Appendix A – Tred Avon Tributary Plan

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Appendix A – Tred Avon Tributary Plan

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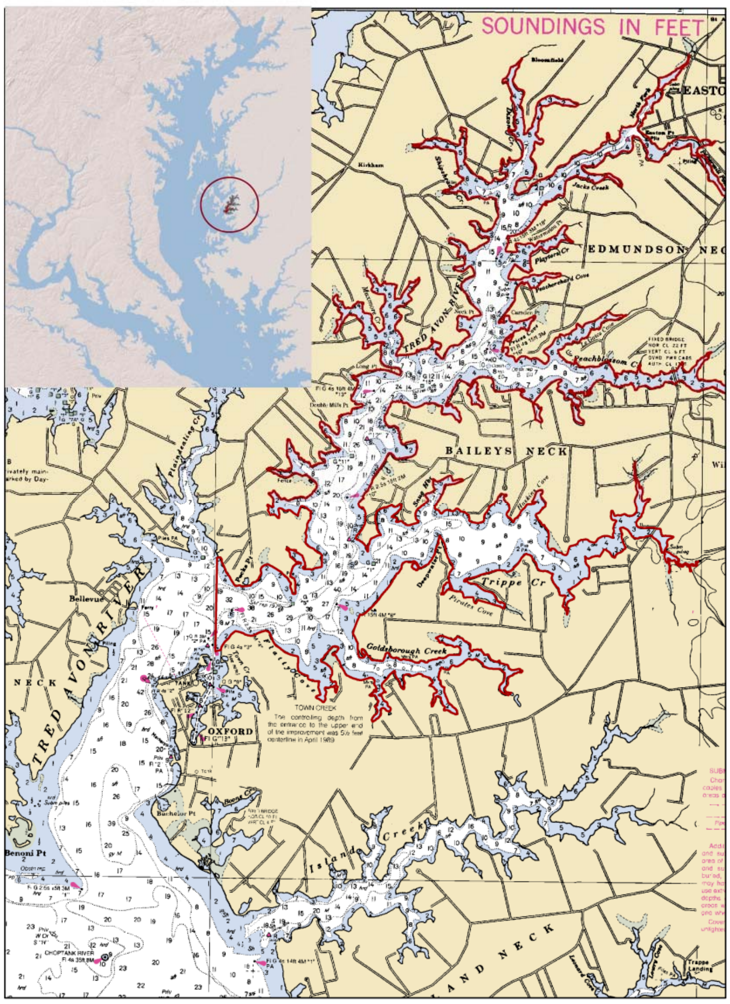
Tred Avon River Oyster Restoration Tributary Plan:

A blueprint for sanctuary restoration

As drafted by the
Maryland Interagency Oyster Restoration Workgroup of the
Sustainable Fisheries Goal Implementation Team
April 2015



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The Tred Avon River Oyster Restoration Tributary Plan is meant to be an adaptive, living document. The expectation is that there will be many lessons learned, and that the plan will be adapted to reflect changing conditions and new information as restoration and monitoring progress. Continued dialogue with the consulting scientists, interested stakeholders, and the public is critical to this adaptive process.

Comments on this document are encouraged at any time, and can be directed to Stephanie Westby, Stephanie.westby@noaa.gov.

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The appendices are available on the Internet at:
ftp://ftp.chesapeakebay.net/noaa/Tred%20Avon%20appendices/

Executive Summary

In May 2009, President Obama issued Executive Order 13508, "Chesapeake Bay Protection and Restoration." The oyster outcome associated with this executive order calls for large-scale, tributary-based oyster restoration. Similarly, the 2014 Chesapeake Bay Watershed Agreement calls for restoring oyster populations in 10 Chesapeake tributaries by 2025. The Chesapeake Bay Program's Sustainable Fisheries Goal Implementation Team (GIT) is charged with advancing this goal. The GIT previously convened the Oyster Metrics Workgroup, which established a Bay-wide, science-based, consensus definition of a "restored tributary" per the executive order goal. The GIT has now convened interagency workgroups in Maryland and Virginia to plan restoration work in each state, in consultation with appropriate partners.

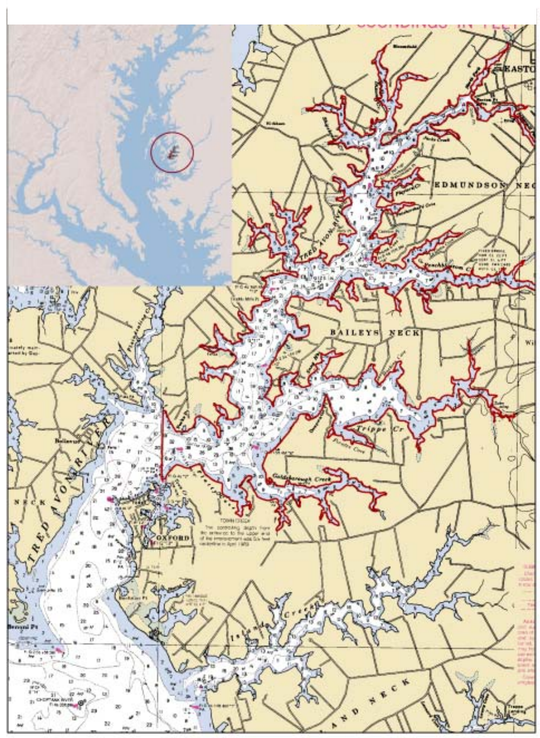
DNR, NOAA, and USACE are charged with implementation of the Tred Avon River tributary plan. However, the productive collaboration of academic, non-governmental, and local groups involved in Chesapeake Bay restoration will greatly help achieve restoration success.

Based on consideration of salinity levels, available restorable bottom, protection from harvest, historical spat set, and other criteria, the Maryland Interagency Workgroup, in consultation with Maryland oyster restoration partners, selected Harris Creek as the first tributary for large-scale oyster restoration, Little Choptank river as the second, and Tred Avon River as the third.

What follows is the Tred Avon River Oyster Restoration Tributary Plan. It details the restoration site selection process, and the reef construction, seeding, and monitoring required to bring the Tred Avon River oyster sanctuary in line with the oyster metrics definition of a successfully-restored tributary. It calls for restoring 147 acres of oyster reefs in the Tred Avon River oyster sanctuary, and includes:

- a description of the process used to develop the tributary plan,
- a map showing which areas of the river are targeted to receive plantings of

Figure 1: Tred Avon River Oyster Sanctuary Location Map



substrate (reef material) and oyster seed,

- a needs analysis for oyster seed and substrate,
- a cost analysis, and
- a discussion of monitoring, implementation, and progress tracking.

The implementation time frame will depend primarily on availability of funding. Existing hatchery oyster seed production capacity is sufficient to allow for implementation of this plan in one or two years from initial implementation. However, other tributaries are being restored simultaneously, and there are other competing demands for hatchery seed. These will likely extend the completion timeframe.

For planning purposes, this document assumes a worst-case scenario where the Tred Avon River does not receive any natural recruitment (spat set) over the course of plan implementation. Since 1985, the Tred Avon River has generally seen low levels of natural spat set. Within that timeframe, only two years (1985 and 1991) saw significant spat sets. From 2000 through 2013, the river saw very low spat sets (DNR, 2013; see Appendix A). It is possible that the river may receive natural spat sets during the implementation time frame, yielding additional oysters at no seeding cost. Thus, it is possible that the seed number and seed cost estimates herein are high.

Along with the Harris Creek and Little Choptank projects, this plan represents an unprecedented scale of oyster restoration in a single tributary in Maryland. Implementation of the Tred Avon River tributary plan is expected to begin in early 2015. Significant data collection and analysis went into the development of the Tred Avon River tributary plan, including benthic sonar mapping with video and ground truthing to identify suitable bottom for restoration, water quality analysis, examination of historic oyster bars, consideration of past and current oyster recruitment, and a survey to determine current oyster populations in the Tred Avon oyster sanctuary. Additionally, public participation was encouraged during an open house to hear input on the plan.

Summary: Tred Avon River Oyster Restoration Tributary Plan

Total Acres Targeted for Restoration	**147**
Total Seed Required	**661.5 million**
Total Substrate Required (cubic yards)	**119,499**
Total Implementation Cost (restoration and monitoring)	**$11.4 million**

Tred Avon River Oyster Restoration Tributary Plan

Context and Scope:

President Obama's Executive Order 13508 called for federal agencies to establish specific measurable environmental goals for restoring the Chesapeake Bay. These environmental goals were laid out in the May 2010 *Strategy for Protecting and Restoring the Chesapeake Bay Watershed*. (Federal Leadership Committee for the Chesapeake Bay). This strategy specifically called for restored oyster populations in 20 Chesapeake Bay tributaries by 2025. The 2014 Chesapeake Bay Agreement later adapted this goal to 10 tributaries by 2025. In support of these policies, the Chesapeake Bay Program's Sustainable Fisheries Goal Implementation Team (GIT) convened the Oyster Metrics Workgroup to develop a science-based, common definition of a successfully-restored tributary for the purpose of tracking progress toward the goal. The workgroup was composed of representatives from the state and federal agencies involved in Chesapeake Bay oyster restoration, as well as oyster scientists from academic institutions. The workgroup produced a report detailing these success metrics (Oyster Metrics Workgroup, 2011). These metrics serve as the basis for the Tred Avon River tributary plan. The following criteria were among those set forth in the metrics report:

- A successfully-restored reef should:
  - have a minimum mean density of 50 oysters and 50 grams dry weight/square meter (m^2) covering at least 30 percent of the target restoration area at 6 years post restoration;[1]
  - have two or more age classes present; and
  - exhibit stable or increasing spatial extent, reef height and shell budget.
- A successfully-restored tributary is one where 50 to 100 percent of the currently-restorable bottom has oyster reefs that meet the reef-level metrics above. Restorable bottom is defined as area that, at a minimum, has appropriate bottom quality and water quality for oyster survival).
- An suitable candidate tributary is one where 50 to 100 percent of the currently restorable bottom is equivalent to at least 8 percent, and preferably more, of its historic oyster bottom.

In 2012, U.S. Army Corps of Engineers (USACE) drafted a native oyster restoration master plan that evaluated tributaries of the Chesapeake Bay to determine those tributaries with the potential to support large-scale oyster restoration efforts. In 2012, the GIT established the Maryland Interagency Workgroup consisting of representatives from the National Oceanic and Atmospheric Administration (NOAA), USACE's Baltimore District, and the Maryland Department of Natural Resources (DNR). The purpose of this group is to facilitate oyster

[1] In addition, a minimum threshold for restoration success was set at a mean density of 15 oysters and 15 grams dry weight biomass/m^2 covering at least 30 percent of the target restoration area at 6 years post restoration activity. Minimum threshold is defined as the lowest levels that indicate some degree of success. However, this tributary plan is focused on the 50 oysters/m^2 target density for a successfully restored reef.

restoration by coordinating efforts among the state and federal agencies, in consultation with the scientific, academic and oyster restoration communities. The workgroup utilized the USACE Native Oyster Restoration Master Plan and the Maryland Oyster Restoration and Aquaculture Development Plan as the foundations of its work. In consultation with consulting scientists, the workgroup has selected the first three tributaries for large-scale restoration focus: the Harris Creek, the Little Choptank River, and the Tred Avon River oyster sanctuaries, all on Maryland's Eastern Shore.

This plan describes the actions necessary to bring the Tred Avon River sanctuary's oyster population and habitat to the oyster metrics definition of a successfully restored tributary. The plan includes specific areas targeted for restoration work, an analysis of the amount of seed and substrate required, and an estimated cost. Included too is a monitoring framework that will allow for the determination of whether or not the Tred Avon River oyster sanctuary can be considered "successfully restored", per the oyster metrics definition.

This plan estimates the funding required to restore and monitor the Tred Avon River oyster sanctuary, per the oyster metrics definition, at $11.4 million. Some funds have already been identified (see implementation section); identifying the balance will need to be an ongoing effort for the oyster restoration partners. This plan will clarify the needs, and allow government agencies, non-profit organizations, academics and other stakeholders to collectively identify the resources needed for implementation.

Tred Avon River Tributary Plan Process

The Tred Avon River Oyster Restoration Tributary Plan was developed using the following steps:

1. Identify tributary for restoration and set restoration acreage target:

   The Tred Avon River oyster sanctuary was selected as the third candidate for large-scale oyster restoration (nearby Harris Creek was the first, and the Little Choptank River was the second) by the Maryland Interagency Workgroup. The selection was based on the findings of the USACE master plan, DNR's fall survey data, the Maryland oyster sanctuary list, and bottom survey data from the Maryland Geological Survey and NOAA. Criteria used in the tributary selection included water quality (salinity and dissolved oxygen appropriate for survival and reproduction), availability of restorable bottom (hard bottom capable of supporting oysters and substrate), historic spat set data (Appendix A), potential for larval retention, oyster sanctuary status, and tributary size. The Tred Avon River oyster sanctuary scored favorably for all criteria (see Appendix B for GIS analysis). The selection process and results were discussed with the consulting scientists.

2. Define restoration goal (target acreage):

As noted earlier, the oyster metrics report defined a successfully-restored tributary as one where 50 to 100 percent of currently restorable bottom, constituting at least 8 percent of historic oyster habitat, consists of restored reefs. NOAA performed a restorable bottom analysis (Appendix B) for the Tred Avon River oyster sanctuary, based on data from the USACE master plan, the oyster sanctuary boundaries, water quality data, and bottom survey data from Maryland Geological Survey and NOAA. General planning guidance from the U.S. Coast Guard was also considered during this process including setbacks of 250 feet from marinas and navigational aids. This analysis showed 251 acres of currently-restorable bottom in Tred Avon River oyster sanctuary. In order to meet the 50 to 100 percent of currently-restorable bottom goal, 125 to 251 acres would need to be restored in the Tred Avon River. The second part of the oyster metrics goal is that this amount—125 to 251 acres—must constitute at least 8 percent of historic oyster habitat. The Yates survey of 1913 identified 851 acres of historic oyster habitat in the river; 8 percent of that is 68 acres. Therefore, restoring between 125 and 251 acres would meet both parts of the oyster metrics goal. Further analysis, described in the blueprint map section of this document, established the restoration goal at 147 acres. (See Table 3, and Figures 2 and 3).

3. Conduct pre-restoration oyster population surveys:

   DNR conducted a spatially-explicit population and oyster density survey of the reefs in the Tred Avon River oyster sanctuary in the summer of 2013.

4. Develop a draft map summarizing major datasets:

   The workgroup summarized the available spatially-referenced data in a map showing potential locations for different reef restoration treatments. From here, the workgroup selected areas suitable for two types of treatment: seed only, or substrate plus seed. The workgroup also looked for areas in the Tred Avon River sanctuary that currently meet the oyster density goal, as determined by the population survey. (No reefs currently meet the target oyster density goal in the Tred Avon River sanctuary.) Additionally, the Coast Guard gives general guidance of a 150-foot setback from federally-maintained channels. Within the Tred Avon River, there are two federally maintained channels – one at the lower end in Town Creek and one in the upper portion between Peachblossom Creek and Easton. The Town Creek channel is outside of the sanctuary limits; however, the sanctuary does coincide with the upper channel for a short distance. Within that area, potential restoration sites were reviewed for compliance with the 150-foot buffer. Sites falling within the buffer were eliminated from the blueprint map. Additionally, a 250-foot buffer was placed around residential docks. Sites falling within that buffer were eliminated. Navigational clearance of 6 feet mean lower low water will be maintained overtop of all reefs where substrate will be added.

5. Send draft blueprint map and tributary plan to consulting scientists for review:

In addition to input from the Coast Guard, the workgroup sought the input of a group of Chesapeake Bay scientists from the academic community, federal and state resource agencies, and non-profit organizations. It is expected that communication with the scientific community will be ongoing throughout restoration.

6. Conduct public open house:

   A public open house was conducted on November 7, 2013 at Oxford Research Lab on Maryland's Eastern Shore to hear input on the draft Tred Avon River Oyster Restoration Tributary Plan. Additionally, USACE solicited local input on waterway use, navigation, and navigational needs in October 2015. USACE sent flyers requesting input to 500 local residents as well as marinas and the Oxford Yacht Club.'

7. Finalize blueprint map and tributary plan:

   Using the input from consulting scientists and the public, the workgroup finalized the Tred Avon River Oyster Restoration Tributary Plan. The plan will be a living document, to be updated as appropriate based on adaptive management and the availability of new data.

8. Obtain Section 10 permit, as needed:

   At this time, no Section 10 permit is expected to be required for substrate placement in the Tred Avon River oyster sanctuary, since USACE will be implementing that portion of the project with federal funds.

9. Implement seeding and substrate activities:

   The tributary plan is expected to be implemented by NOAA, USACE, and DNR. NOAA is planning to contribute funds for seeding activities, as well as mapping and survey actions. USACE is planning to contribute to substrate placement efforts. DNR is expecting to contribute to the reef seeding, as well as mapping and survey activities. All three partners plan to contribute to project planning and monitoring efforts.

10. Monitor project performance and adaptively manage:

    Using the protocols discussed in the oyster metrics report, the workgroup will monitor the performance of the restoration sites in Tred Avon River oyster sanctuary. Key parameters to be monitored include reef structure, population density, total reef population, and the number of age classes. Additionally, the workgroup will monitor water quality and other parameters that affect project success. Monitoring is planned to occur several times within six years following implementation. Depending on the results of the monitoring, additional seeding or other adaptive management actions will be undertaken. Details of the monitoring plan are found in the monitoring section of this document. NOAA, USACE-Baltimore District and DNR will produce annual reports describing progress that has been made on restoring the oyster population in Tred Avon River oyster sanctuary.

Data Used in the Tred Avon Tributary Plan

This section details the parameters considered in the selection of Tred Avon River oyster sanctuary for intensive oyster restoration, the selection of restoration sites within the sanctuary, and the determination of location and type of reef treatment. Some of these parameters were considered in greater depth in the USACE master plan process and/or the Maryland Oyster Restoration and Aquaculture Development Plan process. They warrant mention here, though, since the Tred Avon River tributary plan largely builds on these plans. Further description of each parameter is discussed below.

Table 1: Criteria Considered During the Tred Avon River Tributary Plan Process

Physiochemical	Water quality (dissolved oxygen (DO), salinity, temperature)
Physical	Bottom quality, sedimentation, depth
Biological	Location and quantity of existing oyster population, historical spat set
Other	Sanctuary boundaries; land use; location relative to other estuarine habitats (SAV); input from public, Coast Guard, and consulting scientists

Physiochemical Criteria

Tred Avon River is classified as a mesohaline tributary. Salinity and dissolved oxygen (DO) data were compiled and screened through USACE's master plan efforts by Versar, Inc. Point data were gathered by DNR, the Maryland Department of the Environment, the Alliance for Chesapeake Bay, and the Chesapeake Bay Program. The same salinity dataset was also used to evaluate Tred Avon River for the potential risk from freshets. Temperature is not a limiting factor in Tred Avon River and needed no further consideration. Details of the physiochemical selection criteria are provided in the USACE master plan.

Physical Criteria

Only areas between 4 and 20 feet in water depth were considered suitable for restoration. Deeper waters typically experience low DO conditions and higher sedimentation that are not suitable for oysters or the reef community. Shallower waters conflict with other uses of the waterway. Water depth between 4 and 6.5 feet deep was considered unsuitable for substrate additions due to concerns about navigational interference. Thus, only water depths between 6.5 and 20 feet were considered suitable for substrate additions.

Adequate bottom must be available for oyster restoration. Hard bottom, capable of supporting shell or other material likely to catch spat, as well as areas that currently hold oyster shell were identified by bottom surveys using sonar in conjunction with various ground-truthing methods.

Side-scan sonar surveys conducted by the Maryland Geological Survey (MGS) in 2009 and multi-beam sonar surveys conducted by the NOAA Chesapeake Bay Office (NCBO) in 2013 provided the necessary background data to identify general bottom type;. A more detailed investigation of the seabed conducted by NCBO determined the quality of the seabed and its ability to support restoration actions. Seabed-type polygons were classified by NOAA using the Coastal and Marine Ecological Classification Standard (CMECS) [2] Substrate Component. Boundaries for proposed substrate reefs were created from the CMECS polygons, NCBO fine-scale acoustic survey data (bathymetry, sub-bottom profiling, and seabed classification), ponar sediment grabs, and seabed and oyster abundance data derived from patent-tong surveys conducted by the Maryland Department of Natural Resources in 2013. (Appendices B, C).

Biological Criteria

DNR conducted oyster population assessments for size and density in the summer of 2013 (see Appendix C). Patent tongs were used to sample areas in the Tred Avon River with habitat suitable for oysters as determined by sonar surveys conducted by Maryland Geological Survey and NOAA. A total of 222 samples were taken. The number sizes of the oysters in each sample were recorded.

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[2] Chesapeake Bay-CMECS is the integration of several digital maps that identify the boundaries and distribution of seabed materials and bottom habitats in the Chesapeake Bay. It is a hierarchical ecological classification system that is universally applicable for coastal and marine ecosystems. It was developed by the NOAA Coastal Services Center, in partnership with NatureServe and others, to create a standard classification system that integrates different types of data from multiple sources to fully characterize a specific area. Raw survey data were acquired by the NOAA Chesapeake Bay Office and the Maryland Geological Survey with acoustic seafloor survey systems and validated with video and sediment grab samples. Final seabed habitat polygons were classified using a variant of the CMECS. CB-CMECS places an emphasis on describing the American oyster reef community, and the sediments that encompass it. The oyster reef units described in CB-CMECS are those that can be acoustically derived and differentiated, and are classed based upon their morphological characteristics. CMECS reef attributes in addition to other spatial data sources inform the restoration potential of targeted sites. An example is the “aggregate patch reef” which describes oyster bottom that comprises shell mounds surrounded by soft sediments. Healthy oyster communities exist on this type of habitat, but in most cases restoration potential would be low. More CMECS information, including a description of the classifications, is at http://ftp.ncbo.cgclientx.com/ecoscience/Chesapeake_Bay_Benthic_Habitat_Polygons_CMECS/.

Spat set data compiled by DNR's fall survey from 1985 to 2012 were considered in an effort to understand larval settlement patterns in Tred Avon River (Appendix A). Fall survey spat set data are available for one location in Tred Avon River, Double Mills reef. This dataset was used to make the conservative assumption that there will be no natural spat set over the next 6 years (see seed needs analysis section below). This dataset is the most recent available, thus it was assumed to be most relevant to current conditions in the river. Historical spat set was also considered and used in selecting Tred Avon River as a target tributary (Krantz and Meritt from 1939-1975, see Appendix A).

The oyster diseases Dermo (*Perkinsus marinus*) and MSX (*Haplosporidium nelsoni*) are more virulent in higher salinity waters, leading to higher mortality in these areas. Reproduction is also more successful in higher salinity areas. To balance disease-related mortality and reproduction, mesohaline areas were considered to be high priority for restoration.

Harmful algal blooms (HAB) resulting from *Prorocentrum minimum* and *Karlodinium veneficum* blooms have been documented in the Choptank River (Brownlee et al. 2005; Glibert et al. 2001), but Tred Avon River has not been identified to have significant HAB problems or susceptibilities. Blooms of *Prorocentrum minimum* and *Ulva lactuca* have been documented in the past.

<u>Other Criteria</u>

The State of Maryland has designated 3,937 acres within Tred Avon River as oyster sanctuary, where no commercial harvest of wild oysters is permitted.

The watershed of the Tred Avon River spans 31,242 acres. Land use in the watershed draining to Tred Avon River is largely agricultural (cultivated crops and pasture/hay) with some forested, wetlands, and developed areas. Easton, situated at the head of the Tred Avon River, is the densest and largest urban/suburban development in the watershed. There are 5,358 acres of forests and wetlands in the Tred Avon watershed. This information was used by USACE in its oyster restoration master plan, which in turn informed the selection of Tred Avon River as a site for large-scale oyster restoration.

Four federally listed rare, threatened, or endangered species have been identified in Talbot County which contains the Tred Avon River watershed: Delaware fox squirrel, Eastern fox squirrel, dwarf wedgemussel (Alasmidonta heterodon), and seth forest water scavenger beetle (as listed by Landscope 2012 for Talbot County). Additionally, there are 9 animals and 15 plant species found in Talbot County on Maryland's rare, threatened, or endangered species list.

Submerged aquatic vegetation (SAV) habitat, as designated by the Chesapeake Bay Program, exists in the Tred Avon River. There has been no SAV identified in the main portion of the Tred Avon River since 2005. On average, there have been 140 acres of SAV beds in the Tred Avon River segment (LCHMH) in the past 10 years (2003-2012). SAV beds were more expansive in the decade prior to that, averaging 500 acres annually (1993-2002). In 2011, a number of the small creeks within the Tred Avon system (Hudson Creek, Back Creek, Phillips Creek, Beckwith Creek, and Smith Creek) supported SAV beds. Target restoration sites were cross-checked with SAV maps (dataset here) to ensure that no reef construction or oyster planting would occur on SAV beds.

Blueprint Map

Initial analyses performed for the USACE master plan determined that salinity and dissolved oxygen were suitable throughout the Tred Avon River (USACE 2012). Spatial data were then overlaid in ArcGIS to locate proposed restoration sites. This GIS analysis included the bottom classification (Appendix B), and DNR population survey results (Appendix C).

The foundation of this tributary plan is the blueprint map, based on the spatial analysis, which shows the locations of proposed restoration activities. Sites that met all the following criteria were considered suitable for restoration in the Tred Avon River oyster sanctuary:

1. Hard benthic habitat (Seabed areas suitable for substrate placement, based on CMECS bottom characterization of muddy sand, unclassified hard bottom, sand, and sandy mud- Appendix B).
2. In areas with depths of 4 to 20 feet;
3. Suitable water quality to support oyster populations;
4. Not on leased bottom;
5. Within a legal natural oyster bar;
6. Outside of a 250-foot radius around aids to navigation;
7. More than 150 feet from the federally-maintained navigation channels (upper Tred Avon from Peachblossom Creek to Easton Point);
8. More than 250 feet from a marina;
9. Have an existing population of fewer than 50 oysters per square meter (Interpolated oyster population density data from DNR's 2013 survey- Appendix C. The interpolation method used was the Nearest Neighbor/Inverse Distance Weighted method.)
10. Outside of a 250-foot radius around residential docks;
11. Not identified by the general public or the Coast Guard as a navigational concern;
12. Not slated as a future planting site for DNR's Marylander's Grow Oysters program;
13. Not on a control site as selected in this plan.

Hard benthic habitat was defined as areas that, per acoustic surveys, were found to have the CMECS classifications of artificial reef, aggregate patch reef, fringe reef, patch reef, sand and scattered oyster shell, sandy mud, sand, and muddy sand. Buffers were left around navigational aids, federally-maintained navigational channels (upper Tred Avon River channel), residential docks, and marinas.

The 20-foot maximum depth cutoff was used due to concerns about potential hypoxia and anoxia at greater depths. The shallow depth limit was based on the practical limit of the vessels used for restoration activities, as well as the limits of the acoustic surveys used to create the restorable bottom analysis. However, for substrate placement, a depth limit of 6 feet was used to allow for safe navigation over the substrate.

Areas with more than 50 oysters per square meter would meet the minimum density goal per the oyster metrics report, so these would not be targeted for initial seeding. Note that in the Tred Avon oyster sanctuary, no areas were found to have more than 50 oysters per square meter in 2013).

Using the above criteria one through eight above, 251 acres were identified as suitable for restoration action (Appendix B, and Figure 2 and Table 3). (Criteria 10 through 13 were considered after a draft plan had been developed for public input; see Tred Avon River Tributary Plan Process section above and p. 17). The next step was to determine what restoration treatment was most suitable for each target area. Two treatments were identified: planting oyster seed only, and planting substrate with oyster seed on top. Adding seed only is less costly than adding both substrate and seed, and so it is the first-choice treatment. However, the seed-only option is only suitable where sufficient shell base currently exists. In the absence of existing suitable shell base, substrate must be added to create a hard reef structure. Seed oysters can then be planted on top of the new substrate base. Substrate may be any combination of oyster shell, clam shell, or alternative substrate such as crushed concrete or rock. Reef balls can be added for additional three-dimensional structure, either with or without seed oysters set onto them.

The existing density of oysters was a key consideration in determining whether an area would be targeted for seed only, or substrate and seed. The assumption was that an area that supported existing oysters in quantity (by consensus of the workgroup, that amount was 5 oysters per square meter) should not be overplanted with substrate. This would risk smothering existing oysters. Also, the presence of oysters in such quantity served as an indication that existing substrate was suitable, thus the area would likely do well with the addition of seed only. Areas with hard benthic habitat and fewer than 5 oysters per square meter were further examined to determine if they could be restored using seed only, or if they required the addition of reef-building substrate, followed by oyster seed, to restore. Data sets including sonar maps, oyster density, ponar grabs, and shell quality characterization were considered on each site individually. Areas with substantial quantities of high-quality surface shell and with closer to 5 oysters per square meter were targeted for seed only. Areas that had little shell or predominately low-quality brown or black (anoxic) shell, and few oysters were targeted for substrate, followed by seed. The treatment type will be adapted as needed based on the additional pre-planting diver ground-truthing information. (See description below of ground-truthing protocol to be employed).

