50**	**555**	**20**	**1387500**	**666000**	**1998000**	**55500**	**122.1**
3	1110	70	777	20	1942500	399600	1998000	344100	110.8
2	1340	50	670	20	1675000	804000	2412000	67000	147.3
2	1340	70	938	20	2345000	482400	2412000	415400	131.0
Existing Island Habitats									
Archipelago Remnants	96	36	35	-	87500	73200			

COST EFFECTIVENESS ANALYSIS INCREASE IN PRIMARY PRODUCTIVITY		
Alignment No./ Area/ % Wetlands/ Upland Elev.	Total Gain in Primary Productivity Output (grams dry org matter / m2/ yr)	Initial Total Cost ($ million)
No Action	0	0
1/820/50/10	41000	78.0
1/820/70/10	254200	74.9
1/820/100	574000	59.1
3/1110/50/10	55500	104.7
3/1110/70/10	344100	100.0
3/1110/100	777000	76.3
2/1340/50/10	67000	124.7
2/1340/70/10	415400	116.9
2/1340/100	938000	89.4
1/820/50/20	41000	88.6
1/820/70/20	254200	81.6
3/1110/50/20	**55500**	**122.1**
3/1110/70/20	344100	110.8
2/1340/50/20	67000	147.3
2/1340/70/20	415400	131.0

STACKED IN ORDER OF ASCENDING OUTPUTS		
Alignment No./ Area/ % Wetlands/ Upland Elev.	Total Gain in Primary Productivity Output (grams dry org matter / m2/ yr)	Initial Total Cost ($ million)
No Action	0	0
1/820/50/10	41000	78.0
1/820/50/20	41000	88.6
3/1110/50/10	55500	104.7
3/1110/50/20	**55500**	**122.1**
2/1340/50/10	67000	124.7
2/1340/50/20	67000	147.3
1/820/70/10	254200	74.9
1/820/70/20	254200	81.6
3/1110/70/10	344100	100.0
3/1110/70/20	344100	110.8
2/1340/70/10	415400	116.9
2/1340/70/20	415400	131.0
1/820/100	574000	59.1
3/1110/100	777000	76.3
2/1340/100	938000	89.4

COST INEFFICIENT SOLUTIONS STRUCK THROUGH		
Alignment No./ Area/ % Wetlands/ Upland Elev.	Total Gain in Primary Productivity Output (grams dry org matter / m2/ yr)	Initial Total Cost ($ million)
No Action	0	0
1/820/50/10	41000	78.0
~~1/820/50/20~~	~~41000~~	~~88.6~~
3/1110/50/10	55500	104.7
~~3/1110/50/20~~	~~55500~~	~~122.1~~
2/1340/50/10	67000	124.7
~~2/1340/50/20~~	~~67000~~	~~147.3~~
1/820/70/10	254200	74.9
~~1/820/70/20~~	~~254200~~	~~81.6~~
3/1110/70/10	344100	100.0
~~3/1110/70/20~~	~~344100~~	~~110.8~~
2/1340/70/10	415400	116.9
~~2/1340/70/20~~	~~415400~~	~~131.0~~
1/820/100	574000	59.1
3/1110/100	777000	76.3
2/1340/100	938000	89.4

COST INEFFICIENT SOLUTIONS REMOVED		
COST INEFFECTIVE SOLUTIONS STRUCK THROUG		
Alignment No./ Area/ % Wetlands/ Upland Elev.	Total Gain in Primary Productivity Output (grams dry org matter / m2/ yr)	Initial Total Cost ($ million)
No Action	0	0
~~1/820/50/10~~	~~41000~~	~~78.0~~
~~3/1110/50/10~~	~~55500~~	~~104.7~~
~~2/1340/50/10~~	~~67000~~	~~124.7~~
~~1/820/70/10~~	~~254200~~	~~74.9~~
~~3/1110/70/10~~	~~344100~~	~~100.0~~
~~2/1340/70/10~~	~~415400~~	~~116.9~~
1/820/100	574000	59.1
3/1110/100	777000	76.3
2/1340/100	938000	89.4

	COST EFFECTIVE SOLUTIONS		
H			
	Alignment No./ Area/ % Wetlands/ Upland Elev.	Total Gain in Primary Productivity Output (grams dry org matter / m2/ yr)	Initial Total Cost ($ million)
	No Action	0	0
	1/820/100	574000	59.1
	3/1110/10C	777000	76.3
	2/1340/10C	938000	89.4

HABITAT DIVERSITY CALCULATION UTILIZING SHANNON WEAVER INDEX

Proportions = (acres of particular habitat type) (total relevant project area). Total project area is 3rd column for all variables except finger groins.

Alignment No. Area % Wetlands Upland Ele.	Alignment No.	Site Area (acres) (Footprint)	Footprint plus Finger Groins	No. of cells proceeding N to S	Percent Tidal Wetlands	Tidal Wetlands (acres)	Low marsh (acres) (incl islands, open water, tidal creeks)	Low marsh (acres) (not incl islands and open water habitat)	Proportion of	High marsh (acres)	Proportion of	Upland forest (acres) (incl ponds but not islands)	Proportion of	Upland scrub (acres) (incl ponds but not islands)	Proportion of	Bare substrate islands (acres)	Proportion of	Vegetated islands (acres)	Proportion of	Finger Groins (linear ft)	Finger Groins (acres)	Proportion of	Total open water (acres) (within tidal marsh)	Proportion of	Shannon Weaver Diversity Index (applied to created habitat categories)	Diversity Index x Total Area
No Action		Undefined			0	0	0	0		0		0		0		0		0		0					Undefined	
1 820 50 10	1	820	822	3	50	410	328	295	0.36	82	0.10	205	0.25	205	0.25	6	0.007317	6	0.007317	3000	2.1	0.00251	21.3	0.026	0.640	526
1 820 70 10	1	820	822	3	70	574	459	424	0.52	115	0.14	123	0.15	123	0.15	12	0.014634	6	0.007317	3000	2.1	0.00251	22.8	0.028	0.607	499
1 820 100	1	820	822	3	100	820	656	620	0.76	164	0.20	0	0.00	0	0.00	18	0.021951	6	0.007317	3000	2.1	0.00251	24.4	0.030	0.336	276
3 1110 50 10	3	1110	1113	4	50	555	444	400	0.36	111	0.10	278	0.25	278	0.25	8	0.007207	8	0.007207	4000	2.8	0.00248	28.4	0.026	0.639	711
3 1110 70 10	3	1110	1113	4	70	777	622	575	0.52	155	0.14	167	0.15	167	0.15	16	0.014414	8	0.007207	4000	2.8	0.00248	30.4	0.027	0.606	674
3 1110 100	3	1110	1113	4	100	1110	888	839	0.76	222	0.20	0	0.00	0	0.00	24	0.021622	8	0.007207	4000	2.8	0.00248	32.5	0.029	0.334	372
2 1340 50 10	2	1340	1343	5	50	670	536	481	0.36	134	0.10	335	0.25	335	0.25	10	0.007463	10	0.007463	5000	3.4	0.00256	35.5	0.026	0.641	861
2 1340 70 10	2	1340	1343	5	70	938	750	692	0.52	188	0.14	201	0.15	201	0.15	20	0.014925	10	0.007463	5000	3.4	0.00256	38.1	0.028	0.609	818
2 1340 100	2	1340	1343	5	100	1340	1072	1011	0.75	268	0.20	0	0.00	0	0.00	30	0.022388	10	0.007463	5000	3.4	0.00256	40.6	0.030	0.338	453
1 820 50 20	1	820	822	3	50	410	328	295	0.36	82	0.10	205	0.25	205	0.25	6	0.007317	6	0.007317	3000	2.1	0.00251	21.3	0.026	0.640	526
1 820 70 20	1	820	822	3	70	574	459	424	0.52	115	0.14	123	0.15	123	0.15	12	0.014634	6	0.007317	3000	2.1	0.00251	22.8	0.028	0.607	499
3 1110 50 20	**3**	**1110**	**1113**	**4**	**50**	**555**	**444**	**400**	**0.36**	**111**	**0.10**	**278**	**0.25**	**278**	**0.25**	**8**	**0.007207**	**8**	**0.007207**	**4000**	**2.8**	**0.00248**	**28.4**	**0.026**	**0.639**	**711**
3 1110 70 20	3	1110	1113	4	70	777	622	575	0.52	155	0.14	167	0.15	167	0.15	16	0.014414	8	0.007207	4000	2.8	0.00248	30.4	0.027	0.606	674
2 1340 50 20	2	1340	1343	5	50	670	536	481	0.36	134	0.10	335	0.25	335	0.25	10	0.007463	10	0.007463	5000	3.4	0.00256	35.5	0.026	0.641	861
2 1340 70 20	2	1340	1343	5	70	938	750	692	0.56	188	0.14	201	0.15	201	0.15	20	0.014925	10	0.007463	5000	3.4	0.00256	38.1	0.028	0.601	808

