MARYLAND
DEPARTMENT OF
NATURAL RESOURCES

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***Boyd Rutherford,*** *Lt. Governor*
***Mark Belton,*** *Secretary*
***Joanne Throwe,*** *Deputy Secretary*

October 30, 2015

Abbie Hopkins
US Army Corps of Engineers
Baltimore District
10 S Howard Street
Baltimore, MD 21201

Ms. Abbie Hopkins,

This letter contains Maryland Department of Natural Resources' responses to the Baltimore District of the US Army Corps of Engineers comments and questions concerning the resubmittal of the permit application NAB-2009-61802-M04 on October 23, 2015 to dredge shell from Man-O-War Shoal in Baltimore County.

The US Army Corps of Engineers questions and comments are below in the black text font and Maryland Department of Natural Resources' responses are in red text font.

1. Since the intent of the dredging is to obtain a specific amount of shell and it's understood from your submittal that it's unknown how thick the subject oyster shell layer is at any dredge location, the exact total area to be dredged cannot be determined. We assume that MD DNR has at least estimated what the existing shell layer thickness is and therefore we are requesting that MD DNR provide an estimate or range of total area (acre or square footage) to be dredged to obtain five million bushels of oyster shell. This information will be included in the Corps/MOE public notice to inform the public of the total dredge area.

   The total estimated acreage to be dredged to obtain 5 million bushels of shell (299,400 cubic yards based on 16.7 Maryland bushels per cubic yard) is 20.7 acres. This estimate is based on the following measurements. Each cut will be no wider than 500 feet. The cut will extend no more than one-third of the distance through the shoal which equates to an average of 233 feet (rounded down to 200 feet to be conservative) based on ten measurements of the shoal using a nautical chart. The depth of the dredge cut will be approximately 30 feet deep based on past upper Bay shell dredging. The rate of return for shells based on past shell dredging in the upper Bay is between 33% and 40% (rounded down to 30% to be conservative). Therefore, an average cut is 111,111 cubic yards, yielding about 33,333 cubic yards of shell based on a 30% return. At 33,333 cubic yards per cut, 9 cuts will be made to obtain 5 million bushels of shell (299,400 cubic yards).

   Average cubic yards per dredge cut = (500' * 200' * 30') / 27 = 111,111
   Average cubic yards of shell per dredge cut = 111,111 * 0.30 = 33,333
   Estimated number of dredge cuts needed = 299,400 / 33,333 = 9
   Estimated acreage to be dredged = (500' * 200') * 9 cuts = 900,000 sqft = 20.7 acres
   Estimated total cubic yards to be dredged = 9 * 111,111 = 999,999 (or 1 million cubic yards)

2. Provide names/addresses of any interested parties, organizations, etc. (pro or con), that MD DNR has coordinated with on the proposed MOW Shoal dredging.
   The list of interested parties, organizations, etc. is included at the end of this response letter.

3. Provide names and addresses of adjacent property owners for new proposed placement sites that have not been Corps/MOE approved. (Adjacent property owners to the MOW dredging site are not required.)
   Planting sites will be on natural and historic oyster bars as per an existing permit with the Corps (Permit number 2008-005120-M36 and 2012-61332-M24), therefore there are no new proposed placement sites. If any new sites arise, then approval will be sought before they are planted.

4. Plans for the public notice must be 8.5" by 11 ". An 8.5" by 11" drawing should be provided that shows how the shoal structure will change with the proposed dredging. Also show either actual or presumed sites or dimensions of dredge cuts on 8.5" by11 "plan view and cross-section drawings. As currently proposed, be sure to show on the cross-section drawings that there will be a layer of existing oyster shell a minimum two feet in depth left at the bottom of the dredged trench.
   Please see attached plans.

5. Provide current surveyed bathymetry, if available.
   The Department of Natural Resources uses the bathymetry available on NOAA navigational charts.

6. Please verify that the MOW Shoal is 456 acres and shell removal will be by hydraulic dredging as stated in your application resubmittal. Please provide detail on the type hydraulic dredging to be used, including how the return water is to be handled.
   The 456 acres provided in the application was determined by a survey conducted by the Maryland Geological Survey, cited in the application. This acreage includes the actual shoal as shown on the nautical chart and an area around the shoal that MGS included in their survey of shell bottom. The actual shoal shown on the NOAA nautical, and defined by the 12 foot contour line, is an estimated 214 acres. This 214 acre shoal is seen on the plan view (page 8 of this letter) as the area outlined in green. The area outlined in blue is the historic Yates Bar, named Man O'War Shoals, and is 729 acres. The proposed Man-O-War shoal dredging project, as described in the permit application, will only be on the 214 acres of the shoal.