Additionally, areas shallower than 6.5 feet deep were considered unsuitable for substrate placement, due to navigational concerns. This plan allows for a minimum navigational clearance of 6 feet (mean lower low water) overtop of reefs requiring substrate. In water 6.5 feet deep, 6-inch-high reefs will be constructed, allowing for 6 feet of navigational clearance. In water 7 or more feet deep, reefs up to one foot high will be constructed, again allowing for the minimum 6-foot navigational clearance.

As of fall 2014, DNR's permit in the Tred Avon River, and USACE's NEPA clearance, both limit placement of substrate to areas where 8 feet of navigational clearance can remain over a completed reef. Placing substrate in so as to leave only 6 feet of navigational clearance will require completion of supplemental NEPA documentation by USACE, or a permit modification for DNR work.

Restoration using the seed-only treatment is targeted in waters 4-20 feet deep. Table 2 is a summary of the criteria used to determine restoration treatment for each area .

Table 2: Criteria used to determine treatment type for each targeted restoration area

Criteria	Restoration Treatment Type
Water depth less than 4 feet or greater than 20 feet	No action; unsuitable for restoration
Soft benthic habitat	No action; unsuitable for restoration
Areas with hard benthic habitat, water depths between 4 and 20 feet, and with between 5 and 50 oysters/m^2	Add seed only (no substrate)
Areas with hard benthic habitat, water depths between 4 and 20 feet, and fewer than 5 oysters/m^2	Review sonar maps, and oyster density, ground truth, and shell quality data to determine if these sites can be restored using seed only, or if they require substrate. *(See decision criteria in next two rows)*
Areas with hard benthic habitat, fewer than 5 oysters/m^2, AND with predominately white (oxic) shell, high quality shell, substantial surface shell, more oysters	Add seed only (no substrate)
Areas with hard benthic habitat, fewer than 5 oysters/m^2, AND with predominately brown or black (anoxic) shell, low quality shell, very little surface shell, few oysters, and in waters 6.5 to 20 feet deep	Add substrate, followed by seed

Next, GIS was used to create maps showing the appropriate treatment type in each area. From here, workgroup members blocked off areas into somewhat-regular polygons to facilitate planting and tracking. Some areas were eliminated or changed in this process. For example, very small, odd-shaped appendages to the larger polygons, and long, thin slices bordering unsuitable bottom, were eliminated as they would likely be difficult to plant accurately. Also, areas less than one contiguous acre were eliminated.

From here, the workgroup sent the draft blueprint map and plan to consulting scientists, and hosted an open house and virtual open house to collect public input. USACE also sent letters to all waterfront homeowners within the sanctuary, and posted signs at marinas and other public facilities asking for input. [Among the input received was that of citizen volunteers from DNR's Marylanders Grow Oysters (MGO) program. Working with DNR, this group identified sites for future MGO plantings, and requested that this successful program proceed apace, undisturbed by the work proposed in this plan. These sites, totaling six acres, will be tracked separately from this plan by the MGO program, and are not included in the target restoration goal in this plan].

The combined professional and public input, and eliminating reefs less than one acre and creating somewhat-regular polygons, reduced the target to 182 acres. An additional 28 acres were removed from the restoration target to serve as project controls (see controls section). The result was a target of 154 acres. Diver ground truthing has shown that sonar surveys may overestimate the area of hard bottom suitable for planting seed oysters. Based on field experience, it was assumed that the area suitable for planting seed only, as determined by sonar, will be reduced by 10 percent upon examination by divers. A 10-percent reduction *of the area targeted for seed-only* reduces the 154 acres identified to 147 acres. This amount, 147 acres, is the actual oyster restoration goal for the Tred Avon oyster sanctuary. (See Figure 2 and Table 3).

Blueprint Map Summary

In summary, the oyster metrics report defined a successfully restored tributary as one where 50 to 100 percent of the currently restorable bottom, constituting at least 8 percent of historic bottom, meets the reef-level goals. In the Tred Avon River, the restorable bottom analysis (Appendix B) showed 251 acres of restorable bottom, so the absolute minimum threshold to consider this tributary restored is half that, or 125 acres, of restored reefs. This tributary plan targets 147 acres, allowing for the possibility that some of that acreage may not respond sufficiently to the restoration activity. (See Figure 2 and Table 3).

Table 3: Acreage by Reef Treatment (with anticipated reduction)

Reef Treatment	Acres Identified in Blueprint Map	Suitable Acreage (with 'seed only' treatment areas reduced by 10%)
Currently meets target density of 50+ oysters/m^2	0	0
Reef treatment: Add seed only	71	63
Reef treatment: Add substrate and seed*	84	84
Total Acreage Requiring Reef Treatment	**154**	**147**

* 59.7 acres in waters 6.5 to 9 ft. deep; 24 acres in waters 9 to 20 ft. deep

Figure 2: Tred Avon Goal Development
This graphic describes how the Tred Avon River goal of restoring 147 acres of oyster reef was developed.

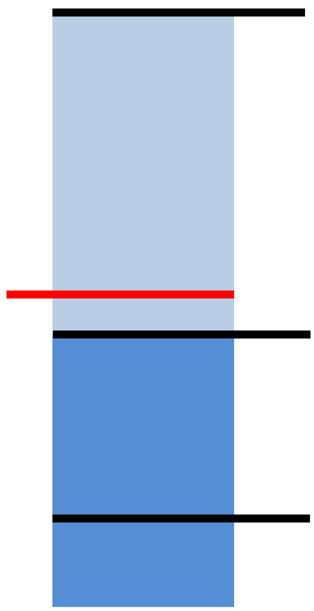
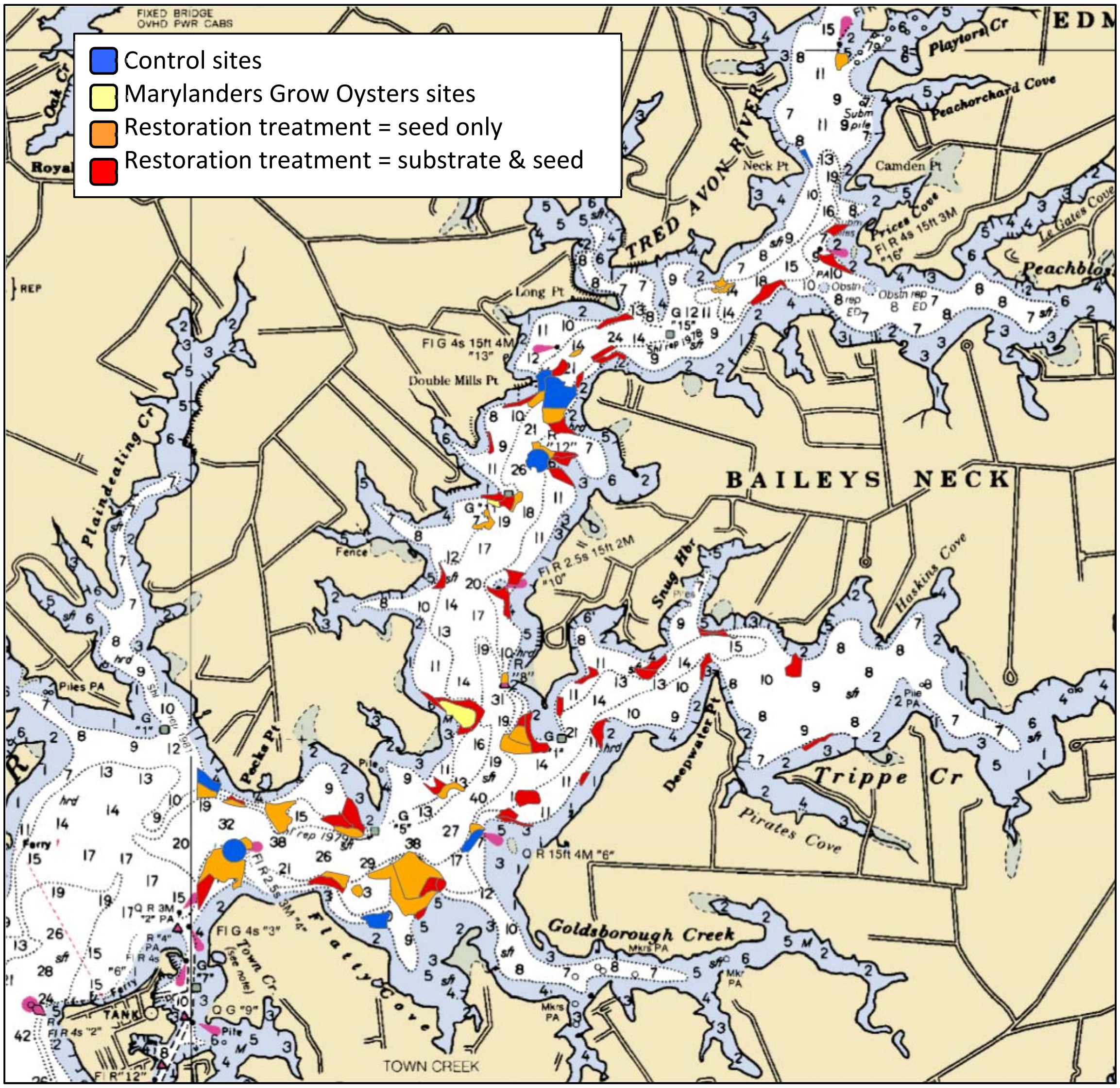


Figure 3: Blueprint Map



See Appendix D at ftp://ftp.chesapeakebay.net/noaa/Tred%20Avon%20appendices/ for downloadable maps for detailed viewing.

Note that the Blueprint Map above identifies 154 acres for restoration. The goal is 147 acres, assuming that 10 percent of the *seed-only areas* identified above will, upon further ground truthing, actually be unsuitable (too soft). See page 17 and Table 3 for further explanation of the 10 percent reduction.

Ground Truthing

Prior to seeding, diver ground truthing will be performed on all sites targeted for seed-only treatment. The purpose of the ground truthing is to validate the acoustic surveys, and to modify the boundaries of target sites if needed to ensure oysters are placed on hard substrate. Ground truthing of any given site is expected to occur within a few months prior to restoration work.

Diver ground-truthing protocol: Seed-only sites will undergo diver ground truthing. Diver ground truthing will be accomplished by running several transects within each target area. The number of transects depends on the size of the area. Typically, each transect will be 200 meters long, marked every 2 meters for reference. Transect lines will be laid out haphazardly within the target polygon; divers will then swim along the line and report the condition of the bottom every 2 meters. Parameters to characterize bottom condition will be recorded at each 2-meter interval. The parameters include: amount of exposed shell, substrate type, substrate penetration and oyster density. Divers will determine a score for each parameter. Table 4 outlines the score for each category, with increasing metric values indicating bottom-type improvement.

Table 4: Summary of Ground-Truthing Protocols

Exposed Shell	Value	Substrate Type	Value *	Penetration (cm)	Value *
Zero	0	Silt	0	70	0
Very Little / Patch	1	Mud	1	40	1
Some	2	Sandy Mud	2	20	2
Exposed	3	Sand	3	10	3
Oyster Bar	4	Rock / Bar Fill / Debris	4	5	4
		Shell Hash	5	0	5
		Loose Shell	6		
		Oyster	7		

* Increasing metric values show bottom-type improvement

The data for each transect will be recorded directly into a Microsoft Access database created specifically for the Paynter Labs. The mode value of each category will be used to determine whether each transect can be categorized as preferred, acceptable, or unacceptable bottom. The bottom-type category will be determined as the category within which two of the three data types (exposed shell, substrate type and penetration) fall. This information will be then relayed to ORP staff and the workgroup to help make decisions about which target areas, or portions of target areas, may not be suitable for planting spat.

Table 5 outlines the requirements for each bottom-type categorization.

Table 5: Summary of Bottom-Type Categorization

Category	Exposed Shell Range	Substrate Type Range	Penetration Range
Preferred	3-4	4-7	5
Acceptable	2	3-4	3-4
Unacceptable	1-0	0-2	0-2

Seed Needs Analysis

A projected 661.5 million oyster seed will be required to implement this plan. This number assumes that 4 million spat-on-shell per acre will be added to all restoration areas targeted in this plan. The oyster metrics report calls for the target density of 50 oysters per square meter to be achieved within 6 years of restoration activity. This plan therefore lays out oyster survival projections over 6 years. To do this, assumptions were made regarding survival rates of both planted seed and existing oysters. It is recognized that oyster survival rates are highly variable, and that the actual survival rate is unknown. However, for planning purposes it was necessary to make reasonable assumptions as to survival rates. These assumptions may be revised in future iterations of this plan if more accurate rates are determined through the recommended monitoring (see monitoring section below).

First-year planted spat-on-shell survival rate: Based on Volstad et al (2008) and Oyster Recovery Partnership's field experience with hatchery-produced spat-on-shell in Maryland, the workgroup set assumed survival rates for first-year planted spat-on-shell at 15 percent.

Out- year planted spat-on-shell survival, and annual survival rate of existing oysters: To deduce the out-year annual survival rate, the workgroup considered historic annual mortality from DNR's fall surveys. This data set varies widely on the Tred Avon River, ranging from 0 to 85 percent since 1985 (see Table 6).

Table 6: Tred Avon River Annual Mortality Rates

Median 1985-2012	Median 2003-2012	Minimum	Maximum
11.5%	7.5%	0%	85%

As a conservative estimate, the workgroup used the 1985- 2012 median mortality rate of 11.5 percent as the projected annual mortality (rounded to 12 percent) for out-year mortality of planted spat-on-shell, and for existing oysters on the reef prior to restoration.

Summary of oyster survival assumptions for the Tred Avon River:

Planted spat-on-shell: First year survival rate = 15 percent;
Out-year annual survival rate = 88 percent;

Existing oysters (on the reef in summer 2013): Annual survival rate = 88 percent.

A key unknown is the level of natural spat sets that might occur in Tred Avon River over the implementation time frame, and what density of oysters might result from these spat sets. The workgroup dealt with this unknown by making a conservative assumption that there would be no natural spat set over the course of implementation. This assumption was based on the fact that there has not been a significant spat set in the Tred Avon River since 1991, and historically spat sets have been low in the river (Krantz and Meritt, 1977; MD DNR annual fall survey), See Appendix A). By making this assumption, the tributary plan calls for planting enough seed to reach the density goals in 6 years, even with no natural spat set in the river. Thus, the intent is to plan for a conservative scenario, and adapt the tributary plan as needed. The tributary plan calls for an initial large planting on most reefs, followed by monitoring in year 3, and an additional smaller planting in year 4 to ensure a multi-age-class population and target density after year 6. Population monitoring will be critical to determining the need for the additional seeding. This will occur, at a minimum, on each reef three and six years post-restoration (see monitoring section for details). Annual monitoring is also called for on three sentinel sites in the river. If diver ground truthing, DNR fall surveys or other data indicate a natural spat set, additional population surveys may be required on areas that have not yet been restored.

A summary of the 661.5-million seed calculation is provided in Table 7; the seed cost estimate is provided in Table 8.

Table 7: Seed Needs and Oyster Survival Assumptions

Reef Treat-ment	First Planting *(seed per m², assuming 4 million seed per acre)*	First Planting, year 1 annual survival rate	First Planting, year 2-6 annual survival Rate	Second Planting (in year 4) *seed per m², assuming 500,000 seed per acre*	Second Planting (in year 4) first year survival	Second Planting, years 5 and 6 annual survival Rate	Oyster Density After 6 Years *(surviving oysters from first and second plantings)* oysters per m²	Area Targeted for Restoration (acres)	Total Amount of Seed Needed for Treatment Type *(4.5 million seed per acre, over two plantings, multiplied by number of acres)*
Seed only	989	0.15	0.88	123	0.15	0.88	96	63.3	284,850,000
Substrate and seed	989	0.15	0.88	123	0.15	0.88	94	83.7	376,650,000
Total for Tributary Plan								**147**	**661,500,000**

Table 8: Seed Cost Analysis

Reef Treatment	Area to be Treated (acres)	Seed Required per Acre	Seed Required for Treatment Type	Seed Cost for Treatment Type (at $5,000 per 1 million seed)*
Seed only	63.3	4,500,000	284,850,000	$1,424,250
Substrate and seed	83.7	4,500,000	376,650,000	$1,883,250
Total for Tributary Plan	**147**		661,500,000	**$3,307,500**

* $5,000 per million spat-on-shell, including planting costs, based on ORP estimates (Stephan Abel, personal communication, July 2013). Note that this is an average cost, but actual cost depends on the number of oysters the University of Maryland hatchery produces each year. For example, as of mid-2013, hatchery production was relatively high, bringing average costs down to $4,200 per million spat, including planting costs.

Substrate Needs Analysis

A projected 119,400 cubic yards of substrate will be needed to implement the tributary plan. Substrate may be any combination of oyster shell, clam shell, or alternative substrates such as crushed concrete, rock, or reef balls.

The projection of substrate needs assumes reefs will be constructed to either 6-inch or 1-foot height. One-foot reefs will be constructed in areas with water depths of at least 7 feet, so as to allow a minimum of 6 feet of clearance overtop of the completed reef (64 acres). Six-inch reefs will be constructed in areas with water depth of 6.5 feet, also to allow a minimum of 6 feet of clearance overtop of the completed reef (20 acres). One-foot-high reefs require 1,613 cubic yards of substrate per acre; 6-inch-high reefs require 807 cubic yards of substrate per acre.

Reefs in nearby Harris Creek have been built to several different heights. If higher reefs or lower reefs perform better in Harris Creek, this plan will be adapted to favor oyster survivorship while efficaciously using substrate material. The computation of the substrate need is shown in Table 9, with the substrate cost estimated in Table 10.

Table 9: Substrate Needs Analysis

Reef Treatment	Area to be Treated (acres)	Amount Substrate Needed per Acre (cubic yards)	Amount of Substrate Needed for Treatment Type (cubic yards)
Substrate and seed (6-inch-high reefs)	20	807	16,140
Substrate and seed (One-foot-high reefs)	64	1,613	103,232
Seed only	63	0	0
Total for Tributary Plan (rounded)			**119,400**

The estimated cost to purchase and place substrate for reef construction in the Tred Avon River oyster sanctuary is $62 per cubic yard. This amounts to $100,000 per acre for a one-foot-high reef, and $50,000 per acre for a 6-inch-high reef.

This cost estimate was derived from the USACE 2014 reef construction contract in the Tred Avon River. Rock and mixed shell substrate used in that contract cost approximately $56 per cubic yard. In addition to the unit costs, there were other contract-wide costs (e.g., mobilization, demobilization, bonding, design, construction/project management, cost estimate, and solicitation), which amount to an additional 10 percent. The unit and contract costs together yield a rounded price of $62 per cubic yard for substrate. Other reef substrate materials may have different costs.

Table 10: Substrate Cost Analysis

Reef Treatment	Area to be Treated (acres)	Substrate Required per Treatment (6" reefs @ 807 cy/ acre; 1' reefs @ 1,613 cy/ acre)	Substrate Cost per Acre ($62 per cy)	Substrate Cost per Treatment (6" reefs @ 807 cy/ acre; 1' reefs @ 1,613 cy/ acre)
Substrate and seed (6-inch-high reefs)	20	807	$50,000	$1,000,000
Substrate and seed (1-foot-high reefs)	64	1,613	$100,000	$6,400,000
Seed only	70.7	0	$0	$0
Total for Plan				$7,400,000

Monitoring

The primary objective of the monitoring described here is to determine whether or not the restoration work meets the definition of a restored tributaryper the oyster metrics report. In addition, diagnostic parameters are recommended. These are basic water quality and biological parameters which can help determine the cause of success or failure of the restoration work. The extent of the monitoring is consistent with the scope of this document and the oyster metrics report. Cost estimates are approximate; they will likely evolve as monitoring progresses.

Monitoring of Oyster Metrics Success Goals

The principle goal of monitoring efforts in Tred Avon River is to determine if the restored reefs can be considered "successful" per the oyster metrics standards. According to the oyster metrics report, evaluation of reef-level restoration success requires the determination of four parameters:

(1) structure of the restored reef (reef spatial extent, reef height, and shell budget),
(2) population density (as individual abundance and biomass),
(3) an estimate of total reef population (including biomass and number of individuals, and
(4) the number of age classes present on the reef.

In keeping with the oyster metrics report, these parameters will be measured as the basic monitoring protocol for the Tred Avon River oyster sanctuary under this plan, likely in partnership with academics, researchers, non-governmental organizations, private contractors, and other agencies. Table 11 describes in detail the recommended parameters to be monitored to evaluate progress towards the restoration goals.

Pre-restoration data on reef extent were collected by Maryland Geological Survey and NOAA using sonar, video, and grab samples. Baseline data on oyster population density were collected by DNR. These data were used to estimate baseline oyster population size and densities in the Tred Avon River oyster sanctuary. Future monitoring results will be compared to these baseline data, and to control sites, to determine the success of restoration efforts, and whether or not adaptive management actions are necessary. Table 11 lists estimated costs for monitoring per the oyster metrics success goals.

Diagnostic Monitoring

In addition to monitoring to evaluate the success or failure of restoration projects per the oyster metrics standards, it is wise to include further monitoring that will help determine the causes of the success or failure. These are deemed diagnostic monitoring parameters. These include basic water quality, disease, and physiologic factors that affect oyster health and reef structure persistence. Understanding these parameters alongside metrics of restoration success will allow practitioners to understand not only whether or not the project succeeded, but why. Table 12 lists the recommended diagnostic parameters.

Due to the large scope of monitoring, some of these factors will be measured only at designatedsentinel sites within the Tred Avon River oyster sanctuary. Sentinel sites are fixed sites that are monitored annually. Collecting data on these recommended diagnostic monitoring parameters will likely require partnering with academic institutions, non-governmental organizations (NGOs), and other state and federal agencies. Table 12 shows suggested diagnostic monitoring activities and estimated costs of these activities.

Table 11: Suggested Restoration Success Monitoring Activities

Parameter	Sentinel Site Monitoring*	All Site Monitoring**	Method of Measurement	Units/Performance Metric	Estimated Cost (assumes a 6-year monitoring timeline)
Population- Density	x	x	quadrat sampling or patent tong	number of oysters/m^2	These three parameters are collected simultaneously; cost to monitor sentinel sites annually for 6 years = $33,000 ($11,000 per year). The cost to monitor each of 440 acres in years 3 and 6 = $512,720 ($580 per acre per monitoring event).
Population-Biomass	x	x	regression	g wet or dry weight/m^2	
Size-Frequency Distribution (multiple age classes)	x	x	quadrat sampling or patent tong	(length, number)	
Spatset			quadrat sampling or patent tong	(spat/m^2) Evidence of successful recruitment during at least two recruitment periods	No additional cost (this data is collected as part of DNR's existing annual fall oyster survey)
Reef Height		x	sidescan or multibeam sonar/seismic profiling	(cm) Positive or neutral change in reef height from original structure	No additional cost (These three parameters are monitored as part of NOAA's existing program; the value of NOAA's data collection is $80,000 over 6 years).
Reef Area		x	sidescan or multibeam sonar/seismic profiling	(m^2)	
Reef Patchiness		x	sidescan or multibeam sonar/seismic profiling	Percent of reef with hard substrate and/or 15 oysters m^2; target is >30%	
Shell Volume -- black/brown (shell budget)		x	patent tong or quadrat sampling (if possible)	increase in brown shell/black shell ratio	No additional cost
Total Additional Cost over 6 Years (rounded)					**$546,000**

Table 12: Suggested Diagnostic Monitoring Activities

Parameter	Priority	Frequency	Number of Sites	Method of Measurement	Units/ Performance Metric	Estimated Cost
Dissolved Oxygen	High	Every 30 minutes	3 sentinel sites	Data logger	mg/L	$147,000 over 6 years, including equipment and labor
Temperature	High	Every 30 minutes	3 sentinel sites	Data logger	°C	
Salinity (Conductivity)	High	Every 30 minutes	3 sentinel sites	Data logger	PSU	
pH	Medium	Every 30 minutes	3 sentinel sites	Data logger	$-\log[H^+]$	
Total Algae (Chlorophyll a)	Medium	Every 30 minutes	3 sentinel sites	Data logger	µg/l	
Turbidity	Medium	Every 30 minutes	3 sentinel sites	Data logger	NTU	
Alkalinity	Medium	Monthly	3 sentinel sites	Titration	mg/L of $CaCO_3$	$100 for test kits; data can be collected when sensors are changed
Disease (Dermo, MSX)	High	Annually in fall	2	Histology	Prevalence, intensity	No additional cost (included with DNR's fall survey unless additional sites are added)
Predation	Low	Annually in fall	Signs of predation will be assessed during population surveys.	Shell examination	N/A	No additional cost
Poaching	High	Constant	All	MLEIN	N/A	No additional cost (part of DNR's existing MLEIN program)
Sedimentation Rate	High	Pre- and post-construction, years 3 and 6	3 sentinel sites	Sonar	cm/year	No additional cost (sedimentation rates can be estimated as part of NOAA's existing program)
Total Additional Cost over 6 Years (rounded)						**$147,000**

Table 13 summarizes the costs of the suggested restoration success and diagnostic monitoring activities for the Tred Avon oyster sanctuary.

Table 13: Summary of Monitoring Costs

Monitoring per Oyster Metrics Success Standards*	**$546,000**
Diagnostic Monitoring*	**$147,000**
Total Cost	**$693,000**

* This reflects the cost to monitor beyond what is already funded as part of ongoing federal, state and NGO programs.

Monitoring Protocols

More information is provided below for some of the monitoring identified in the restoration success monitoring table. Note that these are parameters already collected by agencies and/or partners.

Post-Planting Monitoring – Spat Growth and Mortality

Growth and mortality of seed plantings are monitored 4 to 8 weeks after planting by collecting spat on shell. The 4- to- 8- week window has been found to be the most effective in assessing these parameters. Focusing on a narrower window in time has proven difficult with weather and other variables affecting the opportunities to sample. Using the planting vessel's track lines as a target, divers collect hatchery shells from each survey location. Divers place a 0.3-meter x 0.3-meter quadrat on the bottom and collect all shells contained within the quadrat. Divers attempt to collect at least six quadrat samples at each site. When shell densities are too low for quadrat sampling, such that the diver could not find shell in areas with few track lines, the diver will instead haphazardly collect 50 to 100 shells from throughout the bar.

Each shell is examined for live spat, boxes, scars, and gapers. Additionally, the first 50 live spat observed in each sample are measured for shell height and, each shell is inspected for the presence of *Stylochus*. Shells are counted in the field, without magnification. The assumption is that live spat are visible at 4-8 weeks old. All shells are returned to the bar when sampling is complete. The number of spat per shell is multiplied by the total amount of shell planted on each bar to calculate the amount of spat detected on the bar by the post-planting monitoring survey. Spat survival is then calculated as the percentage of spat planted that was detected by the survey.

Oyster Population Surveys

Patent tong surveys are conducted on target reefs to assess restored oyster population dynamics including reef-level population estimates, oyster size frequency and disease dynamics, as well as spatial patterns of oyster and shell densities across a given reef.

A grid of 25-meter x 25-meter cells is overlaid onto the planted area using spatial tools in ArcGIS and each grid cell is sampled with hydraulic patent tongs. Number and size (mm) of live and dead (box) oysters are recorded at each grab. In addition, shell score (the amount of shell substrate collected in each tong grab) is quantified on a scale of 0 to 5[3]. The density of oysters at each point is calculated based on the grab area of the tongs (between 1 and 2 square meters depending on the vessel used) and a population estimate is generated using this density data. The total biomass of oysters at each reef is estimated according to Liddell (2007). The density of oysters and shell score at each patent tong survey point is spatially referenced using GIS. These spatial data allow for shell score and density plots to be generated to illustrate the spatial distribution of shell and oysters at each site. All oysters and shells, except those collected for disease sampling, are returned to the reef.

Reefs targeted for patent tong surveys are all reefs planted 3 and 6 years prior, in order to facilitate the consistent sampling of each reef. Sentinel reefs are targeted to act as long-term monitoring sites. These reefs are sampled every year (rather than every 3 years). This allows for the analysis of temporal trends in oyster population and disease levels, as well as how the spatial distribution of oyster density and shell base changes with time.

The dynamic nature of the conditions in the Chesapeake Bay and the ever-changing body of information on oysters and restoration in general require a flexible monitoring plan paired with controlled experiments to maximize restoration success and efficiency. Additionally, the productive collaboration of all agencies involved in Chesapeake Bay restoration has greatly helped with the success of restoration. The coordination of the efforts of the Maryland Geological Survey, DNR, NOAA Chesapeake Bay Office, ORP, and the Paynter Labs has allowed for the implementation of the most up-to-date data on the suitability of areas for planting. This coordination is critical to the success of oyster restoration.

Control Sites

Control sites (untreated areas) have been designated to allow comparison between restored reefs and untreated reefs within the Tred Avon River oyster sanctuary. These are areas that are otherwise suitable for restoration, but will receive neither substrate nor seed. (See Blueprint Map for control site locations). Of these, four sites were otherwise suitable for seed-only treatment, and four were otherwise suitable for substrate treatment. One of the sites suitable for seed-only is also a DNR fall survey site. Four other sites (two seed only and two

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[3] Oyster Recovery Partnership's tong fullness scale: 0=no shell in the tongs; 1= 1/5 full; 2= 2/5 full; 3= 3/5 full; 4= 4/5 full, 5= totally full. These values are for total volume of shell within the patent tongs.

substrate and seed site) were already serving as control sites for NOAA Oyster Reef Ecosystem Services research project, so were designated to receive no restoration treatment. The remaining three sites were selected so as to geographically cover the upstream/ downstream extent of the sanctuary.

