STATE OF VIRGINIA

DREDGED MATERIAL MANAGEMENT PROCESS IMPLEMENTATION STUDY: PRELIMINARY TECHNICAL RESULTS

INTERIM REPORT OF THE BAY ENHANCEMENT WORKING GROUP

2022

PREPARED BY: MARYLAND ENVIRONMENTAL SERVICE

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Appendices

ACRONYM LIST

CAD	Confined aquatic disposal
CZM	Coastal Zone Management
EPA	Environmental Protection Agency
MDOT MPA	Maryland Department of Transportation Maryland Port Administration
NOAA	National Oceanic and Atmospheric Administration
RSDAPS	Rappahannock Shoal Deep Alternate Placement Site
SAV	Submerged Aquatic Vegetation
SGCN	Species of Greatest Conservation Need
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
VA BEWG	Virginia Bay Enhancement Working Group
VDWR	Virginia Department of Wildlife Resources
VIMS	Virginia Institute of Marine Science
VMRC	Virginia Marine Resources Commission
WTAPS NE	Wolf Trap Alternate Placement Site Northern Extension
WTAPS	Wolf Trap Alternate Placement Site

I. Introduction

Purpose: Maintenance dredging of the Chesapeake Bay (Bay) shipping channels is conducted to provide safe ship passage while transiting the Bay to the Port of Baltimore in Maryland, to the main anchorage for the Port of Virginia, and to the York River Naval Weapons Station. More specifically for the purposes of this report, the York Spit Channel in Virginia is dredged on an as-required basis because the shoaling rates and process are not consistent along the channel. In general, approximately 1.5 million cubic yards of sediment is dredged from the channel every 3-5 years. In addition, the entire length of the channel does not require dredging during each dredging cycle. The U.S. Army Corps of Engineers, Baltimore District, (USACE) who contracts the dredging and placement work, identifies the locations requiring dredging through hydrographic surveys, which are conducted periodically to determine the condition of the channel, and completed prior to estimating costs, discussions with ship pilots, and awarding a contract with a dredging company to conduct the work. The USACE must advertise the dredging contract 6-9 months before the work is expected to start. Therefore, an approved placement site is required well in advance and must be part of the solicitation package.

In 2014, the Commonwealth of Virginia expressed interest in finding an alternative to the Wolf Trap Alternate Placement Site (WTAPS) and the Rappahannock Shoal Deep Alternate Placement Site (RSDAPS), two open water placement sites for material dredged from the York Spit Channel and the Rappahannock Shoal, respectively. In 2019, the former Virginia Secretary of Natural Resource, Matthew J. Strickler, sent a letter to the USACE requesting that any future maintenance and proposed widening of the channels include a thorough evaluation of alternatives that include beneficial use opportunities.

Letter from Secretary Strickler January 14, 2019 (Appendix A): "The Commonwealth has stressed that the use of WTAPS threatens blue crab and multiple fish species identified by NOAA in its review of the Essential Fish Habitat assessment of WTAPS.

As an alternative, on behalf of the Commonwealth, I recommend that the Baltimore District limit the placement of the dredge material generated by the 2018 - 2019 maintenance dredging cycle at either alternative placement site previously identified by Virginia Marine Resources Commission (VMRC) and Virginia Institute of Marine Science (VIMS). Further, that such use of the alternative location in Virginia, if chosen, be restricted to the 2018 - 2019 cycle and that any future maintenance and proposed widening of this channel include a thorough evaluation of alternative proposed projects/concepts that include beneficial use opportunities as well as disposal outside the Chesapeake Bay."

Response Letter from Colonel John Litz, Commander, USACE Baltimore District, February 19, 2019 (Appendix B): In response to the letter from Secretary Strickler, the USACE Baltimore District responded via letter and committed to several next steps. First, the Maryland Department of Transportation Maryland Port Administration (MDOT MPA) and USACE postponed any further action on the proposed widening of the channel

system. Secondly, the USACE agreed to use the WTAPS Northern Extension placement site for the upcoming and future maintenance dredging cycles rather than the WTAPS site. Lastly, USACE pursued an update to their Dredged Material Management Plan (DMMP) to investigate potential alternative solutions. Subsequently, the DMMP Update process did not generate any further alternative placement solutions to explore. Therefore, together the MDOT MPA and USACE committed to convene the Virginia Bay Enhancement Working Group (VA BEWG), to identify potential beneficial use placement sites, projects or concepts, investigate their feasibility and ultimately prioritize solutions for formal study and evaluation (i.e. USACE Feasibility Study, Chief's Report, Congressional Authorization and Appropriations) to advance toward implementation.

"*The Corps understands the Commonwealth's preference to use the northern extension area contiguous with the current WTAPS for placement of material from the York Spit channel. We also acknowledge the Commonwealth's desire for beneficial use of the material in the long term. To accommodate this request, the Corps plans to use the WTAPS northern extension as the placement site for future maintenance dredging cycles until a new, long-term solution is identified, approved, and implemented…*

…The Corps will initiate the process to utilize the WTAPS northern extension using existing data and consistent with applicable federal regulations. The project sponsor would be responsible for any costs above the currently approved base plan as determined by the Corps…

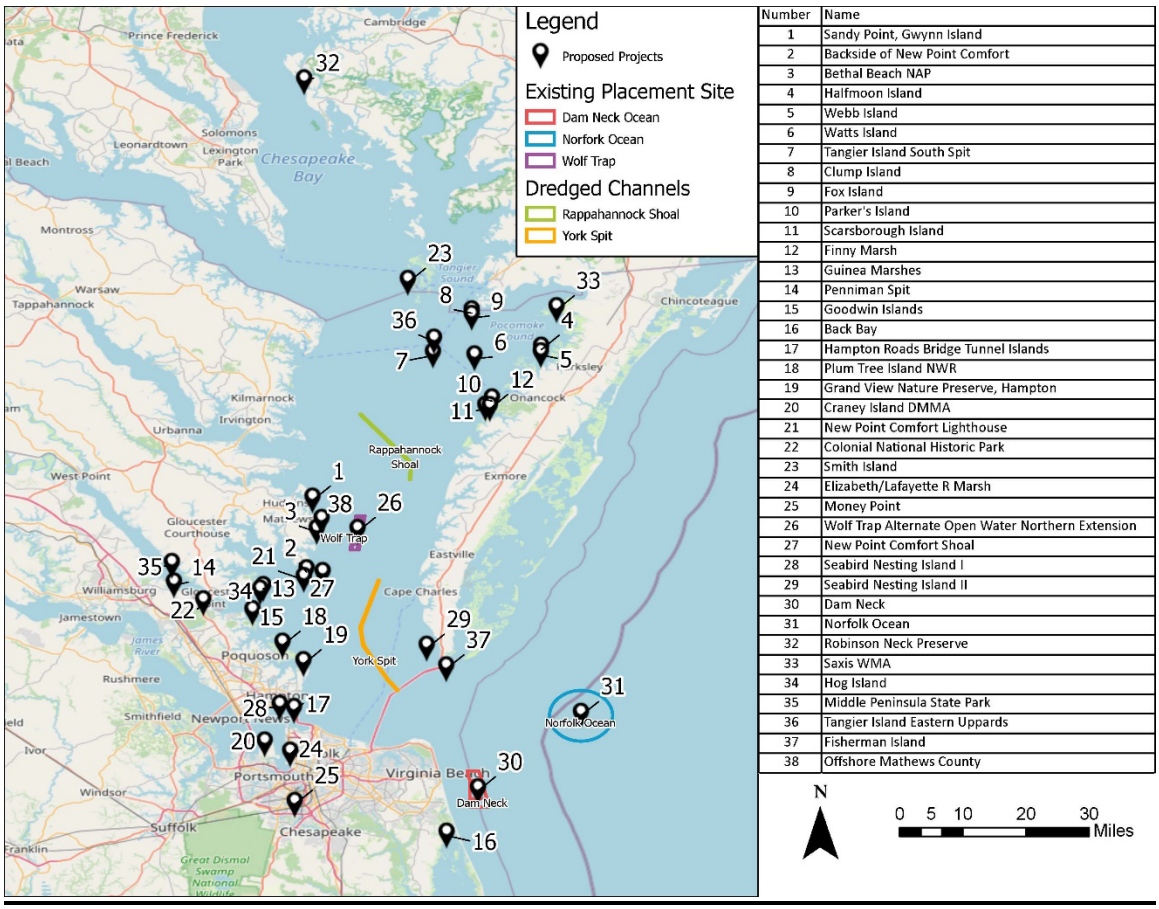
…Any potential projects recommended for further study would require specific feasibility analyses to determine costs, benefits, and environmental impacts as well as appropriate public and agency coordination. Feasibility studies require a non-federal sponsor as a cost-sharing partner. Projects selected for implementation by the Corps require funding, a non-federal cost-share partner, a Project Partnership Agreement, and public support…"

Goal: The Maryland Department of Transportation Maryland Port Administration (MDOT MPA) in association with Virginia Marine Resources Commission (VMRC) established a new working group, the Virginia Bay Enhancement Working Group (VA BEWG) in response to issues related to the placement of dredged material from the Virginia portion of the 50-foot channel that leads to Baltimore. The VA BEWG has the goal to identify potential proposed projects/concepts such as beneficial use projects or other solutions for placement of dredged material that are environmentally acceptable, feasible from an engineering perspective, cost-effective, and logistically efficient, and assist potential non-federal sponsor(s) with identifying the processes associated with project authorization and appropriations. The VA BEWG effort focused specifically on sediment dredged to maintain navigable water depths in the York Spit Channel. The Rappahannock Shoal Channel has not needed maintenance dredging since it was initially deepened to the authorized 50-foot depth in the 1980's and was not considered as part of this effort.

Objective: This report is designed to serve as a resource to support the scores applied during the environmental screening process. It assembles and provides preliminary environmental

resource findings to date and identifies study elements that may be required in the future. The materials presented in this report are based on the input from members of the VA BEWG and information available at the time of completion. As proposed projects/concepts are screened and evaluated for further study, and as additional information and analyses become available in the future, the information in this report can aid in enabling a comparison of the proposed projects/concepts for a wide range of environmental parameters.

Figure 1: Map of Proposed project/concepts



Number	Name
1	Sandy Point, Gwynn Island
2	Backside of New Point Comfort
3	Bethal Beach NAP
4	Halfmoon Island
5	Webb Island
6	Watts Island
7	Tangier Island South Spit
8	Clump Island
9	Fox Island
10	Parker's Island
11	Scarsborough Island
12	Finny Marsh
13	Guinea Marshes
14	Penniman Spit
15	Goodwin Islands
16	Back Bay
17	Hampton Roads Bridge Tunnel Islands
18	Plum Tree Island NWR
19	Grand View Nature Preserve, Hampton
20	Craney Island DMMA
21	New Point Comfort Lighthouse
22	Colonial National Historic Park
23	Smith Island
24	Elizabeth/Lafayette R Marsh
25	Money Point
26	Wolf Trap Alternate Open Water Northern Extension
27	New Point Comfort Shoal
28	Seabird Nesting Island I
29	Seabird Nesting Island II
30	Dam Neck
31	Norfolk Ocean
32	Robinson Neck Preserve
33	Saxis WMA
34	Hog Island
35	Middle Peninsula State Park
36	Tangier Island Eastern Uppards
37	Fisherman Island
38	Offshore Mathews County

II. VA BEWG Planning Process

The VA BEWG effort was initially focused on identifying dredged material placement proposed projects/concepts that could provide beneficial uses in the form of habitat enhancement and ecosystem benefits as well as social and economic benefits while minimizing potential adverse effects.

The physical and chemical characteristics of the sediment are major factors in determining the optimal end use for beneficial or innovative uses. Prior to dredging the sediment is

characterized through the collection of sediment samples and/or borings within the channel that is scheduled to be dredged. Sediment grain size can vary from the southern reaches of the York Spit Channel near the mouth of the Chesapeake Bay, where more sand sized particles are present, to the northern reaches where the sediment is composed of finer grained silts and clays. Both the volume of sediment requiring dredging and the grain size of that sediment are important considerations to be assessed in determining the most suitable locations and proposed projects/concepts for placement.

The VA BEWG only considered the sediment dredged for maintenance purposes because this is an ongoing, albeit intermittent, requirement. The York Spit Channel is currently dredged to an 800-foot width and 50-foot depth but has been authorized by Congress to be constructed to a width of 1,000 feet. Whether or not the channel widening occurs will be determined at some future time, along with the volume of sediment requiring removal and a suitable dredged material placement site. The grain size and other characteristics of any sediment removed as part of that effort also require further investigation. The VA BEWG did not incorporate any sediment volume or characteristics that may result from widening the channel into the assessment of placement proposed projects/concepts because of these unknowns, which would make the effort speculative. However, members of the group realized that further environmental review would be required for the selection of a final site or sites and warranted the inclusion of previously considered alternatives in the ranking process. Thus, sites such as the U. S. Environmental Protection Agency (EPA) Approved Ocean Placement Sites (Norfolk Ocean Disposal Site, Dam Neck Ocean Disposal Site) and the Wolf Trap Alternate Placement Site Northern Extension (WTAPS-NE) were included in the list of potential sites and proposed projects/concepts for review, ranking, and analysis.

III. VA BEWG Participating Staff

Staff representing the following agencies and groups in the effort were as follows:

Association of Maryland Pilots
Chesapeake Bay Foundation
Accomack-Northampton Planning District Commission
EcoLogix Group *(providing consultant support)*
Hampton Roads Planning District Commission
Maryland Department of Natural Resources
Maryland Department of Transportation Maryland Port Administration
Maryland Environmental Service *(providing consultant and contractor support; meeting facilitation)*
Middle Peninsula Planning District Commission
National Oceanic and Atmospheric Administration – Chesapeake Bay Office
National Oceanic and Atmospheric Administration – National Marine Fisheries Service, Greater Atlantic Regional Office
Smithsonian Environmental Research Center
Port of Virginia
The Nature Conservancy

The Port of Virginia
U.S. Coast Guard
U.S. Fish and Wildlife Service
U.S. Navy
U.S. Army Corps of Engineers – Baltimore District
U.S. Army Corps of Engineers – Norfolk District
University of Maryland Center for Environmental Science
Virginia Department of Conservation and Recreation
Virginia Department of Environmental Quality
Virginia Department of Wildlife Resources
Virginia Institute of Marine Science
Virginia Marine Resources Commission
Virginia Pilots Association

IV. Option Identification Process

Beginning in October 2020, the VA BEWG held a total of 17 meetings, approximately one per month until May 2022. The first meeting provided members an introduction to the MDOT MPA and Corps dredging process in the York Spit Channel, including an overview of dredged material characteristics; previous placement at WTAPS and most recently WTAPS-NE; examples of large scale beneficial use and aquatic ecosystem restoration projects; the BEWG process; missions and objectives for advancing the effort to a final conclusion; recommending a site(s) for formal feasibility analysis; and authorization and steps to achieve those ends. At the second meeting all members were encouraged to suggest potential sites or proposed projects/concepts that might be considered for inclusion, essentially an initial brainstorming process. This resulted in the identification of 55 potential projects or concepts. At subsequent meetings additional information was presented to the group, which resulted in a number of these initial suggestions being removed from the list for various reasons such as project constraints, redundancy, and/or the project was located on private property. In some cases, separate individual suggestions were combined into one suite of concepts either based on close proximity or having similar developmental characteristics, further reducing the list.