Relative Habitat Diversity

Cost Effectiveness Analysis

Alignment No./ Area/ % Wetlands/ Upland Elev.	Initial Total Cost ($ million)	Shannon Weiner Diversity Index (applied to habitat categories)	Diversity Index x Total Area
1/820/50/10	78.0	0.640	526
1/820/70/10	74.9	0.607	499
1/820/100	59.1	0.336	276
3/1110/50/10	104.7	0.639	711
3/1110/70/10	100.0	0.606	674
3/1110/100	76.3	0.334	372
2/1340/50/10	124.7	0.641	861
2/1340/70/10	116.9	0.609	818
2/1340/100	89.4	0.338	453
1/820/50/20	88.6	0.640	526
1/820/70/20	81.6	0.607	499
3/1110/50/20	**122.1**	**0.639**	**711**
3/1110/70/20	110.8	0.606	674
2/1340/50/20	147.3	0.641	861
2/1340/70/20	131.0	0.601	808

In ascending order of outputs, then costs

Alignment No./ Area/ % Wetlands/ Upland Elev.	Initial Total Cost ($ million)	Shannon Weiner Diversity Index (applied to habitat categories)
3/1110/100	76.3	0.33
1/820/100	59.1	0.34
2/1340/100	89.4	0.34
2/1340/70/20	131.0	0.60
3/1110/70/10	100.0	0.61
3/1110/70/20	110.8	0.61
1/820/70/10	74.9	0.61
1/820/70/20	81.6	0.61
2/1340/70/10	116.9	0.61
3/1110/50/10	104.7	0.64
3/1110/50/20	**122.1**	**0.64**
1/820/50/10	78.0	0.64
1/820/50/20	88.6	0.64
2/1340/50/10	124.7	0.64
2/1340/50/20	147.3	0.64

Alignment No./ Area/ % Wetlands/ Upland Elev	Initial Total Cost ($ million)	Diversity Index x Total Area
1/820/50/10	78.0	526
1/820/70/10	74.9	499
1/820/100	59.1	276
3/1110/50/10	104.7	711
3/1110/70/10	100.0	674
3/1110/100	76.3	372
2/1340/50/10	124.7	861
2/1340/70/10	116.9	818
2/1340/100	89.4	453
1/820/50/20	88.6	526
1/820/70/20	81.6	499
3/1110/50/20	**122.1**	**711**
3/1110/70/20	110.8	674
2/1340/50/20	147.3	861
2/1340/70/20	131.0	808

Economically inefficient solutions struck through

Alignment No./ Area/ % Wetlands/ Upland Elev.	Initial Total Cost ($ million)	Shannon Weiner Diversity Index (applied to habitat categories)
3/1110/100	76.3	0.33
1/820/100	59.1	0.34
~~2/1340/100~~	~~89.4~~	~~0.34~~
2/1340/70/20	131.0	0.60
3/1110/70/10	100.0	0.61
~~3/1110/70/20~~	~~110.8~~	~~0.61~~
~~1/820/70/10~~	~~74.9~~	~~0.61~~
~~1/820/70/20~~	~~81.6~~	~~0.61~~
~~2/1340/70/10~~	~~116.9~~	~~0.61~~
3/1110/50/10	104.7	0.64
~~3/1110/50/20~~	~~122.1~~	~~0.64~~
~~1/820/50/10~~	~~78.0~~	~~0.64~~
~~1/820/50/20~~	~~88.6~~	~~0.64~~
~~2/1340/50/10~~	~~124.7~~	~~0.64~~
~~2/1340/50/20~~	~~147.3~~	~~0.64~~

Alignment No./ Area/ % Wetlands/ Upland Elev.	Initial Total Cost ($ million)	Diversity Index x Total Area
1/820/100	59.1	276
3/1110/100	76.3	372
2/1340/100	89.4	453
1/820/70/10	74.9	499
~~1/820/70/20~~	~~81.6~~	~~499~~
1/820/50/10	78.0	526
~~1/820/50/20~~	~~88.6~~	~~526~~
3/1110/70/10	100.0	674
~~3/1110/70/20~~	~~110.8~~	~~674~~
3/1110/50/10	104.7	711
~~3/1110/50/20~~	~~122.1~~	~~711~~
2/1340/70/20	131.0	808
2/1340/70/10	116.9	818
2/1340/50/10	124.7	861
~~2/1340/50/20~~	~~147.3~~	~~861~~

APPENDIX C

EXECUTIVE SUMMARIES FROM TECHNICAL REPORTS

POPLAR ISLAND RESTORATION PROJECT
SITE DEVELOPMENT GUIDELINES

ENVIRONMENTAL STUDY AND ENGINEERING DESIGN
CHESAPEAKE BAY, MARYLAND

PIN NO. 600105-H
MPA CONTRACT NO. 595904

Prepared for

Maryland Department of Transportation
Maryland Port Administration

Prepared by

Gahagan & Bryant Associates, Inc. &
Moffatt & Nichol, Engineers
Joint Venture

March 23, 1995

EXECUTIVE SUMMARY

The U.S. Army Corps of Engineers (USACE) is responsible for maintaining the Federal navigation channels which serve the Port of Baltimore, and the Maryland Port Administration (MPA) is responsible for providing placement areas for the material which is dredged from the channels. These channels require periodic maintenance dredging. This dredged material must be managed in an environmentally sound and cost effective manner. The Poplar Island Restoration Project offers an opportunity for beneficial use of clean dredged material removed from the southern approach channels to the Port of Baltimore. Coordination between MPA and the Maryland Environmental Service (MES), USACE and the Poplar Island Working Group (PIWG) has led to a concept for reconstruction of Poplar Island using dredged material. An initial approach to this concept was described in the Prefeasibility Report (PFR). This approach would return Poplar Island to a size comparable to that which existed during the last century and would allow for creation of important and diverse aquatic, intertidal and upland habitat.

The following report summarizes important Site Development Guidelines (SDG) which will provide a framework for the overall planning, design, and environmental analyses of the Poplar Island Restoration Project. The specific goals of this SDG report are listed below:

- Present a summary of the Site Development Guidelines.
- Provide a review of the Prefeasibility Report (PFR) for the project.
- Summarize the status of various elements of the work completed by the design team.

The report is separated into eight sections as described below:

Section 1. Introduction. This section of the report summarizes the overall objectives of the project which are listed as follows:

- Recreate Poplar Island

- Create/restore desirable habitat
- Optimize the capacity of the site for placement of dredged material as well as benefits to wildlife habitat
- Prepare a cost effective project design
- Prepare an environmentally acceptable design.

Section 2. Site Conditions. This portion of the report presents a summary of the environmental site conditions which will dictate the project design. A brief summary of each condition is provided below:

- **Bathymetry and Topography**. Depths within the project area range from 2 to 12 feet below Mean Lower Low Water (MLLW).
- **Winds**. Design winds for the site were developed on the basis of data collected at Baltimore-Washington International (BWI) airport. These winds, which can exceed 90 miles per hour during a 100-year storm, were used to develop design wave conditions. Predominant wind direction is from the northwest.
- **Water Levels**. Normal water levels at the site are dictated by astronomical tides which have a mean range of 1.8 feet from MLLW to Mean Higher High Water (MHHW). Extreme water levels are dictated by storm tides which can be as high as 6.7 feet above MLLW during a 100-year storm. The Mean Spring High Water (MSHW) elevation is defined to be 2.4 feet above MLLW; this elevation will be considered to be the boundary between wetland and upland.
- **Waves**. The largest waves approach the site from the north and south. The 100-year return period waves are about 10 feet in height and have a wave period nearing 6 seconds.
- **Currents**. Tidal currents in the vicinity of Poplar Island are relatively weak. Construction of the Project will change current patterns and circulation in the vicinity of Poplar, Coaches and Jefferson Islands.
- **Soil Conditions**. Soil types at the site consist of four basic stratums. Stratum 1 is a surficial silty sand. Stratum 2 is a soft to hard silty clay. Stratum 3 is a stiff silty clay with pockets of sand. Stratum 4 is a very soft gray silty clay. A sizable

pocket of silty fine sands, with 0 to 7 feet of silty clay overburden, was encountered in the southern portion of the site, adjacent to Coaches Island. A stratum of surficial, very soft silty clay was encountered northeast of the site. A pocket of cemented sands (ironite) was encountered west of South Central Poplar Island.

