

Middle Peninsula Shallow Water Dredging Master Plan Framework

A strategy for dredging sustainability

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3/10/2010

Introduction and Summary

Navigable channels are pivotal to the use and enjoyment of docks, marinas, boat yards, yacht brokers and eateries. Water borne traffic has been at the heart of Middle Peninsula waterways since becoming home to its earliest settlers.

This project will begin the process of identifying and discussing the issues and framework necessary to establish a Middle Peninsula Regional Dredging and Sediment Management Plan (D & S Plan). A sustainable dredging and sediment master plan will be developed from the following components which include:

- Identification of regional and local dredging and sediment management needs
- The costs and potential funding mechanism for dredging projects
- The feasibility, nature and form of inter-municipal cooperation
- A methodology and process for determining dredging priorities and scheduling
- Feasibility and requirement for expedited permitting
- Alternative for ownership, control and operation of dredging equipment.
- Consideration of ecosystem restoration through the beneficial use of dredged material, incorporating dredging Sections 202 and 701 of the Chesapeake Bay Executive Order call on Federal agencies to expand public access to waters and open spaces of the Chesapeake Bay and its tributaries from Federal lands and conserve landscapes and ecosystems of the Chesapeake Bay watershed.

The primary focus of this investigation is on the rivers, creeks, harbors, and embayment's draining from the Middle Peninsula into the Chesapeake Bay. However, the solutions developed should be applicable and transferable to all Chesapeake Bay communities.

In preparation of and with full anticipation that the US Army Corps of Engineers (ACE) will no longer be available for local waterway dredging, the Middle Peninsula must address the economic impact and needs of shallow water dredging and sediment management and determine how to accomplish and fund a Plan. It is believed that by study of these issues the Middle Peninsula region will be assured timelier, cost effective and adequate maintenance dredging of the waterways of the Middle Peninsula. The development of a Middle Peninsula Regional Dredging and Sediment Master Plan (D & S Plan) will allow for continuing economic activity by improving the use of Middle Peninsula waterways and, more importantly, promote further economic, commercial and recreational use of the Middle Peninsula.

Dredging Needs and Economic Impacts

The first step in the Plan development is to identify the dredging and sediment needs in the geographic area of impact, namely the counties of Essex, Gloucester, King and Queen, King William, Mathews, and Middlesex including the Towns of Tappahannock, Urbanna, and West Point. This will include gathering information from site visits, interviews with public officials, marina operators, yacht clubs and marine contractors as well as a review of Town and County files and a review of the US Army Corps of Engineers regulatory permit files. Emphasis should be placed upon the physical configuration of the channels, the

type and level of use, size of vessels, sediment physical characteristics and chemical quality and the past dredging experience including the sponsoring entity, frequency, amounts and disposal.

The primary focus of this investigation is on the rivers, creeks, harbors and embayment's draining from the Middle Peninsula into the Chesapeake Bay, a universe of 50-75 different potential dredging areas of need or recreational and or commercial style dredging projects. Areas could be categorized as primary, secondary (including smaller tributaries and unmarked channels) or tertiary based on traffic volume and economic impact (public launches and docks and marinas). Private channels and private docks will likely continue to depend on private funding for dredging needs.

The economic impacts of scheduled maintenance dredging and the existence of a single responsible entity are difficult to accurately estimate. It is clear, however, from a number of objective measures that the existing economic activity represented by recreational boating, commercial fishing and the potential economic development associated with the existence of good marine facilities are substantial.

Program Organization

The Middle Peninsula/Chesapeake Bay Public Access Authority (MPCBPAA) has been identified as the lead organization to identify a potential plan and organization for a regional D&S management program. Potential D & S program organization may include one of the following or a combination of:

- Traditional Army Corps of Engineers (ACE) model
- Public centralized approach: establish a dredging authority
- Decentralized approach: private citizens
- Hybrid of each of the above

Dredging Priorities and Scheduling

Traditional/Historic Approach

As in the past, Army Corps of Engineers establishes dredging priorities. Scheduling is determined primarily on the basis of necessity, as evidenced by past dredging history and vessel traffic for identified channels. A schedule is then developed for all channels identified for maintenance. The schedule will include the channel to be dredged, the frequency of dredging, and an estimate of the amount of dredging necessary. Permitting for D & S is centralized using this approach. However, it is unlikely that federal funding will be provided to maintain all but the most heavily trafficked, or primary waterways. Historically, ACE has not dredged smaller tributaries or unmarked channels. It is unlikely that they will be included in future D & S scheduling through ACE. Therefore, some plan will need to be identified to provide a D & S schedule for these secondary waterways.