   Hydraulic dredging is the method proposed to obtain the shells. A cutterhead at the end of a "ladder" rotates and dislodges sediment and shells from the bottom. The loose material is pumped through a pipe in the ladder, up to the dredging vessel and into a shell washer. The washer is a cylindrical metal screen which tumbles the shell/sediment slurry as it is sprayed with jets of water from the Bay and washed. The screen on the washer separates shells from "fines" (shells and shell pieces less than 1" in size). The "whole shells" exit the washer to a barge adjacent to the dredge. The "fines" exit to the other side of the dredge to a barge. The wash water with sediment and small bits of shells not retained as fines exit the washing apparatus though a discharge pipe at the stern of the dredge through an underwater "elephant trunk" pipe directed downward into the cut. The sediment laden wash water is discharged overboard through the elephant trunk discharge pipe. Sediment and shell bits backfill the cut and fill it with about 10' to 15' of fill. Lighter silt particles create a large plume in the Bay in the direction of the tidal flow.

   In summary, the process used is hydraulic dredging with overboard disposal of the wash water. The shell dredging program is a beneficial use project where the shells are used to benefit the oyster population,

enhance oyster habitat, both in sanctuaries and on harvested bottom. In addition, the ecological oyster ref community is enhanced due to the presence of the shells and oysters resulting from this project.

7. The resubmittal states there may be some stockpiling of dredged shell as well as placing on the restoration site. Where is (are) the stockpile site(s) located? Please specify the name and address of each stockpile location. What will the method of transportation be to both the placement site and the stockpile site?
   The shell planting locations will be a combination of natural and historic oyster bars. The plan sheets for these in-water planting locations can be found in Attachment 2a and 2b of the permit application. Additionally, some of the shells will be taken to on-land shell stockpile sites. After on-land storage the shells will be planted in the Bay as described above. The on-land stockpile locations will include:
   - Love Point: 400 Pier Ave, Stevensville, MD 21666
   - Grasonville: Queen Anne County Transfer Station
     401 Gravel Run Road, Grasonville, MD 21638
   - Cambridge: University of Maryland, Horn Point Laboratory
     2020 Horns Point Road, Cambridge, MD 21613
   - Crisfield: Wellington Road, Crisfield, MD 21817
   - Baltimore Site to be determined

   The method of transportation from the dredging site to the planting sites is by tugboat and barge. The method of transportation from the dredging site to the on-land stockpile sites is first by tugboat and barge to an offloading site, and then by dump truck to the stockpile site.

8. What is the proposed method of shell placement into the water?
   The two most likely methods of shell placement will be by a clam bucket or a water cannon. Using the clam bucket, the typical method will be to swing the bucket as the shells are planted in order to create a layer of shells with each swing. The tag line on the bucket will be set so the bucket opening is perpendicular to the axis of swing in order to obtain the most effective dispersal of shells. The barge with the clam bucket will be "spudded down" in a stationary position as the shells are planted. To plant a large area with a layer of shells, the barge will be constantly repositioned to plant shells through the area. When a water cannon is used, a jet of water will be used to wash the shells off the deck of the barge. The barge will be towed and constantly moving through the area as the shells are washed off, in order to plant the shells in a layer and avoid creating a pile on the bottom.

9. If MOW shell will be placed at locations that have current Corps/MOE approval(s), provide the Project name and Corps/MOE permit numbers. If MOW shell is proposed to be used for project(s) currently under review, identify and provide description.

   The shells from Man O' War Shoals are planned to be used by the Department of Natural Resources on existing permitted sites. The Department of Natural Resources currently has a permit to plant shell on natural and historic oyster bars within the Maryland waters of the Chesapeake Bay (2008-005120-M36 and 2012-61332-M24).

10. Identify the following for each proposed shell placement site not currently authorized by the Corps/MOE:
    - Plan view drawing
        - Relationship to shoreline/land features
            - Relationship to Federal authorized navigation channels (i.e., Little Choptank, Tred Avon), as applicable
            - Size

- Existing depths at MLW (NOAA navigation chart at a minimum)

o Cross-section drawing

- Vertical clearance (minimum/maximum)
- Approximate thickness of the shell placement on bottom (1-3 inches, 6-9 inches, 9-13 inches, etc.) and the relationship to MLW.