Section 3. Site Layout. Layout of the footprint for the proposed island restoration must consider:

- The 1847 footprint.
- Location of existing oyster bars.
- Location of remnant islets.
- Interactions with Jefferson and Coaches Islands.
- Water depths
- Foundation conditions
- Efficiency of shape.
- Ratio of upland and intertidal habitat
- Impacts to flora and fauna
- Archeological features

The PFR island footprints focused on restoring Poplar Island to, nearly as possible, its 1847 geometry. The footprint identified as the PFR Base Plan with an area of 930 acres was modified due to soft silty clays to the north, and is indicated as Alignment 1 with an area of 820 acres. Two additional footprints have been developed as alternatives to the PFR approach. Both of the alternative alignments connect to Coaches Island and have larger areas than the PFR footprint. Alignment 2 would provide an island area of about 1350 acres whereas Alignment 3 would provide an island area of 1125 acres. There are advantages to creating the larger footprints because the site can store substantially more dredged material with a marginal increase in dike lengths. Decisions regarding final selection of the footprint should be made on the basis of cost effectiveness as well as wildlife habitat benefits. Critical to these decisions, however, is the coordination of real estate issues pertaining to connections to Coaches Island. These issues must be resolved in order to proceed with a specific alignment for final design.

Section 4. Dike Construction. There are a number critical factors which will dictate design of the containment dikes for the Poplar Island Restoration Project. These factors are described below:

- **Design Life, Return Period and Optimization Studies.** The dike design life and the return period condition (or alternatively, level of risk) chosen for design are critical factors which will have a profound impact on project initial and/or maintenance costs. Previously, USACE would normally specify a return period of 73 years for projects of this type which corresponds to a 50% level of risk for a 50 year project life. This has now been superseded by the revised COE Regulation ER-1110-2-1407 (November 30, 1990) which dictates that a fuller range of alternatives be studied to account for differences in cost of repair, periodic replacements and rehabilitation. The PFR presented designs for a 25-year return period which corresponds to a 50% level of risk for a 17-year project life. The recommended approach for this project is to select design conditions on the basis of an optimization procedure which balances initial construction and long-term maintenance costs.
- **Geotechnical Factors.** Soil conditions at the site, along with construction methodology, will dictate the dike side slopes and maximum safe crest elevations. Recent boring investigations and design studies indicate that a slope of 3 horizontal to 1 vertical can be achieved using sand excavated from the project. This sand would serve as the core of the dike. Additional alternatives incorporating cores constructed of geotubes or clay borrow will also be investigated. Foundation conditions along the dike alignment are generally favorable in terms of dike stability and settlement.
- **Dike Height.** The dike height is dictated by soils conditions and wave runup and overtopping. Assuming a sand core, soils conditions do not appear critical as regards dike crest elevations. A dike with crest armor can sustain a larger amount

of wave overtopping and can therefore be lower than a dike without crest armor. Wave overtopping computations indicate that the western dike without crest armor should have a crest elevation ranging from 8 feet MLLW for a 5-year storm to 11.5 feet MLLW for a 100-year storm. Similarly, the western dike with crest armor should have a crest elevation ranging from 4.5 feet MLLW for a 5-year storm to 10.5 feet MLLW for a 100-year storm. The crest elevation for eastern dike without crest armor should range from 4 feet MLLW to 8 feet MLLW for 5 and 100-year, respectively. Similarly, the eastern dike incorporating crest armor should have a crest elevation of 3.5 feet MLLW for a 5-year storm to 7.5 feet MLLW for a 100-year storm. Physical model tests and optimization studies will be conducted to finalize the dike crest elevations.

- **Armor Stone & Toe Protection**. Armor stone has been sized using the van der Meer method which accounts for random wave behavior instead of the Hudson equation (Shore Protection Manual) which tends to be overly conservative. Computations indicate that armor sizes for the western dike should range from 0.8 tons for a 5-year storm to 2.4 tons for a 100-year storm. Similar computations for the east dike section give required armor stone sizes ranging from 100 pounds for a 5-year storm to 600 pounds for a 100-year storm. The above stone requirements assume a double layer of armor stone. Hart Miller Island incorporated a single layer of armor. Single layer armor has some safety disadvantages, but can result in cost savings. Estimates of single layer armor rock sizes have been made for the western dike and indicate that armor sizes should range from 1 ton for a 5-year storm to 4.5 tons for a 100-year storm. The final armor stone sizes, whether single or double layer, should be designed on the basis of physical model tests. Above grade toe protection is recommended for each dike section.
- **Conceptual Dike Sections**. Conceptual dike cross sections have been prepared for 25-year return period design conditions. These cross sections were developed for the purpose of discussions and to make an initial assessment of project quantities and costs. Final design conditions will be evaluated on the basis of optimization studies. Typical western dike cross sections were developed for

single and double armor layers and a sand and clay core. Typical eastern dike cross sections were prepared for a double layer of armor and sand and clay cores.

- **Soils for Dike Construction Methods.** The following construction methods and borrow sources will be examined:
  - Side borrow using mechanical methods
  - Onsite borrow using hydraulic dredging
  - Offsite borrow using hydraulic dredging
- **Construction in Lifts.** Dried maintenance material could be used to augment an initially constructed dike section.

Section 5. Cost Estimates and Alternatives Analysis. The basic capital cost of the site will be dictated by the perimeter dike construction cost. Cost estimates for other site capital costs and site operations costs will also be prepared. These cost estimates are an integral part of preliminary design studies and alternatives analysis.

Section 6. Environmental Issues. This section of the report describes the environmental issues and concerns that are associated with constructing a beneficial use and habitat creation site using dredged material at the Poplar Island location. Primary topics discussed are as follows:

- **Loss of Open Water.** Reconstruction of Poplar Island will constitute a loss of approximately 1150 acres of shallow open water.
- **Loss of Fish and Macroinvertebrate Habitat.** Loss of the snag areas (fallen trees, etc.) along the western shores of the remnant islands that provide a cover resource will be offset by large rock to be used for construction of the dike.
- **Changes in Wave Regime.** Reconstruction of Poplar Island will transform an area of high wave energy into one that is lower within the Poplar Harbor area (in the lee of the maximum fetch distance and greatest depths).
- **Changes in Tidal Hydrodynamic Regime.** The local tidal regime within the Poplar Island wetlands and surrounding the island may change, however not significantly. Baywide tidal pattern changes will be negligible.

- **Need for Additional Habitat.** Reconstruction of Poplar Island will provide needed tidal wetland habitat and promote the growth of subaquatic vegetation (SAV) by providing suitable protected shallow water habitat.
- **Impacts to Adjacent Islands.** Impacts to adjacent islands are expected to be minimal.
- **Impacts to Oyster Beds.** Impacts to oyster beds will be minimized during construction; monitoring will be conducted and efforts will be made to avoid unacceptable impacts. Following construction, Poplar Island would serve to protect the beds.
- **Restrictions to Hydraulic Dredging.** Seasonal restrictions on hydraulic dredging are presented.