Public Centralized Approach

Requires a centralized dredging authority to provide project accountability and to facilitate and properly manage regulatory permitting. The authority will also provide administrative support (accounting, contracting, payroll and human resources). The public centralized model will look to evaluate the region as a whole and coordinate the timing between projects and establish locations to maximize the

3/10/2010

sediment spoil (new sand for erosion control, create new islands, etc.), as well as coordinate multiple projects in the same area. D & S needs will determine whether or not it will be advantageous to perform dredging operations with staff or with contractors. If dredging is performed by the authority, it should have a dedicated crew trained specifically in D & S operations with the selected equipment.

Equipment needs will be determined in part by the physical and chemical composition of sediment materials as well as the expected volume and disposal practices.

Using a public centralized approach will require a funding plan that may include private funding options and/or public options.

Decentralized Approach

This approach leaves the issue to private citizens to address. Basically, those who own docks, marinas or waterfront property will dredge as they see the need to get boats in and out of access points rather than as part of an identified plan or schedule. Financing, permitting and contracting will become the responsibility of the citizen or business owner.

Hybrid

This approach may include portions of all presented options. The most likely combination might utilize ACE for the primary waterways (highest economic impact) with a centralized authority assuming responsibility for secondary areas to include smaller tributaries and unmarked channels based on vessel traffic. Private Citizens will likely be required to assume responsibility for tertiary and/or privately owned docks that have limited impact on the regional economy.

Spoil Use, Disposal and Environmental Impacts

Regardless of the D & S program organization approach, a continuing problem with dredging operations is disposal of dredge spoils. Dredging can create disturbance to aquatic ecosystems, often with adverse impacts. Dredge spoils may contain toxic chemicals that may have an adverse effect on the disposal area. The process of dredging itself often dislodges chemicals and injects them into the water column. This must be taken into consideration in the disposal or re-use of spoil from dredge sites.

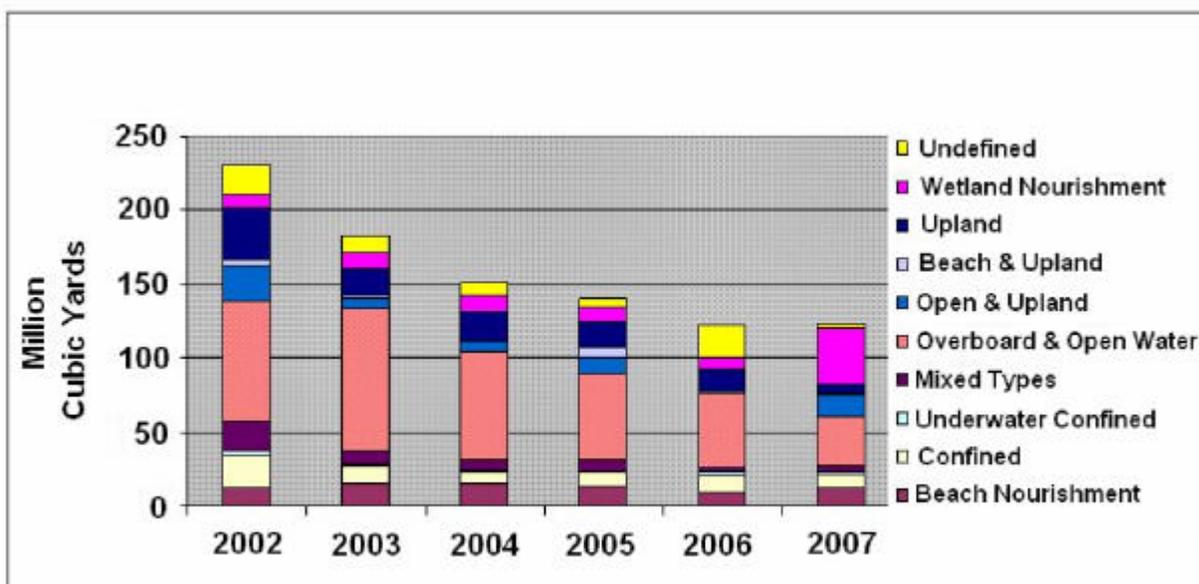
Traditional disposal of spoil involves use of centralized, deep water sites well away from the dredging sites. Transportation can be costly. A variety of beneficial uses for the spoils should also be explored such as beach nourishment and/or erosion protection. The use of spoils for construction materials or as daily cover in landfills should also be explored, though studies show these are more costly means of disposal due to the cost of extra handling, transportation and testing involved in this solution.