A major concern of the group was the distance required to transport the dredged sediment to a particular site because of the time and expense required for that transport, and a few sites were eliminated on that basis. Finally, if a site or suggestion was identified as likely having insufficient capacity to accept at least a reasonable proportion of the dredged sediment from a single York Spit dredging cycle it was also eliminated from the list.

Table 1 identifies the list of projects/concepts suggested, and whether or not the suggestion was deleted from consideration, combined with other suggestions and/or retained for scoring in the matrix. The determinations of option retention or deletion were made by the members of the group after careful consideration. Table 1 also indicates the reason for deletion. In some cases, a suggestion was not completely eliminated, but was combined with another option (e.g., Tangier Island) or included in a larger project (e.g., Shoreline Protection Mathews County) to simplify the scoring process or to result in a greater

sediment capacity more suitable for the quantities dredged for channel depth maintenance purposes. A total of 15 proposed projects/concepts suggestions were advanced to the matrix scoring. These are indicated as "retained" in Table 1.

Table 1: Alphabetical list of proposed projects/concepts. Those retained are in bold.

All Middle Peninsula tidal marshes	**Retained**; Incorporated in Shoreline Protection Mathews County (Co.)
All Middle Peninsula Shorelines	Deleted; Not specifically defined
Bethel Beach Natural Area Preserve (NAP)/inlet spit/Mathews Co.	**Retained**; Incorporated in Shoreline Protection Mathews County
Capping contaminated sites (Elizabeth River)	**Retained**
Catlett Island Chesapeake Bay National Estuarine Research Reserve (CBNERRS) property, Gloucester Co.	Deleted; Already in planning stages
Clump Island, Accomack Co.	**Retained**; Combined with Fox Island
Colonial National Historic Park and surrounding marshes	Deleted, Project already in progress
Combine material with aragonite (create cement)	**Retained**; Part of Upland Placement for Innovative Reuse
Confined Aquatic Disposal	**Retained**
EPA approved ocean placement sites	**Retained**; For use in Alternative Site Assessment (Norfolk Ocean and Dam Neck Ocean)
Fish House Island, Lynnhaven River	Deleted; Not well defined, project already in planning stages
Fisherman Island	**Retained**
Fox Island, Accomack Co.	**Retained**; Combined with Clump Island
Guinea Marsh Islands	**Retained**; Renamed Guinea Marsh Island Complex
Grandview Nature Preserve, Hampton, VA	Deleted; Grain size unsuitable, low capacity
Guinea Marshes	**Retained**; Incorporated into Guinea Marsh Island Complex.
Half-Moon Island, Accomack Co.	Deleted; Long distance, low capacity
Haven Beach, Mathews Co.	**Retained**; Incorporated in Shoreline Protection Mathews Co.
Hog Island (Mobjack Bay)	**Retained**; Incorporated in Guinea Marsh Island Complex
Mathews Co. Bay Shorelines and Marshes	**Retained**; Incorporated in Shoreline Protection Mathews Co.
Middle Peninsula, Farms and Fields	Deleted; Salinity of sediment makes unlikely to be successful soil amendment

Middle Peninsula Public Access Authority properties	Deleted; Most likely too low capacity
Middle Peninsula State Park	Deleted; Low capacity
New Point Comfort Lighthouse Island	Deleted, Site projects already underway or in planning stages
New Point Comfort Shoal	**Retained**
Oyster Bar Creation/Restoration	Deleted; Not suitable for sediment direct application on bottom
Parker-Scarborough-Finneys Island complex, Accomack Co.	Deleted; Private ownership, low capacity
Penniman Spit at the Cheatham Annex Naval Facility	Deleted; Project requires armoring
Plum Tree Island National Wildlife Refuge, Poquoson, VA	Deleted; UXO (unexploded ordinances) likely present, low capacity
Robinson Neck Preserve, Taylors Island, MD	Deleted; Long distance, low capacity
Saxis (Increase elevation of causeway)	**Retained**; Modified to be marsh restoration at Saxis WMA (Wildlife Management Area)
Seabird nesting island	**Retained**
Shore/Sea bird Habitat	Deleted; Habitat identification, incorporated into retained projects
Smith Island, MD shoreline protection	**Retained**
Stingray Point, Middlesex Co.	Deleted; Project not well defined
Tangier Island South Spit	**Retained**: Combined with Uppards site into single Tangier Island Option
Tidal marshes/islands in Elizabeth and Lafayette Rivers	Deleted; Project locations and suitability not well defined
Tunnel mitigation project (Hampton Roads)	Deleted; Project already in planning stages and/or underway
Uppards (Island NE of Tangier)	**Retained**: Combined with South Spit site into single Tangier Island Option
Ware Creek WMA	Deleted; Project not well defined
Watts Island (lengthen north/south; widen beaches)	Deleted; Grain size not suitable, low capacity
Webb Islands, Accomack Co.	Deleted; Long distance, low capacity
Wolf Trap Alternate Northern Extension	Retained; For use in Alternative Site Assessment

V. Resource Scoring Parameters

The VA BEWG membership collectively developed a list of screening parameters that were used to score the various proposed projects/concepts put forward. These parameters were largely based on the parameters that had been developed by the Maryland BEWG but were modified to more closely align with the ecosystem, economic, and social

characteristics in Virginia. The full list of parameter descriptions and associated scoring rationale is available in Appendix C.

Fifty-one parameters were developed to evaluate the potential suitability of the 15 proposed site projects/concepts. These parameters were grouped into 10 categories based upon similar attributes:

1. Water Quality,
2. Aquatic Habitat,
3. Wetlands,
4. Aquatic Biology – Finfish/Shellfish,
5. Special Regulatory,
6. Wildlife,
7. Physical Attributes,
8. Other Non-Biological Attributes,
9. Beneficial Attributes, and
10. Additional Parameters

Each parameter was assigned a raw score of +1, -1, 0, or 0. The scores are presented in the environmental ranking matrix and used to calculate the score for each proposed project/concept. A brief description of the scoring process is described below, and as noted above the more complete descriptions are included in Appendix C.

Table 2: Scoring Process

+1	Assigned to a given parameter if the option is expected to protect or enhance *existing* resources of that type in or immediately adjacent to the option footprint.
–1	Assigned if the resource is present and negative impacts (or further degradation) is expected as a result of option development.
0	Assigned when no positive or negative impacts are expected to existing resources at or immediately adjacent to an option. A 0 was also assigned in cases where there was not enough basic information to make a definitive evaluation, or the information was ambiguous.
0	The zero underline indicates to decision makers those proposed projects/concepts that had insufficient information available to warrant a score in the opinion of the group.
	If the parameter is not applicable at a particular proposed project/concept because it could not possibly exist in that location, the box is shaded.

For the majority of parameters, the impacts are carefully defined as long-term negative impacts to existing resources so proposed projects/concepts will not be scored negatively for potential short-term effects (e.g., short term increase in turbidity associated with placement of sediment).

The scores for each resource parameter for a particular proposed project/concept were assigned based upon the best professional judgement and consensus of the VA BEWG and

were subject to change as new data or information became available during meetings and discussions. Values were then entered into a scoring matrix, attached as Appendix D. It is expected that additional information will be required for proposed projects/concepts as the process moves forward, acquiring this additional detailed analysis will be the focus of the second phase of the VA BEWG process to further refine the list of potential candidate concepts/projects. As the information becomes available, the scores can be reevaluated and updated as determined appropriate by the VA BEWG.

Following the assignment of the +1, -1, 0, 0, or shaded (i.e., N/A) scores for each parameter and proposed project/concept, the total score for each proposed project/concept was determined by summing the values across all applicable parameters. The total score for each proposed project/concept was normalized by dividing by the number of applicable (unshaded) parameters for that option. In this way, proposed projects/concepts were not unduly weighted for resources that could not exist at the proposed site/projects. The normalized scores are for *relative comparison* among the proposed projects/concepts, and a positive or negative score *does not necessarily indicate that a proposed project/concept has an overall positive or negative impact*. To emphasize that the rank of the screened proposed projects/concepts is relative, the lowest normalized score was added to the score for each final option evaluated. Therefore, all the proposed projects/concepts have positive scores, and the lowest ranking option has a score of 0.

VI. Distance to Proposed Sites & Sediment Characteristic Considerations

As part of the evaluation process, the group discussed the distance to the proposed sites because of the increased costs associated with transport of dredged sediment from the channel segment being dredged. A potential project/concept located a short distance from the York Spit Channel segment would have lower transportation costs and could potentially enable more funding to be utilized for pre-construction engineering, design, and construction to maximize the beneficial use elements of the project.

The grain size of the sediments dredged from the York Spit Channel is not uniform across the full length of the channel. In general, the sediments are coarser in the southern reaches of the channel, closer to the mouth of the Chesapeake Bay, and become progressively finer with distance from the mouth. Coarser sediment, in the southern portion of the channel may be more suitable for direct application to restore an eroding shoreline or beach, while the finer sediment located further to the north is likely not suitable for such a purpose without containment measures included in the engineering/design/construction to prevent the dispersal of sediment from high wave and/or tidal action and ensuring the long-term viability of the restoration project. However, the finer sediment may be suitable for direct application on an existing tidal marsh as a beneficial use restoration project. Thus, projects located near the southern channel section that involve beach nourishment or direct shoreline application may be suitable for sediment dredged from that portion of the channel while minimizing transport distances. Similarly, projects located closer to the northern section of the York Spit Channel for which finer grained sediments are suitable will have shorter transport distances. Costs could potentially be reduced if a project site is located in proximity to the section of the channel with the preferred sediment grain size for the proposed beneficial use.

To address grain size suitability and transportation distances and costs, the committee developed a Distance Table, shown below, that includes the distance to the projects from the northern portion, the center, and the southern portion of the York Spit Channel with the northern and southern section's encompassing approximately the upper 1/3 and lower 1/3 of the entire channel length. Not all projects listed above in the Option Identification section (Table 1) are included in the distance table because some had already been deleted from the list before the distance measurements were made, or no distance could be determined because the location of the potential project had not been identified. Projects such as Upland Placement for Innovative Reuse and Confined Aquatic Disposal, for example, had no specific location determined.

The dredging process itself has historically utilized hopper dredges, which due to the conditions in the Virginia waters of the Chesapeake Bay would likely be required as the dredging method in future dredging cycles. The relatively open waters of this portion of the Chesapeake Bay with long fetch coupled with ocean swells entering through the mouth of the Bay generally precludes the use of bucket and scow dredging operations due to safety concerns, according to the USACE VA BEWG members. Another potential constraint is related to industry's hopper dredge fleet capacity, which can pose challenges in scheduling the relatively few hopper dredges in the United States with due regard to environmental windows (time of year restrictions on dredging operations) for species migration and breeding. Thus, it may be difficult to schedule enough time for the dredge to conduct the work with long transport distances required. Increasing the transport distances would require lengthier contract time, thus increasing operational costs and possibly

necessitating work to be conducted outside of environmental windows, which could increase the impacts to threatened and endangered species. Some of the proposed projects/concepts involve marsh restoration which may include applying the dredged sediment to the existing marsh surface to raise the elevation and counter sea-level rise and marsh subsidence and erosion. This process is commonly referred to as thin-layer placement. Thin layer placement necessitates additional equipment and time at the site to offload the dredged sediment from the hopper dredge, which would result in additional expense and time to complete the dredging and placement operation.

An additional aspect of the hopper dredges that have been utilized for dredging the York Spit Channel is that they require a water depth of at least -24 feet. Most of the beneficial use projects/concepts proposed by the VA BEWG are located in shallow water depths, often less than -10 feet deep. It is important to note that in Maryland the existing Poplar Island beneficial use project and the Mid-Bay project, which is in the final design stage, are both located in relatively shallow water less than 15 feet deep. Approach channels need to be dredged to these sites, to allow tug and barge access to the project sites. The sediment dredged to allow access, if of suitable grain size, can be utilized in the project construction itself, otherwise its placement must be addressed in the project capacity. The committee also requested, as part of the evaluation process, that the distance from the approximate location of the proposed sites/projects to a water depth of -24 feet be measured. Similar to the distance from the York Spit Channel itself, additional cost would be associated with dredging and maintaining an access channel for any chosen site/project, which is of consideration because minimizing costs is typically a preferable option.

Table 3: Distances of proposed project/concepts from York Spit Channel sections and from 24-foot water depths. See text for details.

Proposed Project/Concept	Northern Portion of York Spit Channel		Center Point of York Spit Channel		Southern Portion of York Spit Channel	
	Distance from center of Northern York Spit section (miles)	Distance from Water of 24-foot depth (miles)	Distance from center of Entire York Spit Channel (miles)	Distance from Water of 24-foot depth (miles)	Distance from center of Southern York Spit Section (miles)	Distance from Water of 24-foot depth (miles)
Bethel Beach NAP	14	3	19	3	23.5	3
Capping contaminated sites (Elizabeth River Area)	37	N/A	31	N/A	26.5	N/A
Clump Island, Accomack Co.	47	2	53	2	57.5	2
Colonial National Historic Park	24.5	<0.1	21.5	<0.1	26	<0.1
EPA approved ocean placement sites	41/35	N/A	35/30	N/A	31.5/25.5	N/A
Fox Island, Accomack Co.	47	2	53	2	57.5	2
Goodwin Island	18.5	0.8	15.5	0.8	20	0.8

Grandview Nature Preserve	9	4	5.5	4	5	4
Guinea Marsh Islands	9.25	4.5	14	1.5	19.5	1.5
Half-Moon Island	47	4	53	4	57.5	4
Middle Peninsula State Park	32	0.5	29	0.5	33.5	0.5
New Point Comfort Lighthouse Island	8	1	12	1	16.5	1
New Point Comfort Shoal	7.5	0.5	11	0.5	15.5	0.5
Offshore Eastern Mathews County	14	1 to 2.5	18	1 to 2.5	23	1 to 2.5
Parker-Scarborough-Finneys Island complex	36	4	41	4	45.5	4
Penniman Spit at the Cheatham Annex Naval Facility	29	0.5	26	0.5	30.5	0.5
Plum Tree Island NWR	9	4	5.5	4	10	4
Sandy Point/Gwynn Island	18	2	23	2	27.5	2
Saxis WMA	53	6	59	6	63.5	6
Seabird nesting island	10	<0.1	5	<0.1	8	<0.1
Smith I, MD	50	3	55	3	59.5	3
Stingray Point, Middlesex Co.	24	1.5	29	1.5	33.5	1.5
Tangier Island, South Spit	40	1	45	1	49.5	1
Tangier Island, Uppards	43	2	48	2	52.5	2
Tidal marshes - Elizabeth and Lafayette Rivers	37	<1	31	<1	26.5	<1
Watts Island	50	2	55	2	61.5	2
Webb Islands	47	4	53	4	57.5	4

VII. Proposed Project/Concept Descriptions

Through the process outlined above the VA BEWG developed a list of 15 proposed projects/concepts for scoring and ranking according to the agreed upon criteria parameters. Some of these proposed projects/concepts were beneficial use and aquatic ecosystem restoration projects, while others were alternative uses that the group determined may be viable proposed projects/concepts to consider (e.g. Confined Aquatic Disposal, upland Innovative Reuse opportunities) and some were included as a basis for the alternatives analysis required for federal environmental assessments further in the feasibility evaluations (e.g. EPA Approved Ocean Disposal Sites, Wolf Trap Alternate Northern Extension). Although general in nature, a description for each option was developed to guide the VA BEWG membership for scoring the environmental matrix. For example, to score the environmental parameter for shallow water habitat, it would be necessary to know if the proposed site was located in shallow water. Where possible, a potential project sponsor(s) was identified, a group that would be an advocate for the project and potentially be engaged through the selection and design process. The identification of a project sponsor is not intended to exclude other agencies or groups from being engaged. Project distance from the approximate center of the York Spit Channel is included because of the importance of transport distance on the potential project cost. Inclusion of distance is for general reference, the more complete information on distance from channel segments and distance from water with depths suitable for access by the hopper dredge is included above in Table 3.