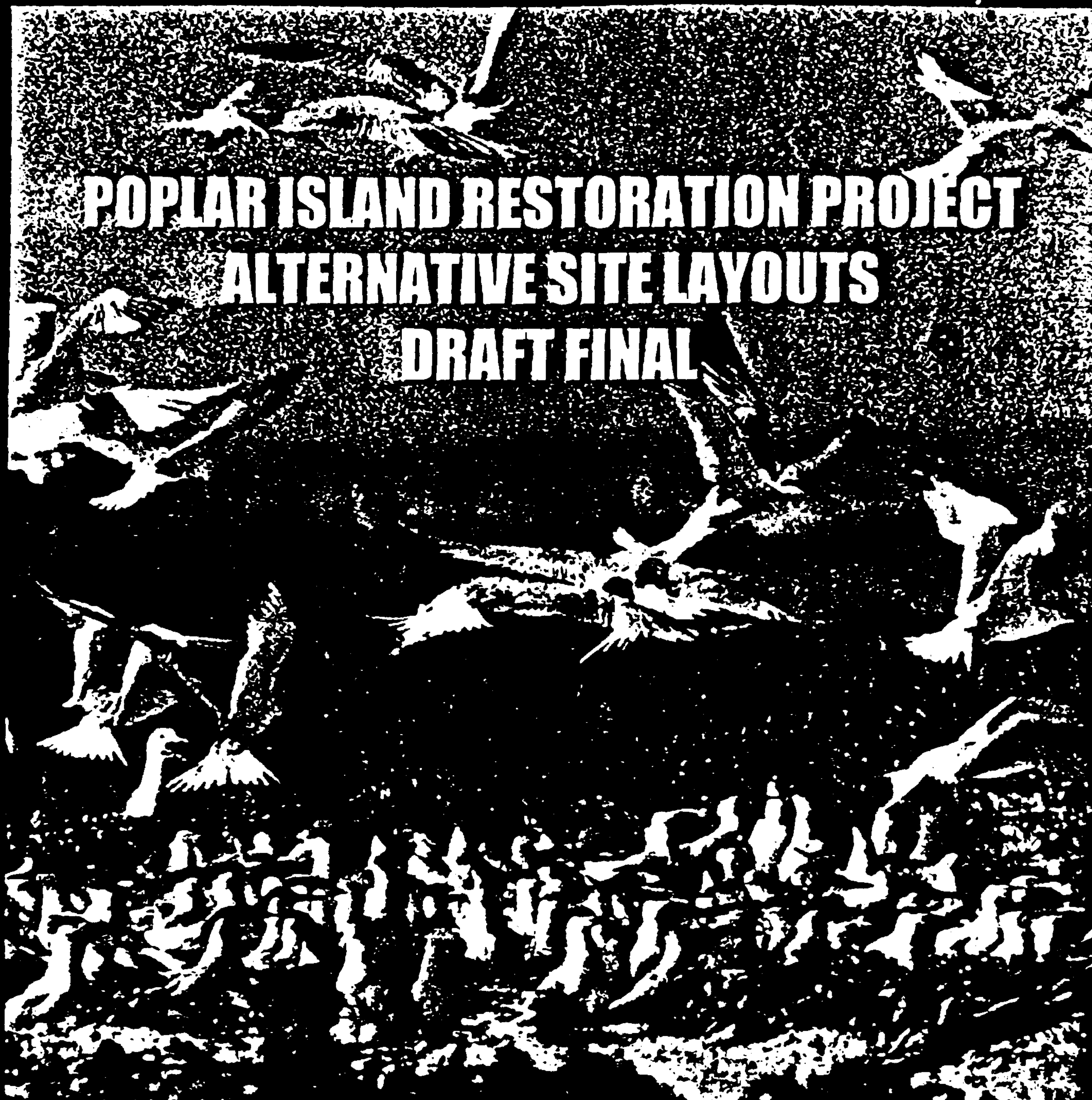
Section 7. Habitat Creation. This section summarizes requirements that must be met in order to construct the viable wetland habitat following placement of the dredged material. Primary components of this section are:

- Definitions of Habitat Terms
- Vegetation Types
- Dredged Material Characteristics
- Material Consolidation
- Final Elevations and Vegetated Zones
- Peninsula Dikes
- Tidal Circulation
- Issues Involved in Habitat Development
- Target Flora and fauna

Section 8. Prefeasibility Report (PFR) Review. Review of the PFR focuses on several important areas of site design and development which will be given detailed consideration in the preliminary design, alternatives evaluations and final design phases. These are:

- Staged construction of the perimeter dike
- Site operational life
- Projected dredging quantities
- Orientation of wetlands
- Wetland cell elevations and slope
- Cell water level control

This section concludes with a summary of PFR Base Plan characteristics.



POPLAR ISLAND RESTORATION PROJECT
ALTERNATIVE SITE LAYOUTS
DRAFT FINAL

ENVIRONMENTAL STUDY AND ENGINEERING DESIGN
CHESAPEAKE BAY, MARYLAND

PIN NO. 600105-H
MPA CONTRACT NO. 595904

Prepared for

Maryland Department of Transportation
Maryland Port Administration

Prepared by

Gahagan & Bryant Associates, Inc. &
Moffatt & Nichol, Engineers
Joint Venture

June 16, 1995

EXECUTIVE SUMMARY

The *Alternative Site Layouts* report is one of a series being prepared as part of the detailed planning and design of the Poplar Island Restoration Project. The project consists of the reconstruction of tidal wetland and upland habitats by making a beneficial use of dredged materials removed from the southern Bay approach channels to the Port of Baltimore. This report presents the results of the dike design optimization and discusses the three alternative site layouts (820, 1110 and 1340 acres) which generally follow the historical footprint of Poplar Island. Details of the project objectives, the present conditions at the project site, and a description of the project are contained in the *Site Development Guidelines (SDG)* (GBA - M&N JV, January 1995).

The purpose of this report is to present the characteristics of the site alternatives, the dike design optimization, and the associated costs needed to assist decision makers in selecting the site layout carried to final design. The designs and the analyses contained in this report have been carried to the 20% completion level.

The objectives of this beneficial use site are:

- Optimization of the volumetric capacity of the site for dredged material
- Preparation of a cost-effective design within available funding
- Restoration of Poplar Island to approximately its 1847 footprint
- Creation/restoration of desirable habitat
- Design of all aspects of the site in an environmentally acceptable manner

A summary of environmental site conditions that are relevant to the design is provided below:

- **Bathymetry and Topography**. Depths within the project area range from 2 to 12 feet below Mean Lower Low Water (MLLW).

- **Wind Conditions.** Design winds for the site were developed on the basis of data collected at Baltimore-Washington International (BWI) airport. These winds, which can exceed 90 miles per hour during a 100-year storm, were used to develop design wave conditions. Predominant wind direction is from the northwest.

- **Water Levels.** Normal water levels at the site are dictated by astronomical tides which have a mean range of 1.8 feet from MLLW to Mean Higher High Water (MHHW). Extreme water levels are dictated by storm tides which can be as high as 6.7 feet above MLLW during a 100-year storm. The Mean Spring High Water (MSHW) elevation is defined to be 2.4 feet above MLLW; for this project this elevation will be considered to be the boundary between wetland and upland.

- **Wave Conditions.** The largest waves approach the site from the north and south. The 100-year return period waves are about 10 feet in height and have a wave period nearing 6 seconds.

- **Currents.** Tidal currents in the vicinity of Poplar Island are relatively weak (less than one foot per sec.) Construction of the project will change current patterns and circulation in the vicinity of Poplar, Coaches and Jefferson Islands comparable to conditions circa 1847.

- **Soil Conditions.** Soil types at the site consist of four basic stratums. Stratum 1 is a surficial silty sand. Stratum 2 is a soft to hard silty clay. Stratum 3 is a stiff silty clay with pockets of sand. Stratum 4 is a very soft gray silty clay. A sizable pocket of silty fine sands, with 0 to 7 feet of silty clay overburden, was encountered in the southern portion of the site, adjacent to Coaches Island. A stratum of surficial, very soft silty clay was encountered northeast of the site. A pocket of cemented sands (ironite) was encountered west of South Central Poplar Island.

Three alternative footprints are presented for final selection by decision makers. These footprints are designated as Alignments No. 1, No. 2 and No. 3. Alignment No. 1 is a variation of the

"Base Plan" identified in the Prefeasability Report. This footprint has been adjusted at the northern end of the site to avoid an area of soft foundation materials. The northwest portion of the dike is parallel to the line which demarks the eastern boundary of oyster bar N.O.B. 8 - 10. The eastern dike is more-or-less aligned along the 1847 position of the eastern shoreline of Poplar Island. The southeast portion of the perimeter dike is roughly perpendicular to the northwest dike segment and is bayward of the 1847 shoreline. For the purposes of this report, the term "Western Perimeter Dike" includes the north, northwest, south, and southwest segments of the dike. The term "Eastern Perimeter Dike", on the other hand, refers to the northeast, east and southeast portions of the dike. Alignment No. 1 has a nominal site area of 820 acres. Alignment No. 2 is an extension of Alignment No. 1 to the south and east and fronts on the southern shoreline of Coaches Island. The southeast and south segment of the perimeter dike generally follow the -8 foot MLLW contour. This alignment is the largest considered with a nominal area of 1,340 acres. Alignment No. 3 has an area of 1,110 acres which just exceeds the average areas of Alignments No. 1 and No. 2.

