



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

Ms. Abigail Hopkins
Baltimore District Corps of Engineers
Regulatory Branch
10 S. Howard Street
Baltimore, MD 21201

August 19, 2016

Dear Ms. Hopkins :

This letter is in reply to Federal agency comments sent on April 4, 2016, regarding the Maryland Department of Natural Resources (DNR) permit application to dredge oyster shells (CENAB-OP-RMN (MD DNR FISHERIES SERVICE/MAN O' WAR SHOAL DREDGING) 2009-61802-M04), resubmitted by DNR on July 17, 2015.

Comments were provided to DNR, through your office, from three Federal agencies: Corps of Engineers Baltimore District, National Marine Fisheries Service (NMFS), and the Environmental Protection Agency (EPA). Each agency wrote a separate letter, therefore DNR's reply is in three parts: one for each agency. DNR understands that review of the shell dredging permit application cannot be completed until all of the requested information is provided. Please inform DNR should there be additional information that is needed.

Sincerely,

A handwritten signature in black ink, appearing to read "Chris Judy".

Christopher Judy,
Shellfish Division Director, DNR
443-223-0472

cc:

Justin Berezna, MDE

CENAB-OP-RMN (MAN O' WAR SHOAL DREDGING) 2009-61802-M04

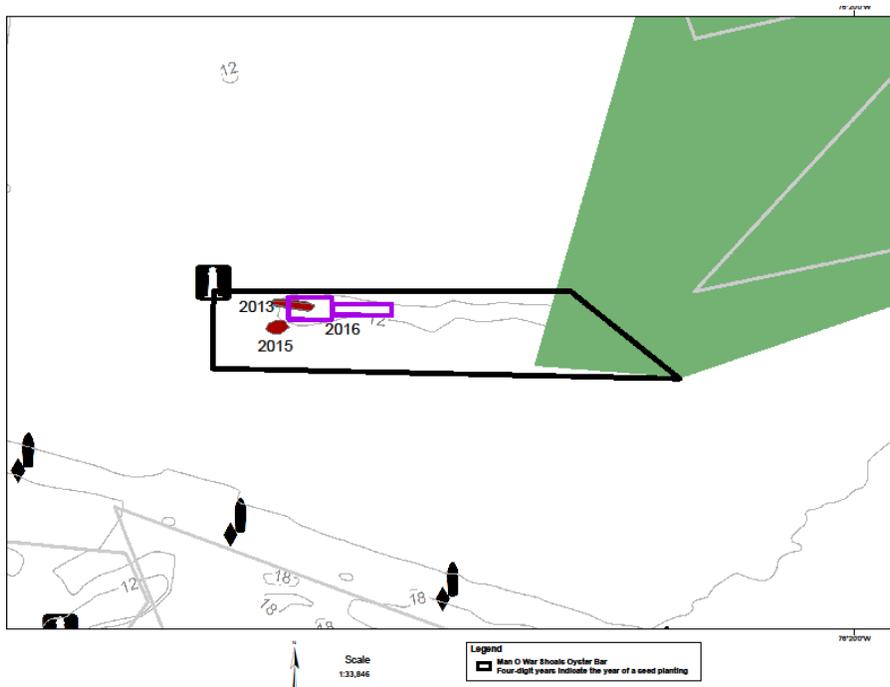
In the Corps letter dated April 4, 2016, seven comments were provided, including a request that DNR also reply to comments from NMFS and EPA.

CORPS (1): Provide the known history of, and any data and information collected from, past shell removal operations from Man O' War Shoal; this should include location and areal size and amount of shell removed.

There has been no prior shell dredging or shell removal from Man O' War Shoal.

CORPS (2): Provide a chart/plan that accurately shows the location and site limits of the recent two years (2013 and 2015?) of oyster spat planting of the shoal by Baltimore County watermen and all other viable oyster beds with an approximate estimate of their density within the shoal.

A spat planting map for Man O' War Shoals is shown below, with seed plantings for 2013, 2015, and 2016. The 2016 plantings are currently underway. Plantings for harvest production are made through cooperative efforts between DNR and the various County Oyster Committees (Baltimore, in this case). DNR will not dredge sites where seed were planted, since both DNR and the County Oyster Committee worked to create a harvestable site there. This commitment was stated a number of times in the application. The estimated planting density has ranged from 1M to 4M spat per acre (or 250 spat/sqm to 1,000 spat/sqm). These are high densities, but note that there is significant mortality from spat to market size oysters. There are no other viable oyster beds because the shoal has poor natural oyster reproduction and in addition to this longterm condition, suffered severe mortality in 2011 due to severely depressed salinity resulting from high spring rains, a tropical storm, and a hurricane.



CORPS (3): Attachment #1, included with the resubmitted application, presents information that conflicts with other information that MDNR subsequently provided us during our review of the current application. One item of particular significance is it stating that the bottom of the cuts will have a two-foot layer of oyster shell left in place, while additional information provided to the Corps indicated a 10 to 15 foot layer of sediment and shell bits from the washing would be put back into the cuts. The entire Attachment #1 must be revised to accurately present the project.

Attachment #1 has been revised and is included with this letter. The statement that a two-foot shell layer would be left exposed at the bottom of the cut was incorrect. It was written by staff not familiar with the project. The dredging process since the start of the program in 1960, has always involved discharging sediment and shell “fines” back into the cut, such that the cut is partially filled. This covers the bottom of the cut, but it also leaves variable topography after dredging (ie cuts in the bay bottom) that provide diverse habitat post-dredging. The logic of targeting this material back into the cut was to contain it as much as possible and prevent it from being broadcast loosely across the undredged adjacent Bay bottom: an environmental safeguard built into the program from the beginning.

CORPS (4): Provide the specific proposed testing parameters which are to be used in Year 1. They will be subject to the agencies’ comments and approval as part of our permit application review. Also please note that, should a DA permit be issued, the conclusion of any study will also require the concurrence of the agencies.

A table listing the parameters for Year 1, and the additional years as well, was provided on page 53 of Attachment #1. They are: oyster density, fish bottom trawls results, sediment samples and benthic samples, and water quality (bottom and surface salinity, dissolved oxygen, conductivity, turbidity, and water temperature). DNR fully expects and supports that the parameters, the study, and the study results must be reviewed and approved by the agencies.

CORPS (5): Please note that DA permit #2008-00512, a significant permit that MDNR proposes to use for the shell placement, will expire on March 18, 2017. This is prior to Year 2 when the shell dredging is to be performed, if authorized.

DNR will submit a new permit application in advance of the expiration date, in time to provide for a seamless transfer into the new permit. DNR will work with the Baltimore Corps Regulatory Branch to coordinate the timing of our application with your new Regional General Permit.