Research

The workgroup also recognizes that the large-scale oyster restoration described in this plan provides unique opportunities for critical research.

The workgroup also recognizes that the large-scale oyster restoration described in this plan provides unique opportunities for critical research. Research topics that may be addressed utilizing the restoration framework described in this plan include, but are not limited to, assessment of the efficacy of different oyster restoration techniques, quantification of ecosystem services provided by restored oyster reefs, investigation of oyster larval transport and population dynamics, and analysis of disease dynamics.

The hope is that having this tributary plan will allow researchers, agencies and funders to understand the intended restoration work slated for Tred Avon oyster sanctuary, and to determine if it may constitute a suitable study site for research. In fact, it may be possible to actually design reefs to facilitate certain studies by having agencies and researchers work collaboratively. The ideal approach to large-scale, tributary-based restoration is to maximize the gain in both restored reefs as well as knowledge about successful restoration strategies. The interest in optimizing learning from the effort may need to be tempered, though, with the realities of limited resources.

Cost Analysis for Tred Avon River Tributary Plan

The total estimated cost for implementing this plan, including monitoring, is estimated at $11.4 million. Of that, $3.3 million is for hatchery-produced seed (including planting), and $7.4 million is for substrate (including material purchase and substrate placement). The remaining $693,000 is for monitoring. Table 14 summarizes the plan implementation cost (details of the seed costs are in Table 8; details of substrate costs are in Table 10; and details of monitoring costs are in Table 13).

This estimate assumes a cost of $5,000 per million planted oyster seed (ORP, July 2013), and $62per cubic yard for substrate (USACE, Baltimore District, 2014). This cost is for rock and mixed shell; costs could be different for other materials, such as fossilized oyster shell, reclaimed oyster shell or other substrates, should they become available in the large volumes necessary for this restoration project.

Table 14: Summary of Total Costs

661.5 Million Seed (rounded)	**$3.3 million**
119,400 Cubic Yards Substrate	**$7.4 million**
Monitoring	**$693,000**
Total Cost (rounded)	**$11.4 million**

Implementation of the Tred Avon River Tributary Plan

The time frame for implementing the Tred Avon River oyster restoration tributary plan depends primarily on funding. The cost for implementation and monitoring is estimated at $11.4 million. USACE has $2 million to begin reef construction in the Tred Avon River as early as 2015, with the expectation that future funding could be directed toward completing the Tred Avon tributary. DNR and NOAA anticipate being able to provide funding in future years toward implementation of the seeding activities in the Tred Avon tributary plan. Timeline for completing work is dependent upon available funding.

Project completion is also dependent upon oyster seed production, and performance of the restoration actions. The Horn Point hatchery has the capacity to produce over one billion spat-on-shell annually, to be planted by ORP. At current capacity, the 661.5-million seed demand for restoring the Tred Avon oyster sanctuary could be met in as little as one year. However, substrate placement would need to come before seed planting on 83.7 of the targeted acres. Also, other restoration projects (notably Harris Creek and the Little Choptank River, which have similar tributary restoration plans), oyster gardening programs, aquaculture, and public wild fishery grounds may also require seed from this partnership, so not all of Horn Point hatchery's annual production would go to the Tred Avon initiative. A natural spat set on the river could significantly reduce anticipated costs, seed needs, and the time frame in which restoration can be achieved.

Substrate for new reef construction may be a limiting factor. The amount of substrate needed to restore the Tred Avon oyster sanctuary is estimated at 119,400 cubic yards. This could be any combination of oyster shell, clam shell, or alternative substrates such as crushed concrete or rock. Reef balls can also be used for additional three-dimensionality. Oyster shell is a natural material, and relatively inexpensive if it can be found locally. However, it is currently in extremely short supply, and demand is high from both the restoration and aquaculture sectors. Also, shell from seafood processors can break apart into very small fragments ('fines') with multiple handlings resulting in reduced interstitial spaces. Further, oyster shell provides no protection from illegal harvesting/poaching. It may be possible to reclaim old shell from past unsuccessful restoration efforts, but it remains unclear how much of this shell is potentially recoverable and at what expense. Rock and concrete are readily available, and may help deter poaching. However, these materials are costly, and concerns exist about possible interference with other fisheries (e.g., trotlines for crab harvest). Reef balls are a good citizen outreach activity, and may help deter poaching. However, reef balls are costly as well, and concerns also exist about possible interference with trotlines.

Permits are another key component for implementation. Currently, DNR's permits limit placement of substrate to areas where a clearance of 8 feet of water depth will remain overtop of the reef post construction. Assuming 1 foot of substrate is placed, 9 feet of water depth or greater is needed to maintain the 8-foot clearance. The analyses performed for the tributary plan show that in order to meet the restoration target, shallower areas need to be restored. Should DNR proceed with any substrate construction, they would require a permit modification to construct reefs with less than 8 feet of navigational clearance. However, at this time, the substrate construction for the Tred Avon River tributary plan is planned to be undertaken 100 percent by USACE-Baltimore District under its Civil Works program. As a Federal construction project, USACE must comply with the National Environmental Policy Act (NEPA). Since prior NEPA documents did not address shallower depths, in October 2013 USACE initiated an effort to revise the existing NEPA documentation to work in areas with less than 8 feet of clearance so that the necessary acreage can be restored.

Adaptive Management and Project Tracking

The Tred Avon River Oyster Restoration Tributary Plan is meant to be an adaptive, living document. The expectation is that there will be many lessons learned, and that the plan will be adapted to reflect changing conditions and new information. The original document will be posted on the websites of the NOAA Chesapeake Bay Office and DNR. As the document is adapted, newer versions will be posted to ensure transparency. Continued dialogue with the consulting scientists, interested stakeholders, and the public is critical to this adaptive process. Comments on this document are encouraged at any time, and can be directed to Stephanie Westby, Stephanie.westby@noaa.gov.

NOAA, USACE-Baltimore District and DNR will produce annual updates describing progress that has been made on restoring the oyster population in the Tred Avon oyster sanctuary. These reports will be produced annually by spring for the previous calendar year. The reports will include: an accounting of the seed and substrate planted, a map showing the location of the seed and substrate plantings for the year, a summary of any major issues encountered by the project, a discussion of any adaptations made to the original plan, and planned work for the next year. These annual updates will be posted on the websites of the NOAA Chesapeake Bay Office and DNR.

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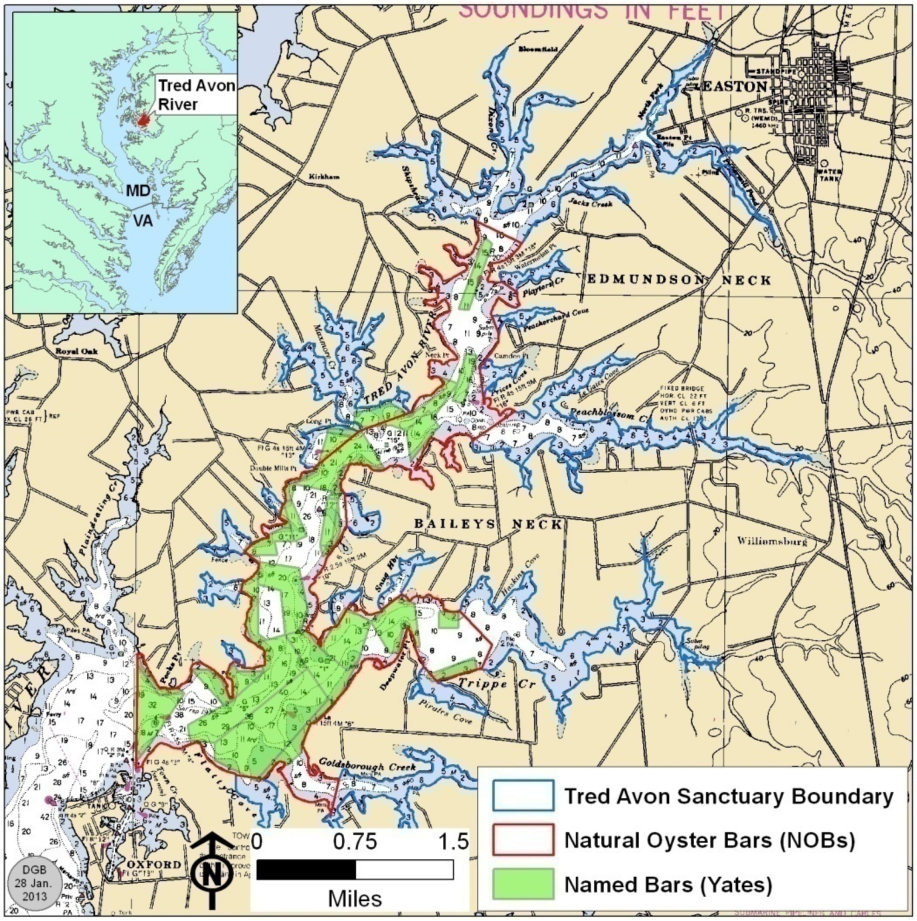
Appendix B – NOAA Restorable Bottom Analysis

Draft Tred Avon River Oyster Sanctuary
Restorable Bottom Assessment and Data Summary

David G. Bruce, NOAA Chesapeake Bay Office, 6-11-2013



Introduction

This document provides a preliminary assessment of the area suitable for oyster restoration in the Tred Avon River Oyster Sanctuary based on existing spatial data.

Restorable bottom is defined here as hard seabeds with oyster shell and coarse sediments in depths 4-20 ft MLLW. Seabed composition and distribution was characterized from broad scale acoustic survey data collected by the MD Geological Survey (MGS) in winter of 2009, and by the NOAA Chesapeake Bay Office (NCBO) in spring of 2013. The survey extent was partially ground truthed with data from the MD Department of Natural Resources (MDDNR) patent tong survey (Figure 5). Similar to Harris Creek, additional fine scale surveys and ground truthing will be required to identify the boundaries of specific restoration sites for the final blueprint.

Seed-Only Restoration

Seabeds suitable for restoration with hatchery seed-only are composed of dense biogenic and anthropogenic oyster shell rubble. Bottoms classified as sand or mud dominant but with co-occurring shell were excluded, as was anthropogenic shell rubble placed on mud bottoms.

Substrate and Seed Restoration

Areas suitable for restoration with substrate and hatchery seed include hard bottom comprised of sand (24%), muddy sand (51%), sandy mud (14%), anthropogenic oyster shell rubble (1%), biogenic oyster shell rubble with co-occurring sand (1%), and unclassified sediments (9%). Sub-bottom profiling sonar indicated that sandy mud bottoms identified as restorable were located on hard base sediments. Patent tong survey data indicated that areas of oyster shell rubble with sand had live oyster densities less than 5 per square meter. Unclassified bottoms are presumed to be on hard base sediments because of their association with shallow water, shorelines, and shoals (Figure 6).

Unlike the Harris Creek restorable bottom assessment, interpolated oyster density was not used to identify shelled bottoms with low live oyster density as suitable for restoration with substrate and seed, rather, 98% of shelled bottom, was designated for seed-only restoration. The main reasons for this are as follows: 1) the oyster abundance survey was based on a preliminary habitat classification that only covered 59% of the current extent, so all of the shell habitats within the sanctuary were not surveyed for abundance, 2) the tong survey was not based on a regular grid and high spatial heterogeneity in oyster abundance was observed within surveyed polygons making the interpolated surface an inadequate model of live oyster distribution (Figure 9).

Area Summary

Areas selected for substrate and seed restoration bottom were stratified into two depth intervals: 6-9 ft. and 9-20 ft. based on current construction permits. As requested by the US Coast Guard, areas within 250 ft of navigation aids were removed from consideration. There was no intersection between restorable bottom identified with survey data and oyster leases, maintained navigation channels, marinas, or shellfish closure areas, so these factors did not influence restorable area.

Based on this analysis, there are at least 251 acres of seabed available for restoration (Table 1). Hatchery seed alone could potentially be placed on 136 acres of shelled bottom in depths 4-20 ft. Substrate and seed could be placed on 115.0 acres in depths 6- 20 ft. Note that geometry of some long and narrow sites may hinder full utilization from an operational perspective.

Table1.

Restoration Type	Depth Interval	Total Acres	Mean Acres	Min. Acres	Max. Acres	Num. Polygons
Substrate and Seed	6-9 ft.	64.2	1.3	0.2	4.1	48
Substrate and Seed	9-20 ft.	50.8	1.5	0.1	8.5	33
Substrate and Seed	6-20 ft.	115.0	2.5	0.5	12.3	46
Seed Only	4-20 ft.	136.4	5.9	0.5	26.9	23
Total Restorable Bottom	4-20 ft.	251.4				

Salinity and Dissolved Oxygen: Modeled

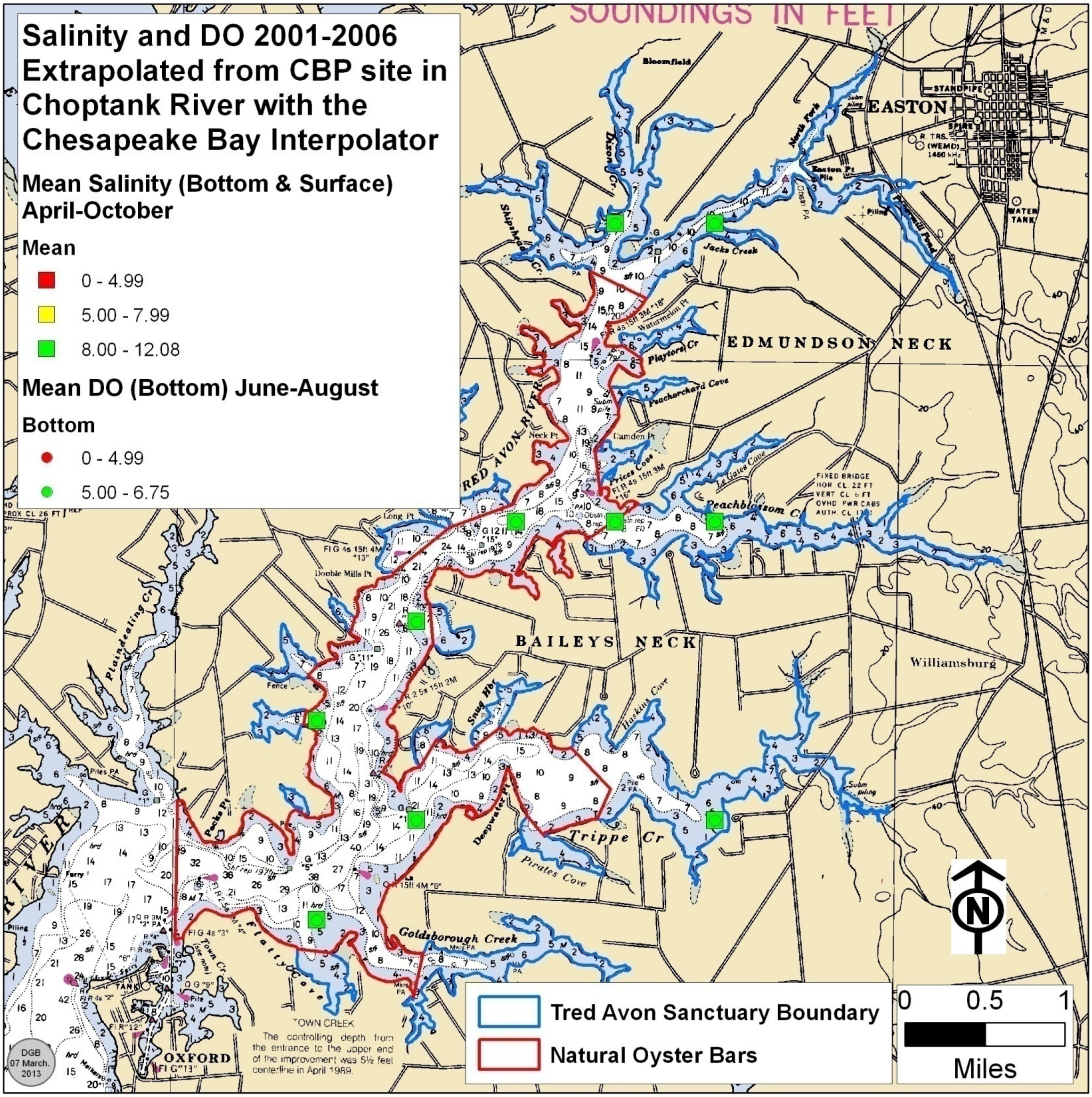


Figure 1. Extrapolated salinity and dissolved oxygen levels in the Tred Avon River oyster sanctuary. Long term water quality observations are not currently available for this region. Extrapolated data presented here are based on field samples collected at the Chesapeake Bay Program monitoring site (EE2.1) in the lower Choptank River April-October 2001-2006. Values were derived with the Chesapeake Bay Interpolator. These data suggest that both salinity and oxygen are generally at levels suitable for restoration.

Salinity: Observed

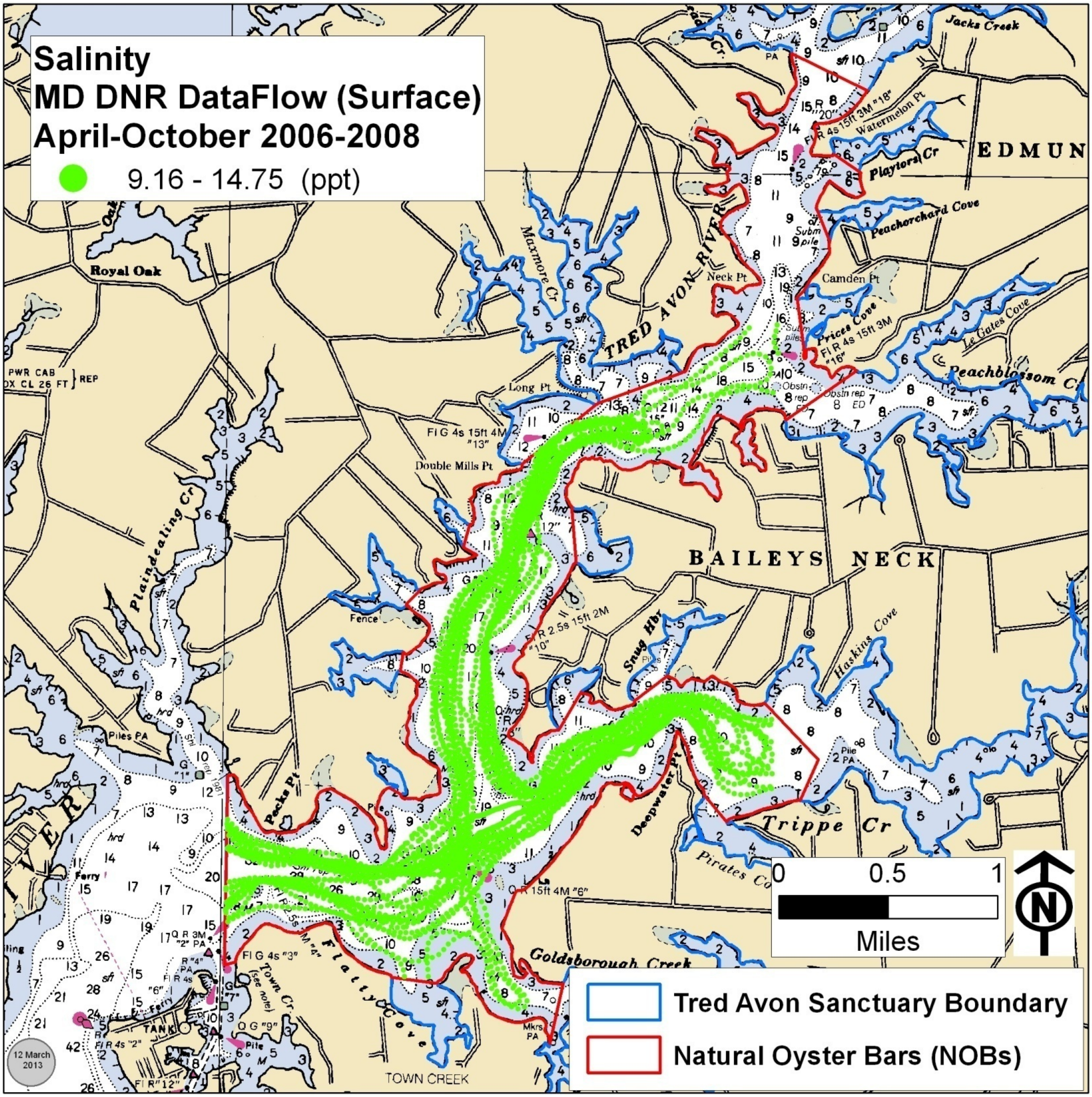


Figure 2. Observed surface salinity in the Tred Avon River oyster sanctuary. Data were collected by MD DNR Tidewater Ecosystem Assessment Division with a DataFlow system, April-October 2006-2008.

Dissolved Oxygen: Observed

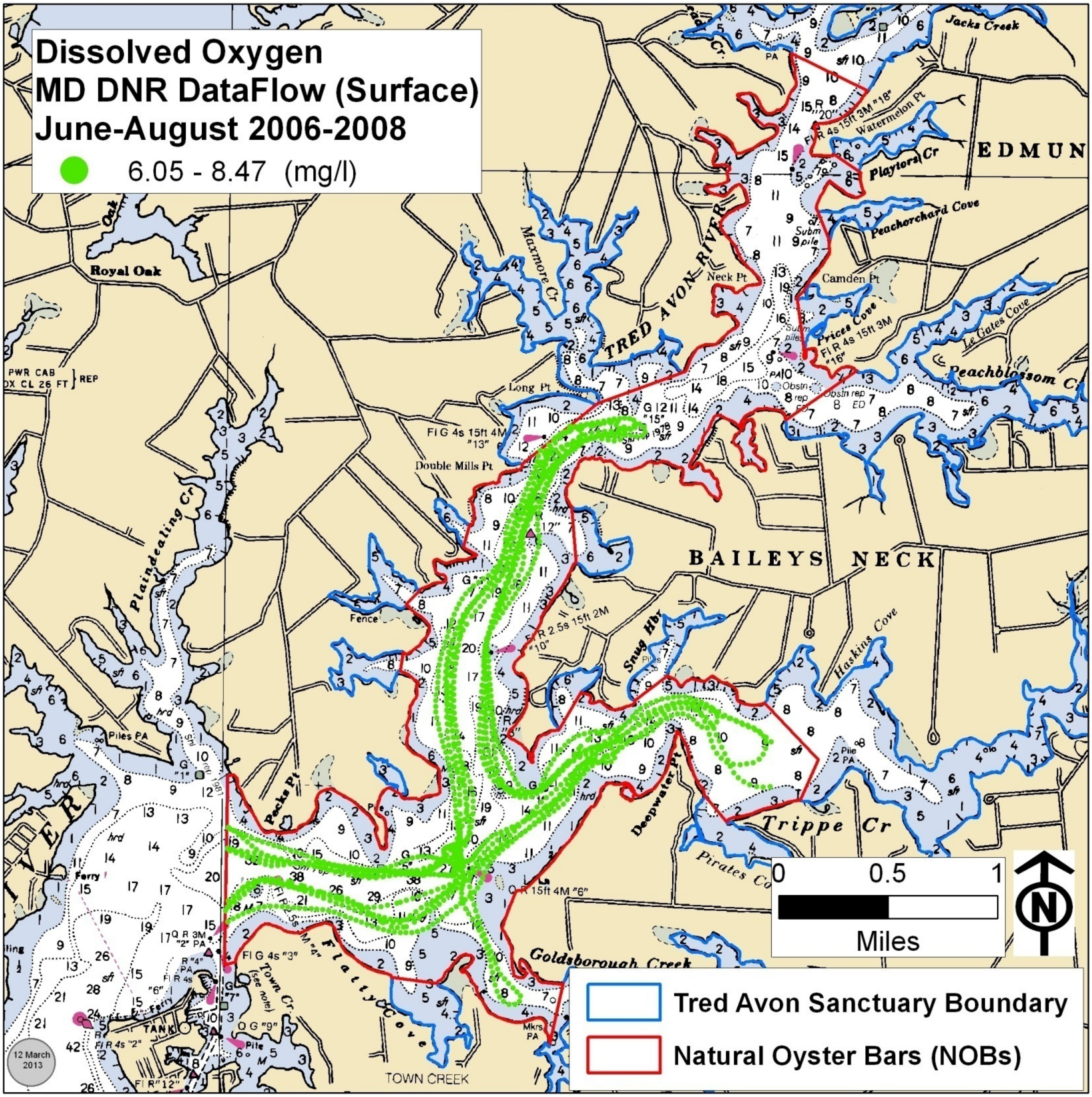


Figure 3. Observed surface dissolved oxygen in the Tred Avon River oyster sanctuary. Data were collected by MD DNR Tidewater Ecosystem Assessment Division with a DataFlow system, June-August 2006-2008

Depth

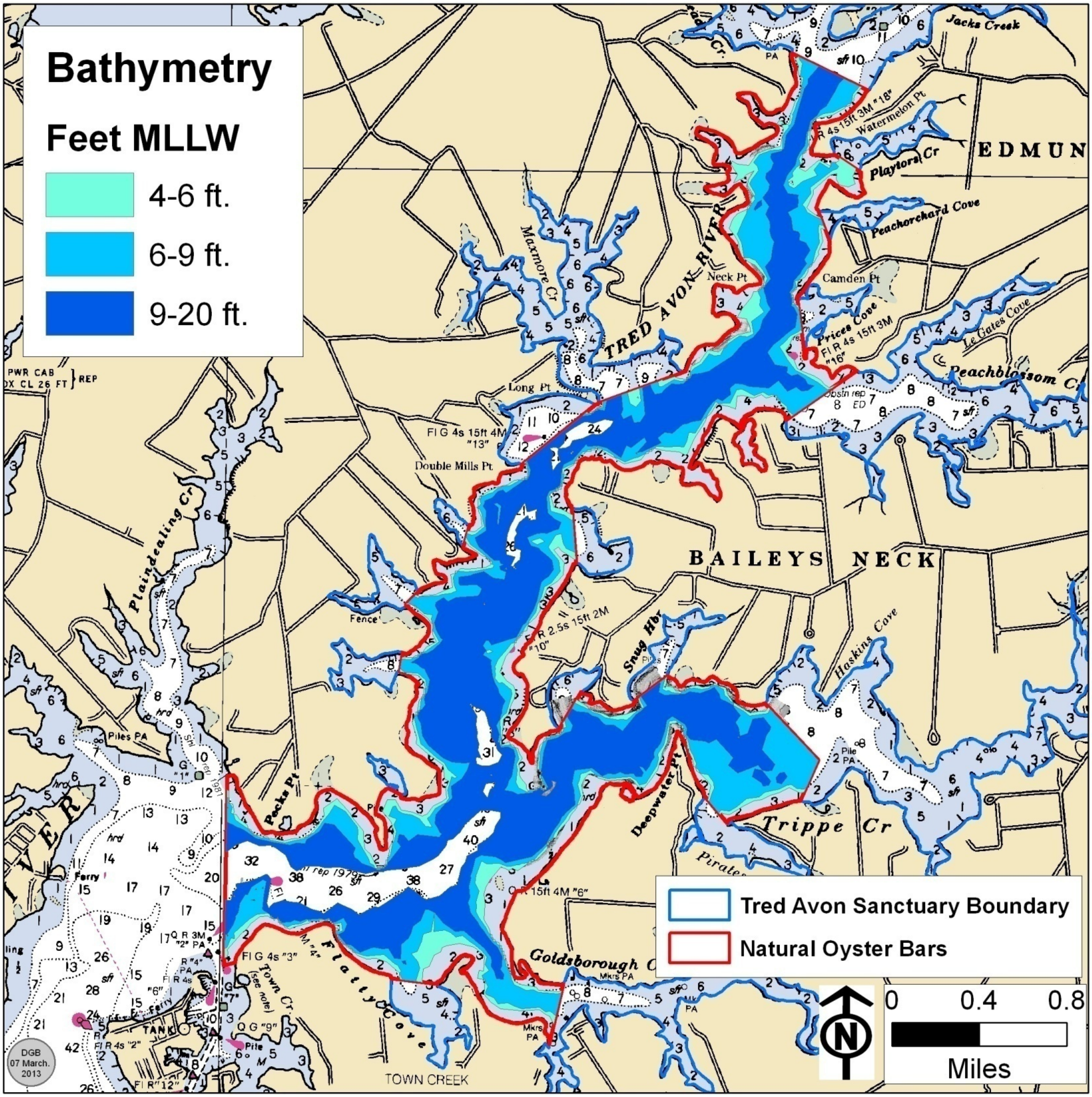


Figure 4.Depth intervals in the Tred Avon suitable for restoration sites. The US Army Corps Engineers Master Plan absolute criterion for maximum depth is 20 feet MLLW, and 4 feet is the presumed minimum operational depth for planting hatchery seed. Depth data indicate that 9% of sanctuary area within the NOB is between 4 and 6 ft deep, 20% of the area is between 6 and 9 foot depths, and 45 % is between 9 and 20 feet.