The primary dredged materials to be encountered will be clean sands. These materials are believed to primarily originate in shore transport along the shorelines and are deposited in the channels as shallow bars. As the bars grow in width and height, the sand is spread along the channel length. Since the spoil is primarily derived from along shore sources, it should be acceptable to reintroduce the dredged material to the along shore transport system. Candidate disposal sites would be high-energy areas, where shorelines are receding, for which the biological substrate is relatively devoid of aquatic species.

3/10/2010

This proposal will require additional investigation, likely an on-site visual inspection of the proposed disposal area by a qualified biologist to ascertain that no significant aquatic habitats will be disturbed. Written permission from adjacent landowners may also be required to allow placement of the materials.

In general, suitable disposal sites should be close enough to each channel that material can simply be pumped to the designated disposal site and discharged. For some sites, spoil will have to be disposed of at offshore, underwater sites or on land. A 2008 report from the Corps of Engineers indicates 10 disposal techniques are traditionally used as disposal strategies (chart below). Additional considerations should be given to the use of dredged materials to enhance public recreational opportunities, increase living resource habitats, and enhance the environmental quality of the Chesapeake Bay and tributaries of the Middle Peninsula



Corps of Engineers annual dredged material placement (IWR 2008)

Equipment Needs

Depending on the approach selected, it may be more cost-effective to operate the D & S operation with “in-house” staff. Equipment needs will be determined in part by the physical and chemical composition of sediment materials as well as the expected volume and disposal practices. Other considerations will include the physical constraints of proposed dredging sites including the distance between sites, maximum and minimum depths, channel widths, overhead obstructions and channels’ exposure to winds, waves and currents.

For small scale dredging in confined channels, the primary means of dredging are mechanical and hydraulic. Generally, maintenance dredging is most easily accomplished with hydraulic equipment using a trailing suction hopper dredger that trails its suction pipe when working and loads the dredge spoil into one or more hoppers in the vessel. When the hoppers are full, the dredger sails to a disposal area and either dumps the material through doors in the hull or pumps the material out of the hoppers.

Permitting

Permits are necessary from both the US Army Corps of Engineers and the Virginia Marine Resource Commission for dredging operations in the study area waterways. A significant advantage of having a single entity responsible for permitting of the proposed dredging operations is the centralization of the permitting information, data on each channel's sediments and their characteristics, and knowledge of dredging operation scheduling and limitations. With this information in hand, no difficulty with environmental permitting for dredging of any of the study area channels would be anticipated. The permitting process may become more problematic for individual businesses or private citizens. Having an advanced schedule for dredging of sites would allow for early permit applications, minimizing any delays associated with the review process. Again, without a centralized authority and advanced scheduling, the process will slow significantly. However, most sites have existing permits and available background information that will form the basis for continuing permitting. All Federal required permitting may be combined into a single regional permit and State permits are relatively easy to have reissued if good records are maintained of dredging and disposal operations.

The use of dredge spoil from the study area channels for beach nourishment and/or erosion protection will involve dredge spoil placement in near-shore upland habitats. Approvals for this placement will require at least a visual inspection by a qualified aquatic biologist to assess habitat conditions in the disposal area.

Estimated Costs and Funding

This section will summarize the estimated costs for implementation and operation of the D & S Management Program and identifies and recommends funding sources.

Program Costs

An analysis of cost estimates for comparison should be based on:

- 1) Cost per cubic yard for shallow water dredging including disposal and permitting. Estimates should also include published dredging public costs, interviews with dredging contractors and recent bids for shallow-water dredging.
- 2) Capital plus operating costs for self-operated dredging to include all crew personnel as well as administrative support functions.

The decision to contract or self-operate will be determined by the annual expected volume of dredging determined to be needed in the study area.

Program Funding Options

Anticipated annual cost for the D & S Management Program will be determined by the cost analysis above. Five different funding approaches will be explored as part of the development of the Plan. They are:

- Voluntary, Private Funding
- County Funding
 - General Fund Support
 - Special Taxing District
 - County-wide New Tax
- Town Funding Utilizing Harbor Improvement Districts
- User Fee through a Per Slip/Launch Lane Basis
- User Fee through a Boat Registration Add-On

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