1 - Tangier Island

Description:
The Tangier Island Project consists of two closely spaced projects, one on the South Spit of the Island and the other on the eastern side of the Uppards. Due to their close proximity and distance from the York Spit Channel it was decided to combine the projects which would also serve to increase the overall capacity to receive dredged sediment.

The South Spit serves as both wildlife habitat and as protection for the harbor and community of Tangier Island. The sandy nature of the spit provides important habitat for numerous species, including the following Species of Greatest Conservation Need (SGCN) identified in Virginia's Wildlife Action Plan: state-threatened gull-billed terns, common terns, royal terns, black skimmers, American oystercatchers and diamondback terrapins. In the past when the spit was longer, it helped attenuate wave action for the harbor area. Utilization of dredged sediment in this proposed location would serve to enhance and/or protect the south spit. In cases where the dredged sediment is predominantly sandy, it could be applied directly to the spit itself, improving the habitat and increasing the size. That material which is too fine to be applied directly to the spit could be contained in a nearby area, similar to the construction project at Poplar Island, Maryland. The containment area would be protected from erosion and dispersal by a dike protected by rock revetment. The interior of the diked area could be designed to provide both marsh and upland areas further enhancing the habitats in the area. In addition, it would provide erosion protection to the south spit itself, whether or not that area receives dredged sediment directly.

The Uppards located north and east of Tangier Island serves as both wildlife habitat and as protection for the harbor and community of Tangier Island. The Eastern Uppards provides habitat for the following SGCN: American oystercatchers, willets, American black ducks and diamondback terrapins. Moreover, there is a wading bird colony comprised of little blue herons, tricolored herons, snowy egrets, glossy ibis and other SGCN on the north side of the harbor that is highly vulnerable to sea level rise. Utilization of dredged sediment at the Uppards would serve to enhance and/or protect the marshy islands. In cases where the dredged sediment is predominantly sandy, it could be applied along the edges of the islands. That material which is too fine to be utilized in this manner could be contained in a nearby area, similar to the construction project at Poplar Island, Maryland. The containment area would be protected from erosion and dispersal by a dike protected by rock revetment. Alternatively, the material could be applied to the existing marshes in as a thin layer thereby increasing elevation of the marshes without altering the habitat and possibly creating new habitat for breeding wading birds.

Project Sponsor:
Accomack-Northampton Planning District Commission
Accomack County

Distance from York Spit Channel:
Approximately 45 miles from the York Spit Channel centroid.

2 - Smith Island

Description:
Smith Island in Maryland hosts island marsh and pocket beach habitats with isolated uplands as well as an island community. South Point marsh, a geomorphic extension of Smith Island into Virginia, currently supports Virginia's largest brown pelican and double-crested cormorant breeding colonies. The following SGCN are known to or likely nest on Smith Island: American oystercatchers, willets, American black ducks, Forster's terns, clapper rails, Virginia rails, seaside sparrows, saltmarsh sparrows and diamondback terrapins. Erosion is a constant issue and degrades both the wildlife habitat and the communities. Sea level rise threatens the marshes. The communities are located near the western side of the island and significant erosion occurs in this area due to the extensive fetch to the west. Protection and enhancement of the natural habitats and the communities could be accomplished with the proper utilization of dredged sediment. In cases where the dredged sediment is predominantly sandy, it could be applied along the edges of the eroding islands adjacent to or directly on the existing pocket beaches. That material which is too fine to be applied in this manner could be contained in a nearby area, similar to the construction project at Poplar Island, Maryland. The containment area would be protected from erosion and dispersal by a dike protected by rock revetment. The interior of the diked area could be designed to provide both marsh and upland areas further enhancing the habitats in the area. Construction of an island in the western portion of the Smith Island complex could be designed to attenuate the wave action on the island reducing erosion of both natural habitats and the community areas.

Project Sponsor:
TBD/Suggested by The Nature Conservancy

Distance from York Spit Channel:
Approximately 55 miles from the York Spit Channel centroid.

3 - Guinea Marsh Island Complex

Description:
The Guinea Marsh Islands are a complex group of eroding islands and spits that are largely marsh with isolated uplands present. The group (including Hog Island) provide habitat for numerous species, provide storm protection to adjacent communities, and protect adjacent aqueous habitats. The islands are eroding as sea level rises and with anticipated accelerated sea level rise the islands are at increasing risk due to erosion, thereby eliminating the island habitats and removing the protection to adjacent habitats and communities.

Utilization of dredged sediment in a project at this proposed location would serve to enhance the islands themselves or serve as additional protection for the islands and reducing erosion. Should the dredged sediment be predominantly sandy it could be applied directly to the existing beaches on the islands to provide additional habitat and storm protection. Material that is too fine to be applied to the beaches could be utilized to increase the elevation of the existing marshes by direct spraying onto the marshes. Alternatively, the finer grained sediments could be contained in a nearby area, similar to the construction project at Poplar Island, Maryland. The containment area, designed either as a separate island or contiguous with an existing island, would be protected from erosion and dispersal of the dredged sediment by a dike protected by rock revetment. The interior of the diked area could be designed to provide both marsh and upland areas further enhancing the habitats in the area.

Project Sponsor:
NOAA
Middle Peninsula Chesapeake Bay Public Access Authority/Middle Peninsula Planning District Commission/Gloucester County

Potential Funding Sources
Restoring America's Wildlife Act, Coastal Zone Management (CZM) funds, USFWS Wildlife Restoration grant program, and the Water Resources Development Act-Continuing Authorities Program

Distance from York Spit Channel:
Approximately 14 miles from the York Spit Channel centroid.

Project Lifespan and Project's Ability to Accommodate Multiple Dredging Cycles
The project lifespan could be lengthy due to the complexity of the erosion occurring in the vicinity of the Guinea Marshes. The proposed project could be staged across multiple dredging cycles to focus on differing sections of the eroding marshes.

4 - Clump and Fox Islands, Accomack County

Description:
Both Fox and Clump Islands located in Accomack County are low marshy islands with thin sandy beaches fronting the low marshes. Both islands are eroding rapidly due to sea level rise and significant fetch, particularly to the west. Submerged Aquatic Vegetation (SAV) beds are located to the east of the islands which protect those beds from wave action. Thus, the islands serve both as habitat themselves and as protection to adjacent habitat. Dredged sediments could be applied to the shorelines if consisting of sandy sediments and applied in a thin layer to the marsh surface to improve resistance to erosion and flooding. Alternatively, a diked protected structure could be constructed to the west of the islands with the dredged sediment placed in the interior. Sediment placed in the interior could be utilized to create upland or marsh habitats, or both. A constructed island protected from erosion in this location would serve to protect the existing islands from excessive erosion from wave action. The following SGCN are known to have nested on Clump and Fox Islands in the past: royal terns, common terns, Forster's terns, black skimmers, American oystercatchers, willets, American black ducks, seaside sparrows and diamondback terrapins. Moreover, the federally and state threatened *Rufa* red knot has been observed on Clump Island during spring migration. At a minimum, restoration efforts would benefit these species and likely attract others in the future.

Project Sponsor:
Accomack-Northampton Planning District Commission
Accomack County

Distance from York Spit Channel:
Approximately 53 miles from the York Spit Channel centroid.

5- Saxis – WMA

Description:
The Saxis Wildlife Management Area is comprised largely of low elevation marshes with isolated uplands and localized pocket sandy beaches. Exposure to wave action and rising sea levels has resulted in the erosion along the exposed edges and increased flooding of the interior marshes has resulted in marsh degradation. Saxis provides some storm protection to adjacent communities. It also provides habitat for a variety of SGCN, including Forster's terns, American oystercatchers, willets, American black ducks, seaside sparrows, saltmarsh sparrows (currently a candidate species for federal listing) marsh wrens, Virginia rails and diamondback terrapins. Saxis is also home to Virginia's few remaining pairs of the federally threatened and state endangered black rail. With anticipated accelerated sea level rise, the entire area is at increasing risk due from erosion.

Utilization of dredged sediment in a project at this proposed location would serve to preserve the habitat and maintain the extent of the management area. Should the dredged sediment be predominantly sandy it could be applied directly to the existing eroding beaches to provide additional habitat and storm protection. Material that is too fine for application on the beaches could be utilized to increase the elevation of the existing marshes. This could be accomplished by direct spraying onto the marshes, or by infilling of interior open water depressions that were once wetlands and have developed from marsh degradation as sea level rises.

Project Sponsor:
VA DWR

Distance from York Spit Channel:
Approximately 55 miles from the York Spit Channel centroid.

6 - New Point Comfort Shoal

Description
The proposed project anticipates the construction of a large island that is similar in function to Poplar Island, Maryland. The intent is to create wetlands, uplands, oyster reefs, SAV beds, etc. Island size could increase over time as material is added, but ultimately a 500+ acre island could be managed for (1) sandy habitat with sparse vegetation that would attract nesting seabirds, shorebirds and diamondback terrapins; (2) grassy upland areas (S. patens) for nesting waterfowl, pelicans and laughing gulls, salt-marsh sparrows, black rails and other high-marsh dependent species, and (3) shrubby habitat for nesting long-legged wading birds. In addition to the upland habitats the project could be designed in a way that promotes the establishment of SAV beds, oyster reefs and other features beneficial to fish populations and other aquatic organisms. Moreover, building a large island adjacent to an eroding shoreline may provide additional protection from storms and destructive long fetch waves.

Benefits to Wildlife
The overarching goal of this project is to "construct" suitable breeding/spawning, stopover and/or wintering habitat for a variety of terrestrial and aquatic wildlife. More specifically, habitats for a number of SGCN and listed species would be created to offset the loss of natural habitats to sea level rise high intensity storms, development and other human-induced factors, and to enhance climate readiness for these species. The current preliminary list of VA DWR priority species (i.e., SGCN and listed species) indicates that thirty-nine percent (n = 31) of the 80 avian SGCN in Virginia may gain suitable breeding, staging/migration and/or wintering habitat, of which four are federally and/or state listed.

Project Sponsor
VA DWR
Middle Peninsula Chesapeake Bay Public Access Authority/Middle Peninsula Planning District Commission/Mathews County

Potential Funding Sources
Restoring America's Wildlife Act, CZM funds, USFWS Wildlife Restoration grant program, and the Water Resources Development Act-Continuing Authorities Program

Distance from York Spit Channel
The specific site location will likely be determined based on discussions with associated management, permitting and funding agencies, but the suggested location on the New Point Comfort Shoal is just south of the Wolf Trap open water disposal site, and approximately 8 miles from the York Spit Channel centroid.

Project Lifespan and Project's Ability to Accommodate Multiple Dredging Cycles
The project lifespan could be as much as 50 years. All the dredge material in the first construction year could be utilized to establish the project footprint and initial elevation. The island could be enlarged and elevated to utilize all dredge material for several dredging cycles, as needed.

7 - Shoreline Protection of Eastern Mathews County

Description
The area offshore of the current Mathews County shoreline consisted at one time or a series of low marsh and associated sandy beaches bay ward of the upland areas. A variety of habitats were supported which also provided shoreline protection to the adjacent uplands. This project would seek to recreate a similar zone utilizing dredged sediment with the design intent of serving the same purposes. It would utilize sand from the York Spit Channel and/or other sources, which would be placed offshore in shallow water areas to recreate sandy subaerial habitat that could serve as stopover habitat for migrating *rufa* red knots, a state and federally threatened shorebird, help protect adjacent habitat for the state and federally threatened Northeastern Beach tiger beetle and restore least tern breeding habitat, a SGCN in Virginia. Placement would occur offshore of the area roughly between Gwynn Island and Winter Haven to the south. Shore protection structures may be required to maintain the sediment in place and prevent excessive erosion. Finer grained sediment from the York Spit Channel could be placed landward of the sandy deposits and developed into intertidal marshes. Some of the fine-grained sediment could also be sculpted into uplands to provide a greater variety of habitats in the placement area. The intertidal marshes would not necessarily be connected to existing marshes on the mainland, although in some locations where marsh currently exist on the mainland thin layer placement could be utilized to restore marsh loss that has resulted from sea level rise and/or subsidence. The project would serve to recreate an equivalent to the conditions that existed in the area before excessive loss to erosion.

Project Sponsor:
Middle Peninsula Chesapeake Bay Public Access Authority/Middle Peninsula Planning District Commission/Mathews County

Potential Funding Sources
Restoring America's Wildlife Act, CZM funds, USFWS Wildlife Restoration grant program, and the Water Resources Development Act-Continuing Authorities Program

Distance from York Spit Channel:
Approximately 20 miles from the York Spit Channel centroid.

Project Lifespan and Project's Ability to Accommodate Multiple Dredging Cycles
The project lifespan could be lengthy because the project could be conducted in stages along the entire eastern facing shoreline of Mathews County. In each dredging cycle a section or sections of the project could be constructed.

8 - Seabird Nesting Island (Cape Charles area)

Description
The proposed project anticipates the construction of an island that is similar in function to Poplar Island, Maryland. Sediment placed in this location would be contained by a dike that itself is protected from erosion by a rock revetment. A portion of the island, where potential erosion is more limited, could have sandy sediments of suitable grain size placed to create beaches that likely would require some protection from wave and tidal action, such as offshore segmented breakwaters. The interior of the island could be a combination of wetlands and vegetated uplands to support a variety of species. Portions of the island interior could have sandy islands surrounded by the marshes, to serve as nesting habitat for shorebirds and seabirds. In addition, construction of a large island adjacent the mainland shoreline would provide additional protection to that shoreline.

Depending on the size of the island, the elevation, and the ratio of wetlands to uplands various volumes of material could be utilized. If constructed with interior cells, similar to Poplar Island, multiple dredging cycles could conceivably be utilized.

Benefits to Wildlife
Similar to the proposed New Point Comfort Shoal project, the overarching goal of this project is to "construct" suitable breeding/spawning, stopover and/or wintering habitat for a variety of terrestrial and aquatic wildlife. More specifically, habitats for a number of SGCN and Threatened & Endangered (T & E) species would be created to offset the loss of natural habitats to sea level rise and increased storminess, development and other human-induced factors, and to enhance climate readiness for these species. The current preliminary list of VA DWR priority species (i.e., SGCN and listed species) indicates that thirty-nine percent (n = 31) of the 80 avian SGCN in Virginia may gain suitable breeding, staging/migration and/or wintering habitat, of which four are federally and/or state listed.