The project requires the construction of a perimeter dike both to contain dredged materials as they are placed and to provide protection from wave action for the developed habitats. Interior dikes will be constructed to separate upland and tidal wetland habitat and to partition the site into manageable cells. The perimeter and interior dikes will be constructed of sand borrowed from within the site footprint. Perimeter dikes will be protected from wave attack by rock slope protection on the exposed portions. Perimeter dikes will have an armored toe dike to provide additional protection during and after construction.

Initial construction costs for the project site are demonstrated by the dike construction costs. Accordingly, a detailed cost optimization analysis was conducted to develop cost-effective designs for both the Western Perimeter Dike (dike segment exposed to waves from the north, west and south) and the Eastern Perimeter Dike (dike segment exposed to the relatively low-energy waves from the east).

The cost optimization analysis indicates that the optimal structure slope for the perimeter dike ranges from 3:1 to 4:1. Overall, the optimal design return period for the Western Perimeter Dike is about 35 years, however, the optimal return period for the primary armor stone is 25 years. The optimal design return period for the armored eastern dike is about 50 years. Similarly, the optimal return period for the design of the eastern dike armor stone is 50 years. The unarmored option for the Eastern Perimeter Dike is also 50-years. It should be noted however, that the unarmored dike is vulnerable to long term erosion. Additional shoreline stabilization structures may have to be added to the cost of this alternative. The additional cost associated with the additional stabilization structures would render this option more costly than the Eastern Perimeter Dike (armored rock option).

The creation and restoration of desirable habitat is the primary object the of this project. Factors which are important to the development of habitat at the site include final elevations of placed dredged material, surface slopes, tidal circulation, water quality, material consolidation and vegetation establishment. These factors will be focused on during habitat development planning.

Initial site construction costs, habitat development and annual management costs for the life of the project are developed for each alignment. The percentage of tidal wetland habitat was examined for levels of 50, 70 and 100 percent tidal wetlands for each of the three alternative alignments. The upland areas were examined for elevations of +10 and +20 ft. MLW.

September 1, 1995

PHASE I TERRESTRIAL AND MARINE ARCHEOLOGICAL SURVEYS FOR THE POPLAR ISLAND RECLAMATION PROJECT AND PHASE II INVESTIGATIONS OF SITE 18TA237, TALBOT COUNTY, MARYLAND

DRAFT REPORT

R. Christopher Goodwin & Associates, Inc.
337 East Third Street
Frederick, Maryland 21701

PREPARED FOR:

GBA-M&N A Joint Venture
9008-O Yellow Brick Road
Baltimore, Maryland 21237

ABSTRACT

This report presents the results of Phase IB marine and terrestrial archeological surveys of the Poplar Island Reclamation Project area, and of the Phase II evaluation of Site 18TA237 on South Central Island. These investigations were carried out during November and December, 1994, and July, 1995, by R. Christopher Goodwin & Associates, Inc. under contract to The Joint Venture of Gahagan & Bryant Associates, Inc. and Moffatt & Nichol, Engineers. This project was conducted in compliance with the National Environmental Policy Act (NEPA) of 1969, with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, and with Article 83B, Sections 5-617 - 618 of the Annotated Code of Maryland.

These investigations were designed to identify potential submerged archeological resources through the use of magnetometer and sub-bottom profiler surveys of the submerged portions of the 1847 Poplar Island footprint (Alternative Alignment #1) and of the access channel, and through magnetometer and side-scan sonar survey of the shallow areas near Coaches Island (Alternative Alignments #2 and #3), and to identify sites and site boundaries on the remaining terrestrial areas. The terrestrial portion of the study examined the four remaining islets of Poplar Island and the immediate shoreline of Coaches Island within proposed Alternative Alignments #2 and #3. As the result of initial Phase I investigations on South Central Island, Site 18TA237 was recommended for Phase II evaluation. The U.S. Army Corps of Engineers, Baltimore District, the Maryland Port Administration, and the Joint Venture decided to proceed with this Phase II evaluation during the Phase I investigations of Coaches Island because the site was immediately threatened by erosion.

The Phase IB study included background research, marine survey, near-shore dredging, terrestrial survey, and laboratory analysis. The terrestrial survey examined eight previously recorded archeological sites on five islands. Seven sites were not relocated or were too disturbed to warrant additional investigation. One site (18TA237) on South Central Island was recommended for additional Phase II investigation based on its research potential. Phase II evaluation of 18TA237 involved close interval shovel testing, test unit excavation, near-shore dredging, and laboratory

analysis. The site was found to be a redeposited and reworked beach deposit. No intact features were identified. No additional investigation was warranted or recommended for Site 18TA237.

The marine survey recorded 27 magnetic and acoustic anomalies. Sub-surface testing was recommended for six target areas. This testing should entail reacquisition of each target location, bottom searches and probing to determine the extent of the site, and limited underwater excavation using diver-held excavation equipment to the extent necessary to determine the potential National Register eligibility of each site.

October 17, 1995

PHASE II EVALUATION OF SIX MARINE ANOMALIES FOR THE POPLAR ISLAND RECLAMATION PROJECT, TALBOT COUNTY, MARYLAND

ADDENDUM TO PHASE I TERRESTRIAL AND MARINE ARCHEOLOGICAL SURVEYS FOR THE POPLAR ISLAND RECLAMATION PROJECT AND PHASE II INVESTIGATIONS OF SITE 18TA237, TALBOT COUNTY, MARYLAND

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CHAPTER I

INTRODUCTION

This addendum to R. Christopher Goodwin & Associates, Inc.'s *Phase I Terrestrial and Marine Archeological Surveys for the Poplar Island Reclamation Project and Phase II Investigations of Site 18TA237, Talbot County, Maryland*, presents the results from the Phase II underwater archeological investigations and sub-surface testing of six (6) anomalous target areas recommended for further investigations by Goodwin & Associates, Inc. Sub-surface testing was recommended for these anomalies because they lie within the boundaries of the Poplar Island Land Reclamation Project Area, and potentially were at risk of being adversely affected by the future construction work planned for the project.

Intensive archeological field investigations were conducted by R. Christopher Goodwin & Associates, Inc. from August 25 - September 1, 1995, and were concluded on September 7, 1995. These investigations entailed: the reacquisition of initial target locations using Differential Global Positioning System (DGPS) positioning; the refinement of these positions with a proton precession magnetometer and diver surveys; identification and delimitation of the anomalous sites; and evaluation of potential National Register of Historic Places eligibility for each target. For the magnetic anomalies, magnetometer surveys were conducted over a 22,500 sq ft area around their initial target locations, using a 25 ft track-line spacing. Diver investigations also were completed at every target, with an average of 11,852 sq ft of seabed surveyed per anomaly. Identification and delimitation of the extent of each anomaly, and its potential for National Register eligibility, was accomplished using diver-held metal-detection equipment, sub-surface probing, and limited underwater excavation. Shell and soil samples also were collected and analyzed to determine the date and origin of mollusk shell beds and to identify soil types.

During the course of the Phase II investigations, a total of 135,000 sq ft of the Bay floor was resurveyed with the magnetometer, and 130,378 sq ft of seabed was mapped by divers. Of the six anomalous targets that were investigated, the sources of four of the anomalies were located and identified. These anomalies consisted of: (1) a biogenic concentration of mixed species mollusk shell; (2) discrete geological deposits; and (3) a concentration of modern (twentieth century) refuse. Anomalies that were not located during the Phase II investigations are likely to have been too small to be considered historically significant; are buried deeply beneath sand overburden, and are unlikely to be adversely affected by the deposition of additional sediments above them; or were moved or destroyed by the powerful forces of wind, waves, and strong tidal currents that prevail in the waters surrounding the Poplar Island group. Because no National Register-eligible cultural features were discovered during the Phase II underwater investigations, R. Christopher Goodwin & Associates, Inc. recommends no further archeological investigations of any of the six targets: 10-727, 10-755, 30-1151, 40-665, 48-819, and the cluster formed by anomalies 58-1477, 60-579, 62-1508.

