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

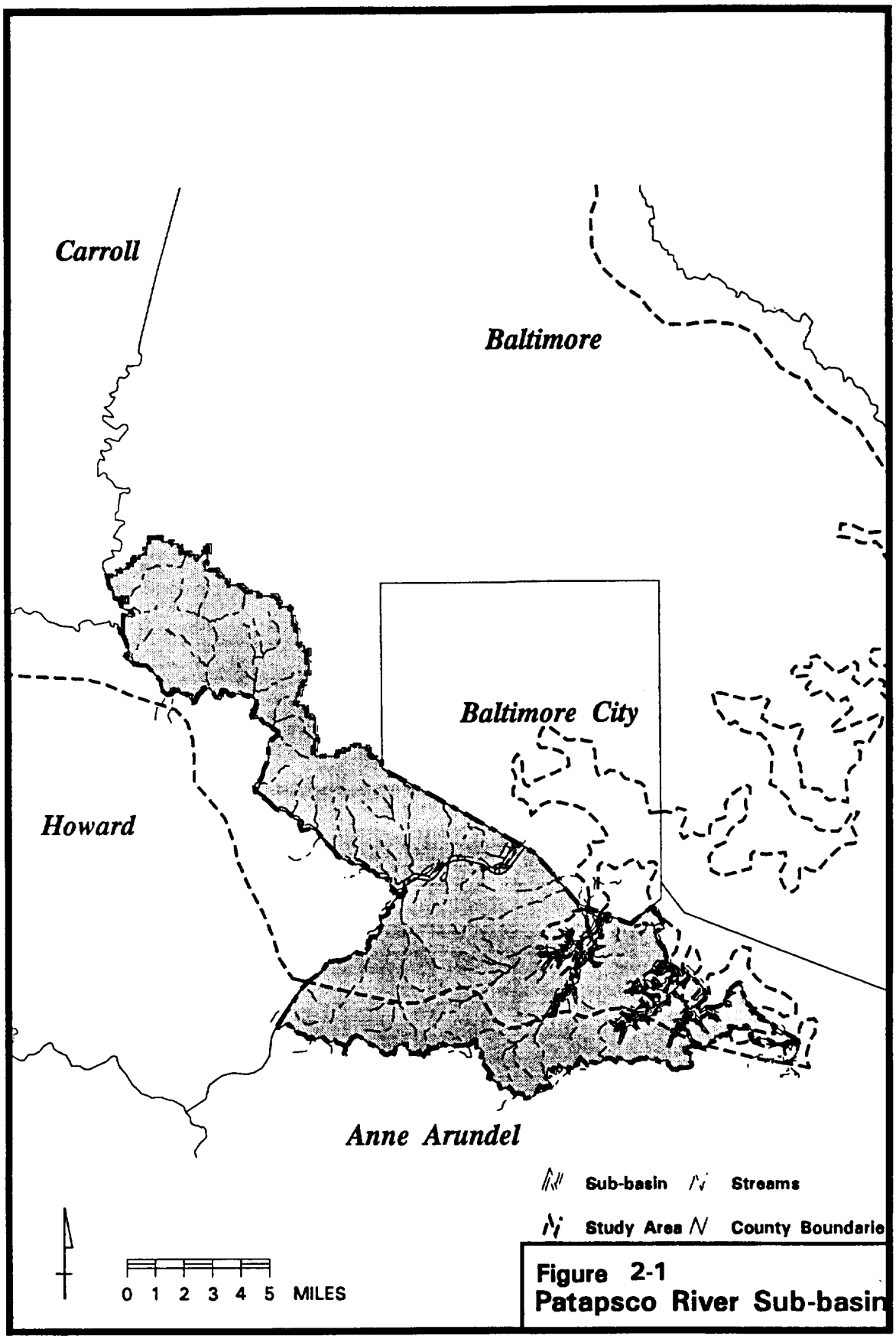

Figure 2-1
Patapsco River Sub-basin

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).