Live Oyster Density – Patent Tong Sample Sites

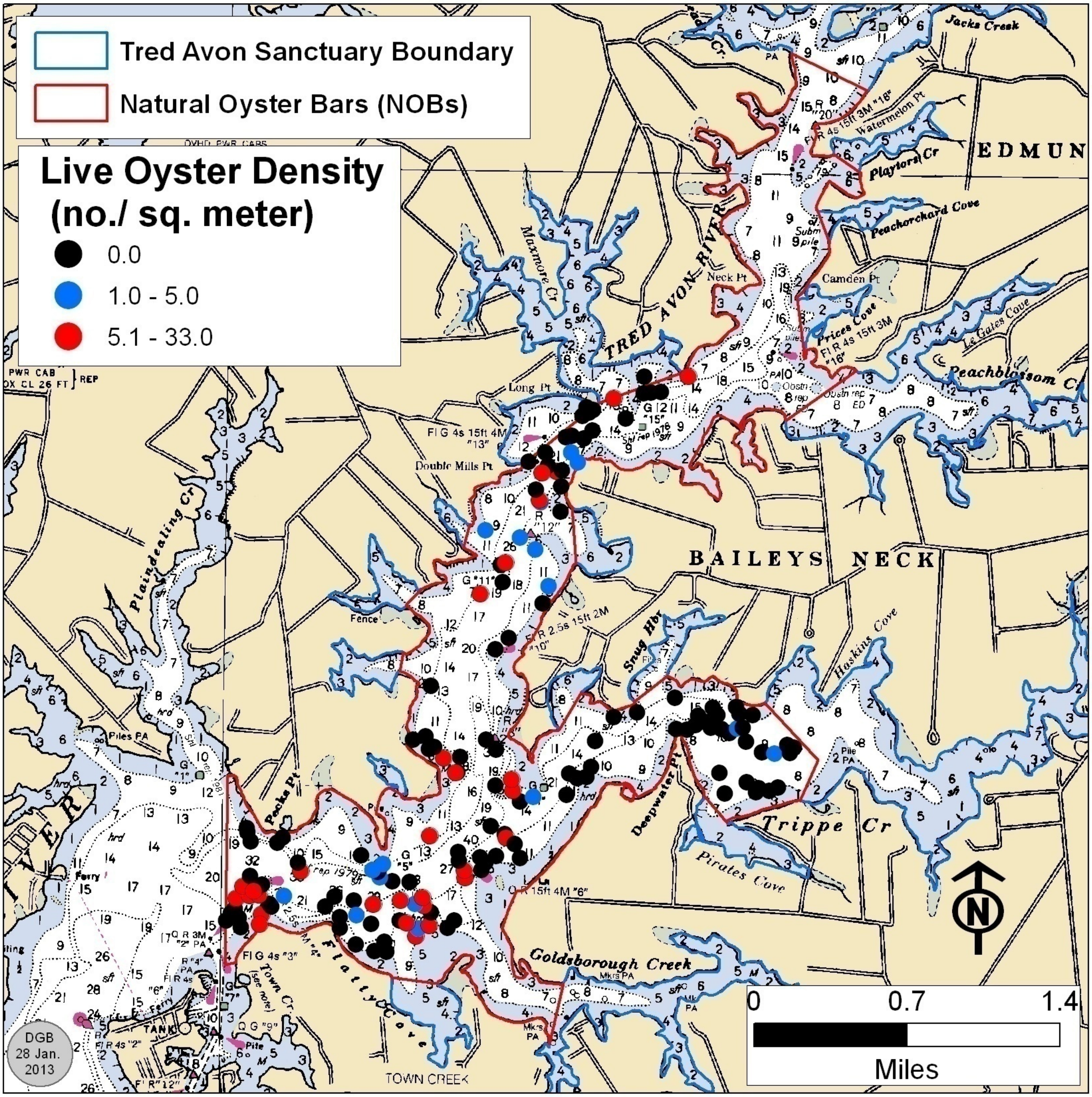


Figure 5. Locations of patent tong oyster abundance samples. Surveys were conducted in May 2012 by MD DNR Shellfisheries Division, and were based on acoustic seabed survey data collected in 2009 by the MD Geological Survey. A total of 163 samples were collected within the NOB boundary and only 29% of the samples contained live oysters.

Bottom Type

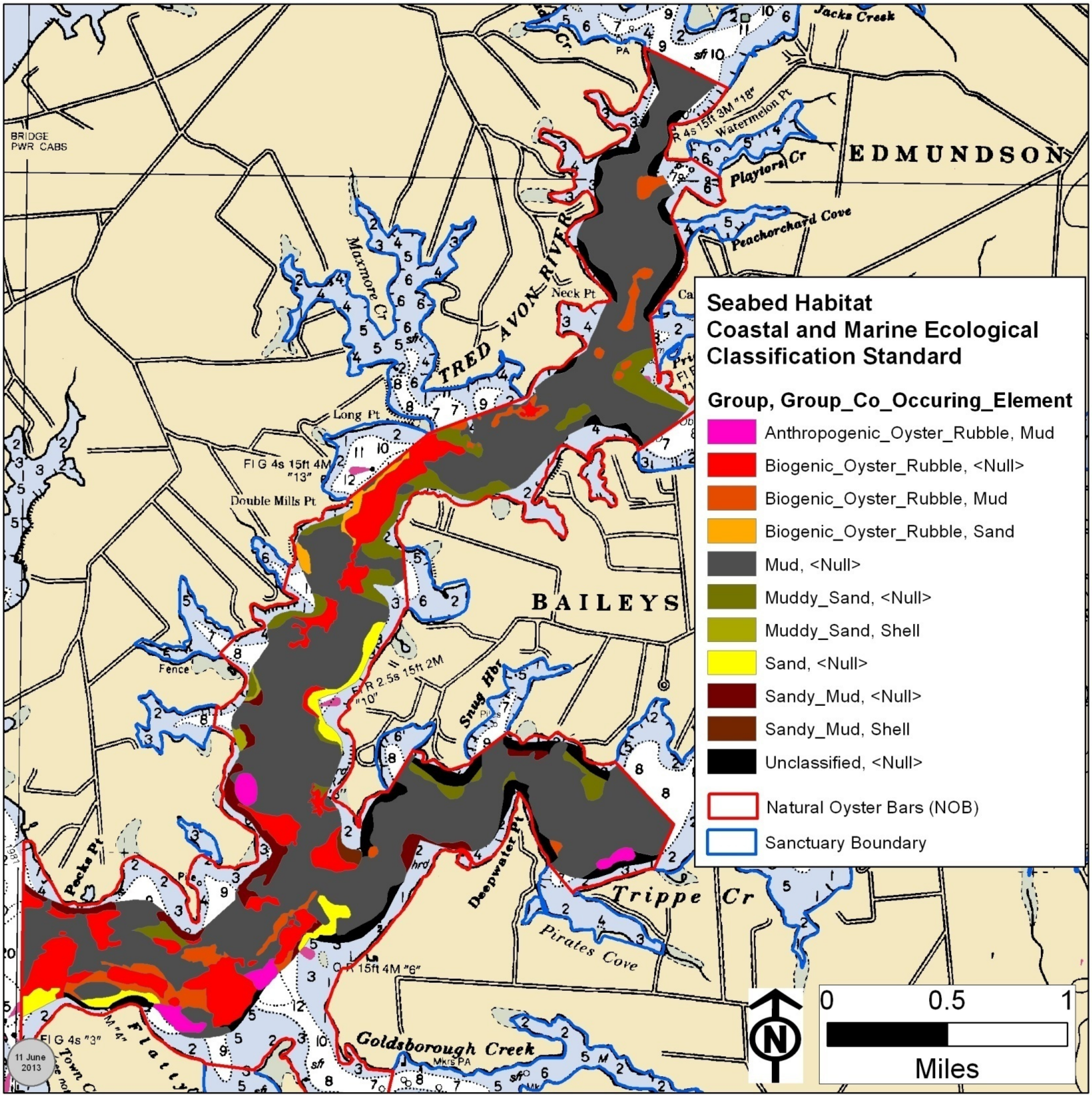


Figure 6. Habitat polygons derived from full seabed survey coverage within the Natural Oyster Bar and Sanctuary. Habitat polygons were derived from sidescan sonar, acoustic seabed classification, and patent tong surveys conducted by the MGS, NCBO, and MDDNR.

Miscellaneous Exclusion Zones

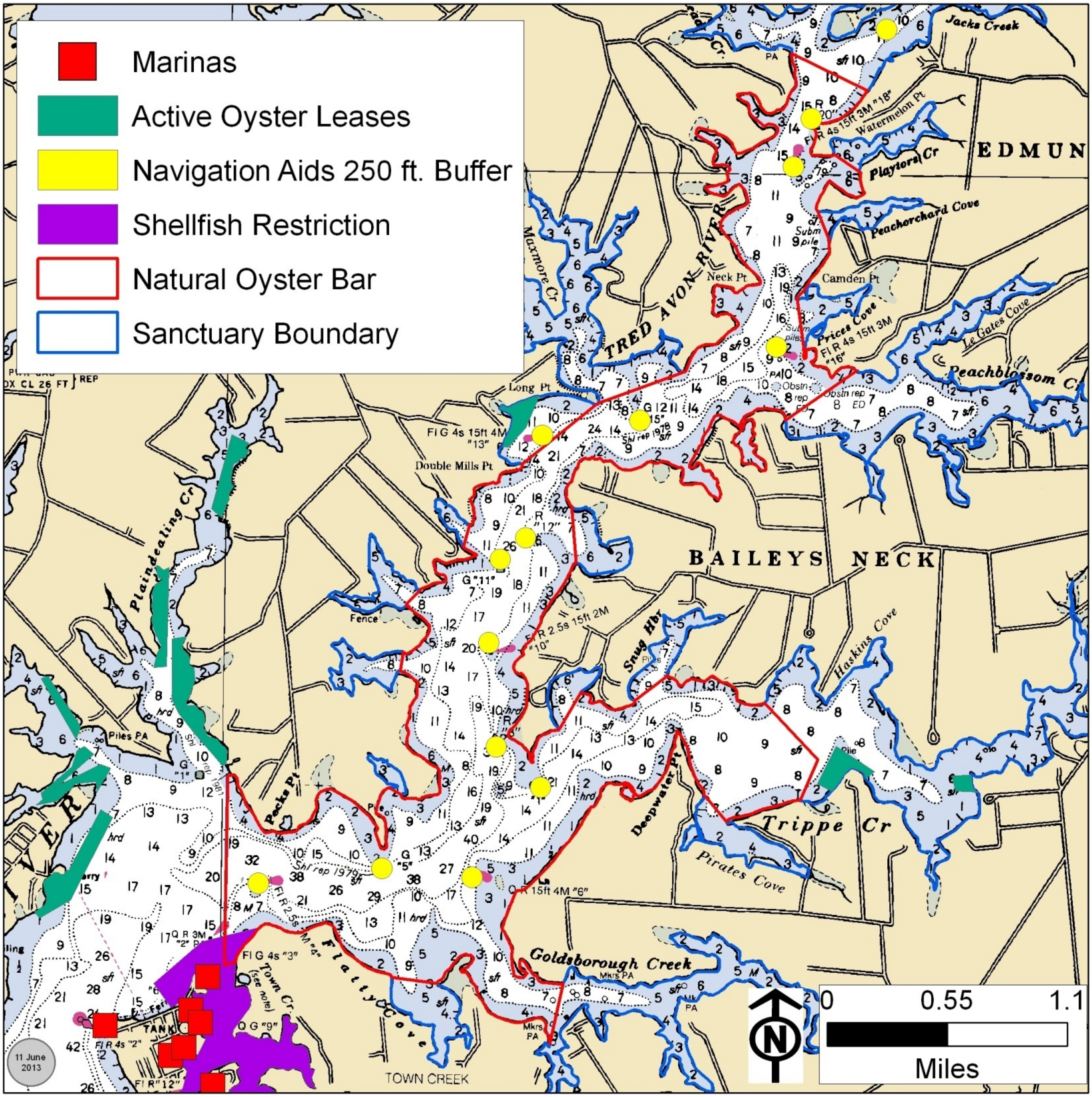


Figure 7. Miscellaneous exclusion zones in the vicinity of the Tred Avon River Oyster Sanctuary. Navigation aids were the only exclusions that influenced the total area of restorable bottom.

Restorable Bottom

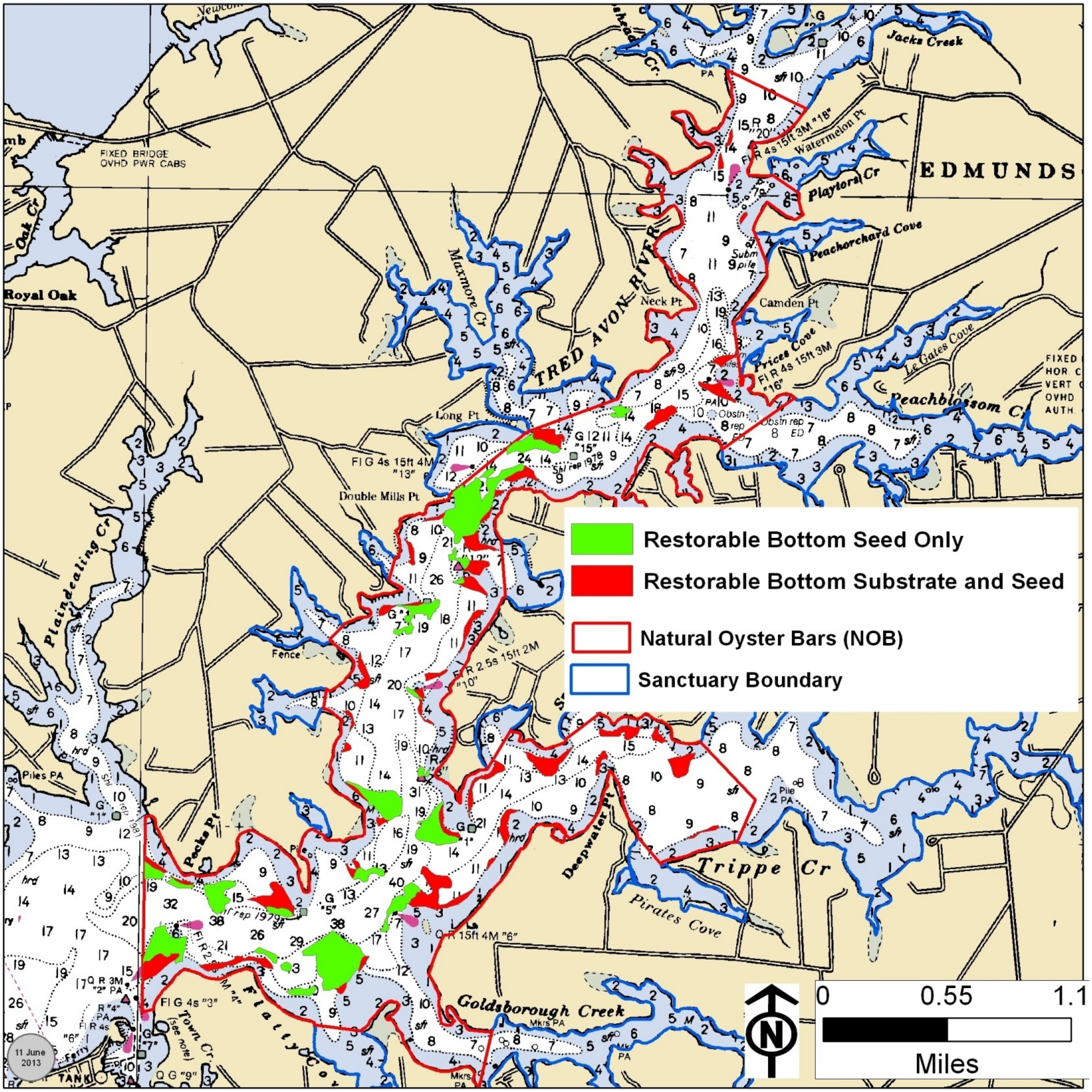


Figure 8. Restorable bottom as identified by surficial seabed material, depth, and base sediment composition identified with sub-bottom profiling sonar.

Restorable Bottom and Oyster Abundance

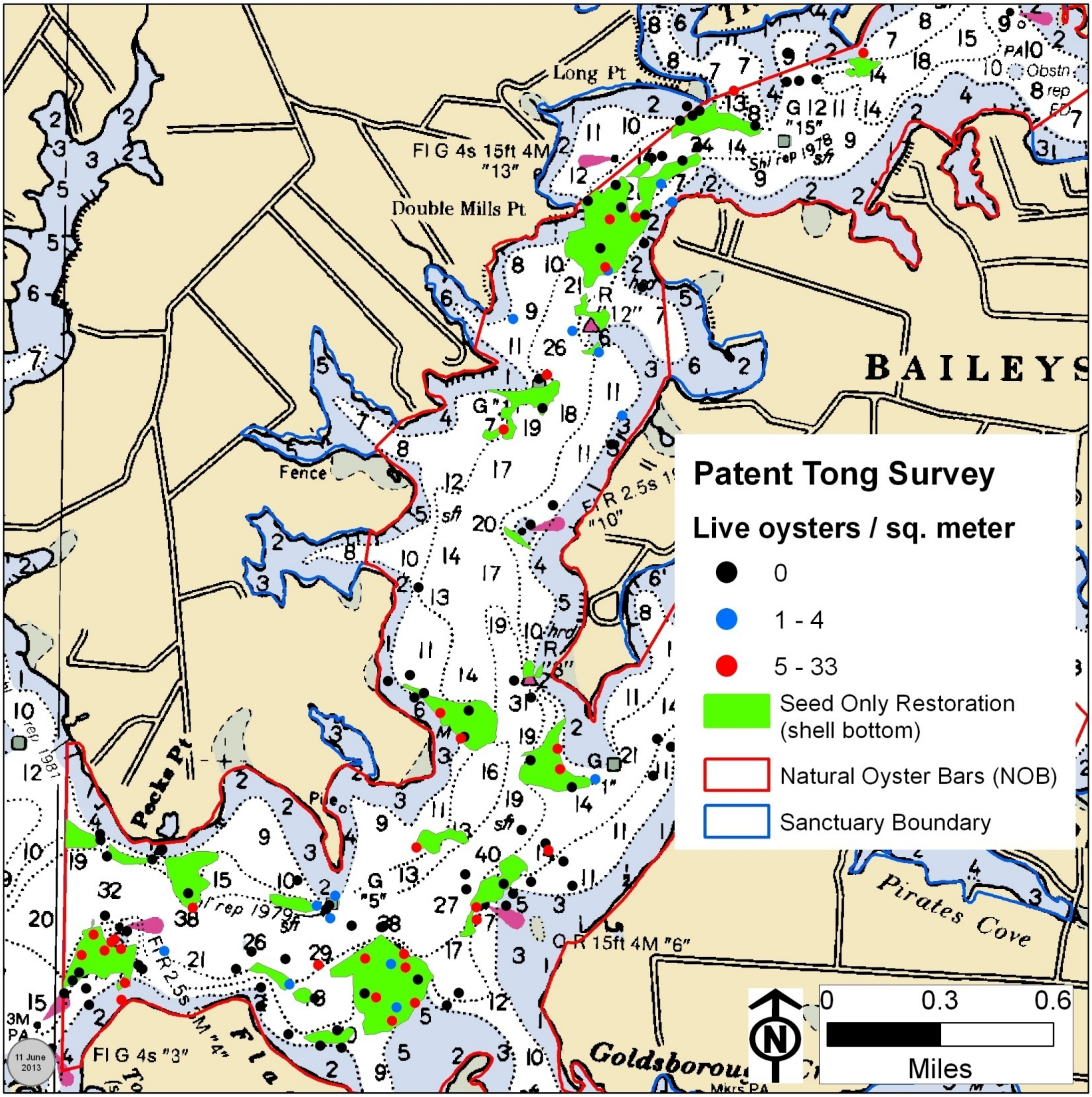


Figure 9. Live oyster abundance and shell dominant seabeds identified for seed-only restoration in depths 4-20 ft. This figure shows the high degree of variability in oyster abundance within shell bottom boundaries, in addition to irregular and incomplete tong survey coverage of shelled habitats.

Appendix C – USACE Shallow Water Permit and Water Quality Certificate

Martin O'Malley
Governor

Anthony G. Brown
Lieutenant Governor

Robert M. Summers, Ph.D.
Secretary

July 18, 2014

Amy Guise
Chief, Planning Division
Baltimore District, U.S. Army Corps of Engineers
P.O. Box 1715
Baltimore, Maryland 21203-1715

RE: Chesapeake Bay Oyster Recovery Project
Tred Avon River, Talbot County

Dear Ms. Guise:

I am responding to the U.S. Army Corps of Engineers' (USACE) request for a Clean Water Act, Section 401 Water Quality Certification (WQC) to conduct oyster restoration work in the Tred Avon River, Talbot County, Maryland. As noted in your letter, the USACE has partnered with the Maryland Department of Natural Resources (DNR) to fund oyster restoration activities in the Chesapeake Bay, and has worked with the Maryland Department of the Environment (MDE or Department) to develop and implement a coordinated, streamlined, and integrated review process for aquaculture and oyster restoration activities in the State.

The Department strongly supports the USACE's Oyster Restoration Program and concurs that one of the purposes of the Program is to enhance water quality in the Chesapeake Bay and its tributaries. Accordingly, based on the information provided, the State of Maryland hereby certifies that the USACE's oyster restoration/recovery activities in the Tred Avon River, including the placement of alternate substrate in the shallower depths between 6-9 feet mean lower low water (MLLW), will not violate the State's water quality standards if carried out in accordance with the conditions of the attached Water Quality Certification # 14-WQC-O1. In addition, MDE has determined that the oyster restoration activities in the Tred Avon River are consistent with the Maryland Coastal Zone Management Program, as required by Section 307 of the Federal Coastal Zone Management Act of 1972, as amended (CZMA).

Please note that this certification and determination does not cover oyster restoration activities, if any, undertaken by DNR in the Tred Avon River. The Clean Water Act, Section 401 WQC and CZMA, Section 307 Federal Consistency determination will be issued as part of the State's Tidal Wetlands authorization for any DNR restoration work.

If you have any questions, please contact me at 410-537-3763, or by email at elder.ghigiarelli@maryland.gov.

Sincerely,

Elder Ghigiarelli, Jr.
Deputy Program Administrator
Wetlands and Waterways Program

Cc: Angie Sowers, USACE
Mike Naylor, DNR
Gary Setzer, MDE
Robert Tabisz, MDE

Martin O'Malley
Governor

Robert M. Summers, Ph.D.
Secretary

Anthony G. Brown
Lieutenant Governor

WATER QUALITY CERTIFICATION

NABPL

CERTIFICATION NO. 14-WQC-01

TO: Planning Division
Baltimore District, Corps of Engineers
U.S. Army Corps of Engineers
P.O. Box 1715
Baltimore, MD 21203-1715

FOR: Oyster Restoration/Recovery Activities in the Tred Avon River, Talbot County, Maryland, including the placement of alternate substrate in shallower depths between 6-9 feet MLLW.

This water quality certification is issued under authority of Section 401 of the Federal Water Pollution Control Act and its Amendments and the Environment Article, Sections 9-313 - 9-323, inclusive, Annotated Code of Maryland. This certification does not relieve the applicant of responsibility for obtaining any other approvals, licenses or permits in accordance with federal, State, or local requirements and does not authorize commencement of the proposed project. The Maryland Department of the Environment has determined that the federally-proposed/authorized discharges will not violate Maryland's water quality standards, provided that the following conditions are satisfied.

The applicant shall comply with the conditions marked (X) below:

(X) (1) The proposed project shall be constructed in a manner which will not violate Maryland's Water Quality Standards as set forth in COMAR 26.08.02. The applicant is to notify this department ten (10) days prior to commencing work. Verbal notification is to be followed by written notice within ten (10) days.

(X) (2) The proposed project shall be constructed in accordance with the plan and its revisions as approved by the:

(X) (a) Corps of Engineers
( ) (b) Water Management Administration

(X) (3) All fill and construction materials not used in the project shall be removed and disposed of in a manner which will prevent their entry into waters of this State.

( ) (4) The applicant shall notify this Department upon transferring this ownership or responsibility for compliance with these conditions to another person. The new owner/operator shall request transfer of this water quality certification to his/her name.

(X) (5) The certification holder shall allow the Maryland Department of the Environment or its representative to inspect the project area at reasonable times and to inspect records regarding this project.

( ) (6) Construction of any bulkhead shall be completed prior to filling behind the bulkhead. The bulkhead shall be constructed in such a manner so as to prevent the loss of fill material to waters of the State. Only clean fill, which is free of organic, metallic, toxic or deleterious materials shall be used.

(X) (7) The disturbance of the bottom of the water and sediment transport into the adjacent State waters shall be minimized.

(X) (8) The placement/discharge of alternate substrate materials shall not result in turbidity levels exceeding 150 Nephalometer Turbidity Units (NTU's) at any time, or 50 NTU's as a monthly average.

( ) (9) To minimize impacts to spawning anadromous fish and oyster resources, dredging shall be done only during the period December 15 through February 14 of any year.

( ) (10) Stormwater runoff from impervious surfaces shall be controlled to prevent the washing of debris into the waterway. The natural vegetation shall be maintained and restored when disturbed or eroded. Stormwater drainage facilities shall be designed, implemented, operated and maintained in accordance with the requirements of the applicable approving authority.

( ) (11) ______________________________ shall provide to the Water Management Administration a stormwater management plan including cross-sections which incorporates effective pollutant removal strategies in uplands to treat a minimum of the first one-half inch of runoff from impervious surfaces prior to release of stormwater into State waters or wetlands. There shall be no discharge of untreated stormwater to State waters or wetlands. The plan shall be provided by ______________ and shall be implemented by______________________.

( ) (12) ______________________________ shall provide to the Water Management Administration a mitigation plan for the construction of - ______________ acre(s) of ______________________ wetland for review and approval by ______________________. The plan shall be implemented by ______________________. The plan shall show:

- **-the source of hydrology for the constructed wetland**
- **-the source and amount of soil to be used in constructing the wetland**
- **-the species, size and density of vegetation to be planted in the constructed wetland and a planting schedule.**
- **-a monitoring/maintenance plan.**

( ) (13) ______________________________ shall monitor the mitigation site for a period of five years and shall determine whether the wetland construction has been successful. A successful mitigation project shall result in: ______ plants/acre and 85% survivability of plants in forested and scrub/shrub wetlands and plants covering 85% of the area for emergent wetlands. If these standards are not met, ______________________ shall determine the reasons for failure, the problem(s) shall be corrected, and the area(s) shall be replanted and monitored.

( ) (14) The mitigation site shall be constructed in accordance with the plan, dated______________________.

( ) (15) ______________________________ shall provide a ______________________________ plan for review and approval by ______________________. This plan shall be implemented by ______________________.

( ) (16) At least one culvert in every stream crossing shall be depressed at least one foot below existing stream bottom under the low flow condition. A low flow channel shall be provided through any riprap structures. The culvert shall be constructed and any riprap placed so as not to obstruct the movement of aquatic species.

( ) (17) Stormwater discharges from ponds, stormwater management outfalls, and stormwater facilities shall have a velocity no greater than four feet per second for the two year storm in order to prevent erosion in the receiving waterway or wetland.

( ) (18) Future stormwater discharges to certified pond(s) are prohibited unless the first one half inch of stormwater runoff from impervious surfaces is managed in uplands for effective pollutant removal.

( ) (19) Authorized stormwater detention ponds shall have a maximum detention time of ____________________ hours.

( ) (20) ___________________________ shall restore and re-vegetate all temporarily disturbed waters and wetlands to original contours upon completion of construction.

Failure to comply with these conditions shall constitute reason for suspension or revocation of the Water Quality Certification and legal proceedings may be instituted against the applicant in accordance with the Annotated Code of Maryland. In granting this certification, the Department reserves the right to inspect the operations and records regarding this project at anytime.

CERTIFICATION APPROVED

[signature]
Water Management Administration

July 18, 2017
Expiration Date

Appendix D – USACE Waterway Assessment Analysis for the Tred Avon River

Do you boat or sail on the Tred Avon River?

The U.S. Army Corps of Engineers wants your input!

USACE, in partnership with the Maryland Department of Natural Resources, and the National Oceanic and Atmospheric Administration, is rebuilding oyster populations at various sites in the Chesapeake Bay.

We want your help to understand navigational pathways in the Tred Avon River.

Construction of oyster reefs will occur at select sites within the Tred Avon River and may reduce water depths by at most 1 foot at these restoration sites. We would appreciate *information on the draft needed for passage of your vessel* in the Tred Avon River and navigational pathways. Some restoration sites are proposed in near-shore areas; therefore, we are also requesting information on the *location of your docks and moorings*.

Your information is necessary for a successful project that restores the oyster population while having as little impact to the navigation community as possible.

Please submit input to: Kim Gross
Kimberly.U.Gross@usace.army.mil
Or mail to: USACE, Baltimore District
Attn. Kim Gross, CENAB-PP-C
10 S. Howard St.
Baltimore, MD 21201
Please have input submitted or letters postmarked by Oct. 15, 2014
If you have questions, please call 410-962-9015

We welcome any other relevant input on boating and navigation in the Tred Avon River.

Restoration work in the Tred Avon River is scheduled to start later this year. Oyster restoration is important because oysters are filter feeders that improve water quality; in addition, oyster bars (or reefs) provide habitat for animals, including blue crabs and fish. For more info: http://bit.ly/TAoyster

We look forward to hearing from you.