CORPS (6): Due to the size and scope of this project the Protected Resources Division of NMFS has recommended that this project be subject to informal consultation under Section 7 of the Endangered Species Act.

A Section 7 consultation has been initiated. DNR reviewed online information regarding the consultation process and called Brian Hopper of NMFS to discuss the recommended “Informal Consultation”. A return call is expected the week of August 22, 2016.

CORPS (7): DNR will reply to comments from NMFS and EPA See the enclosed responses.

CENAB-OP-RMN (MAN O' WAR SHOAL DREDGING) 2009-61802-M04

Following is DNR's response to a letter from Louis Chiarella, NMFS to William Seib, Corps of Engineers dated February 9, 2016 and provided to DNR April 4, 2016. The NMFS letter is attached.

Due to the complexity and length of the NMFS letter, plus certain questions being repeated a number of times throughout the letter, DNR has provided excerpts and numbered them for convenience. Also included are the page and paragraph citations.

A summary list of issues is on page 2 of the NMFS letter and reads: *"...how MDNR would determine dredge cut locations; an evaluation of the direct impacts of dredging, including specific monitoring plan information, potential impacts to live oysters on Man O'War oyster bar, and potential impacts to anadromous fish migrating past the area during the dredging; the impact of backfilling the dredge cuts with sediment and shell and the resulting change in bottom type; how dredging shell was determined to be the preferred alternative; site specific information on the locations of the proposed shell use; and the State's soon-to-be updated oyster restoration and management plan for the Chesapeake Bay."*

The above summary list was expanded upon in the rest of the letter. DNR's response to those details is below, in the order that the comments were developed in the letter. All responses begin with the general theme of the comment, then in most cases a quote is used from the letter. If there was no clear quote, then just the general theme is noted.

NMFS (1): Backfilling & Covering Shells in the Bottom of the Cut

"The sediment and shell bits would backfill the cut with about 10 to 15 feet of fill, negating any habitat benefits of leaving two feet of shell at the bottom of each dredge cut" (page 2, paragraph 1)

The statement in Attachment #1 that a two-foot shell layer would be left exposed at the bottom of the cut was incorrect. Therefore, there is no shell habitat benefit that is being negated because there is no exposed shell layer at the bottom of a cut to begin with. A new Attachment #1 is enclosed with the text corrected.

The dredging process, since the start of the program in 1960, has always involved discharging sediment and shell "fines" back into the cut, such that the cut is partially filled but not entirely filled, leaving variable topography. This discharging of material into the cut has been approved and required by the permitting agencies every permit cycle since 1960. The logic was to target this large volume of material back into the cut vs having it broadcast loosely across the undredged adjacent Bay bottom. Therefore, this backfilling process is an environmental safeguard built into the shell dredging program.

Note that this part of the Bay has chronic low spat set and can suffer killing freshets so this is not a suitable place to expect an oyster population to naturally develop on exposed shell in a cut, even if it was there to begin with.

NMFS (2): Impacts to Migrating Fish (page 2, paragraph 3)

Potential impacts to migrating fish can be addressed by conditions placed upon the permit by the permitting agencies. This approach of using permit conditions address concerns has been used in the past.

NMFS (3): Specific Dredge Cut Locations - Needed for EFH Assessment, Prior to Permit Approval (page 2, paragraph 3) (page 3, paragraph 2)

DNR did not provide the exact dredge cut locations because they haven't been determined yet. The diagram of dredge cuts in the application (Fig. 1a) is only conceptual and does not indicate confirmed final locations.

Final cut locations will be determined after consulting with the dredging contractor (after the permit is approved and the contract is bid and awarded), various Bay users in the area, the Baltimore County Oyster Committee, and the Oyster Advisory Commission. DNR will also meet the goal to retain areas of undredged bottom between cuts to retain habitat value.

Regarding the EFH Assessment, it isn't clear why exact cut locations are needed when prior EFH Assessments for past shell dredging programs used the overall permitted area for the review, not exact cut locations. The overall area for this proposed project is Man O' War Shoal. DNR proposes that this area be the focus of the EFH assessment, not the precise locations of the cuts which aren't known but which will certainly be located at the shoal. Man O' War will be changed from a large habitat structure without cuts to one that has about a dozen cuts around the perimeter of the shoal and 1/3 into the shoal, such that the structural backbone of the shoal and its core habitat integrity will be retained as will its hydrodynamic nature as an underwater high relief feature. It is reasonable that the general location of the shoal should be sufficient to conduct the EFH assessment vs needing the exact cut locations.

NMFS (4): Variable Topography Negated by Backfilling the Cuts

"This analysis [referring to DNR's studies on benefits of variable topography created by dredge cuts] conflicts with information provided elsewhere in the application where MDNR describes the dredge cut being backfilled by sediment and fines..." (page 3, paragraph 4)

The benefits of dredge cuts to fish and benthic species, shown by prior studies and cited in Attachment #1, are accurate. The benefits are not negated by backfilling, because backfilling is only partial. Backfilling of a cut is partial because shells are removed during dredging, resulting in less material being placed back in the cut than was removed. See Fig. 1b in Attachment #1. The result is a partially filled cut that provides new and variable topography in the area after dredging. The cuts are used by fish and benthic species, based on DNR's past studies of dredged areas (Attachment #1).

NMFS (5): Impacts: Backfilled Cuts, the Silt Plume, Migrating Fish

"The application materials do not provide an analysis of the effects of backfilling the dredge cut, which would bury the shell at the bottom of the cut and potentially alter the area's existing habitat values, lead to sedimentation of the surrounding shell and adverse effects to the existing oyster population, nor is there an analysis of the impacts of the dredge plume on anadromous fish migrating past the area to spawn. Without complete and accurate information, we cannot adequately assess the impacts of the proposed project." (page 3, paragraph 4)

The matter of burying shell at the bottom of a cut was discussed in NMFS (1). There is no shell at the bottom of a cut because the preferred and mandated dredging technique is to discharge sediment and shell fines into the cut, as an environmental safeguard, where they can be better contained vs discharging them broadly into the Bay across adjacent bottom.

Regarding the other impacts mentioned in this NMFS comment, the application materials addressed many of those issues. DNR provided data from past studies of dredged areas (areas with backfilled cuts) and the results are contained in Attachment #1, primarily Sections 4.3 and 4.4. Those studies addressed depth (topography), DO, water quality, fish usage, and benthic populations. To better understand these issues as they directly relate to Man O' War Shoals, obtaining such data is an objective of the multi-year monitoring program described in Attachment #1. Impact data for Man O' War Shoal aren't available yet because dredging will have to occur in order to collect the data.