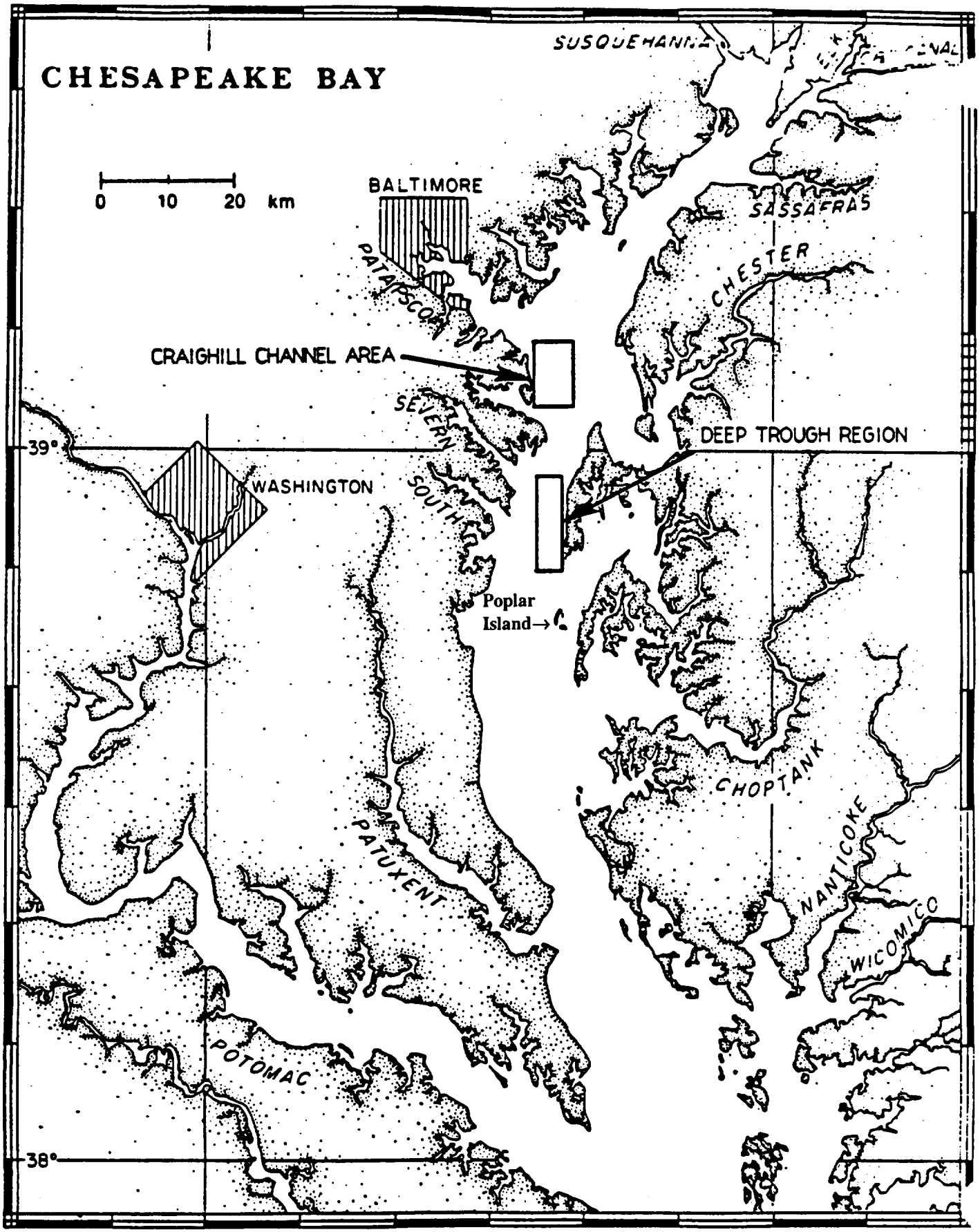

Figure 2-2 Deep Trough Location Map

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.