POPLAR ISLAND RESTORATION PROJECT HYDRODYNAMIC AND COASTAL ENGINEERING DRAFT FINAL REPORT

ENVIRONMENTAL STUDY AND ENGINEERING DESIGN
CHESAPEAKE BAY, MARYLAND

PIN NO. 600105-H
MPA CONTRACT NO. 595904

Prepared for

Maryland Department of Transportation
Maryland Port Administration
Maritime Center II
2310 Broening Highway
Baltimore, Maryland 21224

Prepared by

Gahagan & Bryant Associates, Inc. &
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September 28, 1995

EXECUTIVE SUMMARY

The *Hydrodynamic and Coastal Engineering* report is one of a series being prepared as part of the detailed planning and design of the Poplar Island Restoration Project. The project consists of the reconstruction of tidal wetland and upland habitats by making a beneficial use of dredged material removed from the southern Bay approach channels to the Port of Baltimore. The purpose of this report is to present the coastal engineering aspects of the project. Emphasis is placed on factors that govern the design of the perimeter dikes and the physical impacts of the island footprint on areas in and around Poplar Island. This report presents the project objectives, a description of the project, the details of the present conditions at the project site, a discussion of the three alternative site layouts (820, 1110 and 1340 acres) that generally follow the historical (circa 1847) footprint of Poplar Island, a description of the selected alignment, an evaluation of hydrodynamic conditions at the site, the components of the dike design, the results of the dike design optimization analysis, a reliability analysis of the design, and the results of physical model test for the design.

The objectives of this beneficial use site are:

- Optimization of the volumetric capacity of the site for dredged material
- Preparation of a cost-effective design within available funding
- Restoration of Poplar Island to approximately its 1847 footprint
- Creation/restoration of desirable habitat
- Design of all aspects of the site in an environmentally acceptable manner

A summary of environmental site conditions that are relevant to the design is provided below:

- **Bathymetry and Topography**. Depths within the project area range from 2 to 12 feet below Mean Lower Low Water (MLLW).

- **Wind Conditions**. Design winds for the site were developed on the basis of data collected at Baltimore-Washington International (BWI) airport. These winds, which can exceed 90 miles per hour during a 100-year storm, were used to develop design wave conditions. Predominant wind direction is from the northwest.

- **Water Levels**. Normal water levels at the site are dictated by astronomical tides which have a mean range of 1.8 feet from MLLW to Mean Higher High Water (MHHW). Extreme water levels are dictated by storm tides which can be as high as 6.7 feet above MLLW during a 100-year storm. The Mean Spring High Water (MSHW) elevation is defined to be 2.4 feet above MLLW; for this project this elevation will be considered to be the boundary between wetland and upland.

- **Wave Conditions**. The largest waves approach the site from the north and south. The 100-year return period waves are about 10 feet in height and have a wave period nearing 6 seconds.

- **Currents**. Tidal currents in the vicinity of Poplar Island are relatively weak (less than one foot per sec.) Construction of the project will change current patterns and circulation in the vicinity of Poplar, Coaches and Jefferson Islands comparable to conditions circa 1847.

- **Soil Conditions**. Soil types at the site consist of four basic stratums. Stratum 1 is a surficial silty sand. Stratum 2 is a soft to hard silty clay. Stratum 3 is a stiff silty clay with pockets of sand. Stratum 4 is a very soft gray silty clay. A sizable pocket of silty fine sands, with 0 to 7 feet of silty clay overburden, was encountered in the southern portion of the site, adjacent to Coaches Island. A stratum of surficial, very soft silty clay was encountered northeast of the site. A pocket of cemented sands (ironite) was encountered west of South Central Poplar Island.

The project requires the construction of a perimeter dike both to contain dredged materials as they are placed and to provide protection from wave action for the developed habitats. Interior dikes will be constructed to separate upland and tidal wetland habitat and to partition the site into manageable cells. The perimeter and interior dikes will be constructed of sand borrowed from within the site alignment. Perimeter dikes will be protected from wave attack by rock slope protection on the exposed portions. Perimeter dikes will have an armored toe dike to provide additional protection during and after construction.

Initial construction costs for the project site are demonstrated by the dike construction costs. Accordingly, a detailed cost optimization analysis was conducted to develop cost-effective designs for both the Western Perimeter Dike (dike segment exposed to waves from the north, west and south) and the Eastern Perimeter Dike (dike segment exposed to the relatively low-energy waves from the east).

The cost optimization analysis indicates that the optimal structure slope for the perimeter dike ranges from 3:1 to 4:1. Overall, the optimal design return period for the Western Perimeter Dike is about 35 years, however, the optimal return period for the primary armor stone is 25 years. The optimal design return period for the armored eastern dike is about 50 years. Similarly, the optimal return period for the design of the eastern dike armor stone is 50 years.

Three site alignments have been examined (No. 1, No. 2 and No. 3) jointly through a series of discussions with MPA, COE and MES staffs and the Poplar Island Working Group. Alignment No. 3 was initially selected as the proposed project; further cost optimization analysis was performed to revise the alignment to the most cost-effective alternative.

A reliability analysis shows that the structure has more than a 90% chance that it will suffer damage that will require maintenance over the 100-year design life. This finding is to be expected and has been incorporated into the optimization analysis and long-term maintenance costs for the project presented in this report. Results of the physical model test confirm the armor stone size proposed for the dike design. The results also show that the crest height is adequate for the optimized design section, and that considerable overtopping will be associated with the higher water levels (i.e. storm surge) that will occur during larger return period (less frequent) storm events.

POPLAR ISLAND RESTORATION PROJECT HYDRODYNAMIC AND COASTAL ENGINEERING ADDENDUM

ENVIRONMENTAL STUDY AND ENGINEERING DESIGN
CHESAPEAKE BAY, MARYLAND

PIN NO. 600105-H
MPA CONTRACT NO. 595904

Prepared for

Maryland Department of Transportation
Maryland Port Administration
Maritime Center II
2310 Broening Highway
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February 14, 1996

EXECUTIVE SUMMARY

The purpose of this addendum is to build on the previous hydrodynamic modeling studies and to present results for four additional configurations for Poplar Island, namely: (1) the full 1110 acre site having a minimum 100 foot tidal channel between Coaches Island and the proposed Poplar Island, (2) the full 1110 acre site having a minimum 100 foot tidal channel between Coaches Island and the proposed Poplar Island, however, the tidal channel is cut through the southwestern peninsula of Coaches Island to allow for increased flow through the tidal channel compared to configuration no. 1, (3) a reduced area for Poplar Island of approximately 600 acres that would constitute a Phase I construction scenario for the project, and (4) a reduced area for Poplar Island of approximately 600 acres that would constitute a Phase I construction scenario for the project, along with a "connector dike" that would extend from Poplar Island to Coaches Island, would prevent flow between these two islands, be hydrodynamically equivalent to the full 1110 acre island, and provide protection to Poplar Harbor.

Velocities and Direction of Tidal Flows

Tidal currents in the vicinity of Poplar Island are relatively weak (i.e. less than one foot per second). Construction of the project with the tidal channel (either without the cut or with the cut) will change current patterns and circulation in the vicinity of Poplar, Coaches and Jefferson Islands comparable to conditions circa 1847. Construction of the approximately 600-acre Poplar Island, i.e. Option No. 1, will cause increased flow velocities through the gap between Poplar Island and Coaches Island, and will not provide protection to Poplar Harbor. Construction of the connector dike along with Option No. 1 will protect Poplar Harbor from wave action originating from the west, and will allow for tidal flows around the project site similar to that for the full 1110-acre Poplar Island.

Residence Times

Construction of the 1110-acre project with a tidal channel shows that a channel without a cut has a longer residence time in the area around the southwest peninsula of Coaches Island than a channel with the cut. For Option No. 1 compared to existing conditions, residence time is increased in the Poplar Harbor area between Poplar Island and Jefferson Island . Conversely, residence time is decreased in the area of the gap. For Option No. 1 with a connector dike, residence times are comparable to that for the full 1110-acre Poplar Island, with the exception of a slight increase in residence time in the area between the connector dike and the southern perimeter of Poplar Island.