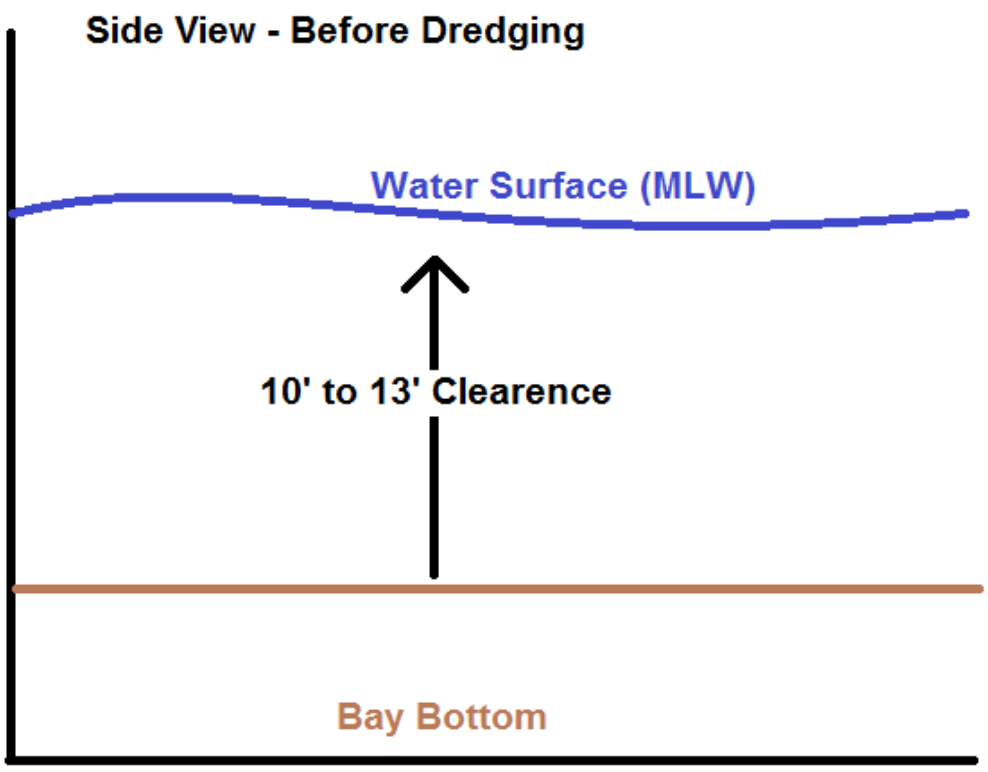
Planting sites will be on natural and historic oyster bars that are already permitted under Permit number 2008-005120-M36 and 2012-61332-M24). There are no new proposed placement sites. If any new sites arise, then approval will be sought before they are planted.

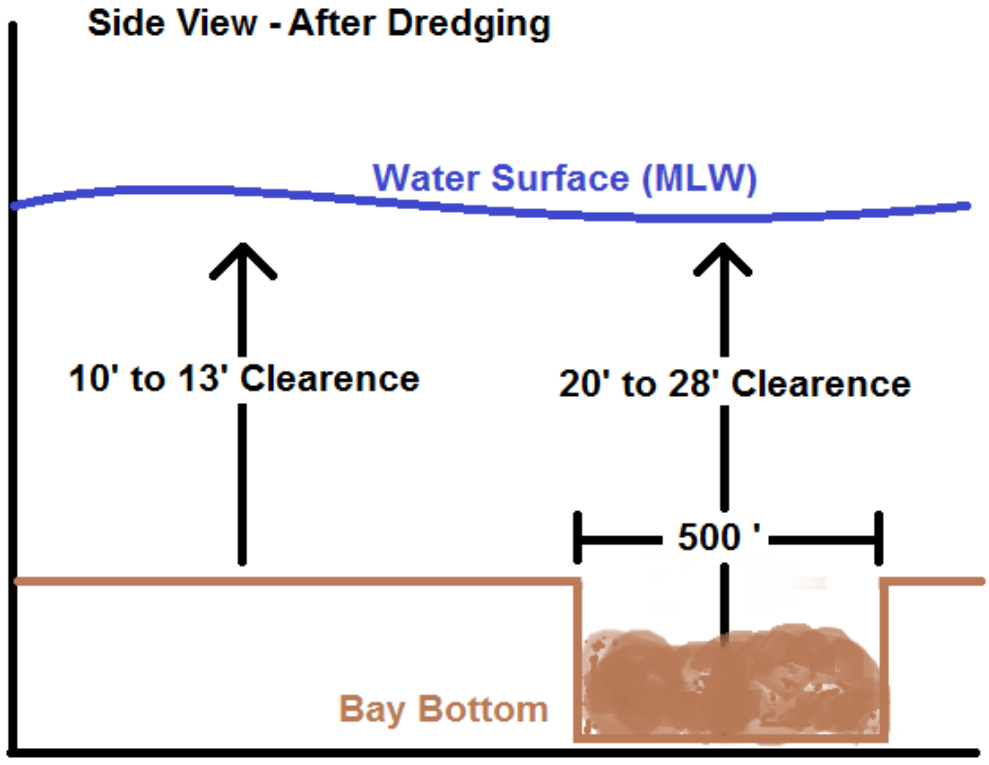
Please feel free to contact Chris Judy, director of the Shellfish Program at Maryland Department of Natural Resources, with any questions or comments about these responses via email at chris.judy@maryland.gov or phone at 410-260-8259.