MARYLAND
DEPARTMENT OF
NATURAL RESOURCES

NOAA

Summary of Public Outreach Efforts Taken to Solicit Input on Waterways Use and Raise Awareness of the Project

Tred Avon navigational initial input Flyer sent via mailing to 555 stakeholders Sept. 23, 2014

Tred Avon flyers were placed and/or posted at the following locations, Sept. 12, 2014:

Tred Avon yacht club
Oxford boatyard marina store and office
Brewer oxford boatyard and marina
Hinckley yacht services ship store
Oxford market
Oxford community news and info bulletin board
Oxford community center bulletin board
Easton Point marina
Tred Avon Bait and Supplies
Talbot County Community center

Coverage/Article Links (circulation):

http://www.nab.usace.army.mil/Media/NewsReleases/tabid/10436/Article/497115/corps-of-engineers-seeks-input-from-tred-avon-recreational-boat-users-for-oyste.aspx

http://www.stardem.com/news/environment/article_0d5ef1fd-1663-5662-80fc-f3e547383fee.html (press release published)

http://www.stardem.com/news/environment/article_f6f9782b-fbef-50de-890a-c99d918d2210.html (neutral/positive)

DNR electronic newsletter (directs to our website): http://campaign.r20.constantcontact.com/render?ca=1f2d9146-0d12-4d6d-9c2a-b6ac176057c4&c=13a96130-2880-11e4-8aff-d4ae526edc76&ch=13b76af0-2880-11e4-8aff-d4ae526edc76

Social Media:

Posted Sept. 11 – 3 likes, 110 people reached (re-tweeted one time)

Posted Sept. 15 – 2 likes, 100 people reached

Posted Sept. 18 – 2 likes, 128 people reached

Posted Oct. 9 – 3 likes, 75 reached

bit.ly/TAoyster – Only 4 clicks as of Sept. 25, 2014.

Web analytics (Urchin): Put in time from Sept. 11 – Oct. 15 and compare to the previous month for average views. Press release was second most visited page during this date range with 103 visits and average stay time of 1:30.

Number of responses and tone: <\\nab-netapp1\Projects\Civil-Projects\Chesapeake Bay Oyster Restoration Program\CENAB Reports and Documents\Tred Avon Supplemental EA\Coordination\Public Coordination>

Stakeholder update email from Angie Sowers provided May 4, 2015.

Press Release: Corps of Engineers, partners start oyster restoration in the Tred Avon River, as restoration in Harris Creek nears completion – distributed May 6, 2015 to media – Coverage was in the Chesapeake Bay Brief May 14, 2015; the Star Democrat May 14, 2015; the Baltimore Sun May 27, 2015; and ABC2 June 18, 2015 (in-depth video with interviews from NOAA and USACE).

This press release was also posted several times through our social media. The story is in our main photo reel of the homepage of our website.

Participated in Bay Day hosted by Phillips Wharf Environmental Center at Harris Creek in Tilghman Island May 2. The Corps had a booth, along with a rep from NOAA. ORP had its own booth. Materials focused on efforts to restore the Chesapeake Bay, including oyster restoration. The progress made in Harris Creek was a key message to visitors.

June 25, 2015- Provide an article for the Midshore Riverkeeper Conservancy summer newsletter. Article was a joint USACE-NOAA article. Newsletter is targeted for distribution the third week of July 2015. Text included information about public notice availability.

Comment Number	Date	General Location	Boat Type	Boat Draft (ft)	Dock	Description of Coord. Location	Areas travelled	Comments provided
1	2-Jul		3 boats- 28', sailboat, and swan 44 boat (mooring)	30", 4'6", and 9'	home and mooring	mooring		needs minimum depth of 8 ft 4 inches MLL
2	16-Sep		large, black-hulled sailing vessel			mooring		
3	16-Sep		1971 37' wooden Egg Harbor cruiser	3.5	Brewers Oxford Marina, A-dock		all of Tred Avon and many of wider creeks, esp. Trippe and Peachblossom	
4	15-Sep	Travelers Rest Ct.		0.9			entire length of Tred Avon	restoration outside of boating channel is supported, have 5'of water at end of dock at MLW; central channel has adequate depth, but need to use caution along shoreline and up smaller creeks at low tides
5	12-Sep	Tar Creek	recreational vessel	4.5	home		throughout Tred Avon and into Choptank	identified reality of quickly changing bottom depths due to storms, etc.; DNR oyster grower; Tar Creek is south of sanctuary boundary
6	12-Sep							deep draft barge and push boat that delivers stone to Easton Pt, churns up bottom in many parts of river
7	15-Sep	end of West Point	sailboat	3.5				asked about work done previously in Maxmore Creek during phone call; very supportive of project
8	13-Sep							concerned with nav aids up North Fork of Tred Avon past Easton Point; concerned with impact of sediment from Vulcan Materials' operations on project success
9	22-Sep		2 boats	3'6" (deepest draft of 2 boats)		dock	friends also visit and use dock	
10	22-Sep	East side of river between Peach Orchard Cove to the North and Edmondson's Pt to the south		3			friends have boats with similar drafts	looking at map, doesn't see problems, but doesn't want efforts to hinder boat traffic; notes year round use by many boats in Peach Orchard Cove
11	24-Sep							manages property on the rive and USCG licensed captain. Interested in more detailed map and materials that would be placed in channel
12	26-Sep	Papermill Pond- dam separates from Tred Avon						location likely outside project area
13	26-Sep		none			address is location of home and dock		no longer sail; unlikely decreased depth will affect them
14	25-Sep		25'Parker outboard	2	60 ft dock			depth at end of dock at low tide is about 40 inches' dra,atoc tides 1-2 times/yr drop tides as much as s2-3 ft below normal low tide
15	26-Sep	Snug Harbor, off Trippe Creek		1.5				he stays in marked channel so doesn't have any concerns with restoration; would like sites properly marked to ensure no disturbances; dock is 5'
16	26-Sep	Dixon Creek	no boat, but dock and boat house					
17	28-Sep							concerns with building artificial reefs that lower water depths and create hazards to boating; also concerned with new habitat given sediment stirred by barges and tugs
18	28-Sep	Maxmore Creek	28' sportfishing boat	3.5'				MGO participant. Grows oysters that they place on reef at left end of Maxmore Cr near marker green 15
19	29-Sep							
20	29-Sep	Snug Harbor, off Trippe Creek	centerboard sailboat	4.5 with board up				has 7 ft of water depth off pier; prefers dock area and channel does not get shallower
21	29-Sep	off Peachblossom Creek	21 foot powerboat	2.5'				
22	30-Sep	Lowes Cove- small shallow cove off Tred Avon; very shallow						does not want reefs in cove or around entrance; sand bar across mouth; mostly sees canoes and kayaks
23	30-Sep	Tred Avon shoreline on Bailey's Neck	23' Parker, 17' Privateer, sailboat	3', 3', 3.5'	pier extends into Tred Avon		1000' along property shore and 1400' channelward	
24	30-Sep	Playtors Cove/Waverly Island		no specific given, but cove is too shallow for use of boat at low tide	yes			request no restoration near their site due to shallow conditions
25	30-Sep	Baileys Neck	27' Sea Ray	3'	yes			12' of oyster reefs won't affect their nav; lived in Easton for 74 years, would love to see WQ return
26	1-Oct	property and dock on south bank of Trippe Creek	#1- power driven sport boat; #2- centerboard sailboat	#1- 3; #2- 3.5 with board down; 1.5 with board up		previously had oyster beds near dock, but watermen poached; asked about how we plan to secure the restoration		

27	2-Oct	Shipshead Creek, north of sanctuary	not specified	7-8' MLLW	none on TA		up TA, 90 degree turn North across from Trippe Cr, sticks to East shore around Double Mills Pt, west shore across from peachblossom Cr, in channel in North, and up the Shipshead/Dixon Creek channel	
28	2-Oct	Trippe Creek	not specified	2'	located outside NOB on Trippe Creek			
29	4-Oct			1.3'				
30	4-Oct			6'			travel up and down river regularly, May thru Oct; anchor in various creeks	would prefer 7.5' in middle of creeks
31	3-Oct	Marker 15; shallow side adjacent to Peachblossom and opposite of Maxmoor Creek	29 ft Back Cove boat		pier built out 225 ft to gain 4.5 ft at low tide			don't want to lose any depth
32	3-Oct	Lagates Cove off Peachblossom Creek	#1- power boat; #2- sailboat	#1- 3; #2- 5.5				Commented that this was a great project.
33	8-Oct							Peachblossom Creek extremely shallow; welcome rebuilding of oyster pop; has not found any nav problems in Tred as long as stay in channel: welcomes program that allows homeowners to increase water depth at docks in return for installation of living shoreline and plant/maintain oyster beds
34	7-Oct					shallow area about 50-100' north of dock; sandbar frequently visible at very low tides; low tide might leave 1-2' of depth even 100'from shore		concerned about potential loss of depth between nav marker 15 and entrance to Maxmore Creek, over the 4'sounding north of marker 15 (provided pic), about restoration site on south side of river btwn nav markers 15 and 16; may cause probs for people entering/exiting Peachblossom Cr, and with narrowing of main Tred chanel at an already narrow point- may force vessels (barges) to the north, shallower shore
35	8-Oct	dock is one of 6 in shallow cove (Diamond Hall Cove) off mainstem northwest of green 11 day marker	sailboats and power boats use cove	30" but others need 3-5				good SAV in cove; hoping not in restoration area b/c area is so shallow
36	2-Oct							doesn't want reefs near property as they would interfere with boating activity
37	3-Oct			4', but visitors have deeper drafts				dock extends southwared into Tred, and its outer end is about 500 yards north of G15 (more precisely, 355 degrees magnetic from G15). The charted depth from G15 to our dock for most of distance is 9 ft, generally correct. Water depth at end of dock is about 8 ft.
38	8-Oct			2.5', visitors draw 2-3 ft		can walk almost 110 ft from shoreline at extreme low tide		our plans include building substrate in front and to east of dock; disputes that there are water depths > 6ft in that area within 400 ft of coastline; concerned about waterway access to his property; shelf in from of property is only on avg 3-4.5 ft deep
39	8-Oct	Hidden Cove; cove located on chart beginning with marker 15 and going to starboard (don't confuse with nearby cove off Peachblossom Creek)		3.5'				residents of Hidden Cove have had access channel to cove dredged twice in past 10 years at 20 ft wide and an average depth @ MLW 3.5;
40	14-Oct	cove east of marker #10 in TA River	Back Cove 34	3.5'	cove east of marker #10			at Jack's Creek on the Tred Avon up near Easton, there is no warning that there is a massive sand bar that extends about 80 feet into the Tred Avon from the northern edge of the Creek's shore. All charts I have consulted lead one to believe that the water there is 4 feet mlt, which isn't true.
41	13-Oct		doesn't own boat		dock has about 5' at medium tide, 3-4' at low			supports oyster restoration, has 6 oyster cages
42	12-Oct	Flatty Cove	40' boat	>3'; guest sailboats 5' keel		pier		extremely concerned about restoration sites moving sand and silt- deposition would affect entrance to Flatty Cove; need to maintain channel to tidal pond
43	6-Oct			3.5'; guests 5', some 6-8' to anchor off dock				parade of boats and numerous sailboat races require 6-8'; concerned that proposed work adjacent to property would change shallow water depths and reduce property values; hope that no addition of substrate to waters with less than 9 ft MLW depth
44	10-Oct	upper right side of river, opposite Fort Stokes	power boat					only potential issue is if we place a reef between dock and channel; no objection to anything else
45	18-Oct		sailboat	5'				need every inch of depth to reach dock; request no reefs be created near dock

46	20-Oct	Maxmore Creek	3 motorboats and a sailboat	2.5', 3', 5-6'				The entrance to Maxmore Creek is a challenge to begin with as the shoal to the north extends outward into the creek first, as does the shoal to the south just before exiting the Creek. The oyster reef would be better placed far to one side or the other — out of the primary navigation channel.
47	20-Oct	Maxmore Creek	2 motorboats	5', 6'				need to add inforamtion here
48	23-Oct	cove outside of Oxford	19' Grady White power boat	not much'	have about 3.5' at dock at high tide			
49	21-Oct	suspect this is in Flatty Cove vicinity		2-3', but visitors >4'				several locations for seed only and substrate adjacent to property. Concerned about positioning and how this will impact acess to pier and property value; oppose restoration so close to shore that will impact nav in low tide

Appendix E – Section 404(b)(1) Evaluation

CLEAN WATER ACT
SECTION 404(b)(1) EVALUATION

SHALLOW WATER OYSTER RESTORATION IN THE TRED AVON OYSTER SANCTUARY, MARYLAND
DECEMBER 2015

I. Project Description

A. Location

Activities are proposed for the Tred Avon River, a tidal estuarine system located on Maryland's Eastern Shore in Talbot County. The Tred Avon River is a tributary on the north shore of the Choptank River. Situated in the lower reaches of the Choptank River, the Tred Avon drains approximately 6% of the Choptank River watershed (approximately 7,300 acres) with a mean water volume of 3,476,500 m^3.

B. General Description

Existing National Environmental Policy Act (NEPA) documentation covers oyster reef restoration at water depths that maintain at least an 8 foot water column above restored reefs. Currently, 1 foot of material is placed on the bottom to restore reef habitat which limits restoration to water depths greater than 9 ft mean lower low water (MLLW). A supplemental Environmental Assessment (EA) is being prepared for the Tred Avon River Oyster Sanctuary to extend oyster restoration and rehabilitation activities for reef bar construction plus seeding into 59 acres of shallower water depths and planting of spat-on-shell on existing reefs into 71 acres in the oyster sanctuary. This supplemental EA will evaluate the impacts of restoring oyster reef habitat using alternate substrates in water depths between 6.5 – 9 ft MLLW to maintain a 6 foot water column above restored reefs as well as the impacts of planting spat-on-shell on existing reefs that currently contain low to no oysters. The potential impacts of expanding restoration work into shallower depths in the Tred Avon have not been evaluated under existing NEPA documentation. As a result of removing an 8-foot minimum navigational depth clearance to allow restoration work to proceed in areas with a 6-foot minimum navigation depth clearance, the procedures imposed by NEPA require USACE-Baltimore to evaluate the affects this action on the quality of the human environment. There was no scientific basis for the existing requirement to maintain an 8-foot depth clearance. Rather, it was a generic approach to avoid navigational issues. However, given the focus on large-scale tributary based restoration a, it is necessary and appropriate to consider restoring oyster reef habitat across broader depth contours within the historic oyster habitat footprint. By removing the 8-foot minimum navigation depth clearance, science-based oyster restoration goals for this tributary could be achieved ultimately restoring native oyster populations and improving local habitat conditions throughout the tributary, while evaluating potential navigational issues.

C. Purpose

The basic purpose of this project is to replace the 8-foot minimum navigational depth clearance for previously authorized activities under the 704(b) Program with a 6-foot minimum navigational depth clearance and to evaluate planting spat-on-shell on existing oyster reefs containing little to no oysters. Removing this depth restriction facilitates oyster restoration activities in shallower areas of the sanctuary beyond the current 9 foot MLLW depth contour. The proposal is to allow alternate substrate oyster restoration activities to occur in depths of up to a minus 6.5 foot MLLW depth contour thus achieving the overall tributary target restoration goal of 146 acres of restored oyster habitat. This is the level identified by the Tred Avon River Tributary Plan to improve community resiliency in the Tred Avon River system and support a sustainable oyster population. The Tred Avon River Tributary Plan includes 1) sites that will receive spat-on-shell (to be constructed as in-kind service credit by MDNR), and 2) sites that will receive substrate and spat-on-shell (to be constructed by USACE). The focus of this 404(b)(1) evaluation is to cover both the substrate and seed, and the seed-only sites. The maximum extent for the project is 130 acres (59 acres of substrate and seed plus 71 acres of seed only). Figure 1 depicts the full Tred Avon River oyster restoration plan. Figure 2 shows only those areas evaluated by this 404(b)(1) analysis.

D. General Description of Discharge Material

1. <u>Characteristics of Fill Material.</u> In water 6.5 feet deep, 3-inch-high reefs will be constructed, allowing for 6 feet of navigational clearance. In water 7 or more feet deep, reefs up to one foot high will be constructed, again allowing for the minimum 6-foot navigational clearance. Restoration using the seed-only treatment, whereby spat-on-shell is planted on existing oyster bars, is targeted in waters 4-20 feet deep. Based on current bathymetry, approximately 49.5 acres would be up to 1 ft in height (in waters deeper than 7 ft MLLW) and 9.3 acres would be 3 inches high (in water depths between 6.5 and 7 ft MLLW).

   Reefs can be restored using oyster shell or alternate substrates. Although oyster shell is preferred, it is anticipated that the reefs will be restored using alternate substrates, due to the lack of available oyster shell. The alternate (non-oyster shell) materials suitable for use include, but are not limited to clam shell, marl, concrete, stone, brick, porcelain, and cinderblock. The most likely substrates to be used are stone and mixed shell. Any concrete rubble to be used would be free of building debris such as wiring, pipes, and other debris. No protruding re-bar is allowed. Concrete may also include man-made products formed into various shapes to provide benthic habitat (i.e., reef balls). Only clean material free of contaminants and hazardous materials are suitable for disposal within State waters and would be used. Further, advances in technology and research may identify new substrates that could be used for the construction of oyster habitat once approved by State and Federal resource agencies. The size of individual pieces of material used would vary with the material type and project purpose. The larger the material, the greater the relief provided for the benthic population. Additionally, hatchery-produced, disease-resistance Eastern oyster (*Crassostrea virginica)* spat-on-shell will be planted on all sites.

2. Fill Material Quantities. A 1-foot reef height requires 1,613 cubic yards of substrate per acre. Therefore, to restore the proposed 49.5 acres of oyster habitat with up to 1 foot reef height, a total of 79,800 cubic yards of substrate will be placed in the Tred Avon River across 26 sites. The remaining 9.3 acres (8 sites) will be constructed to a height of 3 inches which only requires 403 cubic yards of substrate per acre for a total of 3,750 cubic yards of substrate. Therefore, the total amount of substrate planned on being placed in the Tred Avon River for oyster restoration efforts is approximately 84,000 cubic yards.

   Additionally, disease-free spat-on-shell will be planted on all sites. Spat are set on oyster shell at the hatchery. A total of 585 million spat will be planted on the sites at an average density of 4.5 million spat per acre. Initially, 4 million per acre will be planted, followed by a second planting of 0.5 million per acre in year 3.

3. Source of Material. Sources of alternate materials vary. Stone is acquired from regional quarries. Mixed shell is available from wholesalers. Many of the shell sources are byproducts of commercial harvests including commercial clamming and other shellfish operations in the Mid-Atlantic, typically New Jersey and Delaware. Crushed concrete is generally produced from a demolition project such as the replacement of a bridge or building and is intermittently available. Cinderblock, porcelain, and brick are readily available for purchase or can possibly be obtained intermittently from demolition projects. Marl or marl limestone is a calcium carbonate or lime-rich stone which contains variable amounts of clays and aragonite. Marl is mined and is readily available. All materials used in this project would be clean and free of contaminants and hazardous materials.

   Spat-on-shell is produced at the University of Maryland's Horn Point Hatchery in Cambridge, MD.

E. Description of the Proposed Discharge Sites

New oyster habitat would be constructed in the Tred Avon River within the boundaries of natural oyster bars (NOBs) within the oyster sanctuary. Specific locations for project activities have been identified in the Tred Avon Tributary Plan based primarily on bottom composition, salinity, water depth, dissolved oxygen, current oyster populations, and other uses of the waterway. Figure 2 provides the locations and identifies whether the proposed treatment: seed only, 3 in substrate reef with seed, or up to 12 in substrate reef with seed.

F. Description of Dredging and Placement Method

Project activities would involve the placement of substrates to create oyster reef habitat. Materials will be placed using a crane/excavator or front-end loader to place material on the oyster bar. Placement utilizes GPS and computer technology to precisely locate and place material.

Restored areas will also be planted with spat-on-shell. Spat-on-shell is planted by being washed overboard using high pressure water hoses or cannons off of a barge, with the vessel moving continuously through the planting area to control the thickness and acreage of the planting.

II. Factual Determinations

A. Physical and Substrate Determinations

1. Substrate elevation and slope. Restoration activities are proposed to place between 3 and 12 inches of substrate. The water depth would be reduced between 6 – 15 inches at 36 sites across 59 acres, thereby reducing the navigational clearance for boaters throughout the Tred Avon River. Navigational clearances above all restored sites would maintain at 6 feet MLLW. The minimum water depth in the oyster placement areas would be 6.5 feet. Once placed, the substrate will have a heterogeneous topography, but will not add significant slopes to the bottom. Planting of spat-on-shell will add some elevation to all sites, but this is expected to be less than 3 inches.

2. Sediment Type. Substrate placement would target areas determined to be hard bottom by NOAA bottom analyses that can support the weight of the material placed including sand, sandy mud, muddy sand, and sand/scattered shell. Spat-on-shell will be placed on top of substrate reefs once constructed as well as existing reefs which have been determined to contain shell be low or no oysters.

3. Dredged Fill Material Movement. It is not expected that the material would move off site once placed on a bar. There would likely be some settling of the material.

4. Other Effects. None expected.

5. Actions Taken to Minimize Impacts. The substrate material would be discharged in a manner that minimizes the disruption of bottom sediments. Environmental protection measures, such as time-of-year restrictions on construction (construction typically occurs between December and March) and proper site selection to avoid sensitive areas, would be employed at project sites to avoid and minimize impacts to the aquatic environment. Construction specification would state that compliance is mandatory for all applicable environmental protection regulations for pollution control and abatement. Measures have been taken to protect SAV. The placement of substrate would not be permitted within 300 feet of submerged aquatic vegetation as mapped and reported annually by the Virginia Institute of Marine Sciences (VIMS) in coordination with the Maryland Department of Natural Resources (MDNR) Resource Assessment Service. Any concrete rubble to be placed would be free of building debris such as wiring, pipes, and other debris. No protruding re-bar is allowed.

6. Beneficial changes to the physical, chemical, and biological characteristics of the substrate. The original substrate is not productive existing oyster habitat. However, this nonproductive habitat is being replaced with material that will improve the growth and

reproduction of oysters and possibly other fish species as well as improve the habitat characteristics of the sites.

B. Water Circulation, Fluctuation, and Salinity Determinations

1. Water Quality.

(a) *Salinity* – No Change expected

(b) *Chemistry* - No negative impacts expected

(c) *Clarity* – Minor and temporary changes are possible in the immediate vicinity during construction due to turbidity. There would likely be localized improvements in clarity due to oyster filtration following establishment of an oyster population on the substrate.

(d) *Color* - Minor and temporary change expected during construction due to minor increase in turbidity.

(e) *Odor* - No change expected.

(f) *Taste* - Not applicable.

(g) *Dissolved Gas Levels* - No negative impacts expected. Dissolved oxygen levels may improve slightly due to oyster filtration.

(h) *Nutrients* – No negative impacts expected to occur. There would likely be localized improvements in nitrogen (N) and phosphorus (P) due to oyster filtration following establishment of an oyster population on the substrate.

(i) *Eutrophication* - No long-term change expected. It is possible that established oyster populations could provide local improvements to eutrophication levels.

(j) *Temperature* - No change expected.

2. Current Patterns and Circulation.

(a) *Current Patterns and Flow* - Minimal effects are expected, but would likely be a positive improvement that benefits the restored oyster habitat. Elevation of an oyster bar or reef may increase flow and turbulence in the vicinity of the bar or reef, resulting in enhanced mixing and food delivery.

(b) *Velocity* - No significant change in velocity is expected.

(c) *Stratification* - No change expected.

(d) *Hydrologic Regime* - No change expected.

3. Normal Water Level Fluctuations. No change expected.

4. Salinity Gradients. No change expected.

5. Actions That Will Be Taken to Minimize Impacts. Not applicable

C. Suspended Particulate/Turbidity Determinations

1. Expected Changes in Suspended Particulates and Turbidity Levels in Vicinity of Placement Site. A minor and temporary increase in suspended sediment and turbidity is expected in the immediate vicinity of the placement sites. Suspended sediment and turbidity in the vicinity of restored oyster habitat is likely to be reduced after habitat is restored due to stabilizing the sediments with the hard substrate and oyster filtering capabilities.

2. Effects (degree and duration) on Chemical and Physical Properties of the Water Column.

(a) Light Penetration- Minor, temporary, and localized reduction in light penetration due to turbidity would occur in the immediate vicinity of the substrate plantings during placement. Light penetration would depend on placement thickness and the density of the material. Oyster bars and reefs proposed by this action are in 6.5 – 9 ft depths and not in the photic zone. Restored oyster reefs have the potential to improve water clarity and thereby, light penetration.
(b) Dissolved Oxygen- Minor, temporary, and localized reduction in dissolved oxygen in conjunction with elevated turbidity levels may occur in the immediate vicinity of placement operations. However, sites that are typically characterized by low oxygen levels would likely be avoided for oyster habitat restoration.
(c) Toxic Metals and Organics- Placement operations are not expected to result in the release of any measurable amounts of contaminants into the water column.
(d) Pathogens- No pathogens are expected to be released into the water column.
(e) Aesthetics- Transport vehicles, boats, and heavy equipment associated with the proposed project would be a temporary negative impact. Project activities would be constructed under water, and therefore would have no long-term impact on visual and aesthetic values.
(f) Temperature- No change expected.

3. Actions Taken to Minimize Impacts. Construction activities would be limited to the immediate project area except for the barge loading sites which would vary with material type. All sites would be within NOBs and the oyster sanctuary. All alternate substrates chosen for oyster habitat restoration would be determined to be clean and free of toxics. Any concrete rubble to be placed would be free of building debris such as wiring, pipes, and other debris. No protruding re-bar is allowed. The placement of alternate materials would not be permitted within 300 feet of submerged aquatic vegetation as mapped and reported annually by VIMS in coordination with the MDNR Resource Assessment

Service. Placement would be planned for December through March when the risk of impacting living resources is reduced. The USACE-Baltimore recently received a State of Maryland water quality certificate for the construction efforts associated with this project and it is intended that the project will comply with all of the conditions outlined especially water quality certificate special condition #8-"The placement/discharge of alternate substrate materials shall not result in turbidity levels exceeding 150 Nephalometer Turbidity Units (NTUs) at any time, or 50 NTU's as a monthly average."

D. Contaminant Determinations

All alternate substrates chosen for oyster habitat restoration would be determined to be clean and free of toxics. Any concrete rubble to be planted would be free of building debris such as wiring, pipes, and other debris. No protruding re-bar is allowed. No significant levels of contaminants would be released into the water column.

E. Aquatic Ecosystem and Organism Determinations

1. <u>Effects on Plankton</u>. As construction is a very short-term event and plankton are mobile, no effect is expected. The areas restored to oyster bars and reefs from open water would still be available to the plankton community.

2. <u>Effects on Benthos</u>. The placement of substrates for reef restoration would permanently cover the existing substrate and benthos. Non-sessile dwellers may be able to avoid burial, but sessile species could be buried. However, these species are abundant and the restored oyster habitat would provide enhanced habitat for recolonization by benthic epifauna. Oyster bars and reefs are three-dimensional structures which provide more surface area for the attachments of oysters and other sessile organisms (mussels, barnacles, hydroids, algae, etc.) than that provided by relatively flat bottom.

   Spat-on-shell plantings are targeted for existing reef/shell bottom. It is projected that the seed only sites will be enhanced by the addition of spat and shell. These areas were identified as having low to no oysters. Although the risk is low, it is possible that oysters living on the existing habitat will be covered by placement.

   (a) Primary Production/Photosynthesis- Any turbidity generated during construction may temporarily reduce photosynthesis within the area of the oyster bar or reef and possibly slightly outside.
   (b) Suspension/ Filter Feeders- Minor, temporary, and localized impacts due to turbidity may occur during construction.
   (c) Sight Feeders- Minor, temporary, and localized impacts due to turbidity may occur during construction.

3. <u>Effects on Nekton.</u> No long-term negative impacts are expected. Nekton would be temporarily disturbed during construction, but would be able to avoid the area during substrate placement. Following construction, the restored oyster bar or reef would

provide an enhanced habitat for species that rely on structure for habitat, protection, and foraging such as fish, amphipods, shrimp, worms, and crabs.

4. Effects on Aquatic Food Web. No adverse, long term effects are expected. The long-term project effects are expected to be positive by providing reef habitat with subsequent oyster populations and associated assemblages. A great diversity of macroinvertebrates, fish, and shellfish has been shown to colonize restored oyster habitats (Rodney and Paynter 2006). Organisms associated with oyster habitat recycle nutrients and organic matter, and are prey for commercially and recreationally important finfish species.

5. Effects on Special Aquatic Sites. Proposed restoration activities would occur in 6.5–9 ft MLLW. Therefore, project activities are not expected to displace or adversely impact SAV. However, appropriate measures such as time-of-year restrictions on construction near SAV, would be implemented during substrate placement to protect special aquatic sites in adjacent areas from elevated turbidity. There would be no significant negative impacts or effects to other special aquatic sites including marine sanctuaries and refuges, wetlands, or tidal flats.

(a) Sanctuaries and Refuges- Temporary and minor impacts would occur to designated oyster sanctuaries since the material would be placed within existing areas designated as sanctuaries by MDNR. These impacts would include temporary increased turbidity and covering the benthos with the newly placed substrate. There would be no impacts to any other marine sanctuaries or refuges.

(b) Wetlands- There would be no impacts to wetlands as wetlands do not occur in the project area.

(c) Tidal flats- No impacts since tidal flats do not occur in the project area.