Sedimentation

For Option No. 1, sedimentation changes resulting from a northwest wind are comparable to the full 1,100 acre site. Sedimentation changes occurring as a result of wind from the south direction show that erosion along the eastern shoreline of Coaches Island is comparable to the full 1,100 acre site; in addition, significant erosion would occur in the area of the gap. Sedimentation resulting from a northwest wind for Option No. 1 with the connector dike show changes comparable to the full 1,100 acre. Sedimentation changes occurring as a result of wind from the south direction show erosion along the eastern shoreline of Coaches Island comparable to that for the full 1,100 acre site. The presence of the connector dike serves to prevent the erosion in the gap between Poplar Island and Coaches Island.

HABITAT DEVELOPMENT REPORT
FOR POPLAR ISLAND, TALBOT COUNTY, MD

Prepared For:

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10/20/95

EXECUTIVE SUMMARY

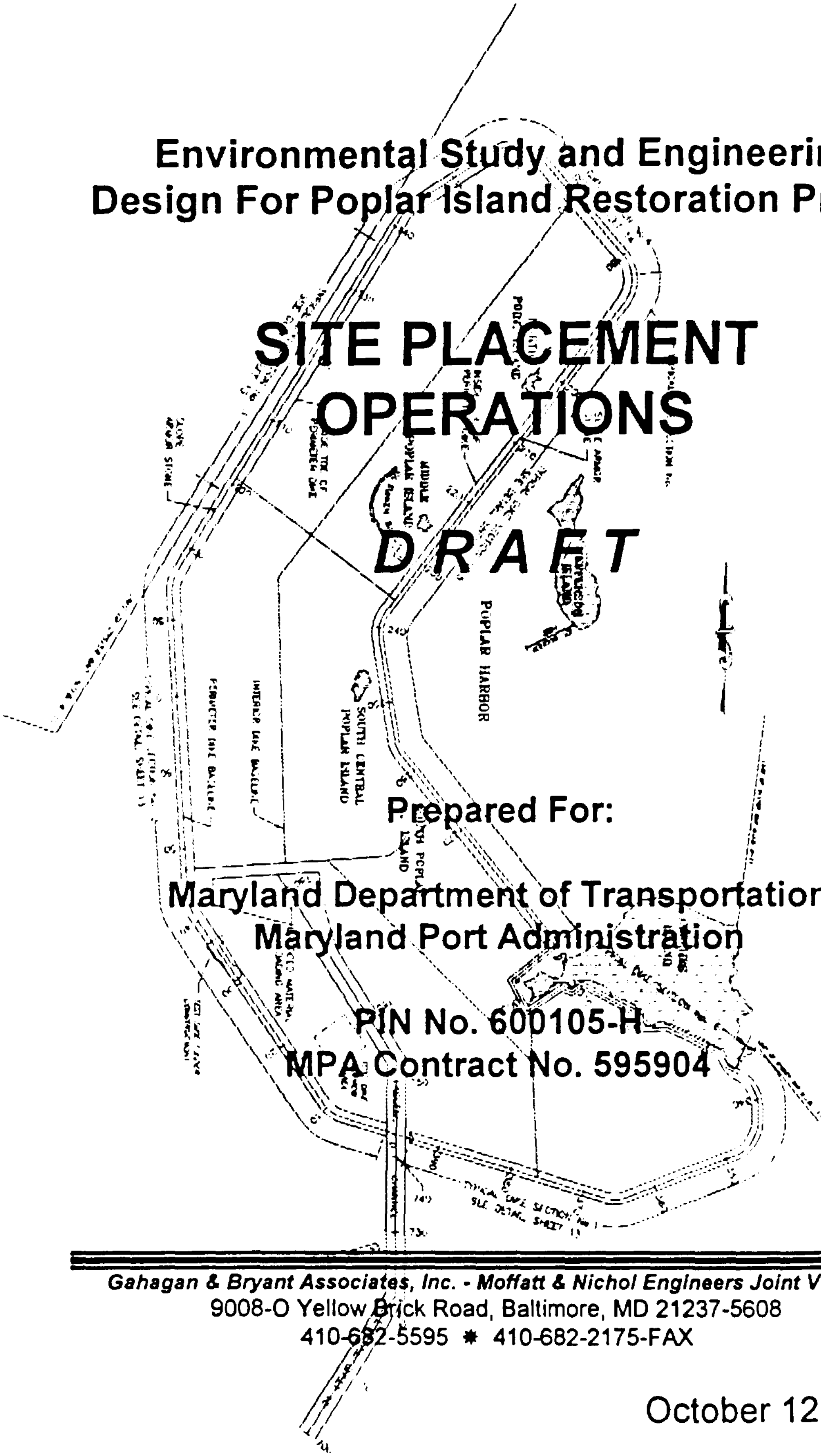
Loss of land to erosion is a common phenomenon in the Chesapeake Bay. Shoreline erosion negatively impacts water quality and habitat through sedimentation and the concomitant reduction in light penetration into the water column. The erosion also frequently leads to the loss of both wetland and upland habitat. Poplar Island, in Talbot County, MD, is an example of how significant erosion in the Bay can be. Historically the island was over 1,000 acres in size. Within approximately 100 years, the island has eroded to the point where only a few small remnants of islands are visible at low tide. Some of the eroded sediment adds to the volume of material that accumulates in the Chesapeake Bay shipping channels, increasing the need for routine maintenance dredging. Disposal of the dredged material is often problematic. One solution to dredged material placement is the beneficial use of the sediments.

The Poplar Island Restoration project offers an opportunity for beneficial use of clean dredged material removed from some of the approach channels to the Port of Baltimore. Coordination between MPA and Maryland Environmental Services (MES), the U.S. Army Corps of Engineers (COE) Baltimore District, and the Poplar Island Working Group has led to a concept for the reconstruction of Poplar Island using dredged material. An initial approach to this concept was described in the Prefeasibility Report (PFR) (MES 1994). This approach would restore Poplar Island to a size comparable to that which existed during the last century, and would allow for the development of diverse aquatic, intertidal, and upland habitat.

The following report summarizes important Habitat Development Guidelines that will guide the planning, design and implementation of the Poplar Island Restoration Project. The specific goals of this report are listed below:

- Provide general design guidelines for cell sizes, and acreages of various habitat components, such as wetland and uplands;
- Provide general specifications for various habitat components;
- Describe habitat development alternatives;
- Provide habitat maintenance guidance; and
- Include general cost estimates for habitat development.

Environmental Study and Engineering Design For Poplar Island Restoration Project



SITE PLACEMENT OPERATIONS

DRAFT

Prepared For:

Maryland Department of Transportation
Maryland Port Administration

PIN No. 600105-H
MPA Contract No. 595904

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October 12, 1995

SUMMARY

This *Site Placement Operations* report is one of a series being prepared as part of the detailed planning and design of the Poplar Island Restoration Project. The project consists of the reconstruction of tidal and upland habitats by making a beneficial use of dredged materials removed from the southern Bay approaches to the Port of Baltimore. This report is prepared in response to the requirements of Paragraph 1.3.6 of Exhibit B of Contract No. 595904 with the Maryland Department of Transportation, Maryland Port Administration (MPA). The report is part of the work effort performed under Task 8.1.7, Site Placement Operations, of the Project Schedule. The site configurations and operational procedures described have been developed by the GBA - M&N Joint Venture and its subconsultants as part of a joint discussion and review with the Office of Harbor Development of the MPA and the Corps of Engineers, Baltimore District and work progress reviews by several state and federal agencies.

PURPOSE AND SCOPE OF WORK

The purpose of this report is to develop a detailed placement operation manual. This draft is the first step in the formulation of the final operating manual.

The scope of work includes the following tasks:

- Define site and cell areas to be developed.
- Determine annual volumes of material to be dredged and placed at site.
- Determine typical contractor operations.
- Develop cell filling schedules.
- Outline site management methods, including monitoring, water level control, consolidation and desiccation, cell habitat development and periodic reporting.

SITE LAYOUT AND FEATURES

Site features are based on the 50 Percent Contract Drawings. The site features and their function are summarized in the table below.

SITE FEATURES, 1110 Acre Site
(All Values in Feet)

Feature	Phased Construction	Full Site Construction
Perimeter Dike:		
Length	25,000	39,560
Top elevation	8.0 to 11.5	8.0 to 11.5
Interior Dikes:		
Longitudal		
Length	10,100	15,400
Top elevation	10	10
Wetland Cross		
Length	1,400	3,800
Top elevation	6	6
Upland Cross		
Length	1,200	3,400
Top elevation	10	10
Spillways:		
Type A		
Tidal wetland cells	2	4
Type B		
Upland Cells	2	3
Type C		
Supplementary	–	–
Access Channel:		
Design depth	25	25
Bottom width	250	250
Length	8,217	8,217
Off loading Area:		
Design depth	25	
Maximum length	1,400	1,400
Maximum width	700	700
Service Dock:		
Length	100	100
Top elevation	6	6
Pad area	0.5 acres	0.5 acres
Staging Area:		
Elevation	10	10
Length	1,800	1,800
Width	150	150
Area	6 acres	6 acres

The Site Features shown are still under review and can be expected to change as the design progresses. No significant changes in the analyses and the procedures presented are anticipated as a result of these refinements.