For the migratory corridor, if the concern is about silt plume impacts DNR offers that the dimensions of the silt plume (Attachment #1, Section 4.1) are minute compared to the width of the upper Bay in this region (~8.5 miles) which leaves an abundantly large corridor. Beyond just the localized plume and considering the presence of multiple permanent cuts (if they are an issue), Man O' War Shoal is approximately 28% of the width of the upper Bay area in this region, which allows for a migratory corridor through the upper Bay to and from the spawning areas. For fish access to the Patapsco River, Man O' War lies north of the main channel and is parallel to it, allowing free access to the river.

NMFS (6): Enhancement of Oyster Bottom at Man O' War

"...any future enhancement of the oyster bottom at Man O' War shoal is not part of the proposed action and should not be assumed in the analysis of impacts." (page 4, 2nd sentence)

DNR recognizes, as stated in this NMFS comment, that any future enhancement is not part of the proposed project or the evaluation.

NMFS (7): Why is Shell Preferred?

"In the application, there is no discussion of why dredging oyster shell is the preferred alternative, and what other less environmental damaging alternatives could be used to restore oyster populations and oyster fisheries." "With these apparent successes [with fossil shell and alternative substrate recruitment and survival success in Harris Creek and Little Choptank], why is MDNR now limiting their restoration efforts to dredged oyster shell?" (page 4, paragraph 2)

Attachment #1, Section 3 contains an abundance of information regarding different materials and methods of restoration, pricing, effectiveness, quantity and availability; with information on why dredged oyster shell is being considered and preferred. Section 3 can be consulted for details, but also note that NMFS raises this question again later in their letter. Please refer to NMFS (20) for a more detailed response to this item. Though dredged shells are preferred, DNR is not limiting efforts to dredged shell only. Dredged shells are being added to the list of materials available for restoration.

NMFS (8): Dredge Cut Locations Required

"MDNR has not yet determined the dredge cut locations, nor have they described how they will determine the dredge cut locations or what measures they would use to avoid and minimize impacts to existing resources in making these determinations." (page 4, paragraph 3)

DNR has not determined final dredge cut locations because it isn't possible to do so before the permit is issued. Identifying dredge cut locations requires working with the shell dredging contractor who will survey the area and recommend locations. A contractor won't be hired until the permit is issued and

DNR has a confirmed program. Only after the program is confirmed can DNR bid the project and award the contract. Identifying dredge cut locations also requires working with local watermen, crabbers, and fishermen who might be affected. Again, this work won't be undertaken until there is a confirmed project (a permit).

To avoid or minimize impacts, DNR will seek input from Bay users regarding locations. DNR will not dredge areas where viable plantings of seed oysters have been made to produce harvestable oysters. This was stated a number of times in the application in Attachment #1. Plantings for harvest production are made through cooperative efforts between DNR and the County Oyster Committees (Baltimore in this case). DNR will not dredge sites where seed were planted, since both DNR and the Committee worked to create a harvestable population there.

Also stated in Attachment #1, to avoid or minimize impacts DNR will conduct a pre-dredging oyster survey to avoid oyster populations (see NMFS(9)), DNR will consult with the U.S. Coast Guard regarding navigation concerns, DNR will also scale the dredge cuts to only go 1/3 into the shoal to maintain the main central body of the shoal (the backbone) in order to retain the shoal's structure as a large underwater obstruction to tidal flow.

NMFS (9): Pre-Construction Oyster Survey Prior to Permit Approval

“MDNR should conduct a pre-construction survey prior to the issuance of any permit to dredge material from the shoal to determine current density of oysters.” “Results of the pre-construction survey should be provided to use for review as part of our evaluation of the effects of the proposed project.” (page 4, paragraph 3)

A pre-construction oyster survey prior to dredging is suitable and can be conducted. This can guide site selection for dredge cuts and help avoid oyster populations, if any viable populations accrue given the chronically low spat sets. The survey results will be provided to the permitting and review agencies prior to dredging. A pre-construction survey prior to dredging (recommended by DNR) is different from a pre-construction survey prior to permit approval (recommended by NMFS); which is actually a pre-decision survey.

One issue with a pre-decision survey is that the results may not reflect the actual situation a few years later when shell dredging begins: oysters that were present for the pre-decision survey could die from a freshet, or a population that wasn't present could appear due to a spat set (though this is highly unlikely) or a seed planting. A pre-decision survey is untimely relative to dredging.

DNR offers that a pre-construction survey is more important and informative for decision making and to protect live oysters. In addition, there is already oyster data available from DNR surveys to date to guide permit review, including information as recently as 2015 and contained in the 5 Year Oyster Report (a summary of these data is contained in the revised Attachment #1).

NMFS (10): Direct Impacts of Dredging - Silt Plume and Shutdown Measures

“There are no protective measures described in the application for shutting down dredging based on characteristics of the plume resulting from dredging and wash water. MDNR should determine thresholds for levels of total suspended solids (TSS) or dissolved oxygen that would result in a shutdown until levels return to ambient.” “ they [MDNR] only consider exposure to lethal turbidity levels (beginning at 4,000 mg/l) and not levels that may lead to behavioral changes, such as for anadromous fish migrating past the area.” (page 4, paragraph 4)

DNR provided detailed results on sediment, plume and dissolved oxygen studies from prior permit cycles in Attachment #1. For this application DNR did not provide shut down procedures or threshold levels for shutting down the operation. Plume thresholds for TSS and DO, as well as shutdown criteria, should be established by the permitting agencies due to their extensive experience with these topics.

The NMFS comment that water quality should return to ambient levels before dredging could resume is a problematic condition in that any shell dredging will increase levels above ambient: essentially shutting down dredging entirely.

Regarding migration comments, see NMFS (5) and for sublethal turbidity comments see NMFS (11).

NMFS (11): Impacts of Sublethal Sediment Levels and Noise Levels

“MDNR should consider the potential for noise and turbidity from the dredging to impede access for anadromous fish to the Patapsco River and upper portions of the Chesapeake Bay.” (page 5, paragraph 1, 2, 3, 4)

Regarding impacts on migratory fish due to sublethal sediment levels and noise from dredging, DNR defers to the permitting agencies to place any needed conditions on the permit.

NMFS (12): Backfilling on top of Shells at the Bottom of a Cut

“MDNR states in their application that they would leave two feet of shell at the bottom of the dredge cuts and ‘thus not change the kind of habitat in the dredged area’...however in their description of the dredging, they describe the dredge cut being backfilled by sediment and fines.” (page 5, paragraph 5)

The statement in Attachment #1 that a two-foot shell layer would be left exposed at the bottom of the cut was incorrect. The dredging process, since the start of the program in 1960, has always involved discharging sediment and shell “fines” back into the cut, such that the cut is partially filled but not entirely filled, leaving variable topography. The text in Attachment #1 has been corrected. Backfilling will certainly cover shells at the bottom of the cut and always has. The text was written by a staff person not familiar with the program. DNR extends it apologies.