Project Sponsor:
TBD/ Suggested by VA DWR

Distance from York Spit Channel:
Approximately 5 miles from the York Spit Channel centroid.

9 - Fisherman Island

Description
Fisherman Island at the southern end of the Delmarva Peninsula is a National Wildlife Refuge administered by the USFWS. It is comprised of interior intertidal low and high marsh, some uplands and is ringed by sandy beaches and low dunes. The northern section of the Chesapeake Bay Bridge Tunnel highway passes over the western section of the island. The island functions as breeding, migratory stopover, and feeding habitat for a variety of shorebirds, waterbirds and marsh birds. Fisherman Island provides stopover habitat for the federally and state threatened piping plover and *rufa* red knot, and breeding habitat for piping plovers. It also supports breeding populations the following SGCN: American oystercatchers, seaside sparrows, willets, clapper rails and diamondback terrapins and least terns.

Sediment dredged from the southern section of the York Spit Channel, which consists of primarily sand sized material could be placed on the beaches and/or low dune areas to increase storm protection, replace habitat lost to erosion, and support US RT 13 infrastructure where it crosses the island. The sediment could potentially be sprayed as a thin layer onto the interior marshes to increase the elevation and mitigate the effects of sea level rise. More specifically, habitats for USFWS at risk species such as the salt-marsh sparrow as well as piping plovers and state-threatened gull-billed terns and several SGCN (e.g. American oystercatchers, diamond backed terrapins, least terns) could be enhanced in areas where shorelines are eroding due to sea level rise and more severe storm occurrence. Grain size suitability for use on the island would need to be assessed prior to placement.

Project Sponsor:
US Fish and Wildlife Service

Distance from York Spit Channel:
Approximately 7.5 miles from the York Spit Channel Southern Section centroid.

10 - Capping Contaminated Sites (Elizabeth River)

Description:
Capping of river bottom sediments in the Elizabeth River area would be accomplished by the controlled placement of suitable dredged material over the contaminated sediments. Typically, the sediment is placed in a layer approximately 3 feet or more in thickness. The cap prevents the migration of contaminated material and isolates it from benthic organisms. Conventional dredging equipment and techniques are frequently used for a subaqueous capping project, but these practices must be controlled more precisely than for conventional open water placement. Previous studies have shown that both fine-grained and sandy material can be effective capping materials; however, the physical characteristics of the subaqueous capping sediment should be compatible with the contaminated sediment and of sufficient grain size to remain in place. The areas that are feasible for this alternative are limited to those areas of the river that are deep enough that the cap system will not alter habitat, significantly impact river currents, or adversely impact navigation. Additionally, capping sites are generally not located in the immediate vicinity of navigation channels due to the potential for disturbance of the cap or future dredging operations in the area.

Project Sponsor:
TBD

Distance from York Spit Channel:
Approximately 25 miles from the York Spit Channel centroid to the approximate center of the Elizabeth River.

11 - Confined Aquatic Disposal

Description
Confined aquatic disposal (CAD) is a process where dredged material is placed at the bottom of a body of water, within a natural depression, a depression constructed specifically for the placement, or within a depression created during sand mining. The difference between CAD and open water placement is that the deposited material is confined to the designated area, preventing lateral or vertical movement. The capacity of a CAD facility depends on the quantity of the dredged material, the volume of the depression or the constructed facility, and the availability of suitable locations to site the facility. CAD has been used successfully throughout the world, and a pilot project conducted in the Baltimore Harbor was successful. In the Baltimore Harbor, clean sand was excavated to create the depression and utilized for construction. The excavated area was later filled with maintenance dredged sediment from the nearby shipping channels.

Project Sponsor:
TBD

Distance from York Spit Channel:
Not determined as a specific location would need to be identified.

12, 13 - EPA Approved Ocean Placement Sites –

12 - Norfolk Ocean Dredged Material Disposal Site (Norfolk ODMDS)

Description
The Norfolk ODMDS is an existing EPA designated site located in the Atlantic Ocean, approximately 17 miles off the Virginia coastline. Norfolk ODMDS is circular in shape, with a radius of approximately 4 nm and an area of approximately 41,500 acres. The water depth ranges from 43 to 85 feet with varying grade elevations of the bottom. The remaining in-place volume of the site in 1990 was estimated at 1.34 billion cubic yards (bcy), as cited in the *Port of Baltimore Dredged Material Management Master Plan* (MPA, 1990). Relatively little material has been placed in the site since that time and it is assumed that remaining capacity has not changed significantly.

Placement of dredged material is restricted to clean sediments. Use of this site is subject to the approval by EPA under the authority of the Marine Protection, Research, and Sanctuaries Act of 1972, as amended (USACE, 1981).

Project Sponsor:
TBD

Distance from York Spit Channel:
Approximately 35 miles from the York Spit Channel centroid.

13 - Dam Neck Ocean Dredged Material Disposal Site (Dam Neck ODMDS)

Description
The Dam Neck ODMDS is an existing U.S. EPA-designated 1,600-acre site located in the Atlantic Ocean, approximately 3 miles off the coastline of Virginia Beach, VA. Currently, the only Baltimore Harbor and Channels Project material allowed to be placed at the Dam Neck Site is suitable dredged material from the Cape Henry Channel. Material dredged from the Thimble Shoal Channel of the Norfolk Harbor & Channels Project is also placed at the site. The Dam Neck ODMDS is approximately 2.1 nm by 0.9 nm in dimension, with an area of approximately 9 square nm. The remaining capacity as of the February 2009 Site Management and Monitoring Plan for the Dam Neck ODMDS was estimated at 50 million cubic yards (mcy).

Project Sponsor:
TBD

Distance from York Spit Channel:
Approximately 30 miles from the York Spit Channel centroid.

14 - Placement and Management for Innovative Reuse

Description:

The proposed concept would place the dredged sediment in a confined manner on upland locations, most likely public lands. The sediment would then be managed to reduce the water content to a level where it can be removed and repurposed for use in the development or manufacturing of commercial, industrial, horticultural, agricultural, or other products. Some examples include construction materials (e.g., concrete aggregates, manufactured bricks, lightweight aggregate); fill for roadways and site grading, manufactured topsoil, land restoration and landfill cover.

For many of these uses full-scale commercial production is not yet available, however widespread efforts are underway to advance the necessary technologies and processes. In many cases, the dredged sediment cannot be utilized directly without adding amendments to develop a suitable product. The type, combination, and amount of amendment material depends on the moisture content, the amount of fines (clays and silts), and organic content of the dredged material. The amount and type of amendment would also be dictated by the required properties of the finished product.

Project Sponsor:
Middle Peninsula Chesapeake Bay Public Access Authority/Middle Peninsula Planning District Commission/Middle Peninsula Localities (if on the middle peninsula)
Other

Distance from York Spit Channel:
Not determined as a specific location would need to be identified.

15 - Wolf Trap Alternate Northern Extension

The site is approximately 3,900 acres in size and is located adjacent to, and north of, the existing Wolf Trap Alternate Placement Site (WATPS) previously used for open water placement with dredged sediment bottom released from a hopper dredge. Cells are identified within the site and the dredge is directed to utilize those cells for placement on each dredging cycle.

Distance from York Spit Channel:
Approximately 17 miles from the York Spit Channel centroid to the Extension centroid.

VIII. Environmental Matrix Scores

The VA BEWG committee retained 15 proposed projects/concepts indicated in Table 1. For each proposed project/concept the committee scored a -1, 0 or 1 for each of the 55 parameters fully described in Appendix B. For those parameters where the group felt that more information would be required to enter a score an underlined 0 (0) was entered. The final score for each proposed project/concept was calculated as described above in Section II. The full scored environmental matrix is included as Appendix C. The 15 options were ranked in descending order as shown in Table 4.

Table 4: Proposed projects/concepts ranked in descending order.

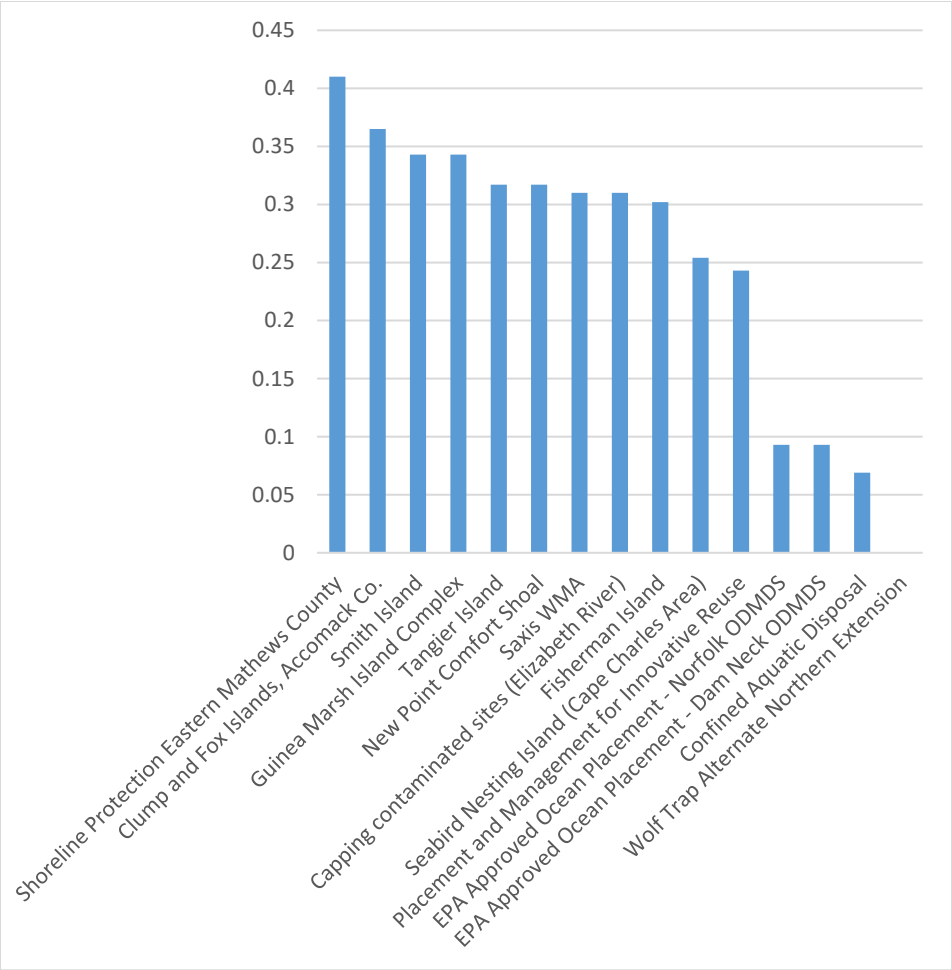
Score	Project Option
0.410	Shoreline Protection Eastern Mathews County
0.365	Clump and Fox Islands, Accomack Co.
0.343	Smith Island
0.343	Guinea Marsh Island Complex
0.317	Tangier Island
0.317	New Point Comfort Shoal
0.310	Saxis WMA
0.310	Capping Contaminated Sites (Elizabeth River)
0.302	Fisherman Island
0.254	Seabird Nesting Island (Cape Charles Area)
0.243	Placement and Management for Innovative Reuse
0.093	EPA Approved Ocean Placement – Norfolk ODMDS
0.093	EPA Approved Ocean Placement – Dam Neck ODMDS
0.069	Confined Aquatic Disposal
0.000	Wolf Trap Alternate Northern Extension

Scores ranged from a maximum of 0.410 to 0.000 with tie scores for third place (Guinea Marsh Island Project, and Smith Island), for fourth place (Tangier Island and New Point Comfort Shoal Island), fifth place (Saxis Wildlife Management Area, and Capping Contaminated Sites – Elizabeth River), and ninth place (EPA Ocean Open Water sites at Norfolk Ocean and Dam Neck).

The proposed project/concept scores were generally distributed in four major groupings, as evidenced in Figure 2. Scoring lowest (<0.1) were the three open water placement projects/concepts, consisting of the two EPA Approved Ocean Disposal sites (Norfolk and Dam Neck ODMDS), and the Wolf Trap Alternate Northern Extension. Also in this category, the Confined Aquatic Disposal scored <0.1. Scoring approximately 0.25 were the Innovative Reuse project/concept and the Seabird Nesting Island in the Cape Charles area. Five projects/concepts scored approximately 0.3: Tangier Island, New Point Comfort Shoal, Saxis Wildlife Management Area, Capping Contaminated Sediments in the Elizabeth River and Fisherman Island. Four sites scored nearly 0.35 or above: Shoreline Protection for Mathews County, Fox and Clump Islands,

Smith Island, Guinea Marsh Islands complex and Tangier Island, with the Shoreline Protection for Mathews County scoring above 0.4.

Figure 2: Environmental Matrix scores for proposed project/concepts.



The fully scored matrix (Appendix D) includes a number of underlined 0's (0) indicating that the group felt that more information was necessary to determine the potential positive or negative impacts from the construction and utilization of the proposed project/concept. Table 5 lists the scored proposed projects/concepts with their scores as well as the number and percentage of cells requiring more information to develop an environmental score.

Not surprisingly, those proposed projects/concepts for which a specific location has not been identified had the highest percentage of parameters requiring more information (0); Capping contaminated sites in the Elizabeth River (50%), Confined Aquatic Disposal (66.7%) and Placement and Management for Innovative Reuse (85%). While all these proposed projects/concepts have potential value for future placement, identifying a specific location and the specific processes associated with the placement or reuse would be necessary to assign the appropriate values for future scoring.

The majority of the other proposed projects/concepts also require more information and data to be considered more fully. Roughly 1/4 to 2/3 of the parameters require more information. Percentages of missing information ranged from a low of 17.8% to 35%. The inability to fully score the matrix used in this process serves to indicate that the list of proposed projects/concepts developed and scored should be considered an initial screening only. Additional projects/concepts may need to be identified in the future and more detailed project footprints and descriptions will be required to determine the most suitable placement option(s) for receiving sediments dredged from the York Spit Channel in the future.

Table 5: Proposed projects/concepts with their scores as well as the number and percentage of cells requiring more information to develop an environmental score.

Score	Proposed Project/Concept	Parameter Cells needing more information (0)	Count of cells with entries	Parameter Cells needing more information (%)
0.41	Shoreline Protection Eastern Mathews County	11	45	24.4%
0.365	Clump and Fox Islands, Accomack Co.	10	45	22.2%
0.343	Smith Island	11	45	24.4%
0.343	Guinea Marsh Island Complex	12	45	26.7%
0.317	Tangier Island	12	46	26.1%
0.317	New Point Comfort Shoal	9	46	19.6%
0.31	Saxis WMA	10	42	23.8%
0.31	Capping contaminated sites (Elizabeth River)	18	36	50.0%
0.302	Fisherman Island	14	44	31.8%
0.254	Seabird Nesting Island (Cape Charles Area)	8	45	17.8%

0.243	Placement and Management for Innovative Reuse	17	20	85.0%
0.093	EPA Approved Ocean Placement – Norfolk ODMDS	7	20	35.0%
0.093	EPA Approved Ocean Placement - Dam Neck ODMDS	7	20	35.0%
0.069	Confined Aquatic Disposal	18	27	66.7%
0	Wolf Trap Alternate Northern Extension	6	28	21.4%

IX. Additional Committee Concerns

Many members of the committee remained concerned throughout the process that the matrix scoring was based on limited information, which resulted in a number of parameter scores of 0. Thus, while the results provide an initial screen of the proposed projects/concepts the ranking should not be interpreted as a final, complete result. More information for some of the proposals may well have altered the final scores during the process and additional information that may become available during the second phase of this process will likely change the ranking should the scoring process be revisited.