The selected site is the result of a 14 month process of analyzing alternate site layouts to select the site which best meets the project objectives.

The proposed site was selected by the Project Inter-agency Working Group which consists of the Office of Harbor Development of the Maryland Port Administration, the U.S. Corps of Engineers and several State Agencies..

At the time of preparation of this report there is still uncertainty as to the phasing of site construction. Because of funding limitations it may be necessary to construct the site in two phases. Phase 1 would be approximately 500 to 600 acres and Phase 2 would add the remaining acres for a total site area of 1110 acres.

DREDGED MATERIAL VOLUMES

The greatest volume of dredged material to be placed at the site will be fine-grained maintenance materials from the Outer Harbor Approach Channels. There may also be some new work materials containing clays and sands that will be placed at the site. This will not change the basic site operations requirements but may require some adjustments in procedures. Therefore the basic operations procedures will be dictated by the characteristics of the predominate fine-grained maintenance materials.

The Alternative Site Layouts report (Section 3) contains a projection of an average annual maintenance dredging volume of 1.7 million cubic yards per year. For the purpose of this report, an average annual volume of material placed in the site of 2.0 million cubic yards is used.

DREDGING CONTRACTOR OPERATIONS

The most economical and environmentally sound method of placing maintenance dredged material into Poplar Island is by loading large hopper scows with clamshell dredges, towing the scows to the site and unloading the barges by hydraulic pumpout dredges. This method is similar to the operation presently being employed at Hart-Miller Island.

This is the most appropriate method in that the distance between the dredging site and Poplar Island (approximately 35 miles) and the type of material being dredged (fine-grained maintenance material) make hydraulic or hopper dredges.

CELL CHARACTERISTICS

The adopted development plan for Poplar Island provides for the construction of a 1,110 acre site consisting of 50 percent tidal wetland habitat and 50 percent upland habitat. The cell arrangements and characteristics used in the analyses presented in this report are summarized in the table below.

CELL CHARACTERISTICS, 1110 Acre Site
Volumes in million cy

Cell Characteristics Cell No.	Area, ac	Type	Average Bottom Elevation	Average Final Elevation	Volume (cy)	V.O. Ratio	Capacity (cy)
1	175	Tidal Wetland	-4.7	1.4	1.7	0.72	2.37
2	188	Upland	-8.2	20	8.6	0.62	13.80
3	139	Tidal Wetland	-3.9	1.4	1.2	0.69	1.71
4	149	Upland	-6.2	20	6.3	0.62	10.16
5	87	Tidal Wetland	-3.7	1.4	0.7	0.69	1.03
6	140	Tidal Wetland	-3.9	1.4	1.2	0.69	1.72
7	232	Upland	-5.5	20	9.5	0.62	15.39
Total	**1110**				**29.1**		**46.2**
Total Tidal Wetland Acres			**555**	**50%**			
Total Upland Acres			**555**	**50%**			

Notes: **Cell Volume** is calculated using the average depth of fill (Average Finished Elevation minus Average Bottom) over the area of the cell.

VO Ratio is the ratio of the Cut Volume measured in the channel being dredged to the volume occupied by the same material after 2 to 3 years of consolidation and desiccation in a cell. The consolidation and desiccation during this time is on the order of xxxxxx percent of the long-term volume change which will take place. The VO Ratio is significantly affected by the placement and materials management procedures described in Section 7.

Cell Capacity is the volume of dredged material which can be placed in a cell measured in cut cubic yards. It is determined by dividing Cell Volume by the VO Ratio.

The cell arrangements shown are still under review and can be expected to change as the design progresses. No significant changes in the analyses and the procedures presented are anticipated as a result of these refinements. The total site area of 1,110 acres and the 50 Percent tidal wetland habitat ratio will be maintained.

CELL FILLING SCHEDULES

Cell filling schedules describe the projected sequence of cell filling and the volumes of material to be placed each year. Each year's filling schedule will be based upon the target elevations for each cell, actual cell material elevations and total volume of material to be placed at the site. The desired rate of filling over the operational life of the site for both tidal wetland and upland cells as well as the optimal placement volume for each cell each year must be considered in the detailed cell filling schedule to be prepared each year. The annual cell filling schedules will be developed based on the above factors as well as the considerations developed in the other sections of this report.

Simulations of cell filling for an average annual placement of 2.0 million cubic yards were made for the first eleven years of site operational life for the total site development of 1110 acres. This analysis is useful for indicating the likely time to reach various cell elevations which defines the development schedules for wetland and upland cells, the sequence for raising upland cell dikes as well as the general effects of particular filling patterns. These conditions defined by these simulations may change markedly after the first year. Even though there will be variations in the volume of material placed annually, the simulations are very useful for determining which cell or cells should be developed initially.

This simulation indicates that after 11 years the remaining site capacity will be approximately 24.3 million cubic yards.

With annual lift thickness of 2 to 4 feet, the material would be placed over a 4 month period during the winter months and allowed to dry for about 8 months.

The site operating staff can use the analyses presented as a basis for refining the year by year plans for determining the volume of material to be placed in the site cells. These annual estimates will also take into account actual channel material characteristics, cell elevations and cell material water contents and resulting void ratios.

CONSOLIDATION AND DESICCATION OF DREDGED MATERIALS

The desired degrees of consolidation and desiccation of dredged materials is markedly different for the tidal wetland and for the upland cells. In tidal wetland cells consolidation and desiccation will achieve what is necessary to minimize continuing settlement of the wetland cell surface after initial habitat development and will achieve a cell surface material water content that will provide optimal soil texture for habitat vegetation.

After material surface levels have reached and exceeded MLLW in the upland cells operational efforts will be made to achieve full desiccation of the upland cell surface. Full desiccation of the surface layer will provide for maximum capacity of the upland cells in a cost-effective manner.

Full achievement of the described consolidation and desiccation will require placement of annual cell lifts on the order of 2 to 4 feet in thickness, proper cell spillway operations during and after each placement and effective materials management ("crust management") in the cells. Large increases over the 2.0 million cubic yards per year used in the analyses contained in this report will require careful planning and adjustments of site operations in order to maximize site effectiveness.

CELL WATER LEVEL CONTROL

The removal of water from the cells is a major factor in the consolidation and desiccation of dredged materials. Cell water levels are controlled by the placement and removal of weir boards in the cell spillways. There are three principal aspects to control of cell water levels:

1. Control of effluent suspended solids during placement operations.
2. Minimization of cell water levels to reduce wave wash on dike slopes.
3. Decant of surface water after placement operations to control drying and consolidation of cell materials.

CELL HABITAT DEVELOPMENT

Tidal wetland and upland cell development is described in detail in a separate report entitled *Habitat Development Report* (ECI September 1995). Various aspects of habitat development which are directly affected by site operational procedures are described in the other sections of this report.

SITE MANAGEMENT AND REPORTING

Periodic observation and reporting of site conditions will aid in determining if the site objectives are being met. In order to achieve the desired objectives of the wetland cells and the maximum capacity of the upland cells, the filling of the site will have to be scheduled annually to maximize the drying of the material placed and the site capacity. The basic guidelines are:

- Maximum lift should be kept to four feet or less in each cell.
- Placement of material should be performed during the winter months in order to maximize dewatering of the material during the summer months.
- During material placement, cell water levels should be kept to a minimum to maximize dewatering time and minimize entrained water in the material.

Annual estimated cell elevations and void ratios should be checked by surveys and material analysis at scheduled intervals.

- Before placement of material
- After placement of material
- After drying periods

Daily operating reports should be made by the crust management operating personnel. These reports should provide the following information:

- Number of personnel
- Types of equipment being used
- Operating time of each piece of equipment
- Which spillways are active
- Stored water in cells
- Weather conditions

Topographic and hydrographic surveys should be made periodically to determine the actual cell volume occupied.