Sincerely,

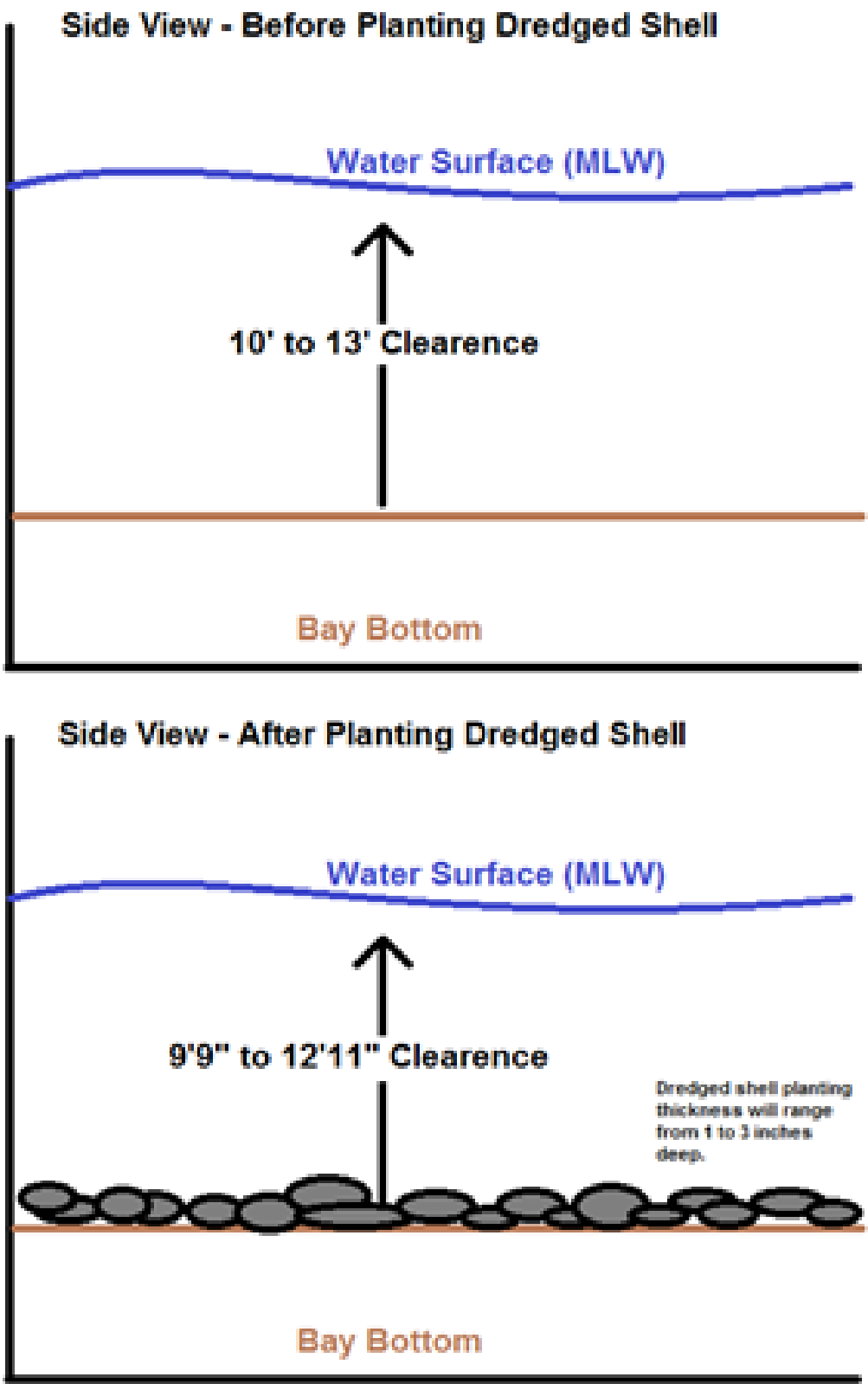
Chris Judy
Director of the Shellfish Program
Maryland Department of Natural Resources
580 Taylor Avenue - B2
Annapolis, MD 21401