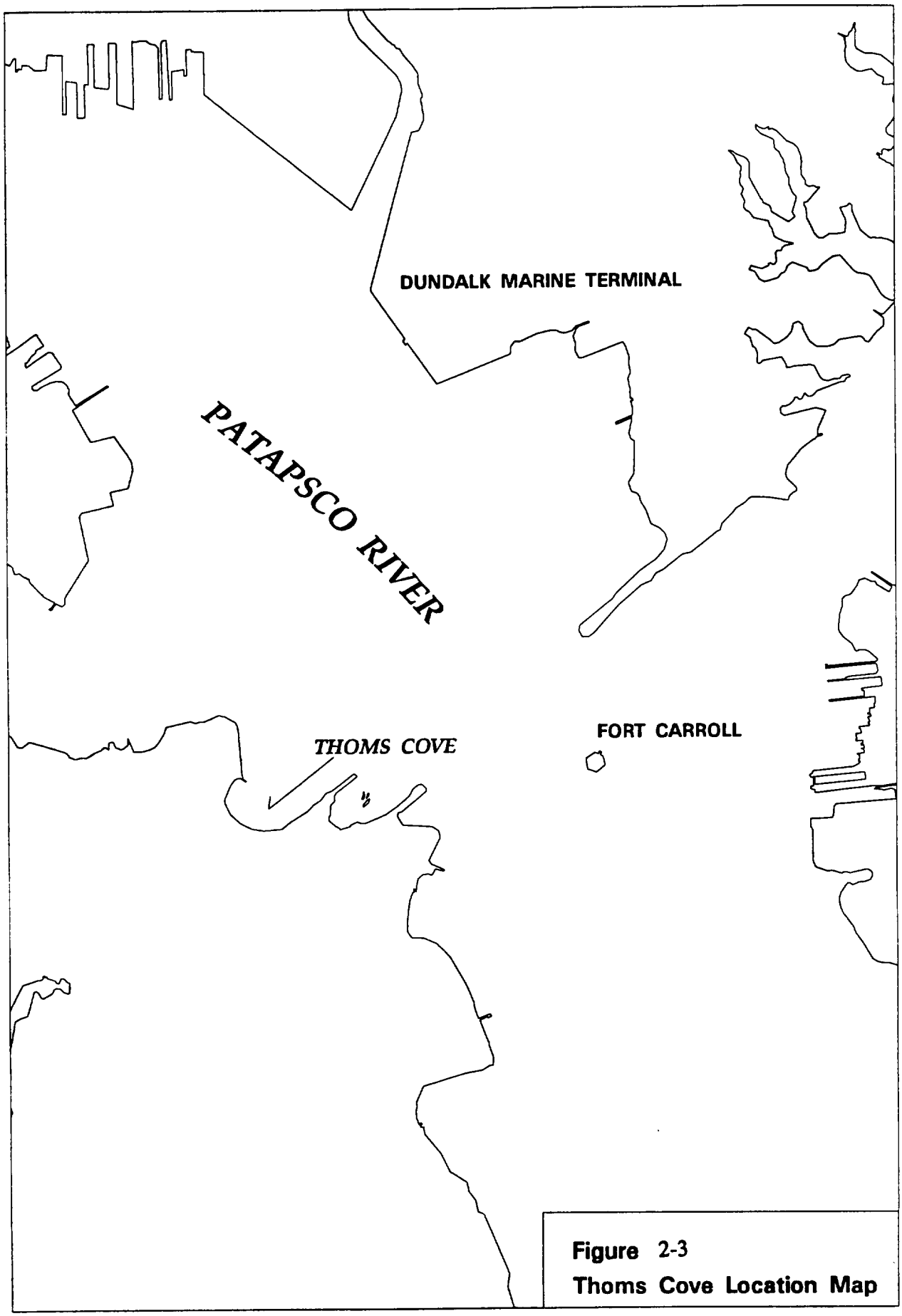

Figure 2-3
Thoms Cove Location Map

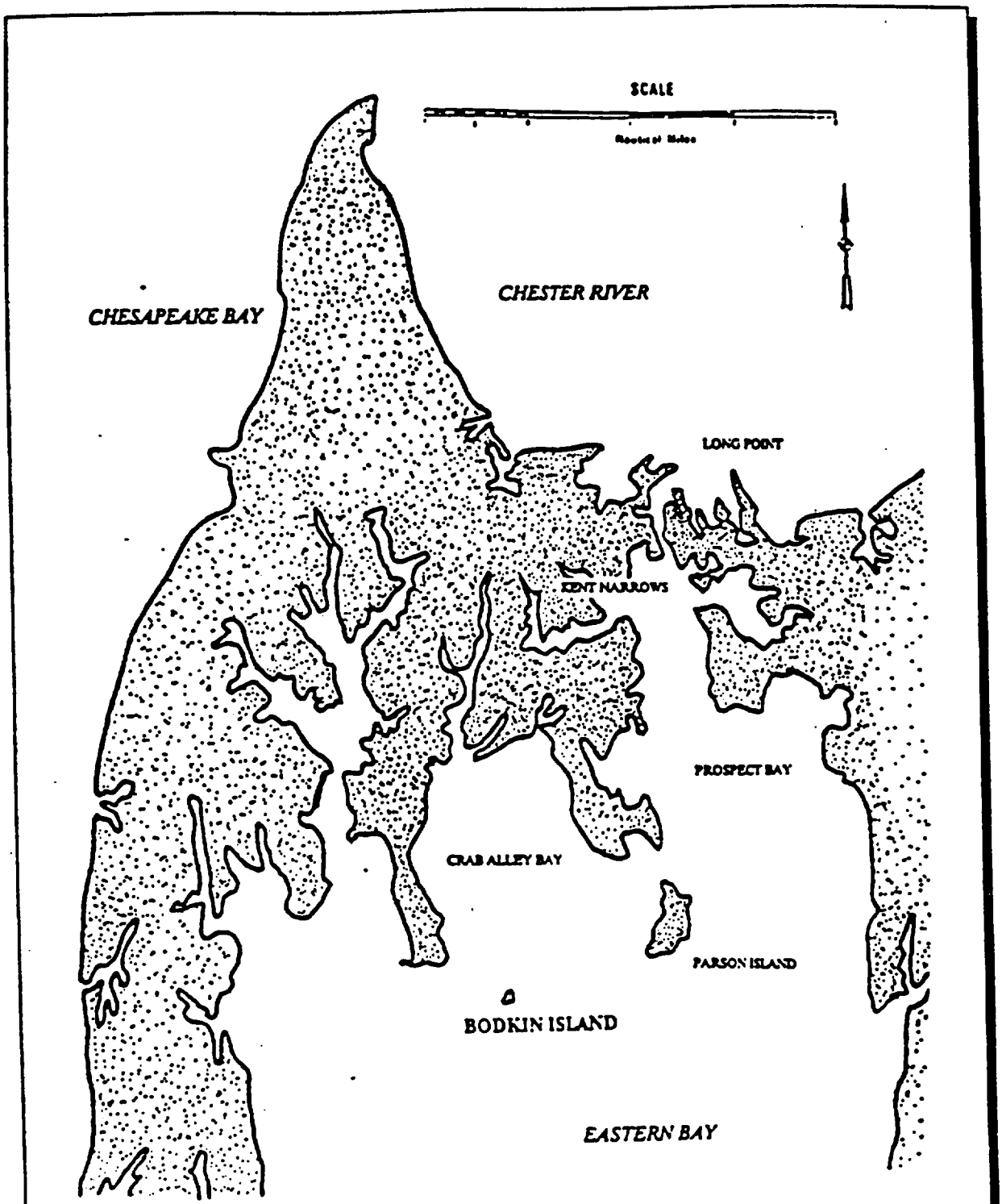