NMFS (13): Impacts of Cuts and Conversion from Shell Bottom

“MDNR should evaluate the impact of the conversion of bottom type from shell to the sediment and shell bits it would be filled with, and the impact of the change in bottom depth. MDNR should describe the steps they would take to ensure that wash water and sediment will be directed into/remain in the cut and not leave sediment on adjacent portions of the oysters bar.” (page 6, paragraph 1)

First, a correction to the assumption that the sediment and shell bits will fill a cut. The cuts will only be partially filled, leaving a well-defined cut and variable topography in the dredged area.

DNR has evaluated the habitat impacts of altering the bottom type due to shell dredging. Shell dredging in the upper Bay has occurred since 1960. Some areas that were heavily dredged for years contain an abundance of cuts, where shell bottom was converted to bottom with numerous cuts. The bottom of the cuts contain silt and shell bits. The sides of the cuts are shelly. DNR has conducted numerous studies of this cut bottom, focusing on depth (topography), DO, water quality, fish usage, and benthic creatures. Information is provided in Attachment #1, primarily Sections 4.1, 4.3 and 4.4.

DNR has taken steps since the program began to direct the waste sediment and shell “fines” (the materials not retained by the shell screens on the dredge) back into the cut, and not onto adjacent oyster bar bottom. This is accomplished after the shell washing process aboard the dredge. After the shells are washed, the sediment and shell fines (bits) are carried with the wash water through a large “elephant trunk” discharge pipe that is directed over the side of the dredge (like an elephant’s trunk) toward the cut. The deep cut fills with about 10’ to 15’ of this material, which isn’t being spread on adjacent bottoms. Of course, not all of the sediment settles into the cut – the lighter particles form a large silt plume. The size and concentration of this plume is described in Attachment #1, Section 4.1.

NMFS (14): Shell Dredging after Oyster Spawning

“MDNR indicates in their application that impacts to Man O’ War oyster bar could be further minimized if shell reclamation dredging does not occur concurrently with oyster spawning (May to September). MDNR should be making all efforts to minimize impacts to existing resources during the proposed project.” (page 6, paragraph 2)

The comment isn’t clear regarding conducting shell dredging outside of the oyster spawning season. Ideally, shell dredging should occur at the beginning of the spawning season, in order to plant shells in other areas of the Bay in time for spat set. However, if the shells aren’t being planted for spat set but instead are being planted to improve the bottom to receive a seed planting, then dredging can certainly occur outside the spawning season.

If the comment is intended to delay dredging at Man O’ War until after spawning occurs there, in order to minimize impacts on spat set, note that there is barely a spat set at all at Man O’ War (see Section 4.2 and Fig. 4 in Attachment #1). To increase the oyster population at Man O’ War Shoal it is best to plant seed oysters, rather than rely on natural spat set.

DNR offers this conclusion: shell planting and dredging timing should be prioritized for spat set in the rest of the Bay, and not be driven by spat set at Man O’ War, which is barely present over 25 years of sampling.

NMFS (15): Year 1 Data and Monitoring Plan Needed Prior to Permit Approval

“Details on the proposed monitoring program should be provided for review prior to permit issuance.” The pre-construction (Year 1) “data should be collected...prior to permit issuance, as this information is needed for a complete evaluation of the potential impacts of the proposed project.” (page 6, paragraph 3) (this is related to - Specific Monitoring Plan (page 2, paragraph 3))

The monitoring plan has been provided for review. The study design, parameters to be measured, and a year by year plan are presented in Attachment #1 beginning in Section 7.0 on page 52, and also in Table 13. A more specific and detailed monitoring plan can be developed working with the permitting agencies in order to provide specific information they require that isn’t covered in the plan presented in Attachment #1.

Regarding providing the Year 1 data prior to permit approval, DNR offers that this is the “before” data (before dredging) and doesn’t speak to dredging impacts. Data already available in Attachment #1 does address impacts and can guide review of the permit application.

DNR requests that the permit process not be delayed by requiring the “before” data, but instead the permit could have a condition to complete the monitoring work before dredging begins, which is what

DNR already planned and stated in the application. The permitting agencies would of course review all the data before allowing any dredging to occur. With this approach, the review process can continue now, the agencies will receive the “before” data before dredging occurs, and dredging can be stopped if the data show it should be stopped.

NMFS (16): Undisturbed Reference Site Selection

MDNR should also describe how they would determine what “undisturbed reference sites” they would use and how they would determine that these areas are not affected by the project.” (page 6, paragraph 4)

A reference site can be located on the far western end of the shoal where the seed oysters are planted and no dredging will occur (Fig 1a, Attachment #1). Also, a reference site can be located to the far eastern end in the sanctuary – dredging here can be held until the end of the program allowing it to be a reference site early in the program. Another site can be on Sevenfoot Knoll oyster bar to the southwest of Man O’ War.

NMFS (17): Scale Back from 2M BU to a Single Dredging Event

“...a more modest project should be undertaken, first with a single dredging event that includes sufficient pre and post construction monitoring to fully assess the ecological effects of the dredging and shell placement.” (page 7, paragraph 1)

The NMFS proposal states that the Year 2 dredging start-up of 2 million bushels is too large to be considered a test project, and it would be preferred to conduct a more modest test program: a single dredging event. DNR is concerned that a single dredging event (a day or a few days) won’t be sufficiently large to evaluate impacts, especially with the NMFS goal to “fully assess” the ecological effects.

One claim against shell dredging is the cumulative impact over time. To evaluate this, data are needed over time, not just for a single event. A single event would provide limited impacts to monitor and cumulative impacts would be undetectable. The stated goal to “fully assess” impacts is likely to be greatly under achieved by a single event. Also, a single event may not be economically feasible to dredge and the contractor may not undertake dredging at all – hence the scaled back “test” would result in no test being conducted. DNR suggests a 1 million bushel volume at a minimum for the first dredging event, but prefers the original 2 million.

NMFS (18): Definition of “Significant Changes” and “Adverse Impacts”

“There is no description of what MDNR would consider “significant changes” in fish usage [or] “adverse effects” that would prevent them from dredging” in the future (Year 5 and onward). (page 7, paragraph 2)

Rather than DNR deciding what defines “significant changes” or “adverse impacts” from shell dredging, the permitting agencies and the review agencies should lead. DNR can forward data and offer an understanding of the data but determining “significant” and “adverse” impacts would be the agency role since DNR is the applicant. It would be driven by the data and what the results show.

NMFS (19): Fish Usage Surveys to be Done Prior to Permit Approval (page 7, paragraph 2)

The request is to have DNR conduct fish usage surveys at Man O' War before the permit is issued. DNR offers that this is not needed in that a condition can be placed on the permit to require the data before any shell dredging can begin. This is how the application was structured – to conduct surveys in Year 1 before any dredging occurs in Year 2. This comment is related to NMFS (15).