**A typical cross section of the proposed dredge cuts to be made at Man-O-War shoal**

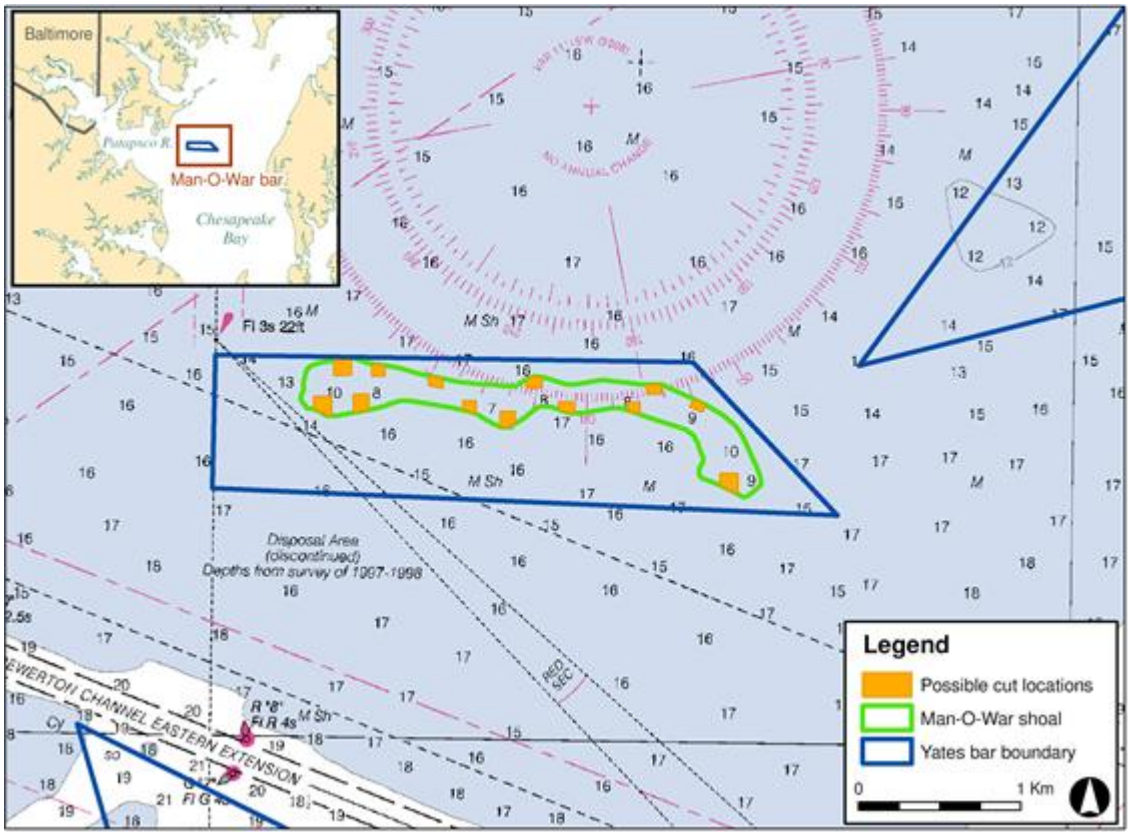


**A typical cross section of planting dredged shell in Maryland using dredged Man-O-War Shoal shell**



**The location and general shape of Man-O-War shoal. Dark lines indicate the boundaries of oyster bars mapped by Yates (1911). Yellow rectangles within the outline of the shoal illustrate the types of cuts anticipated as shell is removed by dredging along the perimeter.**



# Email List of Interested Parties, Organizations, etc. that the Department of Natural Resources has Consulted with Concerning Man-O-War Shoal Shell Dredging

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Note: This list is mostly comprised of members of the legislature, Sport and Tidal Fishery Advisory Commissions, County Oyster Committees, and other known interested parties.