There was also concern that the proposals are not inclusive of other projects that might be proposed in the future. The list of projects/options was initially developed as a "brainstorming" effort by the members of the committee, with alterations to the proposals as the effort progressed. Simply stated, there could be other possibilities available that were not considered as part of this effort.

Transport to the proposed project/concept locations also remained a concern throughout the meeting discussions because of the additional costs associated with transporting over greater distances. Many of the members felt that having a shorter transport distance would potentially allow more funds to be applied to the beneficial use components of any proposal rather than being consumed in transport. Thus, distance and the associated costs are not fully reflected in the matrix scoring.

For any of these proposals to proceed there will be permitting challenges. These challenges are not reflected in the matrix scoring and may, in the end, make or break a project/concept that was proposed.

X. Next Steps & Future Actions

With the results of the work group's first phase of project, concept and site identification, further analysis to refine the potential suite of alternatives is required. MDOT MPA and USACE, Baltimore District have executed a Planning Assistance to the States agreement to collect additional data such as, hydrologic/hydrodynamic information, water quality, sediment characteristics, biological assessments, bathymetry, sea level rise and more in order to identify data gaps and further evaluate the proposed projects/concepts. The VA BEWG members will be

periodically updated, then reconvened at the conclusion of this phase 2 analysis and presented with a refined list of potential solutions. At that point, with the VA BEWG's input, the VMRC, MDOT MPA and USACE will need to prioritize which project, concept or site is recommended for advancement.

At such time as a decision is made to pursue a dredged material placement project/concept, an environmental assessment (EA) or environmental impact statement (EIS), depending on the size of the site and magnitude of the anticipated environmental impacts, will be required to evaluate the suitability of the selected site.

Immediate Next Steps:

1. Present final report to the VA Sec. of Natural Resources (SNR) and the USACE Norfolk District for review and endorsements.
2. Secure approval from Virginia for the WTAPS Northern Extension placement site for the 2024/2025 York Spit maintenance dredging cycle.
3. Form a VA BEWG (ad hoc) steering committee to review the Planning Assistance to the States technical analysis and review preliminary results. This group could also provide guidance and support for projects that have secured a funding source and stand a good chance of moving forward. This committee can also be tasked with keeping tabs on and notifying VA BEWG members of new funding sources for the proposed projects.
4. Present the findings of the Planning Assistance to the States effort to the full VA BEWG.
5. VMRC, MDOT MPA and USACE, with VA BEWG input, recommend a short list of projects to advance for formal study, authorization, and appropriations
6. In the interim, and as necessary, hold an annual VA BEWG meeting to discuss new project ideas, present updates on existing projects and invite reps from USACE Norfolk and Baltimore Districts to receive updates on the availability of dredged material, upcoming maintenance dredging cycles, changes in regulations or policies, and other regional sediment management opportunities for coordination.

Appendix A

Letter from Secretary Strickler

COMMONWEALTH of VIRGINIA

Office of the Governor

Matthew J. Strickler
Secretary of Natural Resources

January 14, 2019

Colonel John Litz
Department of the Army
Baltimore District, Corps of Engineers
2 Hopkins Plaza
Baltimore, MD 21201

Re: Overboard Disposal of Dredged Material In the Chesapeake Bay

Dear Colonel Litz:

This letter regards the Baltimore District's current and future proposed uses of the Wolf Trap Alternate Placement Site (WTAPS) and the Rappahannock Shoals Alternate Placement Site (RSAPS) for the overboard disposal of material generated from the maintenance dredging of the Virginia portion of the Baltimore Channel and from the anticipated widening of the Baltimore 50' Project Channel. I understand that you have scheduled a meeting between the Virginia Marine Resources Commission (VMRC) and the Baltimore District to discuss this matter and I have requested Commissioner Bowman provide this letter.

While a 1981 letter from Virginia to Maryland authorized temporary use of these sites, the letter clearly provides that the Commonwealth of Virginia may designate alternative disposal sites in the Chesapeake Bay. Because of the potential impacts to fishery resources, the Commonwealth cannot support any future use of WTAPS. The Commonwealth also has significant concern about the potential future use of RSAPS.

I am concerned that the Baltimore District has not considered an alternative placement option for the WTAPS identified by VMRC and the Virginia Institute of Marine Science (VIMS) for upcoming maintenance dredging of the York Spit Channel. I also am concerned that plans for the widening of the channel would utilize the same sites that were designated as a result of the 1981 letter without consideration of beneficial use options for future new dredge material and without consideration of the science or our current Governor's position on this issue.

The Commonwealth has stressed that the use of WTAPS threatens blue crab and multiple fish species identified by NOAA in its review of the Essential Fish Habitat assessement of WTAPS.

As an alternative, on behalf of the Commonwealth, I recommend that the Baltimore District limit the placement of the dredge material generated by the 2018 - 2019 maintenance dredging cycle at either alternative placement site previously identified by VMRC and VIMS. Further, that such

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use of the alternative location in Virginia, if chosen, be restricted to the 2018 - 2019 cycle and that any future maintenance and proposed widening of this channel include a thorough evaluation of alternative options that include beneficial use opportunities as well as disposal outside the Chesapeake Bay.

Virginia stands ready to work with the Baltimore District to resolve this matter and to identify alternative dredge material placement options that focus on the beneficial uses and innovative reuse of dredge material.

Sincerely,

Matthew J. Strickler

cc: Steven G. Bowman, Commissioner, Virginia Marine Resources Commission
Ellen Bolen, Deputy Commissioner, Virginia Marine Resources Commission

Appendix B

USACE, Baltimore District response to Secretary Strickler letter

Appendix B

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, BALTIMORE DISTRICT
2 HOPKINS PLAZA
BALTIMORE, MD 21201-2930

February 19, 2019

Mr. Matthew J. Strickler
Secretary of Natural Resources
1111 East Broad Street
Richmond, VA 23219

Dear Mr. Strickler:

This is in response to your letter dated January 14, 2019, concerning overboard placement of dredged material into the Wolf Trap Alternate Placement Site (WTAPS) in the Virginia waters of the Chesapeake Bay. This letter also addresses key points from the January 15, 2019, meeting with Commissioner Steven Bowman of Virginia Marine Resources Commission (VMRC), regarding continued operation and maintenance (O&M) dredging of the York Spit channel and the placement site for material removed from the channel.

The U.S. Army Corps of Engineers (Corps) and the State of Maryland have postponed any further action on the proposed widening of the Baltimore Harbor access channels in Virginia waters. As discussed at our meeting with Commissioner Bowman, the channel widening is already authorized by Section 101 of the River and Harbor Act, Public Law 91-611, but not fully constructed to the authorized widths. The continued O&M of the federal access channels to Baltimore Harbor as currently constructed is vital for safe and efficient navigation. These channels facilitate interstate and international commerce important to the region and the nation.

The Corps is scheduled to remove approximately two million cubic yards of maintenance material from the York Spit channel starting in fall 2019. This maintenance dredging is overdue as we were unable to award a contract in December 2018 to accomplish the work via mechanical dredge. It is imperative that maintenance of the York Spit channel occur in the fall of 2019 to avoid channel restrictions that would impact waterborne commerce. The Corps anticipates that 2019 maintenance dredging will be accomplished via hopper dredge.

The Corps understands the Commonwealth's preference to use the northern extension area contiguous with the current WTAPS for placement of material from the York Spit channel. We also acknowledge the Commonwealth's desire for beneficial use of the material in the long term. To accommodate this request, the Corps plans to use the WTAPS northern extension as the placement site for future maintenance dredging cycles until a new, long-term solution is identified, approved, and implemented.

The Corps will initiate the process to utilize the WTAPS northern extension using existing data and consistent with applicable federal regulations. The project sponsor would be responsible for any costs above the currently approved base plan as determined by the Corps. The Corps will work with VMRC and the Virginia Department of Environmental Quality (DEQ) to issue a public notice and initiate the appropriate analyses and documentation for the proposed action under the National Environmental Policy Act (NEPA). As the action agency, the Corps will seek concurrence from DEQ after determining consistency with Section 307 of the Coastal Zone Management Act. The Corps will also request a Section 401 Water Quality Certification from

DEQ. The Corps will award a dredging contract in fall 2019 specifying open water placement in the WTAPS northern extension after we obtain the consistency concurrence and Water Quality Certification from the DEQ, and NEPA requirements are satisfied.

While pursuing the WTAPS northern extension site for O&M dredged material placement, the Corps will also pursue an update of the Dredged Material Management Plan (DMMP) for the maintenance of the Baltimore Harbor approach channels located in the Commonwealth of Virginia to provide additional placement options. This DMMP update will investigate potential placement site options, including beneficial use that could provide at least twenty years of placement capacity for the material removed from these channels. Any potential projects recommended for further study would require specific feasibility analyses to determine costs, benefits, and environmental impacts as well as appropriate public and agency coordination. Feasibility studies require a non-federal sponsor as a cost-sharing partner. Projects selected for implementation by the Corps require funding, a non-federal cost-share partner, a Project Partnership Agreement, and public support. The Corps will provide regular progress updates to VMRC at least annually throughout the DMMP update process.

Thank you for your continued partnership as we address these important matters. I look forward to continued collaboration on fiscally and environmentally responsible solutions that involve the Chesapeake Bay, its resources and local, state and national economies.

Sincerely,

John T. Litz
Colonel, U.S. Army
Commander and District Engineer

cf:
Mr. Steven Bowman, Virginia Marine Resources Commission
Mr. James J. White, Maryland Port Administration

Appendix C

Environmental Parameters

Appendix C

ENVIRONMENTAL PARAMETERS
RESOURCE SCORING

Fifty-one parameters were developed to evaluate the potential suitability of the proposed options. These parameters were divided into 10 categories based upon similar attributes (Water Quality, Aquatic Habitat, Wetlands, Aquatic Biology – Finfish/Shellfish, Special Regulatory, Wildlife, Physical Attributes, Other Non-Biological Attributes, Beneficial Attributes and Additional Parameters). Each parameter was assigned a raw score of +1, -1, or 0 for each option under consideration. The scores are presented in the environmental ranking matrix, and used to calculate the total weighted normalized score for each option. A basic description of the scoring process is described below, and the complete list of parameters with descriptions follows.

A +1 was assigned to a given parameter if the option is expected to protect or enhance *existing* resources of that type in or immediately adjacent to the option footprint. A –1 was assigned if the resource is present and negative impacts (or further degradation) is expected as a result of option development. For the majority of parameters, the impacts are carefully defined as long-term negative impacts to existing resources so options will not be scored negatively for potential short-term effects (e.g. short term increase in turbidity associated with placement of sediment). A 0 was assigned when no positive or negative impacts are expected to existing resources at or immediately adjacent to an option. A 0 was also assigned in cases where there was not enough conclusive evidence to make a definitive evaluation, or the evidence was ambiguous. In the later cases, the 0 was underlined so that decision–makers will be able to discern those options that had insufficient information available to warrant a score in the opinion of the group. If the parameter is not applicable at a particular option because it could not possibly exist in that location, the box is shaded.

The scores for each resource parameter for a particular option were assigned based upon consensus of the VA-BEWG and were subject to change as new data or information became available during meetings and discussions. Values were entered into a scoring matrix. In the future should more information become available the scores can be reevaluated and altered as required. The scores were be based upon existing data and historical information, as well as the collective experience and knowledge of the VA-BEWG members. It is expected that additional information will be required for options as the process moves forward. The initial scoring and ranking were accomplished with the information and knowledge at hand with some modifications and updates occurring over the course of the process.

Following the assignment of the +1, 0, 0, -1, or shaded 0 scores for each parameter and option the total score for each option was determined by summing the values across all applicable parameters. The total score for each option was normalized by dividing by the number of applicable (unshaded) parameters for that option. In this way, options were not unduly weighted for resources that could not exist at the option. The normalized scores are for *relative comparison* among the options, and a positive or negative score *does not indicate that an option has an overall positive or negative impact*. As an approach to emphasizing that the rank of the screened options is relative, the lowest normalized score was added to the score for each final option evaluated. Thus, all the options have positive scores, and the lowest ranking option has a score of 0.

CATEGORY 1: WATER QUALITY

Water quality is an important environmental parameter that can significantly influence the type of biota present at any particular option. Four water quality parameters will be considered for each option: dissolved oxygen, nutrients, turbidity, and salinity. These factors have demonstrated influences on distributions of aquatic organisms in the Bay. Salinity will be considered separately because of its specific influence upon various life stages of aquatic organisms within the Bay.

Each option in Virginia waters will require a Water Quality Permit issued by the Virginia Department of Environmental Quality (VADEQ). In addition, for those options located in close proximity to Maryland waters, a Water Quality Certificate may be required by the State of Maryland and issued by the Maryland Department of the Environment. Also, for any Ocean placement option a Marine Protection, Research and Sanctuaries Act (MPRSA) section 103 permit issued by the Environmental Protection Agency will be required. The evaluation of each option will be conducted using the above constituents as related to background conditions.

Parameters:

Dissolved Oxygen (DO)

There are areas in the Bay where DO drops below 5 parts per million (ppm) (sometimes even to 0 ppm) during seasonal lows. These areas are less supportive of aquatic life than areas that are well oxygenated over the entire year. If option development is not expected to have any long-term negative impacts on DO, it would receive a score of 0. If option development can impact DO positively, by decreasing depths and raising the bottom of a deep area above the pycnocline; this circumstance would receive a +1. Current changes resulting from option development could also influence water cycling/retention times in an area and negatively affect DO, and would result in a –1.

Nutrients, particularly ammonia nitrogen and phosphorus

Nutrients are natural components of any aquatic ecosystem and are typically balanced by natural processes. Increasing nutrient inputs over natural levels has been demonstrated to over-stimulate plant growth and can lead to problematic fluctuations in water quality, particularly DO. Nutrient releases can result from a variety of option development activities and those that are expected to potentially cause long-term nutrient enrichment would be scored with a –1. For example, newly excavated areas may expose naturally nutrient rich sediments, allowing the nutrients to flux into the surrounding water. Also, discharges during dewatering activities after sediments are placed can be nutrient enriched. If option development is not expected to have any long-term negative impacts on nutrient enrichment, it would receive a score of 0. +1 score if sediments are removed from the Bay and processed for Innovative Reuse (IR) use with discharge managed to reduce nutrient releases.

Turbidity

Many areas of the Bay experience naturally elevated turbidity due to tidal currents, river discharges, shoreline erosion, and other physical processes. Although background turbidity levels have been shown to affect some life stages of aquatic organisms, most organisms that occur in these areas are tolerant of a range of turbidity. Excessive long-term turbidity, however, can be detrimental, particularly to some planktonic and benthic organisms. If option development has the potential to increase turbidity levels beyond the natural ranges for the area on more than a short-term basis, the

option would receive a score of –1. If option development is not expected to have any long-term increase in turbidity, it would receive a score of 0. If it has the potential to ameliorate existing high local turbidity, a +1 would be assigned. In any case, once a potential site is chosen for more complete consideration, the then-current Virginia standards for turbidity levels will be addressed in the site evaluation.