NMFS (20): Planting Sites, Shell Volume, Shell Justification

“MDNR has not identified the specific locations where the shell will be placed, or the amounts needed in each location... there is no way to determine exactly how much material is needed.” “The need to use oyster shell rather than an alternate substrate has not been demonstrated.” “cost estimates don't appear to match between Tables 5 and 6 and p 51.” (page 7, paragraph 3 and last paragraph)(page 8, paragraph 1)

PLANTING SITES: Exact planting sites were not listed in the application because the sites are yet to be determined. They are selected as projects are undertaken, budgets are known, materials and quantities are known, and as DNR coordinates with the many restoration partners and the public.

This is the method used for all prior shell dredging projects and permits. The agencies have always approved permits lacking precise planting site data because it was clear in the applications (as it is in this application) that planting sites will be on natural and historic oyster bars and leases. That level of detail was acceptable. In fact, planting permits currently held by DNR for shell, seed, and alternate materials were approved with that general level of detail.

Note: Providing the planting sites and volumes to the agencies prior to each year's dredging should be easily accomplished. This information is known on an annual basis during the program.

SUBSTRATE VOLUME: Even though exact planting sites aren't known yet, it is possible to estimate the volume of material needed. The total estimated need for the life of the 5 year permit is 11M bushels, for Restoration, the Public Fishery, and Aquaculture. This compares to the requested 5 million bushels of shells from Man O' War Shoals under this permit application. The amount needed for the 5 year period exceeds the amount available for the 5 year period, therefore alternate materials are important, not just dredged shells.

The 11M bushel estimate was developed as follows:

Restoration: 8.5M bushels – for the next two restoration tributaries, as per DNR's Oyster Restoration Manager who also is on the Maryland Interagency Workgroup that designs the large scale projects. Assume the next two tributaries are similar to the three prior tributaries. Assume 158 acres per tributary at a planting rate of 12" per acre. (Attachment #1, p.16)

Industry: 2M bushels – based on a rate of 1M bushels per year, with two years of dredging assumed (Year 1 and Year 5 under the proposed permit). The 1M bushels per year rate is based on past volumes used for Industry under the prior shell program. This is a minimal rate. Typically, Industry plantings were 2M bushels per year up to 5M.

Aquaculture: .5M bushels – based on .25M bushels per year, with two years of dredging assumed (Year 1 and Year 5 under the proposed permit). Assume that an estimated 10 leaseholders will buy shells and will plant 5 acres at 5K bu/acre = 25K bushels per person. This could be a low estimate given the number of leaseholders, however shells are expensive and not everyone will buy them.

JUSTIFICATION for SHELLS: DNR in Attachment #1 and NMFS in their letter both noted that permits for alternate materials provide a similar volume of material to what DNR is seeking from Man O' War Shoals. This raised the question: Why is shell dredging needed at all if Alternate Materials can generate similar volumes as Man O' War?

One reason is quantity: As shown above, the need for substrate surpasses the supply. Alternate materials alone can't meet the demand. Shells are needed to have suitable quantities.

Another reason is quality: Shells are the natural substrate on Maryland's oyster bars. Planting shells will keep Maryland's natural oyster bars in their natural condition. Alternate materials work, but aren't the same quality product for the State's oyster bars.

A third reason is public safety: Stones, as an example, have been used extensively but have created navigation hazards, with boat groundings and damage. Shells are less rigid and less dangerous, they can be spread more easily, and the public opposition to shells is less than stone.

Other significant reasons for dredging shells are explained in Attachment #1, Section 3 and can be summarized as:

- Efforts to re-use previously planted shells are too small scale or simply don't work well. These efforts are bagless dredging, bagged dredging, and shell reclamation.
- Shucked shells from processors and recycled shells from restaurants aren't abundant enough to meet the need for shell.
- For certain users (aquaculture and the public fishery) alternate materials such as stone or concrete aren't suitable for harvesting conditions. The materials are too heavy or simply don't work with the gear being used. These users need and prefer shells. However, discussions are underway with the public fishery to experiment with small sized alternate materials in certain gear areas where the gear could handle it.
- Materials such as stone and concrete have caused navigation hazards and public safety concerns.
- Out of State shells can and have been purchased, even aggressively in recent years. But the volumes aren't enough to meet the need for habitat restoration.
- Alternate materials alone can't provide enough habitat material; dredged shells are needed.
- Cost is a factor but not the major factor. Volume of material available vs the volume needed is the main factor, as well as safety issues.

Note that dredged shells are not the sole material for meeting Maryland's oyster habitat needs. All possible sources of material are being used, if they are available and if they perform well. Maryland is using and will continue to use shucked oyster shell from in-State and out-of-State processors; clam shell and mixed shell, alternate materials such as stone, concrete rubble and other substrate.

Regarding cost data in Tables 5 and 6, they largely match. For a few materials they don't match. Different sources generated the data and perhaps bids were obtained from different companies. DNR will check back with the sources.

NMFS (21): Planting Locations Needed Prior to Dredging

"Dredging should not occur before placement locations and the amount of material needed at each location are established. In addition, it is not possible to conclude that there will be no adverse effects to the bottom at the placement sites until those placement sites are identified and the effects of

placement shell at those sites are evaluated.” (page 8, paragraph 4) (this is related to - Exact Planting Sites not Identified (page 2, paragraph 2))

This comment relates closely to NMFS (20). Exact planting sites were not listed in the application because the sites are yet to be determined. However, providing the planting sites and volumes to the agencies prior to each year’s dredging should be easily accomplished.

Planting sites are usually known at least a few months to up to 6 months in advance of a project being started. In the historic shell dredging program this was the case. Currently, site selection occurs through a cooperative process between the oyster restoration partner agencies (DNR, Corps, NOAA), the public, and local watermen. From Attachment #1 page 2, paragraph 4 regarding sanctuary site selection: “Specific restoration sites will be identified in conjunction with the Maryland Interagency Workgroup, whose members include representatives from MDNR, NOAA, USACE, and the Oyster Recovery Partnership.” For industry plantings, DNR works with the County Oyster Committees in late winter to plan annual plantings. For aquaculture, this type of annual process can be organized.

In summary, planting sites can be provided annually before dredging.

However, if the intent of NMFS (20 and 21) is to obtain planting sites at this time, prior to issuing a permit, it isn’t possible. Determining planting sites is an involved process and it requires knowing the type and volume of material up front (ie having a permit).

Providing planting sites now shouldn’t be crucially needed. First, the proposed planting sites for Man O’ War Shoals (Maryland’s natural bars and historic bars) are already approved under other permits as noted in the NMFS letter on page 2, paragraph 2. Second, the request for exact planting sites at this time (if that is the goal) is not consistent with past permit actions by the agencies. The alternate materials permit and the seed/shell planting permit did not require exact planting sites. They were both approved based on general planting site information (natural and historic bars). Prior shell dredging permits were also approved based on this general approach.