(d) SAV – SAV habitat coverage of the Bay bottom is variable from year to year. SAV habitat was screened from the potential restoration sites during site selection. Also, existing restrictions on construction within 300 feet of existing SAV beds would be upheld to prevent negative impacts associated with construction such as increased turbidity.

(e) Riffle and Pool Complexes- None in project area.

6. Threatened and Endangered Species. No adverse effects are anticipated to threatened and endangered species as a result of this project.

7. Other Wildlife. Construction would have expected noise associated with the machinery used to place the material. This noise would temporarily disrupt some species of wildlife during periods of work. Also, the presence of humans and equipment may disturb some species. Species are expected to return when construction is completed and the equipment leaves the area. In response to USACE's request for additional input on the actions included in the supplemental EA, NMFS indicated that the proposed shallow

water reef restoration and oyster seeding activities would not affect species under their jurisdiction and consultation in accordance with Section 7 of the ESA is not necessary (correspondence dated April 15, 2014). USFWS is also very supportive of the oyster restoration efforts in the Tred Avon, and did not have any concerns from a rare, threatened, and endangered species perspective: "Oyster restoration is vital to the health and long-term stability of the Chesapeake Bay ecosystem: Restoration sites located in the Tred Avon and Harris Creek were selected after long discussions with Federal, State partners and non-governmental stakeholders. These sites are well suited for oyster restoration and have an excellent chance for success. Historically, oyster reefs in the bay were in much shallower water than initially proposed for these sites, and the effort to expand into shallower waters could bring the oyster closer to their historic natural state."

8. Actions to Minimize Impacts. Construction activities would be limited to the immediate project area. All sites would be within NOBs and oyster sanctuaries. All alternate substrates chosen for oyster habitat restoration would be determined to be clean and free of toxics. Any concrete rubble to be placed would be free of building debris such as wiring, pipes, and other debris. No protruding re-bar is allowed. The placement of substrates would not be permitted within 300 feet of submerged aquatic vegetation as mapped and reported annually by VIMS in coordination with the MDNR Resource Assessment Service. Additionally, time of year restrictions are in place.

F. Proposed Placement Site Determinations

1. Mixing Zone Determinations. Not applicable.

2. Compliance with Applicable Water Quality Standards Determinations. Alternate substrates used would be clean and would meet all applicable water quality standards. The proposed work would be performed in accordance with all applicable State of Maryland water quality standards. All work would be conducted in compliance with conditions specified in the project's Water Quality Certification.

3. Potential Effects on Human Use Characteristics Determinations.

(a) Municipal and Private Water Supply- No effect is expected.
(b) Recreational and Commercial Fisheries- The project is expected to enhance and create habitat for oysters and other organisms, including finfish and blue crabs. Alternate substrate plantings have the potential to disrupt/impair crab trotlining.
(c) Water Related Recreation- As an indirect benefit of the proposed work, some increase in recreational fishing may occur following establishment of communities on the restored bars and reefs. There is also the potential that after these oyster reefs are restored, recreational navigation could be impacted if people with boats that draft more than 6 feet are not aware of the where the restoration efforts are being completed and are using the most up-to-date NOAA navigational charts.
(d) Aesthetics- Minor during construction.
(e) Parks, National and Historical Monuments, National Seashore, Wilderness Areas, Research Sites, and Similar Preserves- No effect expected.

G. Determination of Cumulative Effects on the Aquatic Ecosystem

Extending oyster restoration activities into shallower water depths between 6.5 – 9 ft MLLW would permit oyster restoration to continue on a scale that could address goals of restoring significant oyster habitat acreage. Without the use of potential habitat in shallower water depths it is extremely unlikely that significant acreage could be restored due to the current degraded condition of existing oyster habitat. The project is expected to increase the acreage of available oyster habitat as well as enhance recruitment, growth, and survival of oyster populations. The cumulative impact of this project and other oyster restoration projects constructed by MDNR, Federal agencies, and various non-profit and citizens groups is expected to be positive, with the creation of more diverse and productive habitat, and re-establishment of a sustainable keystone species in the Tred Avon River. Please see Section 6 of the Tred Avon Environmental Assessment goes for more detailed analysis.

H. Determination of Secondary Effects on the Aquatic Ecosystem

Secondary effects are expected to be positive, resulting in increased habitat for finfish, blue crabs, and other species. Additional benefits from oyster restoration would include water filtration and regulation of water column phytoplankton dynamics; enhanced nitrogen cycling between the benthic and pelagic system components; enhanced phosphorus burial in sediments; nursery and predation refuge habitat for a diverse community of invertebrates and small fishes; and foraging habitat for transient piscivorous and benthivorous fishes.

The mandatory sequence of the Section 404(b)(l) Guidelines has been applied in evaluation of the proposed action. The proposed extension of restoration activities into waters between 6–9 ft MLLW to restore oyster habitat is in compliance with the Section 404(b)(l) Guidelines. Part II of the analysis shows that the proposed extension into shallower waters does not contribute to the significant degradation of waters of the United States and as such, the proposed project and proposed use of the placement sites comply with the requirements of 40 CFR 230.10(c). Appropriate steps to minimize potential impacts to the aquatic system would be followed.

III. FINDING OF COMPLIANCE

a. Adaptation of the Section 404(b)(1) Guidelines to This Evaluation - No adaptations of the Guidelines were made relative to this Evaluation.

b. Evaluation of Availability of Practicable Alternatives to the Proposed Discharge Site Which Would Have Less Adverse Impact on the Aquatic Ecosystem. – Per the alternatives analysis completed in the *Supplemental Environmental Assessment for Shallow Water Oyster Restoration in the Tred Avon River Oyster Sanctuary, Maryland*, USACE-Baltimore determined that none of the alternatives are expected to provide the same benefits with fewer impacts.

c. Compliance with Applicable State Water Quality Standards. – In full compliance.

d. Compliance with Applicable Toxic Effluent Standard or Prohibition under Section 307 of the Clean Water Act. – N/A.

e. Compliance With Endangered Species Act of 1973 –No impacts are anticipated to these resources. Coordination is in process. Full compliance anticipated.

f. Compliance with Specified Protection Measures for Marine Sanctuaries Designated by the Marine Protection, Research, and Sanctuaries Act of 1972 – N/A.

g. Evaluation of Extent of Degradation of Waters of the United States – No adverse impacts, permanent or temporary, to the aquatic ecosystem diversity, productivity, stability, recreation, and aesthetics and economic values would occur as a result of this project.

h. Appropriate and Practicable Steps Taken to Minimize Potential Adverse Impacts of the Discharge on the Aquatic Ecosystem – Best management practices such as targeted placement of material at bars and reefs would occur. It is important to note that compensatory mitigation to offset the anticipated impacts to aquatic resources was determined not to be necessary due to the proposed action resulting in an overall improvement in aquatic resource functions.

i. On the Basis of the Guidelines, the Proposed Disposal Site(s) for the Discharge of Dredged or Fill Material - On the basis of the guidelines, the proposed discharge sites for the material is specified as complying with the inclusion of appropriate and practical conditions to minimize pollution or adverse effects on the aquatic ecosystem.

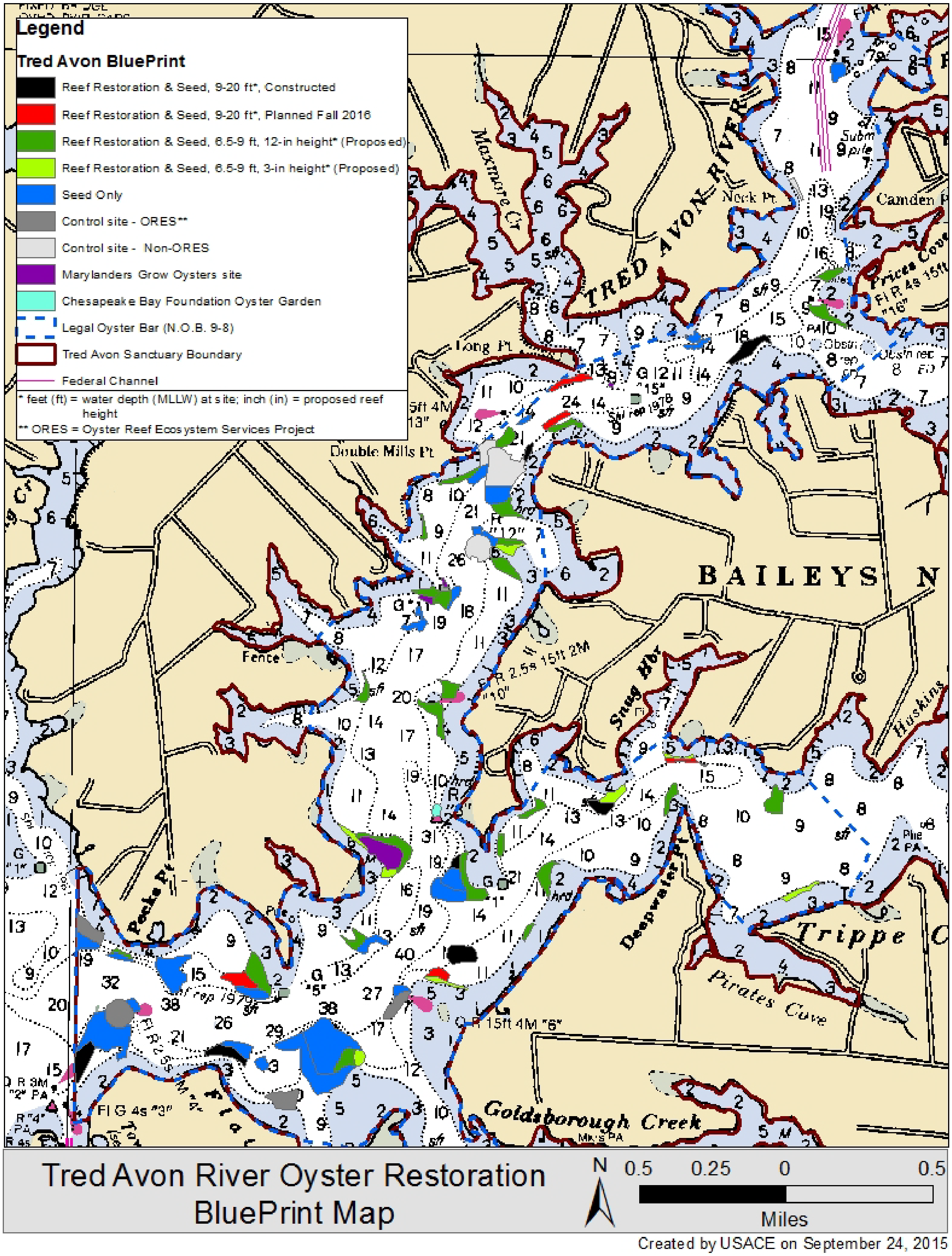


Figure 1. Tred Avon River Oyster Restoration Plan

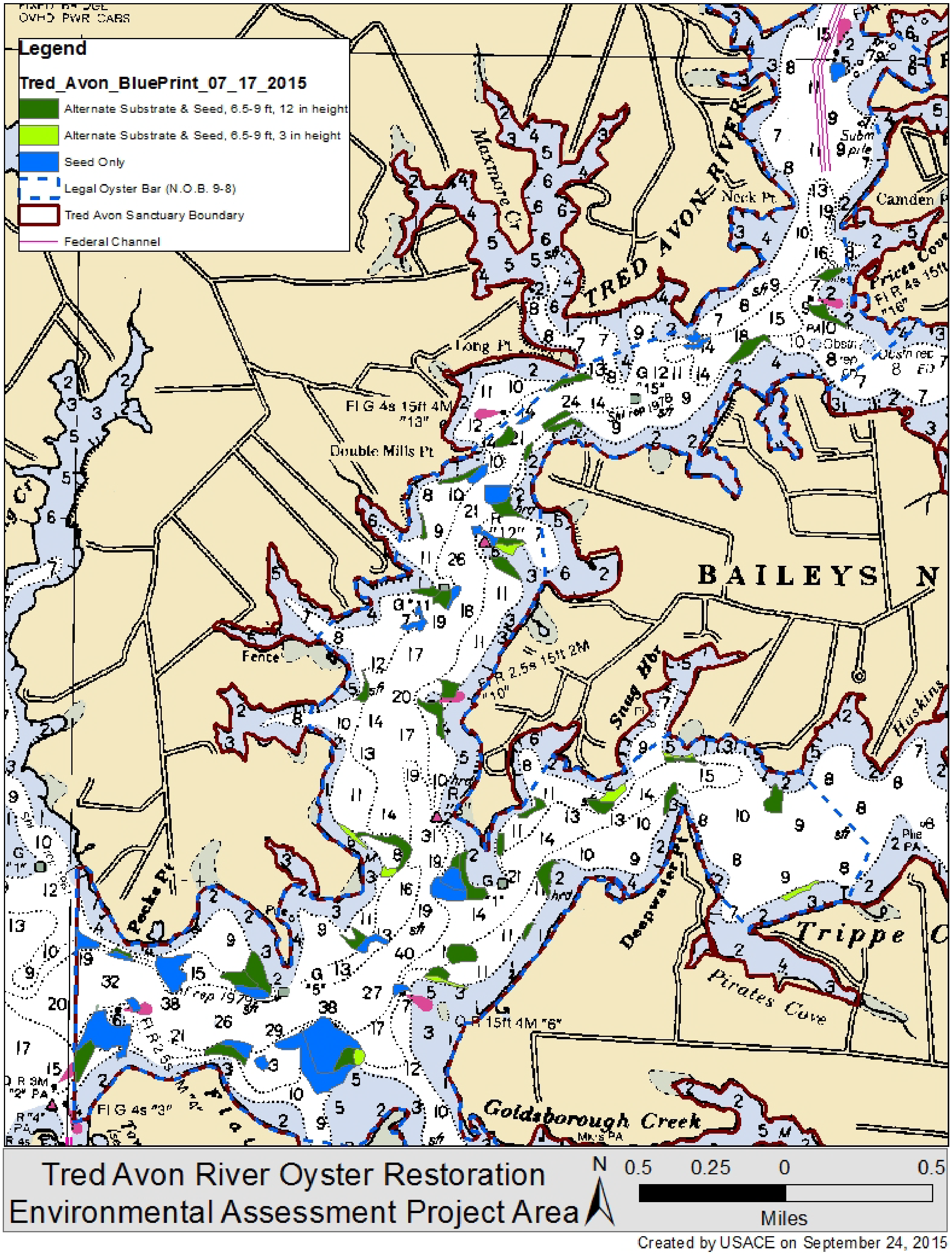


Figure 2. Portion of Tred Avon River Oyster Restoration Plan evaluated by 404(b)(1) analysis

Appendix F – Essential Fish Habitat Assessment

Shallow water Oyster Restoration in the Tred Avon River Oyster Sanctuary

Chesapeake Bay Oyster Recovery Project, Maryland

Essential Fish Habitat Assessment

December 2013

Prepared By: Baltimore District, U.S. Army Corps Of Engineers

Pursuant to Section 305 (b)(2) of the Magnuson-Stevens Fishery Conservation & Management Act, the U.S. Army Corps of Engineers (USACE) is required to prepare an Essential Fish Habitat [EFH] Assessment for restoration of oyster reef habitat in shallow water depths (6 to 9 ft MLLW) as part of the Chesapeake Bay Oyster Recovery Project, Maryland that began in 1996.

Based on the prescribed protocol for preparation of an EFH Assessment, the assessment is comprised of the following components:

1. A description of the proposed action;
2. A listing of the life stages of all species with EFH designated in the project area;
3. An analysis of the effects of the proposed action;
4. The Federal agency's opinions regarding the effects of the proposed action; and,
5. Proposed mitigation, if applicable.

DESCRIPTION OF THE PROPOSED ACTION

The Baltimore District, U.S. Army Corps of Engineers (USACE-Baltimore) proposes to place shell or alternate (non-shell) substrate at existing oyster bars within the Tred Avon River at water depths between 6 and 9 ft MLLW (red polygons in Figure 1). Figure 1 provides a map of the project area.

USACE-Baltimore is proposing to extend oyster reef restoration into shallower water depths than it is currently permitted to be conducted. Existing National Environmental Policy Act (NEPA) documentation covers oyster reef restoration at water depths that maintain at least an 8 foot water column above restored reefs. Currently, 1 foot of material is placed on the bottom to restore reef habitat which limits restoration to water depths greater than 9 ft MLLW. This EFH Assessment will evaluate the impacts to EFH and critical habitat from expanding oyster restoration and rehabilitation activities for reef bar construction and seeding by USACE-Baltimore into shallower depths of the sanctuary that would maintain at least a 5 foot water column above restored reefs in the Tred Avon River.

SPECIES WITH EFH DESIGNATED IN THE PROJECT AREA

Previous consultation with John Nichols, NMFS, (email February 9, 2009) as part of the 2009 *Chesapeake Bay Oyster Restoration Using Alternate Substrate, Maryland* Environmental Assessment determined that some areas of the Chesapeake Bay under consideration for oyster restoration in Maryland lie within the general area that may provide EFH for some of the species managed by NMFS. Species for which EFH is a concern are as follows: summer flounder (*Paralichthys dentatus*), juvenile and adult life stages; bluefish (*Pomatomus saltatrix*), juvenile and adult life stages; windowpane flounder (*Scopthalmus aquosus*), juvenile and adult life stages; cobia (*Rachycentron canadum*), all life stages; red drum (*Sciaenops ocellatus*), all life stages; king mackerel (*Scomberomorus cavalla*), all life stages; and Spanish mackerel (*Scomberomorus maculatus*) (National Marine Fisheries Service, Northeast Region, Habitat Conservation Division EFH web site; *www.nero.nmfs.gov/ro/doc/hcd.htm*).

Due to specific habitat needs, it is unlikely that cobia, king mackerel, Spanish mackerel, or windowpane flounder would be in the project area (Murdy et al., 1994). Windowpane flounder EFH habitat does not extend into the Tred Avon River oyster sanctuary. Cobia more commonly inhabits areas of higher salinity than would be found at most of the project area. Spanish mackerel are most abundant from the mouth of the Chesapeake Bay region to south Florida. They prefer polyhaline regions (18-30ppt) of the lower Bay. Finally, none of the life stages of king mackerel are typically found within the project area. As a result, this EFH analysis will focus on bluefish, summer flounder, and red drum. Focusing on these three species for the Tred Avon River EFH Assessment was confirmed in a phone conversation with David O'Brien, NMFS, on December 12, 2013.

IMPACTS TO SPECIES WITH EFH DESIGNATED IN THE PROJECT AREA

The following section provides a brief overview of pertinent natural history information of: 1) bluefish, 2) summer flounder, and 3) red drum. Additionally, an analysis of the direct, secondary, and cumulative impacts of the proposed use of alternate substrate on federally managed species, and prey species consumed by managed species that occur in the project vicinity is provided.

1. BLUEFISH (*Pomatomus saltatrix*) (juvenile and adult stages)

Bluefish are usually found high in the water column. In some years, large numbers of bluefish penetrate far up the Bay; in other years, bluefish schools are sparse, with larger bluefish concentrating in Virginia waters. For juveniles, all major estuaries between Penobscot Bay, Maine and St. Johns River, Florida are considered EFH.

Juvenile and adult bluefish enter the Chesapeake Bay during spring through summer, leaving the Bay in late fall.

Adults – Adults are uncommon north of Annapolis, and generally do not occur above the U.S. 50 bridge, except during years of greater up-Bay salt wedge encroachment. Adults are not typically bottom feeders and are strong swimmers.

Juveniles - Juveniles tend to concentrate in shoal waters. In contrast to adults, the young have a wide range of salinity tolerance and penetrate much farther up the Bay and its tributaries, where they can be found in shallow waters of very low salinity (Murdy et al., 1997). Therefore, juveniles are more common in the upper Bay above the U.S. 50 Bridge, occurring as far north as the Susquehanna Flats and the lower Elk River (Lippson, 1973).

Spawning - Spawning is oceanic and does not occur in the Chesapeake Bay.

Prey- Juveniles tend to be opportunistic feeders, foraging on a wide variety of estuarine life in the pelagic zone and over a variety of bottom types (Lippson, 1973). Small fish such as Menhaden that bluefish prey upon are widely dispersed across the Bay and do not depend upon the bottom. With respect to prey, there is nothing particularly unique or valuable to bluefish at the project area. Therefore, bluefish prey species should not experience adverse effects on population levels from the proposed project.

Impact on Bluefish- Adults and juveniles would occur in the Bay at the same time as project activities. However, no significant impacts are expected to bluefish as a result of project activities. The extension of oyster restoration into water depths between 6 and 9 ft MLLW is not expected to have any negative impacts on any life stage of bluefish. No impacts are expected because there is sufficient open water habitat outside of the project area during the short construction season and turbidity impacts are expected to be local, minimal, and short-lived. As a transient species, bluefish are expected to be able to avoid any direct, minor construction impacts to water quality.

Cumulative impacts: The proposed action would permit oyster restoration to continue on a scale that could address goals of restoring significant oyster habitat acreage to a diversity of water depths. Without the extension of restoration into shallow water depths it is extremely unlikely that significant acreage could be restored and long-term goals achieved. The project is expected to increase the acreage of available oyster bar and reef habitat as well as enhance recruitment, growth, and survival of oyster populations. The cumulative impact of this project and other oyster restoration projects constructed by MD DNR, ORP and various non-profit and citizens groups is expected to be positive, with the creation of more diverse and productive habitat. No adverse negative cumulative impacts are expected.

There would be short-term increases in turbidity and possibly the release of nutrients from bottom sediments during placement of substrate, whether alternate substrates or native shell. This impact is expected to be direct, but minor and temporary. Long-term impacts to local water quality as a result of the restoration of oyster habitat are expected to be positive throughout the Bay.

Other restoration activities within the Maryland portion of the Chesapeake Bay include large-scale tributary based oyster restoration within Harris Creek by USACE, MDNR, NOAA, and the Oyster Recovery Partnership (ORP). Additionally, MDNR, NOAA, and ORP are planning large-scale tributary based oyster restoration in the Little Choptank River. Restoration in Harris Creek, the Tred Avon River, and the Little Choptank River are all connected to some degree hydrodynamically and should lead to greatly enhanced oyster and fishery resources in the lower Choptank River system. Cumulatively, the oyster restoration impacts are not anticipated to have any significant negative impacts, either direct or secondary to bluefish populations within the Bay.

2. SUMMER FLOUNDER (*Paralicthys dentatus*) (juvenile and adult stages)

Juvenile and adult summer flounder enter the Chesapeake Bay during spring and early summer, and exit the Bay in fall (Murdy, 1997). Both adults and juveniles exhibit a marked preference for sandy bottom and/or submerged aquatic vegetation (SAV) beds, particularly areas near shorelines (Murdy, 1997). The Magnuson-Stevens Act has identified SAV as a Habitat of Particular Concern for both juvenile and adult summer flounder. Summer flounder is not known to use oyster bars.

Adults - Summer flounder adults inhabit shallow coastal and estuarine waters during warmer months. Adults utilize deep channels, ridges, sandbars, and shallow water with sandy bottoms.

Juveniles- Juveniles prefer shallower waters.

Spawning- Summer flounder are ocean spawners. Larvae migrate into the Bay in October.

Prey- Summer flounder feed mainly on fish, squids, shrimp, and crabs. The summer flounder prefers sandy substrate and is frequently seen near sandy shores, partly buried in the sand.

Impact on Summer Flounder- Juvenile and adult summer flounder and laravae would occur in the Bay during project activities. However, no significant direct negative impacts are expected on any lifestage as a result of proposed activities. Secondarily, it is likely that the creation of oyster bars and reefs would serve as an attractant and provide habitat for the small creatures that the summer flounder prey upon.

Since oysters are generally restricted to water depths between- 6 and- 30 feet (MLW), oyster reef restoration would not generally occur within SAV growing range. However, restored oyster bars and reefs do occur in areas adjacent to SAV beds. To minimize any potential direct impacts, no alternate material placement would occur within 300 feet of SAV beds. Further, NMFS has indicated that time-of-year restrictions may be necessary to protect SAV from elevated turbidity within 500 yards of the activity. Given these provisions, no adverse impacts to SAV are anticipated as a result of the proposed project.

Successful oyster restoration is expected to improve local water quality which would benefit SAV beds in the local vicinity. Therefore, oyster restoration would provide secondary beneficial impacts to summer flounder by promoting SAV habitat, which is designated as a Habitat of Particular Concern for summer flounder. Extending oyster restoration into shallower waters would reduce the distance between oyster reef habitat in deeper habitats and SA, increasing the likelihood that oyster restoration will have indirect benefits on SAV habitat.

Finally, cumulative effects from other projects discussed in the bluefish section are not anticipated to have any significant negative impacts, either direct or secondary, to summer flounder.

3. RED DRUM (*Sciaenops ocellatus*)

Red drum are bottom-feeding fish. The young prefer grassy (SAV) or mud bottoms.

EFH for red drum includes all of the following habitats to a depth of 50 meters offshore: tidal freshwater; estuarine emergent vegetated wetlands (flooded salt marshes, brackish marsh, tidal creeks); estuarine scrub/shrub (mangrove fringe); submerged rooted vascular plants (sea grasses); oyster bars and reefs and shell banks; unconsolidated bottom (soft sediments); ocean high salinity surf zones; and artificial bars and reefs. The area covered includes Virginia through the Florida Keys (Reagan, 1985).

Adults- Adults are found in SAV beds and on mud bottoms, but another preferred habitat is oyster bars and reefs. During construction, it is expected that any adults in the vicinity of the project area would be temporarily displaced. As transient species, adult red drum would be able to avoid the disrupted area and find comparable habitat in the nearby vicinity. Restored oyster bars and reefs would provide enhanced habitats for adult red drum.

Juveniles- Juveniles occur throughout Chesapeake Bay from September to November.

Spawning – Spawning is oceanic.

Prey - Red drum prey includes crabs, shrimp and fish. No negative impacts to prey are expected. Oyster bar and reef restoration would provide habitat for red drum prey species and therefore is expected to increase desired species.

Impact on Red Drum- The use of alternate substrates is not expected to have any negative impacts on any life stage of red drum and would likely have a positive secondary impact by promoting prey species that use oyster bars and reefs for habitat. As oyster bars and reefs are designated EFH for red drum, oyster bar and reef restoration would directly improve and increase EFH habitat for red drum.

As discussed in the section on bluefish, the proposed action is not expected to negatively impact SAV. Alternatively, successful oyster restoration is expected to improve local water quality which would benefit SAV beds in the local vicinity. Therefore, oyster restoration would provide secondary beneficial impacts to red drum by promoting SAV habitat, which is designated as EFH for red drum.

Finally, cumulative effects from other projects discussed in the bluefish section are not anticipated to have any significant negative impacts, either direct or secondary, to red drum.

FEDERAL AGENCY'S OPINION ON PROJECT IMPACTS TO EFH

1. Discharge from the site during shell or alternate substrate placement operations must comply with state (Maryland Department of the Environment) water quality standards, and should result in only short term, minor perturbations to local water quality.

2. There would be short-term increases in turbidity and possibly the release of nutrients from bottom sediments during construction. This impact is expected to be direct, but minor and temporary. Long-term impacts to local water quality as a result of the restoration of oyster habitat are expected to be positive.

3. The proposed project is expected to result in direct and secondary, beneficial impacts to aquatic resources. Through the restoration of existing non-productive oyster bars, a portion of historic oyster habitat would be directly restored. Placement of alternate substrates in waters ranging from 6 to 9 ft MLLW would form an elevated bar/reef structure with greatly increased surface area for the attachment of sessile organisms (e.g. algae, barnacles, sponges, bryozoans, and tube-building worms). In addition, this bar/reef structure would provide, as a secondary benefit, shelter and cover for mobile invertebrates and finfish.

4. Placement of reef substrate would most likely occur between December and March. Seeding of restored oyster reefs would occur between June and September, when most species identified are present in the Bay. However, as discussed in the individual sections, no direct negative impacts are expected to the identified species as they are transient and similar habitat is abundant throughout the Bay, or prefer different habitats than those being targeted with the project. Impacts to spawning are not a concern as the species evaluated spawn outside the project area in oceanic waters.

5. The proposed action is not expected to negatively impact SAV. Alternatively, successful oyster restoration is expected to improve local water quality which would benefit SAV beds in the local vicinity. Therefore, oyster restoration would provide secondary beneficial impacts to SAV habitat.

6. The proposed project would directly increase EFH for red drum by restoring oyster bars and reefs. The proposed project would indirectly benefit EFH for red drum and Habitat of Particular Concern for summer flounder by promoting SAV habitat.

7. The Baltimore District, after reviewing fisheries information, has determined that the proposed action is not likely to have significant negative, direct or secondary, affects on EFH or species covered under the Magnuson-Stevens Act and is more likely to benefit these protected species than to have an adverse effect on them.

Mitigation: No significant adverse environmental impacts are expected as a result of the proposed project and mitigation is not necessary.