Salinity

Salinity has a significant influence on the distribution of aquatic organisms in estuaries. Preference for and tolerance of salinity dictates the types of organisms that can live in various areas, and therefore, dictates the structure of the aquatic community. Alterations in regional salinity ranges could influence the aquatic community structure significantly. Additionally, the saltier waters from the ocean travel up the Bay in a wedge near the bottom through the deeper areas of the Bay. This salt wedge enables organisms from saltier areas of the Bay to disperse into fresher water feeding and nursery areas. The potential for significant alterations to near-field and regional salinity will be evaluated at each option. A 0 will be assigned if no negative impact is expected and a –1 if the construction of the option would affect hydrodynamics such that a change in salinity or an effect to the salt wedge would likely occur. A +1 condition would be assigned if a potential increase in salinity would be beneficial to growing SAV for use in coastal resiliency projects.

Ground Water

Some of the proposed options may have a potential influence upon groundwater through the migration of constituents through the underlying soils and would be scored with a -1. This is a particular concern at upland options where potable water resources exist and where sulfur compounds in dredged material are oxidized and acidified by exposure to the atmosphere. The potential for groundwater contamination will be evaluated and a value of 0 will be assigned if no negative groundwater impact is anticipated or where placement in the Bay in the same environment from which the sediment was derived would not alter the geochemistry such that a groundwater impact could occur. Conversely, a +1 would be assigned if a positive impact is probable.

CATEGORY 2: AQUATIC HABITAT

Parameters:

Benthic Community

Benthic communities are an important component of the Chesapeake Bay ecosystem. Benthic organisms provide a trophic link from phytoplankton to higher trophic levels, serve as a food source for commercially important fish and shellfish, and play a role in nutrient cycling. Salinity and substrate are natural characteristics that influence the structure of the benthic community. Sediment composition will be evaluated based on option-specific data. Benthic assemblages are often used as indicators of environmental or anthropogenic stress in aquatic systems. An estuarine Benthic Index of Biotic Integrity (B-IBI) has been developed for Chesapeake Bay benthic communities (Weisberg et al. 1997). The B-IBI is salinity- and substrate-specific and evaluates attributes of the benthic community such as diversity, abundance, biomass, proportions of pollution-sensitive and pollution-tolerant species, and trophic feeding guilds to determine the relative condition (or environmental health) of an option. Options where there is no potential for further long-term benthic degradation within or immediately adjacent to the option from option development will receive a score of 0. Options that will permanently negatively impact the benthic community would

receive a –1. In cases where the benthic habitat could be improved from option development (ex. elevating the bottom above the pycnocline or capping contaminated material) would receive a +1.

Shallow Water Habitat

Shallow water habitat (SWH) is considered a high value resource in the Bay to support potential Submerged Aquatic Vegetation (SAV) growth, fish nursery habitat, and avian (particularly waterfowl/wading bird) feeding areas. In this case we are using the SWH descriptor to be protective of Tier II and Tier III SAV habitat (see below) and the depths considered would be 6.6 feet or less. The existing condition of SWH will be evaluated to define the potential for significant impacts related to placement option development. If SWH exists within the option or immediately adjacent and could be negatively impacted by option development, a –1 will be assigned. If no negative impact is expected, a 0 will be assigned. If development of the option will protect or enhance existing SWH, the option would receive a +1 score.

Submerged Aquatic Vegetation (SAV)

SAV has historically declined over most of the Bay. The Chesapeake Bay Program has issued guidance for protecting SAV in the Chesapeake Bay and its tributaries (CBP 1995). The Chesapeake Bay Program's Executive Council established a SAV Policy in 1989 and committed to an implementation plan in 1990, to achieve the goal of "a net gain in SAV distribution, abundance, and species diversity in the Chesapeake Bay and its tidal tributaries"(CEC 1990). This policy is meant to protect SAV "from further losses due to increased degradation of water quality, physical damage to the plants, or disruption to the local sedimentary environment" (CBP 1995). The Chesapeake Bay Program developed a three-tiered framework of SAV restoration goals or targets:

Tier I: restoration or establishment of SAV in areas of historic (1971 - present) distribution

Tier II: restoration or establishment of SAV in potential habitat to a depth of one meter

Tier III: restoration or establishment of SAV in potential habitat to a depth of two meters

Unvegetated potential habitat areas are protected by the Chesapeake Bay Program's three-tiered SAV restoration goals.

Several state and federal agencies have SAV regulations and policies; however, many of these regulations and policies apply specifically to SAV and not necessarily to potential, unvegetated SAV habitat (CBP 1995). In order for the goals of the Chesapeake Bay Program to be attained, the policies and regulations of these agencies must be considered in all shallow water areas providing SAV habitat.

Recommended SAV protection guidance by the Chesapeake Bay Program includes avoiding dredging activities in Tier I, Tier II, and Tier III areas. Additional guidance includes avoiding dredging, filling, or construction activities that create additional turbidity in or near SAV beds during the growing season; establishing buffers around SAV beds to minimize direct and indirect impacts on SAV during activities that significantly increase turbidity; preserving natural shorelines and stabilizing shorelines when needed; and educating the public about the negative effects of recreational and commercial boating on SAV, and ways to avoid or reduce these effects (CBP 1995).

Only Tier I SAV Habitat is considered here because the SWH parameter is designed to be protective of Tier II and Tier III habitat. If no Tier I SAV habitat occurs within or immediately adjacent to an option and no permanent negative impacts to SAV are expected, the option will receive a score of 0. If option development would protect or enhance Tier I habitat, the option would score a +1. If SAV is known to occur within an option and permanent negative impacts are expected, the option would score a –1.

All species of submerged aquatic vegetation (SAV) are designated as habitat areas of particular concern (HAPC) by the fishery management councils and National Oceanic and Atmospheric Administration (NOAA) Fisheries due to its exceptional ecological value as fisheries habitat, relative scarcity and susceptibility to environmental and human disturbance. In general, areas of water deeper than 1 m throughout the lower Chesapeake Bay and its tributaries typically do not support persistent beds of SAV due to limited light availability on the bottom.

Regulatory and advisory agencies in Virginia use the most recent 5-year composite mapping for SAV from the Virginia Institute of Marine Science (VIMS) SAV monitoring and restoration program to determine the presence/absence of SAV at a project location. The presence of SAV in any one year of the 5-year composite is treated equally as an area that supports or can support SAV. The VIMS SAV monitoring program annual surveys can be found here:
http://mobjack.vims.edu/sav/savwabmap/

CATEGORY 3: WETLANDS

Parameters:

Tidal Wetlands

This category is limited to locations where the possibility of affecting naturally occurring tidal wetlands exists. Options containing naturally occurring functional tidal wetlands will be considered less suitable for the construction of a dredged material placement option. In addition, options that may cause erosional impacts to this resource will be also considered less suitable for construction. If option development is expected to negatively impact natural wetlands, it will be assigned a -1. A 0 will be assigned if no negative impacts to existing wetlands are anticipated and a +1 if option development will result in the protection or enhancement of existing natural tidal wetlands.

Non-tidal Wetlands

This category is limited to locations where the possibility of affecting naturally functioning non-tidal wetlands exists. Options containing such wetlands will be considered less suitable for the construction of a dredged material placement option. If option development is expected to negatively impact natural non-wetlands, it will be assigned a -1. A 0 will be assigned if no negative impacts to existing wetlands are anticipated and a +1 if option development will result in the protection or enhancement of existing natural non-tidal wetlands.

CATEGORY 4: AQUATIC BIOLOGY - FINFISH/SHELLFISH

Parameters:

Finfish Spawning Habitat

Portions of the Bay and the major riverine systems of the Bay are known to be crucial spawning and/or nursery areas for fish species that occur throughout the Chesapeake Bay. This is particularly the case in shallow water areas, or areas that have significant amounts of underwater structure, submerged aquatic vegetation, oyster reefs, marshes or other cover. Each option will be scored based upon the presence (-1) or absence (0) of known or potential spawning within the footprint or immediate vicinity of the proposed placement area. If option development has the potential to protect or enhance existing fish spawning areas, it will receive a +1.

Finfish Nursery Habitat

Many areas of the Chesapeake Bay and its tributaries are known to be critical to the success of early life stages of numerous commercial and recreational finfish species. These are generally termed nursery or rearing habitats and are of equal importance to year class success as the spawning grounds. Suitable nursery habitat (in terms of salinities and other water quality parameters) can occur over large areas within the Bay and tributaries, but the most important nursery areas for fish generally lie within shallow water (or the shore zone) and marshes in warmer months. (Thermal refuge habitat is scored separately). Each option will be scored based upon the presence (-1) or absence (0) of known or potential nursery habitat within the footprint or immediate vicinity of the proposed placement area. If option development has the potential to protect or enhance existing fish nursery areas, it will receive a +1.

Larval Transport

Discharge from tributary rivers transports the early life stages of species that are spawned in the rivers to feeding and nursery areas further down-Bay. In contrast, the salt wedge and tidal currents help to transport young fish that are spawned in saltier areas to feeding areas up-Bay and into the tributaries. Significant alterations to the currents that influence these larval transport mechanisms could have detrimental effects on fish populations. The extent to which larval transport could be influenced by alterations in hydrodynamics will be examined at each option, to the extent possible. A 0 will be assigned if no negative impact is expected and a –1 assigned if negative effects are anticipated. No +1 condition was identified for this parameter.

Essential Fish Habitat (EFH)

The Magnuson-Stevens Act provides protection to essential fish habitats defined as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.” The designation and conservation of EFH seeks to minimize adverse effects to habitat caused by fishing and non-fishing activities. The federally managed species particular to a region and the habitats essential to the success of those species have been identified and described by the National Marine Fisheries Service (NMFS) and regional fishery management councils. If the project lies within an area designated as EFH but the existing habitat does not meet the requirements to support any of the life stages of the species (or the option would otherwise not impact EFH) it will be scored with a 0. If a project is located in an area designated as EFH which is known to support the species and there is a potential for negative impact, it will be assigned a –1. EFH areas will be identified using NMFS’ EFH Mapper (https://www.habitat.noaa.gov/protection/efh/efhmapper/) and consultation

with the NMFS. If project development has the potential to protect or enhance existing EFH, it will receive a **+1**.

Commercial Fish and Shellfish

For the majority of options, the fish species to be used for the screening will include those typically harvested within the Bay, including: Atlantic menhaden (*Brevoortia tyrannus*), white perch (*Morone americana*), striped bass (*Morone saxatilis*), alewife (*Alosa pseudoharengus*), blueback herring (*Alosa aestivalis*), hickory shad (*Alosa mediocris*), American shad (*Alosa sapidissima*) and various species in the family *Sciaenidae* (spot, croaker, etc.). Shellfish considered include blue crab (*Callinectes sapidus*), oysters (*Crassostrea virginica*), soft clams (*Mya arenaria*), and hard clams (*Mercenaria mercenaria*). These species will be selected because of their current or historic commercial importance, and in some cases, because of population declines that have caused the imposition of state or federal prohibitions on the taking of these species. Each of these species uses the Bay during at least one life stage and all of these species are typically used in evaluating the value of the fishery resources of the Chesapeake Bay. Each option will be evaluated based upon current/existing commercial finfish and shellfish harvesting areas, existence of natural or historical oyster beds, and crabbing areas within or immediately adjacent to the area. Potential negative impacts to existing harvesting areas will receive a –1. If no negative impact potential exists, a 0 will be assigned. The commercial harvest potential of the Ocean Placement Option will be based upon previous assessments of commercial fish/shellfish distributions made during the permitting of the option. If option development has the potential to protect or enhance existing commercial harvesting areas, it will receive a +1.

Thermal Refuge

Within the Chesapeake Bay and its major tributaries, deeper areas provide habitat and refuge for young of the year adult finfish species throughout different times of the year. These areas can remain a few degrees warmer or cooler than the overlying (surficial) waters and provide refuge for young or adult fish. This can be critical to the survival of some species because large percentages of some finfish populations may overwinter in the Bay or seek refuge in those deeper cooler waters during the summer. Each option will be evaluated relative to its potential to provide thermal refuge habitat for finfish. A 0 will be assigned if such areas are not present or affected by the construction of a given option, and a –1 will be assigned if negative impacts to or altering of known thermal refuges are anticipated to occur. If option development has the potential to protect or enhance existing thermal refuge areas, it will receive a +1.

Blue Crab Sanctuaries and Overwintering Areas

Virginia has established Blue Crab Sanctuaries to protect seasonal migration corridors utilized by crabs. In addition, deeper waters with muddy bottoms are known to be critical habitat for overwintering blue crabs, which burrow into the bottom to lie dormant for the winter. Each option location will be scored based on its position relative to the Sanctuary Areas and deeper water muddy bottom areas which serve as overwintering areas. A -1 will be assigned if the option is located within a Sanctuary or overwintering area and a 0 will be assigned if the option is not located within those areas. No +1 condition is associated with this parameter.

Recreational Fishery

The recreational fishery in the Chesapeake Bay is among one of the most valued resources. The Bay supports a tremendous number of fish and a diversity of species sought by recreational anglers.

Charter boat captains favor some areas of the Bay, while individual recreational anglers favor other areas although these areas also commonly overlap. Artificial reefs have been installed in numerous locations to enhance fishing potential. Options in these areas that are expected to negatively impact fishing activity will receive a –1 for this parameter. If none or only occasional use is determined, and no negative impacts are expected, a 0 will be assigned. If option development has the potential to protect or enhance existing recreational fishing, it will receive a +1. The potential for each area to be utilized by recreational species and the actual use of each area by recreational anglers will be evaluated in the context of the regional fishery.

Aquaculture

Shellfish aquaculture has grown impressively in Virginia in recent years. In Virginia the vast majority of aquaculture production is focused on oysters (*Crassostrea virginica*) and hard clams (*Mercenaria mercenaria*). Aquaculture leases and permits are issued by the Virginia Marine Resources Commission in consultation with local governmental agencies. In addition to leased grow-out areas on state-owned bottom, hatcheries that support the aquaculture industry have continued to expand in size and number. Water quality is an important component to successful hatchery operations. Areas suitable for sustainable aquaculture are dependent on specific local conditions relative to the species being cultured and are highly variable. Development of or infringement upon aquaculture leases or hatchery operations would be considered a negative impact and scored with a –1. A 0 would be assigned to options that are not expected to negatively impact prime aquaculture areas or hatchery operations. If the option has the potential to protect or enhance existing prime aquaculture areas or hatchery operations, it will receive a +1.

CATEGORY 5: SPECIAL REGULATORY

Parameters:

Protected Species – Threatened and Endangered (T&E)

The distribution of both state and federally protected (i.e., T&E) species relative to the potential placement options will be determined through review of existing information and/or correspondence with both state (Virginia Department of Wildlife Resources [DWR] and Virginia Department of Agriculture and Consumer Services [VDACS]) and federal (U.S. Fish and Wildlife Service, NOAA Fisheries Service, Protected Resources Division) agencies. The U.S. Fish and Wildlife Service's (Service) Information for Planning and Consultation (IPaC) system (https://ecos.fws.gov/ipac/) should be used to identify federal trust resources managed by the Service (including federally listed or proposed threatened and endangered species) that may occur within the action area of an option development. The Service also recommends using the online project review process to facilitate compliance with the Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended (ESA). The online project review process can be found at https://www.fws.gov/northeast/virginiafield/endangered/projectreviews.html.