Regarding potential adverse effects of placing shell at the planting sites, DNR offers that shell planting under the proposed permit will improve the sites by adding shell habitat to degraded oyster bars. The project is designed to enhance oyster bars.

NMFS (22): Aquaculture Doesn’t Meet Self Sustaining Reef Criteria

“The emphasis on self-sustaining reefs is inconsistent with the proposed use of dredged shell for aquaculture purposes, for which the shell would ultimately be removed from the system after harvest. How will MDNR ensure that the shell proposed for aquaculture use remains in the system? Will they develop a shell recycling program to place that shell after it is removed from the planted location?” (page 8, paragraph 6)

The comment concerns a statement in Attachment #1 (at the top of page 8) that says the use of shells from Man O’ War Shoals will emphasize efforts where reefs sustain themselves. NMFS questions that aquaculture is not such a use because shells are lost from the Bay due to continued harvest of the lease. DNR offers that the use of the term “reefs” indicates the sentence on page 8 was speaking about sanctuaries and not aquaculture (“reefs” in the strict sense do not exist on fishery and aquaculture bottom due to harvest). But on the subject of aquaculture, NMFS makes a sound point: self-sustaining ecological reefs are not typically created in a farmed situation.

However, observe that the sentence on page 8 of Attachment #1 speaks about having an emphasis on, not a strict adherence to, reef sustainability. If the ratio of shells allocated to aquaculture is minimal and to sanctuaries it is maximized, then there is an overall emphasis given to sustainable uses for the shells.

Regarding NMFS comment about aquaculture shells not remaining in the system, note that the shells are not entirely lost through harvest. Oysters harvested from aquaculture and fishery bottom are shucked and then a portion can be reused for the Bay either through the shell purchase program with processors or the recycling program with restaurants. The Oyster Recovery Partnership manages an oyster shell recycling program (Attachment #1, Section 3.2, page 12). As shucked shells are re-acquired, they go to the hatchery program where spat are set upon the shells. Therefore, aquaculture shells are re-used to produce more oysters – the shells and the spat on them go back into the Bay system.

Another consideration for the value of using Man O' War shells for aquaculture is that the aquaculture initiative is an effort to provide new economic opportunities to oystermen. As aquaculture increases, less pressure may be upon the natural population. These shells can help develop more aquaculture businesses.

NMFS (23): Shell Allocation Ratio and Volumes not Determined

"...MDNR does not indicate how they will determine which option [of shell allocation] to use beyond public comment to determine the final shell allocation, not do they describe in their application how much shell they anticipate to be necessary for the use in managed public harvest or aquaculture areas.... How much shell is needed and where it would be going are necessary details in determining how much shell to dredge." (page 8, paragraph 7)

The distribution ratio of shells and the exact process for deciding the ratio were not decided prior to submitting the permit application in July 2015. The ratio and the process for determining it can be discussed with the Oyster Advisory Commission which was only recently re-established in July 2016, a year after the permit was submitted. The Oyster Advisory Commission membership includes the major oyster stakeholders: environmental, sportfishermen, oyster industry, educational, general public, and elected officials. Though the ratio of shells isn't yet available to NMFS, the estimated volumes needed for restoration, the fishery, and aquaculture are available: see NMFS (20), above.

NMFS (24): Aquaculture: Volume, Sites, Cumulative Impact

"MDNR should also consider if the potential sites for aquaculture use are already permitted or if new permits would be needed, and if this may result in an increase in aquaculture permit applications and leases. If so, the cumulative effects of this must be considered." (page 9, paragraph 1)

The comment states that more information is needed about aquaculture in order to know how many shells to dredge. The exact volumes and locations for aquaculture sites are not known at this time, and they can't be known until shells are available and leaseholders step forward to make purchases. But the lack of specifics doesn't undermine the ability to estimate the amount of shells needed from Man O' War Shoals. See aquaculture shell estimates in NMFS (20).

Another comment concerned the cumulative impact of aquaculture: should leases increase, shell needs would increase and more impacts would occur on Man O' War. However, the shell allocation ratio will cap shells to a certain level for aquaculture (and for sanctuaries and the fishery as well) so that no matter how many new leases appear, the amount of shells for aquaculture is capped.

NMFS (25): Long Term Oyster Plan Needed Prior to Permit Approval

“It seems premature to move forward with this application until this effort [long term planning and deciding the next two tributaries] is completed so it can be incorporated into any decisions made on placement sites for the dredged shell. In addition, we should have the opportunity to review the new oyster restoration and management plan before making final comments on shell dredging proposal.” (page 9, paragraph 2)

The comment is suggesting that the next two tributary projects need to be designed, complete with planting locations and bushel volumes, before the shell dredging permit can be decided.

DNR views the priority the other way around. The permit needs to be decided first, before the next two tributary projects are designed, to give the planners certainty regarding materials, bushels, and costs. Site selection and design details depend on knowing these factors. Also, having the permit decided in advance provides crucial information for contracting the project with private companies. No contracting can occur until the company knows details about the materials and where they are coming from, as this affects costs and the bid they will submit. Will shells come from Maryland shucking houses, out of state shucking houses, or shell dredging? Each yields a different set of logistics and costs for bidding. Basically, it will be impossible to design the next two tributaries prior to approval of shell dredging.

Note, the next two tributaries are likely to be selected by December 2016 into early 2017. The Oyster Advisory Commission is now reviewing candidate tributaries and will make a recommendation to DNR by December 2016. The names of the next two tributaries will be known to the permitting and review agencies by early 2017 (as an estimate), but details about design won't be possible until after this application is decided.

CENAB-OP-RMN (MAN O' WAR SHOAL DREDGING) 2009-61802-M04

Following is DNR's response to a letter from Mr. Jeffrey Lapp, EPA to William Seib, Corps of Engineers dated February 18, 2016 and provided to DNR April 4, 2016. The EPA letter is attached.

EPA (1): Project Purpose – Restrictive

"..the purpose of the proposed project is to obtain oyster shell to be used to restore oyster populations and oyster fisheries in the Bay" "When determining the project purpose it should not be so restrictive as to constrain the range of alternatives to be considered" Page 1, paragraph 3

The project purpose for DNR's application is restrictive, but appropriately so. The purpose is focused on shell dredging and doesn't include other forms of oyster restoration. The reasons are two fold: a) the other forms of restoration have their own permits. DNR has permits to plant alternate materials, clean bottom, plant seed oysters, for example, b) because the other forms of restoration were already considered at length prior to submitting the shell dredging permit application in 2015.