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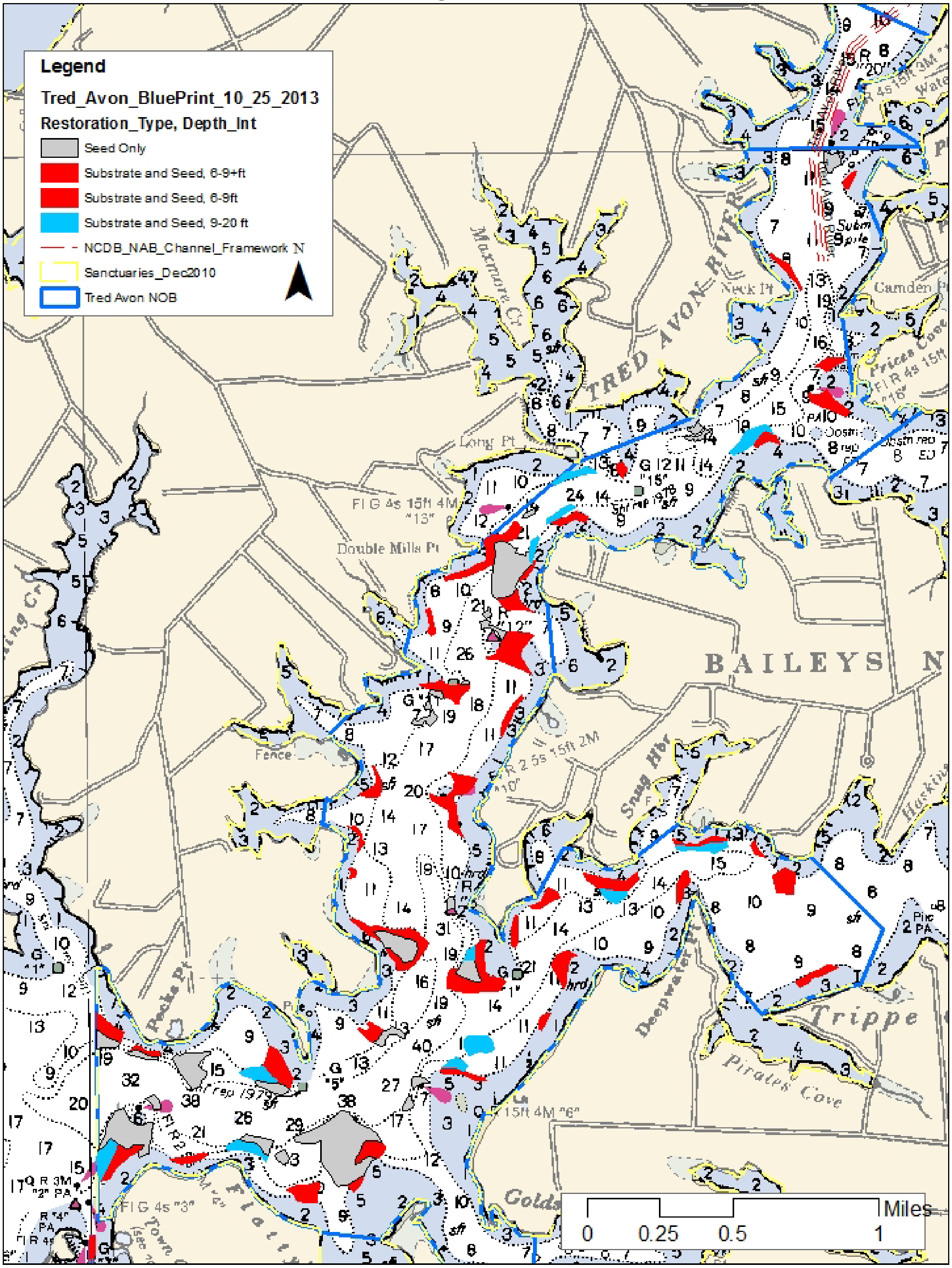
Figure 1. Tred Avon Oyster Restoration



Created by USACE: 12/19/2013

Appendix G – Agency Coordination and Pertinent Correspondence

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Chesapeake Bay Field Office
177 Admiral Cochrane Drive
Annapolis, Maryland 21401
http://www.fws.gov/chesapeakebay

February 11, 2014

Daniel Bierly
U.S. Army Corps of Engineers, Baltimore District
Planning Division
Baltimore, Maryland 21014

RE: Supplemental Environmental Assessments to investigate opportunities to expand oyster restoration activities within the Tred Avon River to shallower water depths; and, to investigate opportunities to expand oyster restoration activities within Harris Creek to shallower water depths.

Dear Mr. Bierly:

The U. S. Fish and Wildlife Service (Service) appreciates the opportunity to comment on the Army Corps of Engineers' (ACOE) plan and future strategies for expanding oyster restoration in the Tred Avon River and Harris Creek. This letter constitutes the report of the Service on the proposed supplemental Environmental Assessments and is submitted in accordance with provisions of the Fish and Wildlife Coordination Act (48stat. 401, as amended; 16 U.S.C. 661 et sec.)

Oyster restoration is vital to the health and long-term stability of the Chesapeake Bay ecosystem. Restoration sites located in the Tred Avon and Harris Creek were selected after long discussions with Federal, State partners and non-governmental stakeholders. These sites are well suited for oyster restoration and have an excellent chance for success. Historically, oyster reefs in the bay were in much shallower water than initially proposed for these sites, and the effort to expand into shallower waters could bring the oyster closer to their historic natural state. Therefore, the Service fully supports the opportunity to restore oysters to shallower depths in these systems. The Service appreciates the opportunity to comment on ACOE's planning projects; particularly those that we believe will benefit Fish and Wildlife resources in the Chesapeake Bay. If you have any questions, please feel free to contact Chris Guy at 410-573-4529.

Sincerely,

Genevieve LaRouche
Supervisor

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Chesapeake Bay Field Office
177 Admiral Cochrane Drive
Annapolis, Maryland 21401
http://www.fws.gov/chesapeakebay

February 11, 2014

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U.S. Army Corps of Engineers, Baltimore District
Planning Division
Baltimore, Maryland 21014

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Sincerely,

Genevieve LaRouche
Supervisor

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1715
BALTIMORE, MARYLAND 21203-1715

REPLY TO
ATTENTION OF
Planning Division

Mr. Chris Guy
U.S. Fish and Wildlife Service
Chesapeake Bay Field Office
177 Admiral Cochrane Drive
Annapolis, Maryland 21014

Dear Mr. Guy:

The U.S. Army Corps of Engineers, Baltimore District (USACE) in conjunction with the Maryland Department of Natural Resources (MDNR) is conducting a supplemental Environmental Assessment (EA) to investigate opportunities to expand oyster restoration activities within the Tred Avon River to shallower water depths. The intent of this letter is to solicit input from your agency and request a determination that the proposed oyster restoration work in shallow water depths is in compliance with the Fish and Wildlife Coordination Act (FWCA) and Section 7 requirements of the Endangered Species Act (ESA).

Currently, USACE-Baltimore maintains 8 feet of navigational water depth clearance above all oyster restoration activities in compliance with its *Chesapeake Bay Oyster Recovery Project, Maryland* EA that was completed in 1996, and the 2009 *Chesapeake Bay Oyster Restoration Using Alternate Substrate, Maryland* EA. The 1996 EA identified six Oyster Recovery Areas (ORA's) in the Chester, Choptank, Magothy, Nanticoke, Patuxent, and Severn Rivers, and seed bar construction at two sites. USACE is proposing to remove the 8 foot clearance standard and replace it with a 5 foot water depth clearance to enable more expansive oyster restoration activities. As a result of removing an 8-foot minimum navigational depth clearance, the procedures imposed by NEPA require USACE-Baltimore to evaluate the effects of this action on the quality of the human environment. This supplemental EA will fulfill that requirement and evaluate the impacts of restoring oyster reef habitat in water depths that maintain a 5 foot water depth clearance above restored reefs (between 6 and 9 ft MLLW).

Current and future USACE-Baltimore oyster restoration efforts contribute to the oyster outcomes of the Chesapeake Bay Protection and Restoration Executive Order (E.O. 13508). USACE-Baltimore has been identified with the National Oceanic and Atmospheric Administration (NOAA) to be co-leads for implementation of the oyster outcomes established by E.O. 13508. Furthermore, the Chesapeake Bay Program's Sustainable Fisheries Goal Implementation Team (GIT) has been charged with advancing the oyster goal of E.O. 13508. The GIT has now convened interagency workgroups in Maryland and Virginia to plan restoration work in each state, in consultation with appropriate partners. The Maryland Interagency Workgroup (MIW) is composed of representatives from NOAA, MDNR, USACE-Baltimore, and the Oyster Recovery Partnership (ORP). The MIW is charged with developing and implementing large-scale oyster restoration plans towards meeting the oyster goal of E.O. 13508 and their respective agencies' goals. Based on consideration of salinity levels, available restorable bottom, protection from harvest, historical spat set, and other factors, MIW, in consultation with Maryland oyster restoration partners, selected the Tred Avon River for large-scale oyster restoration.

The Tred Avon River is one of the main subwatersheds draining to the lower Choptank River, which has historically been a major source of oysters, fish and other aquatic wildlife. MIW developed a tributary restoration plan that outlines an objective of restoring and rehabilitating 191 acres of oyster reef habitat. There are 118 acres of the 191 acre target that are designated as areas for substrate and seed planting. The remaining 73 acres is slated for seed planting only. Of the 118 acres to receive substrate, only 25 acres are at depths greater than 9 ft and are currently permitted to be restored. The majority of sites targeted for reef construction, USACE's primary role in Maryland oyster restoration, are within water depths between 6 and 9 feet. Therefore, it is necessary to evaluate expanding the water depths where oyster reef habitat restoration can occur to reach the restoration target of the tributary plan and provide the greatest likelihood that restored oyster resources will have a system-wide response and become self-sustaining. The proposed restoration areas are identified in the enclosed map (Enclosure 1).

Prior coordination completed for the 2009 Alternate Substrate EA identified that there were no rare, threatened, or endangered species under the purview of FWS in the project area. On December 9, 2013, the Information, Planning, and Conservation (IPaC) decision support system was utilized to generate a preliminary Endangered Species Act species list specific to the Tred Avon River. Two rare, threatened, or endangered species were identified within the project area, but are land mammals that will not be affected by oyster restoration. Further, the inclusion of the Florida panther (*Puma (=felis) concolor coryi*) in the IPaC results is expected to be erroneous. The preliminary species list report is enclosed with this letter (Enclosure 2). Based on this information, extending oyster restoration to shallower waters is not anticipated to have any negative impacts on rare, threatened, or endangered species under the purview of FWS.

Based on past oyster restoration efforts and existing oyster restoration NEPA documentation, USACE-Baltimore has determined that there will be no negative impacts to fish and wildlife resources by this action. USACE-Baltimore is requesting U.S. Fish and Wildlife concurrence with this determination for compliance with the Fish and Wildlife Coordination Act and Section 7 of the Endangered Species Act. Please provide a response within 30 days of the date of this letter. If you have any questions, please call Ms. Angie Sowers at (410) 962-7440.

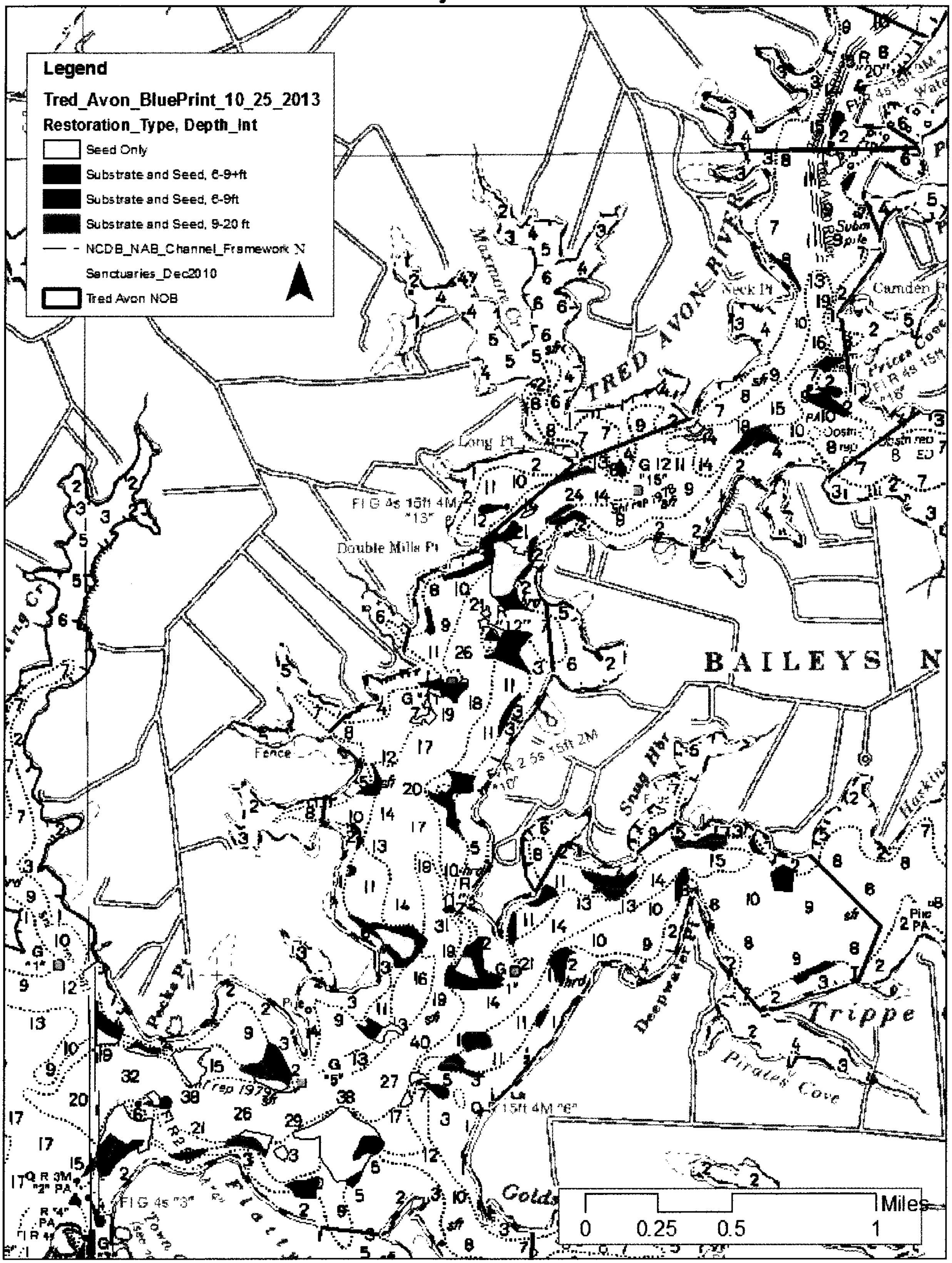
Sincerely,

Daniel Bierly
Acting Chief, Civil Projects Development Branch

Enclosures

Enclosure 1

Tred Avon Oyster Restoration



Created by USACE: 12/19/2013

U.S. Fish and Wildlife Service

Natural Resources of Concern

This resource list is to be used for planning purposes only — it is not an official species list.

Endangered Species Act species list information for your project is available online and listed below for the following FWS Field Offices:

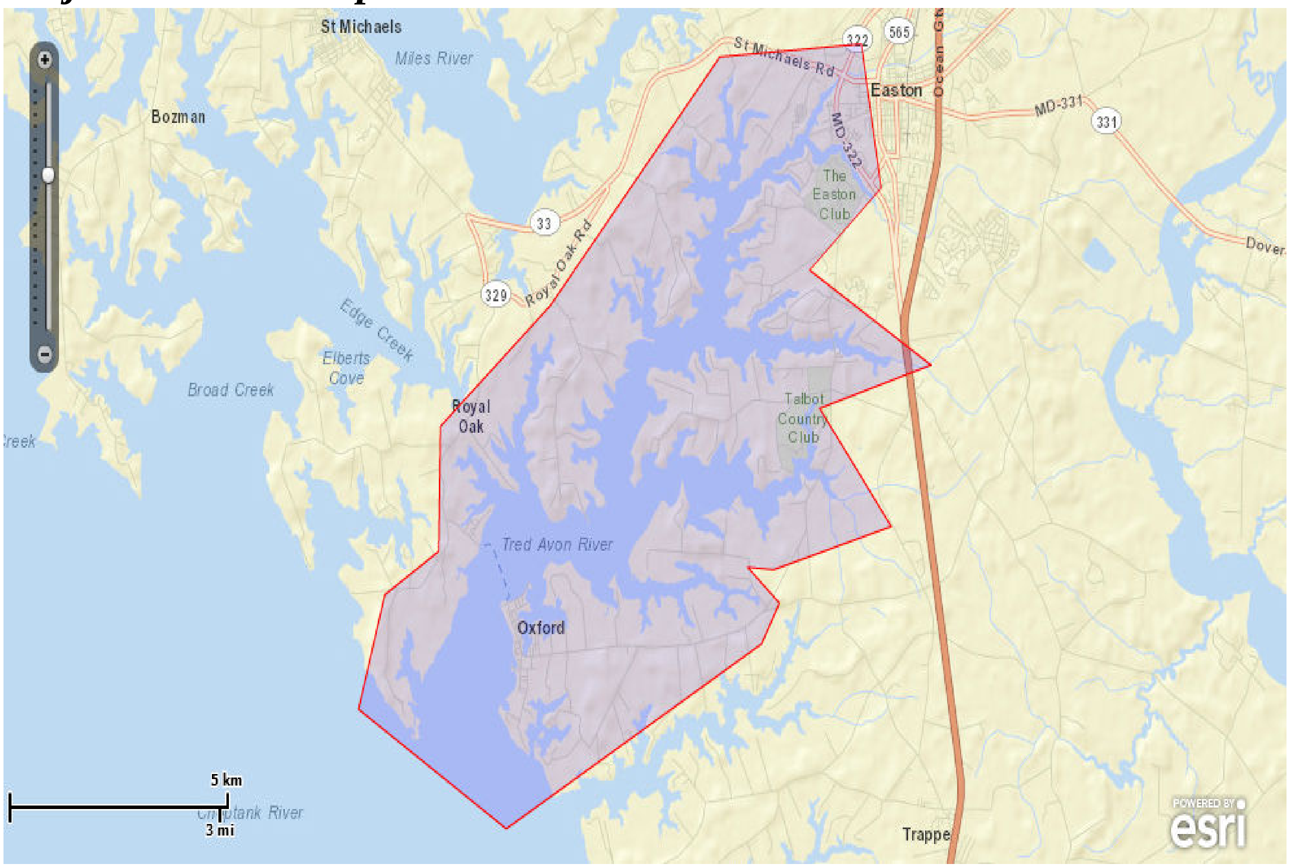
CHESAPEAKE BAY ECOLOGICAL SERVICES FIELD OFFICE
177 ADMIRAL COCHRANE DRIVE
ANNAPOLIS, MD 21401
(410) 573-4500

Project Name:

TredAvon_FWS

Natural Resources of Concern

Project Location Map:



Project Counties:

Talbot, MD

Geographic coordinates (Open Geospatial Consortium Well-Known Text, NAD83):

MULTIPOLYGON (((-76.2136406 38.6756892, -76.2067055 38.6941273, -76.1924576 38.7011208, -76.1919083 38.7212399, -76.1628632 38.7406839, -76.1179909 38.7806533, -76.0804657 38.7827141, -76.0751785 38.7595336, -76.0941986 38.7463607, -76.061995 38.7311232, -76.091555 38.7241059, -76.0725693 38.7051397, -76.1037087 38.6981466, -76.1105751 38.6985486, -76.1021294 38.6927875, -76.1069016 38.6861952, -76.1745018 38.6564956, -76.2136406 38.6756892)))

Project Type:

** Other **

Natural Resources of Concern

Endangered Species Act Species List (USFWS Endangered Species Program).

There are a total of **2** threatened, endangered, or candidate species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fishes may appear on the species list because a project could cause downstream effects on the species. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section below for critical habitat that lies within your project area. Please contact the designated FWS office if you have questions.

Species that should be considered in an effects analysis for your project:

Mammals	Status		Has Critical Habitat	Contact
Delmarva Peninsula fox squirrel (*Sciurus niger cinereus*) Population: Entire, except Sussex Co., DE	Endangered	species info		Chesapeake Bay Ecological Services Field Office
Florida panther (*Puma (=felis) concolor coryi*) Population: U.S.A.(LA and AR east to SC and FL)	Endangered	species info		Chesapeake Bay Ecological Services Field Office

Critical habitats within your project area:

There are no critical habitats within your project area.

FWS National Wildlife Refuges (USFWS National Wildlife Refuges Program).

There are no refuges found within the vicinity of your project.

FWS Migratory Birds (USFWS Migratory Bird Program).

Most species of birds, including eagles and other raptors, are protected under the Migratory Bird Treaty Act (16 U.S.C. 703). Bald eagles and golden eagles receive additional protection under the Bald and Golden Eagle Protection Act (16 U.S.C. 668). The Service's Birds of Conservation Concern (2008) report identifies species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become listed under the Endangered Species Act as amended (16 U.S.C 1531 et seq.).

Migratory bird information is not available for your project location.

NWI Wetlands (USFWS National Wetlands Inventory).

The U.S. Fish and Wildlife Service is the principal Federal agency that provides information on the extent and status of wetlands in the U.S., via the National Wetlands Inventory Program (NWI). In addition to impacts to wetlands within your immediate project area, wetlands outside of your project area may need to be considered in any evaluation of project impacts, due to the hydrologic nature of wetlands (for example, project activities may affect local hydrology within, and outside of, your immediate project area). It may be helpful to refer to the USFWS National Wetland Inventory website. The designated FWS office can also assist you. Impacts to wetlands and other aquatic habitats from your project may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal Statutes. Project Proponents should discuss the relationship of these requirements to their project with the Regulatory Program of the appropriate U.S. Army Corps of Engineers District.

The following wetlands intersect your project area:

Wetland Types	NWI Classification Code	Approximate Acres
Freshwater Pond	PUBF	0.136151
Estuarine and Marine Wetland	E2EM5P	0.48406
Freshwater Forested/Shrub Wetland	PFO1R	5.91089
Freshwater Pond	PUBHh	2.230122
Freshwater Forested/Shrub Wetland	PFO1/4A	29.060365
Freshwater Forested/Shrub Wetland	PFO1R	1.406667
Estuarine and Marine Wetland	E2EM5P	0.784121
Freshwater Forested/Shrub Wetland	PFO1A	5.00628
Estuarine and Marine Wetland	E2EM5P	0.318748
Estuarine and Marine Wetland	E2EM5P	0.93624
Estuarine and Marine Wetland	E2EM5P	0.451513
Estuarine and Marine Wetland	E2EM5P	0.422177
Freshwater Pond	PUBHh	0.525132
Estuarine and Marine Wetland	E2USN	2.558917
Freshwater Forested/Shrub Wetland	PFO1A	0.357457
Freshwater Pond	PUBFx	0.526031

Natural Resources of Concern

Estuarine and Marine Wetland	E2USN	0.446223
Estuarine and Marine Wetland	E2EM5P	1.581119
Estuarine and Marine Wetland	E2EM5P	2.364169
Estuarine and Marine Wetland	E2EM5P	1.122758
Estuarine and Marine Wetland	E2EM5P	0.64134
Estuarine and Marine Wetland	E2EM5P	0.301412
Freshwater Emergent Wetland	PEM5A	0.338599
Estuarine and Marine Wetland	E2EM5P	0.833693
Estuarine and Marine Wetland	E2EM5P	0.686472
Freshwater Forested/Shrub Wetland	PFO1A	0.883826
Estuarine and Marine Wetland	E2EM5N	1.73693
Freshwater Forested/Shrub Wetland	PFO1/4A	0.929003
Freshwater Pond	PUBHh	1.006152
Estuarine and Marine Wetland	E2USN	1.546864
Estuarine and Marine Wetland	E2EM5P	3.74857
Estuarine and Marine Wetland	E2USN	15.123121
Freshwater Emergent Wetland	PEM5A	0.694511
Estuarine and Marine Wetland	E2USP	0.436597
Estuarine and Marine Wetland	E2EM5P	0.331392
Estuarine and Marine Wetland	E2EM5P	1.29608
Estuarine and Marine Wetland	E2EM5P	0.429907
Estuarine and Marine Wetland	E2EM5P	1.385327
Freshwater Pond	PUBHh	1.100715
Estuarine and Marine Wetland	E2USN	0.830452
Estuarine and Marine Wetland	E2EM5P	0.44462
Estuarine and Marine Wetland	E2EM5P	2.230139
Estuarine and Marine Wetland	E2USP	0.547198
Estuarine and Marine Wetland	E2EM5P	1.84348
Freshwater Forested/Shrub Wetland	PFO1C	3.75351
Estuarine and Marine Wetland	E2EM5P	1.265616
Freshwater Forested/Shrub Wetland	PFO4A	2.831023
Freshwater Forested/Shrub Wetland	PFO1S	0.677323
Estuarine and Marine Wetland	E2EM5P6	0.994428
Estuarine and Marine Wetland	E2EM5P	0.427793
Other	PUSC	0.098336
Freshwater Pond	PUBHx	0.247596

Natural Resources of Concern

Freshwater Forested/Shrub Wetland	PFO1A	0.43896
Estuarine and Marine Wetland	E2EM5P	16.220067
Estuarine and Marine Wetland	E2EM5P	0.643791
Estuarine and Marine Wetland	E2USN	0.59802
Freshwater Pond	PUBHh	12.596185
Estuarine and Marine Wetland	E2USN	0.303619
Estuarine and Marine Wetland	E2EM5P	3.002855
Estuarine and Marine Wetland	E2USN	2.977198
Freshwater Forested/Shrub Wetland	PFO1E	0.936159
Estuarine and Marine Wetland	E2SS1/EM5P	1.060885
Estuarine and Marine Wetland	E2EM5P	0.317051
Estuarine and Marine Wetland	E2EM5P	0.973468
Estuarine and Marine Wetland	E2EM5P	0.457703
Estuarine and Marine Wetland	E2EM5P	0.668737
Freshwater Forested/Shrub Wetland	PFO1/4A	0.20501
Estuarine and Marine Wetland	E2EM5P	1.95326
Estuarine and Marine Wetland	E2EM5P	0.462245
Freshwater Forested/Shrub Wetland	PFO4/1A	74.591991
Freshwater Forested/Shrub Wetland	PFO1S	1.192349
Freshwater Forested/Shrub Wetland	PFO1A	1.513566
Estuarine and Marine Wetland	E2USN	1.430179
Freshwater Forested/Shrub Wetland	PFO1A	1.060242
Estuarine and Marine Wetland	E2EM5P	0.384582
Estuarine and Marine Wetland	E2EM5P	1.814038
Estuarine and Marine Wetland	E2USP	0.900805
Freshwater Forested/Shrub Wetland	PFO1/EM5A	13.842704
Estuarine and Marine Wetland	E2EM5N	1.638026
Freshwater Forested/Shrub Wetland	PFO1R	1.848574
Estuarine and Marine Wetland	E2EM5P	9.559811
Estuarine and Marine Wetland	E2EM5P	0.288228
Estuarine and Marine Wetland	E2EM5P	0.25621
Freshwater Forested/Shrub Wetland	PFO1/4A	2.798476
Estuarine and Marine Deepwater	E1UB4L	0.157075
Estuarine and Marine Wetland	E2USM	46.657644
Estuarine and Marine Wetland	E2EM5P	2.468988
Estuarine and Marine Wetland	E2EM5P	1.226746

Freshwater Forested/Shrub Wetland	PFO1/4A	1.680033
Estuarine and Marine Wetland	E2EM5P	1.047084
Estuarine and Marine Wetland	E2EM5P	0.761557
Freshwater Forested/Shrub Wetland	PFO1/4A	10.962085
Freshwater Pond	PUBHx	0.791408
Estuarine and Marine Wetland	E2EM5P	4.180214
Freshwater Pond	PUBHxR	7.86082
Estuarine and Marine Wetland	E2EM5P	1.187428
Freshwater Emergent Wetland	PEM1A	1.223672
Freshwater Pond	PUBHh	1.333536
Estuarine and Marine Wetland	E2USM	59.272785
Estuarine and Marine Wetland	E2EM5P	0.617438
Freshwater Pond	PUBF	0.460804
Freshwater Pond	PUBFx	0.233348
Estuarine and Marine Wetland	E2USM	24.197343
Estuarine and Marine Wetland	E2EM5P	0.43061
Estuarine and Marine Wetland	E2EM5P	0.465646
Estuarine and Marine Wetland	E2EM5P	1.636394
Freshwater Forested/Shrub Wetland	PFO1/4A	4.259714
Estuarine and Marine Wetland	E2EM5P	0.483712
Freshwater Pond	PUBHh	1.230111
Freshwater Forested/Shrub Wetland	PFO1S	0.308686
Freshwater Forested/Shrub Wetland	PFO1/EM5A	9.323328
Estuarine and Marine Wetland	E2EM5P	0.636776
Estuarine and Marine Wetland	E2USN	0.60383
Estuarine and Marine Wetland	E2EM5P	1.485191
Estuarine and Marine Wetland	E2EM5P	10.029175
Freshwater Forested/Shrub Wetland	PFO1A	0.971576
Estuarine and Marine Wetland	E2EM5P	3.706282
Estuarine and Marine Wetland	E2EM5P	0.418457
Estuarine and Marine Wetland	E2EM5P	2.175634
Estuarine and Marine Wetland	E2USP	0.457715
Freshwater Pond	PUBFx	0.190843
Estuarine and Marine Wetland	E2USP	0.183689
Estuarine and Marine Wetland	E2USP	0.159709
Estuarine and Marine Wetland	E2USN	0.699047