Figure 2-4
Bodkin Island Location Map

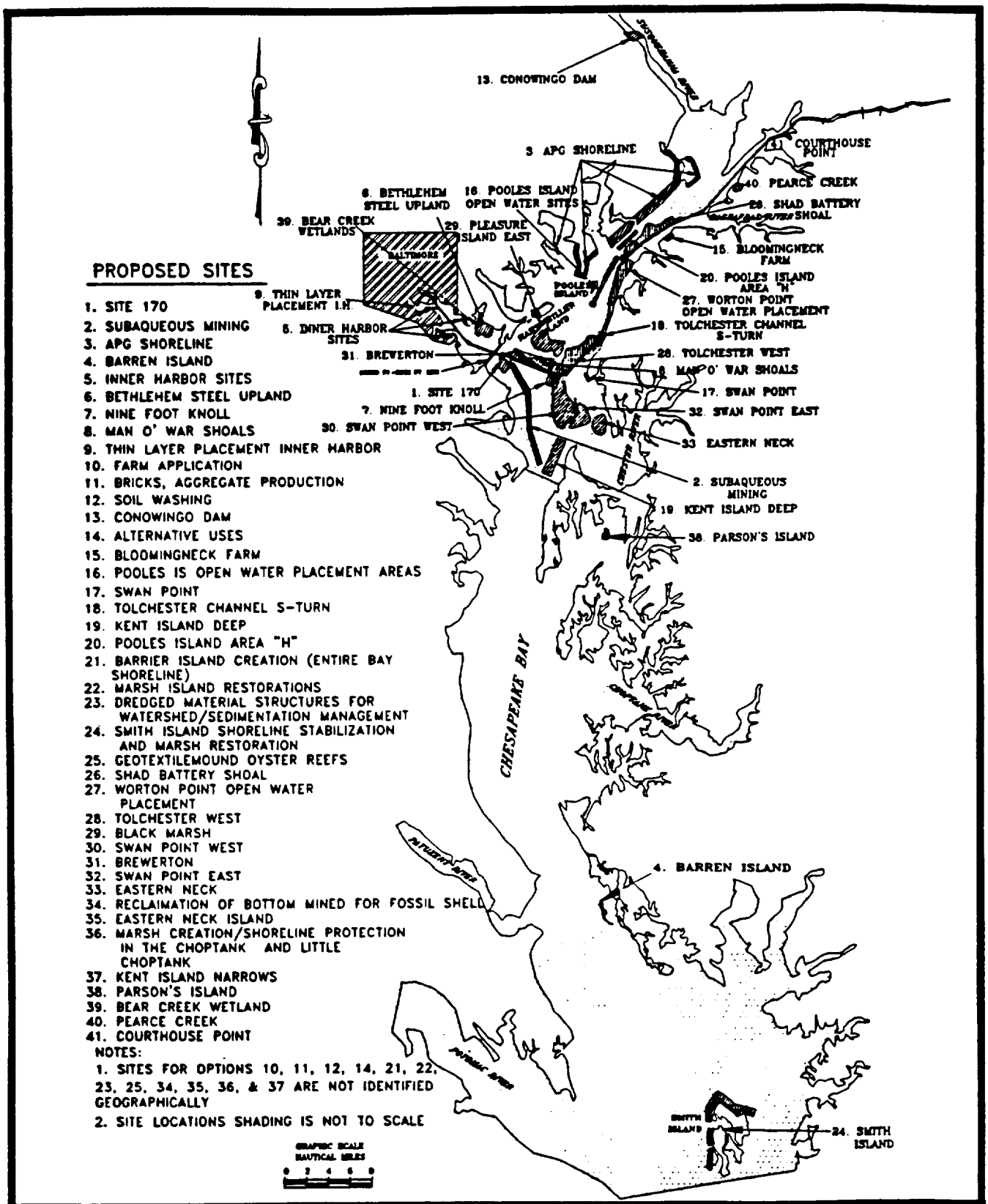

Figure 2-5. Phase II Bay Enhancement Proposed Placement Options Site Location Map

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.