The application was first submitted in 2009 and the agencies determined that not enough effort had been expended on alternative methods before attempting shell dredging; a highly controversial project. The application was placed on an extended "hold" and DNR then undertook a multi-year effort to explore other methods (see Attachment #1). Years later in 2015, the application for shell dredging was then resubmitted as a result of the other methods not being promising enough or having various serious issues. These alternative methods and their results are summarized in Attachment #1. There are numerous reasons why these methods didn't work well enough, but one main reason was the issue of scale - the volume of material from these methods wasn't nearly enough to meet the restoration goals. Shell dredging entered (again) as a proposed method to provide additional habitat material to the oyster initiative and increase the volume to a more sizable amount for restoration. This is also covered in Attachment #1.

Another reason the application purpose is singularly focused on shell dredging is because the application is for a specific activity (shell dredging) to acquire oyster shells for restoration, as stated above in the EPA comment. The application isn't an over-arching program plan (such as a management plan or a restoration plan) to generally conduct oyster restoration, in which case a suite of alternatives would clearly be included. DNR has such plans and the many alternative methods are part of that plan. But this application is for one project; a single project that utilizes a shell dredge to extract buried shell and then use the shell to improve the oyster population. The purpose is appropriately restricted to dredged shells.

EPA (2): Impracticality of Alternatives Needs to be Defined

"While the cost estimates provided for each of the alternative supports that dredging shell is the most effective alternative, the document did not discuss the impracticability of those alternatives." "The applicant should be aware that neither increased cost of an alternative nor an unwillingness to pursue an alternative necessarily renders that alternative impracticable." "..it is not clear that the LEDPA has been identified, and further documentation and analysis should be provided to document the preferred alternative as the LEDPA" (Least Environmentally Damaging Practicable Alternative) Page 2, paragraph 1

The impracticality of the alternatives compared to shell dredging was discussed in Attachment #1. It is summarized below as well.

But first, alternative methods aren't necessarily entirely impractical (though some are). The issue is more a matter of scale - they alone can't provide the volume of material needed for oyster restoration. They might work very well on a small scale and be available in quantity for small scale efforts, but they can't support large scale tributary efforts or industry scale efforts. Neither can shell dredging, alone, meet the need. Therefore, it will be seen below that multiple methods are needed (and are being used).

NMFS in their letter and DNR in Attachment #1 both noted that permits for alternate materials provide a similar volume of material to what DNR is seeking from Man O' War Shoals. This raised the question:

Why is shell dredging needed at all if Alternate Materials can generate similar volumes as Man O' War?

One reason is quantity: The need for substrate surpasses the supply. 11M bushels of material are needed during the 5 year span of the proposed permit, but only 5M bushels will be dredged. As shown above, the need for substrate surpasses the supply. Alternate materials alone can't meet the demand. Shells are needed to have suitable quantities. (11M bushels is the total need: 8.5M Restoration, 2M Public Fishery, .5M Aquaculture).

Another reason is quality: Shells are the natural substrate on Maryland's oyster bars. Planting shells will keep Maryland's natural oyster bars in their natural condition. Alternate materials work, but aren't the same quality product for the State's oyster bars.

A third reason is public safety: Stones, as an example, have been used extensively but have created navigation hazards, with boat groundings and damage. Shells are less rigid and less dangerous, they can be spread more easily, and the public opposition to shells is less than stone.

The impracticality of alternate methods and materials is explained in detail in Section 3 of Attachment #1 and can be briefly summarized as:

- Efforts to re-use previously planted shells are too small scale or simply don't work well. These efforts are bagless dredging, bagged dredging, and shell reclamation.
- Shucked shells from processors and recycled shells from restaurants aren't abundant enough to meet the need for shell.
- For certain users (aquaculture and the public fishery) alternate materials such as stone or concrete aren't suitable for harvesting conditions. The materials are too heavy or simply don't work with the gear being used. These users need and prefer shells. However, discussions are underway with the public fishery to experiment with small sized alternate materials in certain gear areas where the gear could handle it.
- Materials such as stone and concrete have caused navigation hazards and public safety concerns.
- Out of State shells can and have been purchased, even aggressively in recent years, but the volumes aren't enough to meet the need for habitat restoration.
- Alternate materials alone can't provide enough habitat material; dredged shells are needed.
- Cost is a factor but not the major factor. Volume of material available vs the volume needed is the main factor, as well as safety issues.

Note that dredged shells are not the sole material for meeting Maryland's oyster habitat needs. All possible sources of materials are being used, if they are available and if they perform well. Maryland is using and will continue to use shucked oyster shell from in-State and out-of-State processors; clam shell and mixed shell, alternate materials such as stone, concrete rubble and other substrate.

EPA (3): Dredge Cut Location Selection

“...the information provided discusses the volume of shell to be dredged but does not discuss how the locations for the dredge cuts were selected. EPA recommends MDDNR minimize the proposed dredge cuts to the maximum extent possible...” Page 2, paragraph 2

The diagram of dredge cuts submitted in the application (Fig. 1a) is only conceptual and does not indicate confirmed final locations, as per the caption. There has been no selection process yet for cut locations.

Final locations will be determined after consulting with the dredging contractor (after the permit is approved and the contract is completed), various Bay users in the area, the Baltimore County Oyster Committee, and the Oyster Advisory Commission. DNR will also meet the goal to retain areas of undredged bottom between cuts.

Minimizing dredge cuts is both easy and also problematic. On the one hand, only the needed number of cuts will be made in order to acquire the shells. No more cuts than needed will be made. However, because the goal is to only cut into the shoal 1/3 of the distance (in order to maintain the structural integrity of the shoal) the number of cuts needed is inflated. If DNR were to dredge through the entire width of the shoal, far fewer cuts would be needed. But then harm may be done due to creating a tide rip through the shoal.

EPA (4): Protection of Live Oysters on Man O' War

“MDDNR should also discuss if Man O'War is a living oyster bar, and if so, how highly dense areas of living oysters will be avoided.” Page 2, paragraph 2

Man O' War Shoals has an oyster population but it is very low. The bar receives an extremely low level of spat set, if any. Over 25 years of spat data show only one year (2002) where a spat set was detected. Sampling in the far eastern section of the bar in 2015, on 154 sites, found 0 oysters on all but two sites. Earlier surveys across the entire shoal found similarly low levels of oysters. These results and more are summarized in Attachment #1, Section 4.2, starting at page 20.

Man O' War was selected as a potential shell dredging site because it has such a poor oyster population, yet is abundant in buried shell.

There is an exception: seed plantings. Seed oysters (spat) have been planted on the shoal to increase harvests. Planting rates are from about 1M spat to 4M spat per acre (or 250 spat/sqm to 1,000 spat/sqm), though 80% or more die by 4" in size. Nonetheless, these seed plantings greatly enhance the population on the sites where they are planted.