Information regarding threatened and endangered species under the purview of NOAA Fisheries Service can be found at the Greater Atlantic Region's website for Section 7 consultations: https://www.fisheries.noaa.gov/new-england-mid-atlantic/consultations/section-7-consultation-technical-guidance-greater-atlantic

Moreover, any option development selected for further consideration that has the potential to either negatively or positively impact a state-listed T&E, irrespective of its federal status, must be

reviewed by the DWR to ensure compliance with the Virginia Endangered Species Act and the Virginia Endangered Plant and Insect Act (VDACS).

If option development has the potential to negatively impact T&E species habitats, it will be assigned a –1. If no T&E species are determined to be in the vicinity and/or no negative impact is expected, a 0 will be assigned. If option development has the potential to protect or enhance existing T&E species habitat, it will receive a +1.

Habitat Areas of Particular Concern (HAPC)

Habitat areas of particular concern (HAPC) are a subset of EFH that meets one or more of the following criteria: 1) especially ecologically important; 2) particularly susceptible to human induced degradation; 3) environmentally stressed; or 4) is considered rare. HAPCs are designated through action by the regional fishery management councils (Councils) and do not convey additional restrictions or protections on an area; they simply focus increased scrutiny, study, or mitigation planning compared to surrounding areas because they represent high priority areas for conservation, management, or research and are necessary for healthy ecosystems and sustainable fisheries. In the Virginia portion of the Chesapeake Bay, all submerged aquatic vegetation (SAV) is designated as HAPC for summer flounder and shallow, sandy bottom areas near ocean inlets are designated as HAPC for sandbar shark (*Carcharhinus plumbeus*). The presence of HAPC or proximity to HAPC will be evaluated to define the potential impacts from construction or operation of a dredged material placement option or beneficial use option. HAPC areas will be defined using NOAA's EFH mapper (https://www.habitat.noaa.gov/protection/efh/efhmapper/), existing information and consultation with the NMFS. Anticipated negative impacts to HAPC will result in the assignment of a –1. A 0 will be assigned if no HAPC occurs in the area, or if no negative impact to HAPC is anticipated. If option development has the potential to protect or enhance existing HAPC, it will receive a +1.

CATEGORY 6: WILDLIFE

<u>Parameters:</u>

Species of Greatest Conservation Need (SGCN)

The Chesapeake Bay supports a number of SGCN identified in the Virginia Wildlife Action Plan (VDGIF 2015). While the designation as an SGCN carries no additional protective legal status, it is an indicator of low and/or declining populations and/or significant threats to habitats that support the species. Tier 1 - 3 SGCN are ranked as having the highest conservation need (Tier 1: critical conservation need; Tier 2: very high conservation need; Tier 3: high conservation need), and, therefore, warrants the same ranking scores and Potential Weighting Factor as those assigned to habitats of T&E species. Only Tier 1, Tier 2 and Tier 3 SGCN will be considered under this parameter. If option development has the potential to negatively impact habitats of SGCN, it will be assigned a –1. If no SGCN are determined to be in the vicinity and/or no negative impact is expected, a 0 will be assigned. If option development has the potential to protect or enhance the existing habitat of SGCN, it will receive a +1. Any option development selected for further consideration that has the potential to either negatively or positively impact one or more SGCN shall undergo review by the DWR to ensure negative impacts are minimized and positive impacts are maximized.

Waterbird Use of Aquatic Habitats

The Chesapeake Bay supports large populations of breeding, wintering and resident waterbirds and is an important migration stop-over area for this diverse group of birds from throughout the western hemisphere. For this parameter, the definition of waterbirds is limited to species that are dependent on aquatic or water-associated resources in the Chesapeake Bay and include, but are not limited to, waterfowl (ducks, geese and swans), long-legged wading birds (herons, egrets, and ibises), shorebirds (e.g., sandpipers, plovers, phalaropes, etc.) and seabirds (e.g., terns, gulls, black skimmers, northern gannets, pelicans, cormorants, etc.). Excluded from this parameter are waterbirds designated as T&E and/or SGCN, which are scored separately. Shallow water zones, located adjacent to shorelines extending out to water depths of approximately 3 meters, are used extensively by waterbirds for feeding, resting and/or rearing young. Deep water zones (>3 m) are important areas for open-water foraging, staging, roosting and resting waterbirds. The potential impacts upon shallow and deep water zones identified as essential to waterbirds will be evaluated. Options with a potential for long-term negative impacts will receive a score of –1. A 0 will be assigned to options where no negative impacts are expected. If option development has the potential to protect or enhance essential shallow and/or deep water habitat, it will receive a +1.

Shoals, spits, shorelines and islands

This category is limited to habitats with appropriate elevation, acreage and vegetation to support breeding waterbirds and diamondback terrapins. Some species (shorebirds and terrapins) may require sparse vegetation for nesting and foraging while other species (waterfowl, wading birds) require more dense ground vegetation including grasses and shrubs for these activities. Excluded from this parameter are breeding species designated as T&E species and/or SGCN, which are scored separately. The potential impacts upon these habitats will be evaluated. Options with a potential for long-term negative impacts will receive a score of –1. A 0 will be assigned to options where no negative impacts are expected. If option development has the potential to protect or enhance sandy breeding habitats, it will receive a +1.

Marshes

This category is limited to natural wetlands dominated by herbaceous plant species such as grasses, rushes or reeds that also provide essential breeding and non-breeding habitat for waterfowl, shorebirds, wading birds, seabirds, rails, finfish and other marsh-obligate wildlife. This category also addresses potential impacts to sensitive plant communities other than forests and wetlands, which are scored separately. Also excluded from this parameter are marshes known to support T&E and/or SGCN, which are scored separately. Options that will directly impair marshes, negatively impact existing island remnants that are generally suitable for wildlife, or cause erosional impacts to marsh habitats will be assigned a -1. A 0 will be assigned if no negative impact is anticipated. If option development has the potential to protect or enhance existing marsh habitat, it will receive a +1.

Forests

This category includes natural forested areas that are of sufficient acreage and density to provide breeding habitat, forage and cover for terrestrial species. In general that means mature or mostly-mature forest stands of sufficient width (1000+ foot diameter) to provide habitat for species that dwell in forest interiors. This category also includes forested corridors that allow for unimpeded movement among forest patches. Options that could potentially negatively impact such forested areas or corridors would receive a –1 and a 0 would be assigned if no potential negative impact is

expected. If the option has the potential to protect or enhance existing forested areas or corridors, it will receive a +1.

Streams

Fresh and brackish water streams are important habitats for fish and wildlife. Construction near streams, or options that could potentially alter the hydrology of a stream have the potential to alter the physical character of the stream channel which, in turn, impacts the habitat value of the stream. Alterations in stream character can negatively impact the aquatic communities that the stream supports and may also impact terrestrial resources. An option that has the potential to negatively alter the physical character of a stream or stream channel will be scored –1. (Potential impacts to surface water quality are scored elsewhere). If streams exist within or immediately adjacent to an option, but there is no potential for impacts to the streams, the option would score a 0. If the option has the potential to protect or enhance existing natural streams, it will receive a +1.

Other Freshwater Wetlands

Some of the proposed options may have a potential influence upon natural freshwater wetlands, lakes or ponds. This potential will be evaluated and a value of -1 will be assigned if the physical character or hydraulics of these other freshwater wetlands would be potentially negatively impacted by option development. (Potential impacts to surface water quality are scored elsewhere). If no negative impact is anticipated, the site would receive a 0. If the option has the potential to protect or enhance existing freshwater wetlands, it will receive a +1.

CATEGORY 7: PHYSICAL ATTRIBUTES

Parameters:

Substrate Characteristics

Substrate characteristics are known to be a significant habitat feature that influences the distribution of benthic and other aquatic organisms within the Bay. The substrate composition of the benthic environment within the proposed placement option provides important information that will be used to characterize the relative condition of the option, the quality of habitat available to higher trophic levels at the option (such as fish), and the suitability of the option for construction. In the same manner, soil characteristics influence the type and productivity of terrestrial areas. Significant alterations in substrate/soil characteristics that could negatively impact the habitat and biotic communities within an area would be assigned a value of -1. A 0 will be assigned if negative changes to substrate/soil composition are not expected from the option. If the option has the potential to enhance existing substrate or soil characteristics, it will receive a +1.

Hydrodynamic Effects

Wind-driven currents and tidal currents affect the distribution of biological organisms and nutrients, sedimentation patterns, and rates of erosion. Large structures can alter the flow velocity to the point that significant changes in sedimentation, erosion, and potentially the distribution of biological organisms could occur. Hydrodynamic two-dimensional modeling will be conducted, examining the hydrodynamic effects of dredged material placement for water based options. Once a site or sites are selected for further evaluation, but are not part of this Workgroup's mission.

Rather the Workgroup is scoring an option based on the anticipated potential for significant alterations to hydrodynamic processes.

Alterations in hydrodynamics that could increase erosion potential or alter currents over critical areas such as oyster bars would be considered as –1. However, options that would have no effect will be scored as 0. Options that may decrease erosion over sensitive areas or otherwise protest/enhance resources would be assigned a +1 for a positive effect.

For this evaluation, the physical effects of hydrodynamics (erosion/sedimentation and increased currents in shallow or critical areas) are considered separately from the potential effects on larval fish distributions or navigation.

Toxic Contaminants

Sediments/substrates can contain a variety of toxic contaminants introduced from both natural and anthropogenic sources. Sediment toxicants can limit the organisms that are able to utilize the area and can also be mobilized into the food chain (becoming bioavailable to other organisms and food fish). Sediment quality will be evaluated for each of the options based on known sediment quality data.

For the options under consideration, the dredged material would be from the mainstream Bay channels, and if it will be of similar quality to the existing sediments at an option site, be suitable for habitat restoration options, will not introduce additional contaminants to the area it should receive a 0. A +1 would also be assigned if there is a potential for capping toxic contaminated sediments. A –1 would be assigned if there was a potential that an option could degrade the sediment quality in the area.

Hazardous, Toxic, Radioactive Substances (HTRS) and Munitions and Explosives of Concern (MEC)

As part of its mission, the military currently tests, and has historically tested, weapons in portions of the Chesapeake Bay. This includes the firing of live rounds and stray shells are known to have landed outside the designated restricted areas. The Controlled Areas of the Bay are believed to contain shells that did not explode during testing. The presence of or potential for Munitions and Explosives of concern (MEC) could significantly complicate the construction of a dredged material placement area, and would result in the assignment of a -1. Any option without such potential would receive a 0. Also, any option that is known to have the potential for existing pollutants (HTRS) or Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) liabilities would be a poor choice for a dredged material placement area if construction would potentially remobilize contaminants into the environment. With respect to MEC, there is no approved remediation policy. There is also no specific federal policy regarding the liability of potential responsible parties. These are institutional issues, which would need to be addressed in addition to the potential environmental and safety implications associated with MEC, and in relation to technical difficulties associated with cleanup. No +1 condition was identified for this parameter.

Fossil Shell Mining

In portions of the Chesapeake Bay and its tributaries, fossil oyster shell beds and buried shell resources have been mined to provide cultch for oyster replenishment in the other portions of the Bay. Fossil shell mining is viewed as an important resource for the continued production of oysters

from the Bay and the presence of mining areas within or adjacent to a proposed option footprint would be assigned a –1. The absence of such beds would result in the assignment of a 0. No +1 condition was identified for this parameter.

CATEGORY 8: OTHER NON-BIOLOGICAL ATTRIBUTES

Parameters:

Floodplains

In addition to providing natural flood control, floodplains are important buffer and wildlife areas. Floodplains are generally recognized as a non-renewable resource. Development of or infringement upon natural floodplains would be considered a negative impact and scored with a –1. A 0 would be assigned to options that are not expected to negatively impact floodplains. If the option has the potential to protect or enhance existing floodplains, it will receive a +1.

Recreational Value

Parts of the Chesapeake Bay watershed are heavily used as recreational areas. The diverse recreational activities include bird watching, boating, swimming, fishing, hunting, etc. For this evaluation, recreational fishing is already evaluated elsewhere, so it will not be included with this parameter. If an option is known to provide recreational resources currently and option development will permanently disrupt these activities, option development will be assigned a –1. The absence of such resources or use would result in the assignment of a 0. If the option has the potential to protect or enhance existing recreational resources, it will receive a +1.

Aesthetics and Noise

Aesthetics and noise impacts from the construction and operation of a dredged material placement facility can have a negative impact if the option is near a population center, heavily used area, or natural areas where there is a potential for wildlife disturbance. If an option is located within approximately 0.5 mi of a population center, dwellings, or managed natural area it will be considered to have the potential to have a negative impact on aesthetics and noise, and will be assigned a -1. If the option has the potential to reduce existing noise levels or improve aesthetics, it will receive a +1.

Cultural Resources

This parameter is used to describe the potential for archaeological and historic options at each option. The potential presence of shipwrecks and other historical features as well as any archaeological resources known to occur (from existing reports) will be assigned a value of -1. Known resources that have been deemed to have no archaeological value (due to previous disturbance) will not be considered negatively relative to option development, and will be assigned a 0. Determinations that no known resources exist will be assigned a 0 also. If the option has the potential to protect or enhance existing cultural resources, it will receive a +1.

Navigation

Safe and effective navigation is essential to commerce of the region. Due to the large volume of barge, ship, and container traffic in the Bay, the potential effects of the proposed options on local navigation will be evaluated. Options that lie partially or wholly within navigation channels could

be considered hazards to navigation. Additionally, options adjacent to channels could have an impact on navigation due to increased currents from altered hydrodynamics. A structure that may hinder navigation can also pose a potential environmental threat from potential ship collisions and groundings and will be assigned a -1. If no such potential exists, a 0 will be assigned. If the option has the potential to protect or enhance existing navigation on or immediately adjacent to the site, it will receive a +1.

High Quality Agriculture

Prime and unique farmland has been vanishing at a tremendous rate in some areas. Highly productive farmlands with rich soil composition that have been farmed for generations are generally recognized as a non-renewable resource. Development of or infringement upon these farmlands would be considered a negative impact and scored with a –1. A 0 would be assigned to options that are not expected to negatively impact prime or unique farmland. If the option has the potential to protect or enhance existing prime or unique farmlands, it will receive a +1.

CATEGORY 9: BENEFICIAL ATTRIBUTES

Parameters:

Beneficial Use - Habitats for T&E Species

Many of the proposed options will be converted, in part, to fish and wildlife habitat to enhance regional habitat resources (particularly for bird nesting habitat). If an option is not designed to create habitat for aquatic or terrestrial T&E species, then it will receive a 0 score. If habitat for T&E species will be created, the option will receive a +1. This parameter does not specifically relate to impairment or impact evaluation, but gives a positive score for creation of habitat for T&E species. No –1 condition is identified for this parameter.