DNR will not dredge areas where viable plantings of seed oysters have been made to produce harvestable oysters. This was stated in the application. Plantings for harvest production are made through cooperative efforts between DNR and the County Oyster Committees (Baltimore in this case). DNR will not dredge sites where seed were planted, since both DNR and the Committee worked to create a harvestable population there.

Additionally, to avoid or minimize impacts DNR will conduct a pre-dredging oyster survey to avoid oyster populations that might have naturally set between permit review and actual dredging.

EPA (5): Pre-construction Survey of Oyster Population on Man O' War

“EPA recommends completing an updated survey of the shoal’s living oyster population prior to any dredging to better determine the pre-construction conditions.” Page 2, paragraph 2

A pre-construction oyster survey prior to dredging is suitable and can be conducted. This can guide site selection for dredge cuts and help avoid oyster populations, if any viable populations accrue given the chronically low spat sets. The survey results will be provided to the permitting and review agencies prior to dredging. A pre-construction survey prior to dredging (recommended by DNR) is different from a pre-construction survey prior to permit approval (recommended by NMFS); which is actually a pre-decision survey. One issue with a pre-decision survey is that the results may not reflect the actual situation a few years later when shell dredging begins: oysters that were present for the pre-decision survey could die from a freshet, or a population that wasn’t present could appear due to a spat set (though this is highly unlikely) or a seed planting. A pre-decision survey is untimely relative to dredging.

DNR offers that a pre-dredging survey is more important and informative for decision making and to protect live oysters. In addition, there is already oyster data available from DNR surveys to date to guide permit review, including information as recently as 2015 and contained in the 5 Year Oyster Report (a summary of these data is contained in the revised Attachment #1).

EPA (6): Shell Planting Sites and Site Selection Criteria

“EPA has concerns regarding the placement of shells...”. “...it is unclear where the shells will be placed, or what criteria will be used to determine placement” Page 2, paragraph 3

Planting sites were not listed in the application because the sites are yet to be determined. They are selected as projects are undertaken, budgets are known, materials and quantities are known, and as DNR coordinates with the many restoration partners and the public.

As explained in Attachment #1, the sites will be on natural and historic oyster bars and leases. Also explained in Attachment #1 is the general process for determining a tributary for restoration and sites to be planted (Section 5.4). Criteria include suitable water quality for oysters, bottom type that can support the substrate to be planted, spat set history, and condition of the existing oyster population.

Regarding the interest in knowing the planting sites prior to permit approval, note that the agencies have always approved permits lacking precise planting site data because it was clear in the applications (as it is in this application) that planting sites will be on natural and historic oyster bars and leases, and that criteria are applied to select the proper locations. That level of detail was acceptable. In fact, planting permits currently held by DNR for shell, seed, and alternate materials were approved with that general level of detail.

Note: Providing the planting sites and volumes to the agencies prior to each year’s dredging should be easily accomplished. This information is known on an annual basis during the program.

EPA (7): Aquaculture Justification - Self Sustaining Reef Criteria

Additional information should be provided on why shell for aquaculture purposes would be considered when “the goal of the project is also to encourage reestablishment of an abundant self-sustaining oyster populations” Page 2, paragraph 3

The role of aquaculture toward the stated goal is minimal, admittedly. Oysters on a farm are grown and then removed. Some connection to assisting a self-sustaining natural population may occur, though, through the presence of brood oysters at aquaculture sites. These spawners represent brood that otherwise wouldn't be in the Bay. In theory, their offspring could settle on natural bars and help the overall oyster population. This is theoretical, as it is unknown if these oysters actually contribute to developing a self-sustaining population. Some oyster farms grow sterile oysters which wouldn't contribute at all.

Elsewhere in Attachment # 1 (the top of page 8) it says the use of shells from Man O' War Shoals will emphasize efforts where reefs sustain themselves. The sentence speaks about having an emphasis on, not a strict adherence to, reef sustainability. If the ratio of shells allocated to aquaculture is minimal and to sanctuaries it is maximized, then there is an overall emphasis given to sustainable uses.

A consideration for the value of using Man O' War shells for aquaculture is that the aquaculture initiative is an effort to provide new economic opportunities to oystermen. As aquaculture increases, less pressure may be upon the natural population. These shells can help develop more aquaculture businesses.

EPA (8): Backfilling & Covering Shells in the Bottom of the Cut

"...the proposed dredging will leave a minimum of two feet of shell material to be utilized as new substrate for future oyster growth; however the information also states the discharge of 10-15 feet of sediments washed from the dredged shell will be discharged into the cut areas." EPA is concerned that the sediment and fill material being discharged ...would cover the remaining oyster shell, negating any benefits of leaving shell in the bottom the cut areas for future oyster growth." Page 2, paragraph 4

The statement in Attachment #1 that a two-foot shell layer would be left exposed at the bottom of the cut was incorrect. Therefore, there is no shell habitat benefit that is being negated because there is no exposed shell layer at the bottom of a cut to begin with. A new Attachment #1 is enclosed with the text corrected.

The dredging process, since the start of the program in 1960, has always involved discharging sediment and shell "fines" back into the cut, such that the cut is partially filled but not entirely filled, leaving variable topography. This discharging of material into the cut has been approved and required by the permitting agencies every permit cycle since 1960. The logic was to target this large volume of material back into the cut vs having it broadcast loosely across the undredged adjacent Bay bottom. Therefore, this backfilling process is an environmental safeguard built into the shell dredging program.

Note that this part of the Bay has chronic low spat set and can suffer killing freshets so this is not a suitable place to expect an oyster population to naturally develop on exposed shell in a cut, even if it was there to begin with.

The backfilling is not 100% because less material goes back into the cut than was removed, due to the shells being retained by the dredge. The cuts are only partially filled. This leaves variable topography after dredging (ie cuts in the bay bottom) and the cuts are used by fish and benthic species based on past studies of dredged areas. Shell dredging creates variable and diverse habitat that is used by numerous species. Details are in Attachment #1.

EPA (9): Sediment Plume Impacts

The sediment plume “will lead to additional secondary impacts to other species that utilize the shoal and surrounding area. Measures that reduce these secondary impacts should be evaluated in and included in any final design and implementation plan for the harvesting of oyster shell from the shoal.” Page 2, paragraph 4

One measure taken to minimize such impacts is the technique of targeting the silt and shell “fines” left over from the dredging process back into the cut via the elephant trunk discharge pipe. This helps contain a large volume of sediment instead of allowing it to be broadly spread over adjacent oyster bottom of populated sandy bottom. However, there is a large silt plume created by the dredging process that EPA commented on.

Regarding secondary impacts and impacts of the plume, DNR is open to input from the permitting agencies through conditions placed on the shell dredging operation, such as time of year restrictions. DNR defers to the agencies based on their experience with dredging projects throughout the Bay.