Beneficial Use – Upland

Many of the proposed options will be converted, in part, to upland habitat to enhance regional habitat resources (particularly for bird nesting habitat). If an option is not designed to create upland habitat, then it will receive a 0 score. If upland habitat will be created, the option will receive a +1. This parameter does not specifically relate to impairment or impact evaluation, but gives a positive score for creation of wildlife habitat. No –1 condition was identified for this parameter.

Beneficial Use – Wetland

Many of the proposed options will be converted, in part, to wetland habitat to enhance regional habitat resources. If an option is not designed to create wetland habitat, then it will receive a 0 raw score. If wetland habitat will be created, the option will receive a +1. This parameter does not specifically relate to impairment or impact evaluation, but gives a positive score for creation of habitat. No –1 condition was identified for this parameter.

Beneficial Use – Adjacent Habitat Enhancement

Some options may have the potential to restore or enhance adjacent habitat after construction. For example, protection of an eroding shoreline may allow for natural propagation of tidal marsh plants or SAV adjacent to an option. Restoration of certain beaches could also improve the nesting habitat for diamondback terrapins or ground nesting waterbirds (seabirds, shorebirds, etc.). Restoration of

forested uplands could provide isolated (adjacent) fringe habitat or provide enough density of adjacent forests to support forest interior dwelling species (FIDS). Another upland example would be the potential for stream improvements from the cessation of acid mine drainage. Habitat enhancements adjacent to the proposed option will be considered as positive effects of option development and will be assigned a raw score of +1. If no benefit is to be derived, a 0 will be assigned. No –1 condition was identified for this parameter.

Shoreline Protection and Coastal Resilience

Several options have the potential to provide shoreline stabilization that will protect not only wildlife habitat but also dwellings and other man-made properties/structures. These options may provide a benefit that needs to be measured separately from the protection of natural resources. Shoreline stabilization for protection of property and to provide Coastal Resilience would be considered a positive effect of option development under this parameter, and a +1 will be assigned if it is part of the site design. If the option has no designed shoreline protection value, it will receive a 0. No –1 condition was identified for this parameter Shoreline stabilization for the purpose of habitat protection and enhancement is considered separately under other parameters.

CATEGORY 10: ADDITIONAL PARAMETERS

Infrastructure

This parameter refers to the current status of the local infrastructure. This includes but may not be limited to roads, railroads, gas, sewer or electrical lines business buildings and employment opportunities. Existing traffic and traffic patterns are also considered as part of this parameter. If the project has the potential to damage or impede the local infrastructure or negatively impact traffic volume or patterns, the score is -1. If the project will have no impact on the local infrastructure the score is 0. If the project has the potential to improve, protect or provide opportunities to expand, enhance or benefit the local infrastructure or traffic the score is +1.

Existing Land Use

The existing land use in the vicinity of proposed dredged material placement sites includes commercial uses, recreational facilities, residential uses, and even some open/green space. Development of a dredged material placement site has the potential to enhance or perhaps even disrupt the current land use. If the project has the potential to enhance or has high potential to clean up existing shoreline areas (improve eroded bulk heading, remove trash, etc.), the project will receive a score of +1. If a project is consistent with the current land use but provides no benefits or enhancements to the area, it will receive a score of 0. If the project has the potential to negatively alter or impact existing land use or community development/revitalization plans, it will receive a -1.

Socioeconomics: Commercial Income and Assets

The existing commercial venture is in an area or neighborhood, helps to define the character of the area and contribute significantly to the economic base. Development of a dredged material placement site has the potential to either enhance or disrupt the existing commercial activities within an area. Addition/improvement of recreation facilities, improvements to infrastructure, improvements to maritime use, or availability of more commercial space as a result of a project

could bring more commercial income into an area or neighborhood. Such enhancements would be considered positive and receive a score of +1. If a project is consistent with the current commercial usage but provides no benefits or enhancements to an area, it will receive a score of 0. If the project has the potential to negatively alter or impact existing commercial ventures or income, it will receive a -1.

Socioeconomics: Community Assets

The existing community structure and economic character of an area is driven by a variety of factors. Employment potential and quality of education and recreational/commercial opportunities help to dictate property values and the average income of the families within a community. Communities that thrive economically have less turnover in residence and more improvements to individual properties, which maintain and improve the economic base. Development of a dredged material placement site has the potential to either enhance or disrupt the existing community socioeconomics of an area. Addition/improvement of recreation facilities, improvements to infrastructure, or availability of more residential land and small business ventures will tend to improve property values and average residential income within a community. Such enhancements would be considered positive and receive a score of +1. If a project is consistent with the current community usage but provides no benefits or enhancements to an area, it will receive a score of 0. If the project has the potential to negatively impact existing residential socioeconomics (e.g. decrease property values, impact economic character of the area), it will receive a -1

Environmental Justice

Some actions might disproportionately favor higher-income populations or put lower-income populations at higher health and safety risks. Development of a dredged material placement site could positively or negatively impact these types of populations. Addition/improvement of recreation facilities or other community amenities, improvement of property values or decreases of environmental health risks as a result of the project would be considered positive and scored as a +1. If the project does not provide any improvements/enhancements, it will receive a score of 0. If the project has the potential to negatively impact or displace a minority or low-income community (e.g. increasing health risk, decreasing property values for income potential), it will receive a -1.

Public Health

Continuing good health of citizens is a paramount concern of most individuals, families and community leaders. Development of a dredged material placement site has the potential to improve public health in many ways. Capping of contaminated materials, reducing the leaching of toxic material which might enter the human food chain are considered under this category. Limiting the entry of particulate matter or irritant substances into the airways affecting air quality may be one of the outcomes of a dredged material placement project. Improvements to public health would be considered positive and would receive a +1 score. If a site development would not appreciably mitigate any public health concerns, it will receive a score of 0. Although state and federal resource agencies would not knowingly support any project that would potentially increase the risk to public health, there are some potential mitigation projects that could pose increased public health risks during site evaluation and cleanup. If this arises as a potential for development of any site and the potential health risk exceeds the potential benefit, the site should receive a score of -1.

Public Safety

This category refers to those situations affecting recreational, occupational and general public safety issues concerned with dredged material placement options. Some options may include chemical processing of dredge material prior to its final disposition. These options may result in occupational safety concerns. Other options may suggest long-term safety issues such as increases in industrial accidents or significant contributions to traffic accidents (from trucking of dredge material to upland sites). Some options may also have the potential to convert current recreational fishing/boating areas for dredge material placement, which may increase recreational boat traffic in/near shipping channels. If a site has the potential to create any of these potential hazards or otherwise increases public safety concerns, it will receive a score of -1. Improvements to any of these conditions, particularly safer access to public recreation, would be considered positive and would receive a score of +1. No appreciable change to Public Safety would receive a score of 0.

Appendix D

Matrix

COL.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
ROW 1			WATER QUALITY					AQUATIC HABITAT			WETLANDS		AQUATIC BIOLOGY - FINFISH/SHELLFISH									SPECIAL REGULATORY	
2																							
3	Option No.	OPTION NAME	Dissolved Oxygen	Nutrients (N & P)	Turbidity	Salinity	Ground Water	Benthic Community	Shallow Water Habitat	SAV	Tidal Wetlands	Non-tidal Wetlands	Finfish Spawning Habitat	Finfish Nursery Habitat	Larval Transport	Essential Fish Habitat (EFH)	Commercial Fish and Shellfish	Thermal Refuge	Overwintering Crabs	Recreational Fishery	Aquaculture	Protected Species (T & E) long term	Habitat Area of Particular Concern (HAPC)
4	1	Tangier Island	0	-1	1	0	0	0	-1	-1	1		-1	0	0	-1	0	0	0	0	0	0	0
5	2	Smith Island	0	-1	1	0	0	0	-1	0	0		0	0	0	-1	0	0	0	0	0	0	0
6	3	Guinea Marsh Island Complex	0	0	1	0	0	0	-1	-1	1		-1	0	0	-1	0	0	0	0	0	0	0
7	4	Clump and Fox Islands, Accomack Co.	0	-1	1	0	0	0	-1	1	1		1	0	0	-1	0	0	0	0	0	0	-1
8	5	Saxis WMA	0	-1	1	0	0	0	0	0	1		-1	0	0	-1	0			0	0	-1	0
9	6	New Point Comfort Shoal	0	0	1	0	0	-1	-1	1	0		0	0	0	-1	0	0	0	0	0	-1	0
10	7	Shoreline Protection Eastern Mathews County	0	0	1	0	0	0	-1	1	1		1	0	0	-1	0	0	0	0	0	-1	0
11	8	Seabird Nesting Island (Cape Charles Area)	0	-1	1	0	0	-1	-1	0	0		0	0	0	-1	0	0	-1	0	0	-1	0
12	9	Fisherman Island	0	-1	1	0	0	0	0	0	1		-1	0	0	0	0	0	-1	0	0	-1	0
13	10	Capping contaminated sites (Elizabeth River)	0	-1	0	0	0	1	0	0	0		0	0	0	1	0	0	0	1	0	0	0
14	11	Confined Aquatic Disposal	0	-1	0	0	0	0					0	0	0	-1	0	0	0	0	0	0	
15	12	EPA Approved Ocean Placement - Norfolk ODMDS	0	-1	0	0		0								0	0			0		0	0
16	13	EPA Approved Ocean Placement - Dam Neck ODMDS	0	-1	0	0		0								0	0			0		0	0
17	14	Placement and Management for Innovative Reuse		1	1		0					0											
18	15	Wolf Trap Alternate Northern Extension	1	-1	0	0	0	0					0	0	0	-1	-1	0	-1	0	0	-1	0

Legend:

+1 Potential protection or enhancement
0 No potential impacts expected
0 Not enough / inconclusive data
- 1 Potential negative impacts expected
Shaded cells are Not applicable / not calculated

(NOTE: Bold scores represent those that have been "flagged" to receive particular consideration because of significant interest or impact)

COL.	1	2	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
ROW 1			WILDLIFE							PHYSICAL ATTRIBUTES					OTHER NON-BIOLOGICAL ATTRIBUTES					
2																				
3	Option No.	OPTION NAME	Species of Greatest Conservation Need (SGCN)	Waterbird Use	Shoals, Spits, Shorelines, Islands	Marshes	Forests	Streams	Other Freshwater Wetlands	Substrate Characteristics	Hydrodynamic effects	Toxic Contaminants	HTRS & MEC	Fossil Shell Mining	Floodplains	Recreational Value	Aesthetics and Noise	Cultural Resources	Navigation	High Quality Agriculture
4	1	Tangier Island	1	1	1	1	0			0	0	0	0	0		1	-1	0	0	
5	2	Smith Island	1	1	1	1				0	0	0	0	0		1	-1	0	0	
6	3	Guinea Marsh Island Complex	1	1	1	1	0			0	0	0	0			1	-1	0	0	
7	4	Clump and Fox Islands, Accomack Co.	1	1	1	1				0	0	0	0	0		1	0	0	0	
8	5	Saxis WMA	1	1	1	1				0	0	0	0			0	-1	0	0	
9	6	New Point Comfort Shoal	1	1	1	1	0			0	0	0	0	0		1	0	0	0	
10	7	Shoreline Protection Eastern Mathews County	1	1	1	1				0	0	0	0	0		1	-1	0	0	
11	8	Seabird Nesting Island (Cape Charles Area)	1	1	1	1				0	0	0	0	0		1	0	0	0	
12	9	Fisherman Island	1	1	1	1				0	0	0	0			0	0	0	0	
13	10	Capping contaminated sites (Elizabeth River)	0	1						0	0	1	0	0		0	0	0	0	
14	11	Confined Aquatic Disposal	0	0						0	0	0	0	0		0	0	0	0	
15	12	EPA Approved Ocean Placement - Norfolk ODMDS	0	0						0	0	0	0			0	0	0	0	
16	13	EPA Approved Ocean Placement - Dam Neck ODMDS	0	0						0	0	0	0			0	0	0	0	
17	14	Placement and Management for Innovative Reuse						0	0	0		0	0		0	0	0	0		
18	15	Wolf Trap Alternate Northern Extension	0	0						0	0	0	0	0		0	0	0	0	

Legend:

+1 Potential protection or enhancement
0 No potential impacts expected
0 Not enough / inconclusive data
- 1 Potential negative impacts expected
Shaded cells are Not applicable / not calculated

(NOTE: Bold scores represent those that have been "flagged" to receive particular consideration because of significant interest or impact)

COL.	1	2	42	43	44	45	46	47	48	49	50	51	52	53							
ROW 1			BENEFICIAL ATTRIBUTES					ADDITIONAL PARAMETERS													ROW 1
ROW 2																					ROW 2
ROW 3	Option No.	OPTION NAME	Habitats for T & E Species	Beneficial Use Uplands	Beneficial Use Wetlands	Beneficial Use - Adjacent Habitat Enhancement	Shoreline Protection & Coastal Resilience	Infrastructure	Existing Land Use	Commercial Income & Assets	Community Assets	Environmental Justice	Public Health	Public Safety	Count of cells with entries	Total Score	Score/Count	Normalized	Rank	Option No.	ROW 3
4	1	Tangier Island	1	1	1	1	1	1	1	0	0	0	0	0	46	8	0.174	0.317	4 (tie)	1	4
5	2	Smith Island	1	1	1	1	1	1	1	0	0	0	0	0	45	9	0.2	0.343	3 (tie)	2	5
6	3	Guinea Marsh Island Complex	1	1	1	1	1	1	1	0	0	0	0	0	45	9	0.2	0.343	3 (tie)	3	6
7	4	Clump and Fox Islands, Accomack Co.	1	1	1	1	1	0	0	0	0	0	0	0	45	10	0.222	0.365	2	4	7
8	5	Saxis WMA	1	0	1	1	1	1	1	0	0	0	0	0	42	7	0.167	0.31	5 (tie)	5	8
9	6	New Point Comfort Shoal	1	1	1	1	1	0	0	0	0	0	0	0	46	8	0.174	0.317	4 (tie)	6	9
10	7	Shoreline Protection Eastern Mathews County	1	1	1	1	1	1	1	0	0	0	0	0	45	12	0.267	0.41	1	7	10
11	8	Seabird Nesting Island (Cape Charles Area)	1	1	1	1	1	0	0	0	0	0	0	0	45	5	0.111	0.254	7	8	11
12	9	Fisherman Island	1	0	1	1	1	1	0	0	0	0	0	0	44	7	0.159	0.302	6	9	12
13	10	Capping contaminated sites (Elizabeth River)	0			1						0	1	0	36	6	0.167	0.31	5 (tie)	10	13
14	11	Confined Aquatic Disposal													27	-2	-0.074	0.069	10	11	14
15	12	EPA Approved Ocean Placement - Norfolk ODMDS													20	-1	-0.05	0.093	9 (tie)	12	15
16	13	EPA Approved Ocean Placement - Dam Neck ODMDS													20	-1	-0.05	0.093	9 (tie)	13	16
17	14	Placement and Management for Innovative Reuse						0	0	0	0	0	0	0	20	2	0.1	0.243	8	14	17
18	15	Wolf Trap Alternate Northern Extension													28	-4	-0.143	0.000	11	15	18

Legend:

+1 Potential protection or enhancement
0 No potential impacts expected
0 Not enough / inconclusive data
- 1 Potential negative impacts expected
Shaded cells are Not applicable / not calculated

(NOTE: Bold scores represent those that have been "flagged" to receive particular consideration because of significant interest or impact)