Freshwater Forested/Shrub Wetland	PFO1A	0.88541
Estuarine and Marine Wetland	E2EM5P	1.416284
Estuarine and Marine Wetland	E2USN	0.644997
Estuarine and Marine Wetland	E2EM5P	0.385764
Freshwater Pond	PUBFh	2.686194
Estuarine and Marine Wetland	E2EM5P	1.623441
Freshwater Forested/Shrub Wetland	PFO1/4A	6.121539
Estuarine and Marine Deepwater	E1UB4L	0.132005
Freshwater Forested/Shrub Wetland	PFO1/4A	7.554163
Freshwater Forested/Shrub Wetland	PFO1A	1.120537
Estuarine and Marine Wetland	E2EM5P	1.143468
Estuarine and Marine Wetland	E2EM5P	1.013206
Freshwater Pond	PUBHh	1.28352
Freshwater Forested/Shrub Wetland	PFO/SS1R	0.618639
Estuarine and Marine Wetland	E2EM5P	0.776041
Freshwater Forested/Shrub Wetland	PFO1/4A	4.305532
Freshwater Forested/Shrub Wetland	PFO/SS1A	11.662038
Estuarine and Marine Deepwater	E1UB4L	0.768571
Estuarine and Marine Wetland	E2EM5P	0.266894
Freshwater Pond	PUBHx	0.295352
Estuarine and Marine Wetland	E2EM5P	3.770302
Estuarine and Marine Wetland	E2EM5P	1.467611
Freshwater Forested/Shrub Wetland	PFO1R	1.273792
Estuarine and Marine Wetland	E2USM	103.599832
Freshwater Pond	PUBHh	0.257529
Freshwater Emergent Wetland	PEM5A	0.717228
Estuarine and Marine Wetland	E2EM5P	0.298995
Freshwater Pond	PUBHx	0.644296
Estuarine and Marine Wetland	E2USN	1.033324
Freshwater Forested/Shrub Wetland	PFO1A	2.195083
Freshwater Forested/Shrub Wetland	PFO4A	1.162287
Estuarine and Marine Wetland	E2EM5P	0.615631
Freshwater Pond	PUBHx	0.304496
Freshwater Forested/Shrub Wetland	PFO1A	4.325886
Freshwater Forested/Shrub Wetland	PSS1C	0.736158
Estuarine and Marine Wetland	E2EM5P	0.220562

Freshwater Forested/Shrub Wetland	PFO1A	0.760187
Estuarine and Marine Wetland	E2USN	1.037701
Estuarine and Marine Wetland	E2EM5P	2.959971
Estuarine and Marine Wetland	E2USM	12.773723
Freshwater Forested/Shrub Wetland	PFO1A	0.558829
Freshwater Forested/Shrub Wetland	PFO1A	2.262042
Freshwater Forested/Shrub Wetland	PFO/SS1A	3.34289
Freshwater Emergent Wetland	PEM5EH	1.587898
Freshwater Forested/Shrub Wetland	PFO1S	0.668871
Estuarine and Marine Wetland	E2USM	7.135953
Estuarine and Marine Wetland	E2EM5P	0.724849
Estuarine and Marine Wetland	E2EM5P	0.124343
Freshwater Pond	PUBFh	0.187563
Estuarine and Marine Wetland	E2EM5N	0.803891
Estuarine and Marine Wetland	E2EM5P	0.529666
Estuarine and Marine Wetland	E2EM5P	0.66787
Freshwater Forested/Shrub Wetland	PSS1E	0.314775
Freshwater Pond	PUBHh	0.533233
Freshwater Pond	PUBHh	2.953132
Estuarine and Marine Wetland	E2EM5P	0.812164
Estuarine and Marine Deepwater	E1UB4Lx	0.270443
Estuarine and Marine Wetland	E2EM5P	0.720907
Estuarine and Marine Wetland	E2EM5P	0.783002
Estuarine and Marine Wetland	E2SS1/EM5P	0.933187
Estuarine and Marine Wetland	E2USP	0.583877
Estuarine and Marine Deepwater	E1UB4Lx	2.756979
Estuarine and Marine Wetland	E2SS1/EM5P	0.967005
Estuarine and Marine Wetland	E2EM5P	0.300028
Estuarine and Marine Wetland	E2USP	0.458117
Freshwater Pond	PUBHh	0.864585
Freshwater Emergent Wetland	PEM5A	1.420294
Estuarine and Marine Wetland	E2EM5P	0.603231
Estuarine and Marine Wetland	E2SS1P	0.316283
Estuarine and Marine Wetland	E2EM5P	1.578663
Freshwater Pond	PUBHh	12.300912
Estuarine and Marine Wetland	E2EM5P	3.381642

Freshwater Forested/Shrub Wetland	PFO1A	1.446322
Estuarine and Marine Wetland	E2EM5P	0.461804
Freshwater Forested/Shrub Wetland	PFO4A	1.533965
Freshwater Forested/Shrub Wetland	PFO4A	1.696693
Estuarine and Marine Wetland	E2EM5P	0.718362
Estuarine and Marine Wetland	E2EM5P	1.023421
Freshwater Forested/Shrub Wetland	PFO1A	1.941975
Estuarine and Marine Wetland	E2EM5P	0.373254
Estuarine and Marine Wetland	E2EM5P	1.12333
Estuarine and Marine Wetland	E2EM5N	0.670863
Estuarine and Marine Wetland	E2EM5P	1.712674
Freshwater Pond	PUBFh	0.903196
Estuarine and Marine Wetland	E2EM5P	0.214682
Estuarine and Marine Wetland	E2EM5P	0.165464
Estuarine and Marine Wetland	E2EM5P	2.778753
Freshwater Forested/Shrub Wetland	PFO1A	4.403306
Freshwater Forested/Shrub Wetland	PFO1/4A	2.541747
Estuarine and Marine Wetland	E2EM5P	4.042195
Freshwater Pond	PUBF	0.283989
Freshwater Pond	PUBHx	0.338187
Estuarine and Marine Wetland	E2EM5P	0.578902
Estuarine and Marine Wetland	E2USP	0.392226
Estuarine and Marine Deepwater	E1UB4L	0.892667
Estuarine and Marine Wetland	E2EM5P	6.229427
Estuarine and Marine Wetland	E2USN	0.434823
Estuarine and Marine Wetland	E2EM5P	0.474622
Estuarine and Marine Wetland	E2USP	0.537837
Estuarine and Marine Wetland	E2USP	0.212431
Estuarine and Marine Wetland	E2EM5P	1.388973
Freshwater Forested/Shrub Wetland	PFO1C	0.871726
Estuarine and Marine Wetland	E2EM5P	0.345223
Estuarine and Marine Wetland	E2EM5P	0.219309
Estuarine and Marine Wetland	E2SS1/EM5P	1.188422
Estuarine and Marine Wetland	E2EM5P	0.363868
Estuarine and Marine Wetland	E2EM5P	0.216054
Estuarine and Marine Wetland	E2EM5P	0.755705

Freshwater Forested/Shrub Wetland	PFO1A	2.437412
Estuarine and Marine Wetland	E2EM5P	1.200046
Estuarine and Marine Wetland	E2EM5P	1.600135
Freshwater Emergent Wetland	PEM1CHS	19.028253
Estuarine and Marine Wetland	E2EM5P	0.306385
Freshwater Forested/Shrub Wetland	PFO1A	0.566393
Estuarine and Marine Wetland	E2EM5P	1.149444
Freshwater Forested/Shrub Wetland	PFO1C	42.459247
Freshwater Forested/Shrub Wetland	PFO4A	1.623043
Freshwater Forested/Shrub Wetland	PFO1/4A	0.697841
Freshwater Pond	PUBHh	0.250449
Estuarine and Marine Wetland	E2EM5P	2.131827
Freshwater Forested/Shrub Wetland	PFO1J	4.978189
Estuarine and Marine Wetland	E2EM5P	0.301063
Estuarine and Marine Wetland	E2EM5P	0.813146
Estuarine and Marine Wetland	E2EM5P	1.521194
Estuarine and Marine Wetland	E2EM5P	0.204689
Estuarine and Marine Wetland	E2EM5P	0.524548
Estuarine and Marine Deepwater	E1UBL	0.774196
Estuarine and Marine Wetland	E2EM5P	4.362234
Estuarine and Marine Wetland	E2EM5P	0.312392
Estuarine and Marine Wetland	E2EM5P	2.25675
Estuarine and Marine Wetland	E2EM5P	0.506982
Freshwater Forested/Shrub Wetland	PFO1S	0.51184
Freshwater Forested/Shrub Wetland	PFO1/4A	14.497552
Estuarine and Marine Wetland	E2EM5P	5.828432
Freshwater Pond	PUBHx	0.167904
Estuarine and Marine Wetland	E2EM1P	3.665267
Freshwater Forested/Shrub Wetland	PFO1/4A	3.149057
Estuarine and Marine Wetland	E2SS1/EM5P	1.573301
Estuarine and Marine Wetland	E2EM5P	1.018965
Estuarine and Marine Wetland	E2EM5P	0.726282
Estuarine and Marine Wetland	E2EM5P	0.364918
Estuarine and Marine Wetland	E2EM5N	0.669948
Estuarine and Marine Wetland	E2EM5P	0.266211
Freshwater Forested/Shrub Wetland	PFO4A	1.051475

Estuarine and Marine Wetland	E2EM5P	0.182666
Freshwater Forested/Shrub Wetland	PFO1C	3.836919
Estuarine and Marine Wetland	E2EM5P	0.765847
Freshwater Forested/Shrub Wetland	PFO1C	0.271673
Estuarine and Marine Wetland	E2USP	0.429237
Estuarine and Marine Wetland	E2EM5P	2.397475
Estuarine and Marine Wetland	E2EM5P	2.467626
Freshwater Emergent Wetland	PEM1A	2.355945
Estuarine and Marine Wetland	E2EM5P	1.67493
Freshwater Pond	PUBHx	0.164052
Estuarine and Marine Wetland	E2USP	0.510318
Freshwater Forested/Shrub Wetland	PFO1E	2.152495
Freshwater Forested/Shrub Wetland	PFO1/4A	0.294856
Estuarine and Marine Wetland	E2EM5P	0.688085
Freshwater Forested/Shrub Wetland	PFO4/1A	1.83703
Estuarine and Marine Wetland	E2SS1/EM5P	1.520362
Freshwater Forested/Shrub Wetland	PFO1C	15.323088
Freshwater Pond	PUBH	0.242128
Freshwater Forested/Shrub Wetland	PFO1/4A	18.446537
Freshwater Pond	PUBHh	0.827815
Estuarine and Marine Wetland	E2EM5P	1.680839
Estuarine and Marine Wetland	E2EM5P	1.930456
Estuarine and Marine Wetland	E2USN	0.293299
Freshwater Forested/Shrub Wetland	PFO1R	0.24513
Freshwater Forested/Shrub Wetland	PFO1A	1.456926
Estuarine and Marine Wetland	E2EM5N	0.679154
Freshwater Pond	PUBHh	1.71619
Freshwater Forested/Shrub Wetland	PFO4A	5.97574
Freshwater Forested/Shrub Wetland	PFO4A	5.226562
Freshwater Forested/Shrub Wetland	PFO1A	0.835089
Estuarine and Marine Wetland	E2EM5P	0.794001
Freshwater Forested/Shrub Wetland	PFO4/1A	43.905116
Estuarine and Marine Wetland	E2EM5P	0.650239
Other	PUSC	0.338488
Estuarine and Marine Wetland	E2EM5P	1.548801
Estuarine and Marine Wetland	E2USN	0.355919

Freshwater Forested/Shrub Wetland	PFO4/1A	1.795927
Freshwater Forested/Shrub Wetland	PFO1/4A	0.246168
Estuarine and Marine Wetland	E2EM5P	0.542147
Estuarine and Marine Wetland	E2EM5N	1.017313
Freshwater Forested/Shrub Wetland	PFO1/4A	0.679668
Estuarine and Marine Wetland	E2EM5N	0.367071
Estuarine and Marine Wetland	E2USP	0.786511
Estuarine and Marine Wetland	E2USM	4.780923
Estuarine and Marine Wetland	E2SS1/EM5P	5.419866
Freshwater Forested/Shrub Wetland	PFO4A	3.078194
Estuarine and Marine Wetland	E2EM5P	1.030395
Freshwater Pond	PUBH	0.185302
Estuarine and Marine Wetland	E2EM5P	3.046631
Freshwater Forested/Shrub Wetland	PSS1R	3.438661
Freshwater Pond	PUBF	0.256451
Estuarine and Marine Wetland	E2USN	1.467158
Estuarine and Marine Wetland	E2SS1P	0.842803
Freshwater Pond	PUBHh	0.366077
Estuarine and Marine Wetland	E2EM5P	0.431346
Freshwater Forested/Shrub Wetland	PFO1A	4.841151
Other	PUSKCH	0.388661
Freshwater Forested/Shrub Wetland	PFO4A	1.278143
Estuarine and Marine Wetland	E2EM5N	0.572533
Freshwater Forested/Shrub Wetland	PFO1/4A	0.941196
Freshwater Forested/Shrub Wetland	PFO1A	0.557063
Estuarine and Marine Wetland	E2EM5P	0.239464
Freshwater Forested/Shrub Wetland	PFO1A	2.543259
Estuarine and Marine Wetland	E2USP	1.68089
Estuarine and Marine Wetland	E2EM5P6	2.798718
Freshwater Forested/Shrub Wetland	PFO1A	12.594302
Estuarine and Marine Wetland	E2USN	0.624621
Freshwater Forested/Shrub Wetland	PFO4A	4.761521
Freshwater Forested/Shrub Wetland	PFO1/4A	2.341431
Freshwater Forested/Shrub Wetland	PFO1/4A	3.136305
Freshwater Forested/Shrub Wetland	PFO1/4A	1.329962
Freshwater Forested/Shrub Wetland	PFO1A	2.557689

Estuarine and Marine Wetland	E2USP	0.168158
Estuarine and Marine Wetland	E2USM	6.305119
Estuarine and Marine Wetland	E2EM5P	1.192492
Estuarine and Marine Wetland	E2USN	0.41594
Freshwater Emergent Wetland	PEM5A	1.411623
Freshwater Forested/Shrub Wetland	PFO4/SS1R	2.919042
Estuarine and Marine Wetland	E2EM5P	0.22394
Estuarine and Marine Wetland	E2EM5P	1.046557
Freshwater Emergent Wetland	PEM5A	0.456964
Estuarine and Marine Deepwater	E1UBLH	0.593811
Estuarine and Marine Wetland	E2SS1P	0.697888
Estuarine and Marine Wetland	E2SS1P	1.506574
Freshwater Forested/Shrub Wetland	PFO4A	15.168873
Estuarine and Marine Wetland	E2EM5P	0.828424
Freshwater Emergent Wetland	PEM5A	0.414057
Freshwater Forested/Shrub Wetland	PFO1A	0.268279
Estuarine and Marine Wetland	E2USN	0.263246
Estuarine and Marine Wetland	E2EM5P	0.703814
Freshwater Pond	PUBFx	0.246353
Estuarine and Marine Wetland	E2EM5P	2.576342
Estuarine and Marine Wetland	E2EM5P	0.320615
Freshwater Pond	PUBH	0.321364
Estuarine and Marine Wetland	E2EM5P	3.42066
Estuarine and Marine Wetland	E2EM5P	2.05438
Freshwater Pond	PUBHh	3.469099
Estuarine and Marine Wetland	E2EM5P	2.355481
Estuarine and Marine Wetland	E2SS1/EM5P	3.62006
Freshwater Forested/Shrub Wetland	PFO1A	2.848417
Freshwater Forested/Shrub Wetland	PFO1R	7.099223
Estuarine and Marine Wetland	E2USN	0.458153
Freshwater Forested/Shrub Wetland	PFO1A	8.934338
Freshwater Forested/Shrub Wetland	PFO1R	0.76981
Estuarine and Marine Wetland	E2EM5P	1.754113
Estuarine and Marine Wetland	E2USP	0.466746
Estuarine and Marine Wetland	E2EM5P	0.574481
Estuarine and Marine Wetland	E2EM5P	6.713967

Freshwater Forested/Shrub Wetland	PFO1/4J	12.997362
Estuarine and Marine Wetland	E2USP	0.123756
Freshwater Forested/Shrub Wetland	PSS1A	0.439803
Freshwater Forested/Shrub Wetland	PFO1A	1.171086
Estuarine and Marine Deepwater	E1UB4L	0.955518
Estuarine and Marine Wetland	E2USP	0.377772
Estuarine and Marine Deepwater	E1UBLx	4.318881
Freshwater Forested/Shrub Wetland	PFO1/4A	14.507655
Estuarine and Marine Wetland	E2USN	2.943641
Freshwater Forested/Shrub Wetland	PFO4/1A	10.095491
Estuarine and Marine Wetland	E2EM5P	0.626883
Estuarine and Marine Wetland	E2EM5N	1.371422
Freshwater Pond	PUBHx	0.619097
Estuarine and Marine Wetland	E2EM5P	0.829607
Estuarine and Marine Wetland	E2EM5P	3.16959
Estuarine and Marine Wetland	E2EM5N	1.046109
Estuarine and Marine Wetland	E2EM5P	0.552586
Estuarine and Marine Wetland	E2EM5P	0.204135
Other	PUSC	0.098326
Estuarine and Marine Wetland	E2EM5P	0.185847
Estuarine and Marine Wetland	E2EM5P	3.162017
Freshwater Forested/Shrub Wetland	PFO1A	0.491111
Estuarine and Marine Wetland	E2EM5P	0.156686
Estuarine and Marine Deepwater	E1UBL	3.6855
Estuarine and Marine Wetland	E2EM5P	0.356821
Freshwater Forested/Shrub Wetland	PSS1C	2.46098
Estuarine and Marine Wetland	E2EM5P	3.568028
Freshwater Forested/Shrub Wetland	PFO1C	3.793616
Freshwater Forested/Shrub Wetland	PFO1/4A	34.648141
Estuarine and Marine Wetland	E2EM5P	3.465367
Estuarine and Marine Deepwater	E1UB4L	0.399917
Freshwater Forested/Shrub Wetland	PSS1R	0.627192
Estuarine and Marine Wetland	E2EM5P	1.000421
Estuarine and Marine Wetland	E2EM5P	0.336842
Estuarine and Marine Wetland	E2USN	10.953148
Freshwater Forested/Shrub Wetland	PFO1R	0.30389

Estuarine and Marine Wetland	E2EM5P	0.392993
Freshwater Emergent Wetland	PEM5A	2.645496
Freshwater Forested/Shrub Wetland	PFO4/1A	3.705421
Estuarine and Marine Deepwater	E1UB4Lx	0.323048
Estuarine and Marine Wetland	E2EM5P	0.682303
Estuarine and Marine Wetland	E2EM5P	0.495355
Estuarine and Marine Wetland	E2EM5P	1.533938
Freshwater Forested/Shrub Wetland	PFO4A	2.186262
Estuarine and Marine Wetland	E2EM5P	0.784545
Estuarine and Marine Wetland	E2EM5P	1.484013
Estuarine and Marine Wetland	E2EM5P	7.097825
Estuarine and Marine Wetland	E2EM5P	0.643482
Estuarine and Marine Wetland	E2USP	0.196477
Estuarine and Marine Wetland	E2EM5/USP	0.988046
Estuarine and Marine Wetland	E2EM5P	1.441046
Estuarine and Marine Wetland	E2USN	12.996076
Estuarine and Marine Wetland	E2EM5P	3.492522
Estuarine and Marine Wetland	E2EM5P	7.375502
Estuarine and Marine Wetland	E2EM5P	0.454967
Estuarine and Marine Wetland	E2EM5P	0.231309
Freshwater Forested/Shrub Wetland	PFO4A	3.919925
Estuarine and Marine Wetland	E2EM5P	4.417935
Freshwater Forested/Shrub Wetland	PFO1R	2.72213
Freshwater Forested/Shrub Wetland	PFO1S	0.747242
Estuarine and Marine Wetland	E2EM5P	2.366131
Estuarine and Marine Wetland	E2EM5P	1.409672
Estuarine and Marine Wetland	E2EM5/USP	0.445043
Estuarine and Marine Wetland	E2EM5P	0.754698
Estuarine and Marine Wetland	E2EM5P	0.336857
Estuarine and Marine Wetland	E2EM5P	0.394299
Freshwater Forested/Shrub Wetland	PFO1A	0.402808
Estuarine and Marine Wetland	E2USN	0.72753
Estuarine and Marine Wetland	E2EM5P	1.701318
Estuarine and Marine Wetland	E2USN	0.710742
Freshwater Forested/Shrub Wetland	PFO4/1A	2.337059
Estuarine and Marine Wetland	E2EM5P	0.636808

Estuarine and Marine Deepwater	E1UBL	1.677131
Freshwater Pond	PUBHh	0.564821
Estuarine and Marine Wetland	E2EM5P	5.878448
Estuarine and Marine Wetland	E2EM5P	3.486764
Estuarine and Marine Wetland	E2EM5P	0.29093
Estuarine and Marine Wetland	E2EM5/USP	0.247641
Estuarine and Marine Wetland	E2EM5P	0.298216
Estuarine and Marine Wetland	E2EM5P	2.863647
Estuarine and Marine Wetland	E2EM5P	1.839121
Estuarine and Marine Wetland	E2EM5P	0.68217
Freshwater Forested/Shrub Wetland	PFO1/4A	7.538536
Estuarine and Marine Wetland	E2USM	13.788355
Estuarine and Marine Wetland	E2USM	5.431215
Estuarine and Marine Wetland	E2EM5P	0.351408
Estuarine and Marine Wetland	E2EM5P	0.449499
Freshwater Pond	PUBFx	0.947354
Freshwater Forested/Shrub Wetland	PFO1A	1.339303
Estuarine and Marine Wetland	E2EM5P	0.26149
Estuarine and Marine Wetland	E2EM5P	6.326697
Freshwater Emergent Wetland	PEM5A	1.681091
Estuarine and Marine Wetland	E2EM5P	9.367174
Estuarine and Marine Wetland	E2EM5P	2.084732
Freshwater Emergent Wetland	PEM5A	0.292763
Estuarine and Marine Wetland	E2EM5P	1.243016
Estuarine and Marine Wetland	E2USP	1.186156
Freshwater Pond	PUBHh	3.920351
Estuarine and Marine Wetland	E2EM5P	1.250337
Estuarine and Marine Deepwater	E1UB4L	0.751548
Estuarine and Marine Wetland	E2EM5P	0.147637
Freshwater Emergent Wetland	PEM5A	0.059371
Estuarine and Marine Wetland	E2SS1/EM5P	1.63561
Freshwater Forested/Shrub Wetland	PSS1C	1.01977
Estuarine and Marine Wetland	E2EM5P	2.732892
Estuarine and Marine Wetland	E2EM5P	0.435193
Freshwater Emergent Wetland	PEM5AH	0.344133
Freshwater Pond	PUBHx	0.085179

Estuarine and Marine Wetland	E2EM5P	0.842786
Estuarine and Marine Wetland	E2EM5P	4.176585
Estuarine and Marine Wetland	E2EM5P	0.495787
Freshwater Forested/Shrub Wetland	PFO1/4A	95.113392
Estuarine and Marine Wetland	E2EM5P	0.911952
Freshwater Forested/Shrub Wetland	PFO1A	18.618676
Freshwater Forested/Shrub Wetland	PFO4A	7.960264
Estuarine and Marine Wetland	E2EM5P	5.809896
Freshwater Forested/Shrub Wetland	PFO1C	1.703908
Freshwater Pond	PUBHh	0.255144
Freshwater Forested/Shrub Wetland	PFO1A	1.835932
Estuarine and Marine Wetland	E2EM5P	0.257717
Freshwater Forested/Shrub Wetland	PFO1A	1.417277
Estuarine and Marine Wetland	E2SS1/EM5P	1.753227
Estuarine and Marine Wetland	E2EM5P	1.568028
Estuarine and Marine Wetland	E2EM5N	0.984144

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
NORTHEAST REGION
55 Great Republic Drive
Gloucester, MA 01930-2276

APR 15 2014

Daniel Bierly
Acting Chief, Civil Projects Development Branch
Department of the Army
Baltimore District, Corps of Engineers
P.O. Box 1715
Baltimore, MD 21203-1715

Re: Tred Avon River Oyster Restoration

Dear Mr. Bierly,

We have reviewed your letter received by us on March 17, 2014, regarding the proposed oyster restoration activities in the Tred Avon River in Maryland. The U.S. Army Corps of Engineers, Baltimore District is the action agency for these activities. You have requested our concurrence that the proposed action is not likely to adversely affect any species listed as threatened or endangered under the Endangered Species Act (ESA).

We have reviewed the proposed action, the project location, and timing of project activities and have determined that no species listed under our jurisdiction will be exposed to any direct or indirect effects of the proposed project. Based on this, we do not believe that a consultation in accordance with section 7 of the ESA is necessary. As such, NMFS Protected Resources Division does not intend to offer additional comments on this proposal. Should project plans change or new information become available that changes the basis for this determination, further coordination should be pursued. If you have any questions regarding these comments, please contact Chris Vaccaro of my staff (978-281-9167 or Christine.Vaccaro@noaa.gov).

Sincerely,

for Mary A. Colligan
Assistant Regional Administrator
for Protected Resources

Ec: Vaccaro, PRD/GAR
Boelke, HCD/GAR
Sowers, ACOE Baltimore

File Code: Sec 7 No species present 2014

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1715
BALTIMORE, MARYLAND 21203-1715

REPLY TO
ATTENTION OF

Planning Division

Ms. Mary Colligan
National Oceanic and Atmospheric Administration
Assistant Regional Administrator for Protected Resources
55 Great Republic Way
Gloucester, MA 01930

Dear Ms. Colligan:

The U.S. Army Corps of Engineers, Baltimore District (USACE-Baltimore) in conjunction with the Maryland Department of Natural Resources (MD DNR) and the National Oceanic and Atmospheric Administration Chesapeake Bay Office (NCBO) have developed a native oyster restoration plan for the Tred Avon River. USACE-Baltimore is additionally conducting a supplemental Environmental Assessment (EA) to investigate opportunities to expand oyster restoration activities within the Tred Avon River to shallower water depths. The intent of this letter is to solicit input from your agency and request a determination that the proposed oyster restoration work in the Tred Avon River is in compliance with Section 7 requirements of the Endangered Species Act (ESA).

Currently, USACE-Baltimore maintains 8 feet of navigational water depth clearance above all oyster restoration activities in compliance with its *Chesapeake Bay Oyster Recovery Project, Maryland* EA that was completed in 1996, and the 2009 *Chesapeake Bay Oyster Restoration Using Alternate Substrate, Maryland* EA. The 1996 EA identified six Oyster Recovery Areas (ORA's) in the Chester, Choptank, Magothy, Nanticoke, Patuxent, and Severn Rivers, and seed bar construction at two sites. USACE is proposing to remove the 8 foot clearance standard and replace it with a 5 foot water depth clearance to enable more expansive oyster restoration activities. Previous communications from NOAA (Christine Vaccaro/January 2014) identified that additional ESA consultation is required for oyster restoration in the Tred Avon River because an official consultation concurrence had not been obtained for the previously completed 2009 EA.

Current and future USACE-Baltimore oyster restoration efforts contribute to the oyster outcomes of the Chesapeake Bay Protection and Restoration Executive Order (E.O. 13508). USACE-Baltimore has been identified with NOAA to be co-leads for implementation of the oyster outcomes established by E.O. 13508. Furthermore, the Chesapeake Bay Program's Sustainable Fisheries Goal Implementation Team (GIT) has been charged with advancing the oyster goal of E.O. 13508. The GIT has now convened interagency workgroups in Maryland and Virginia to plan restoration work in each state, in consultation with appropriate partners. The Maryland Interagency Workgroup (MIW) is composed of representatives from NOAA, MD DNR, USACE-Baltimore, and the Oyster Recovery Partnership (ORP). The MIW is charged with developing and implementing large-scale oyster restoration plans towards meeting the oyster goal of E.O. 13508 and their respective agencies' goals. Based on consideration of salinity levels, available restorable bottom, protection from harvest, historical spat set, and other factors, MIW, in consultation with Maryland oyster restoration partners, selected the Tred Avon River for large-scale oyster restoration.

The Tred Avon River is one of the main subwatersheds draining to the lower Choptank River, which has historically been a major source of oysters, fish and other aquatic wildlife. MIW developed a tributary restoration plan that outlines an objective of restoring and rehabilitating 193 acres of oyster reef habitat. There are 120 acres of the 193 acre target that are designated as areas for substrate and seed planting. The remaining 73 acres is slated for seed planting only. Of the 120 acres to receive substrate, only 25 acres are at depths greater than 9 ft and are currently permitted to be restored. The majority of sites targeted for reef construction, USACE's primary role in Maryland oyster restoration, are within water depths between 6 and 9 feet. Therefore, it is necessary to evaluate expanding the water depths where oyster reef habitat restoration can occur to reach the restoration target of the tributary plan and provide the greatest likelihood that restored oyster resources will have a system-wide response and become self-sustaining. Historically, oysters did inhabit shallower waters, possibly stretching into intertidal depths. The proposed restoration areas are identified in the enclosed map of the ESA assessment.

NOAA has confirmed via email (dated January 28, 2014 from Christine Vaccaro) that four species of federally threatened and endangered sea turtles may be found in the project area as well as the federally endangered shortnose sturgeon (*Acipenser brevirostrum*) and Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*). The sea turtles potentially found in the project area are the federally threatened loggerhead (*Caretta caretta*), the federally endangered Kemp's ridley (*Lepidochelys kempi*), the federally endangered green sea turtle (*Chelonia mydas*), and the federally endangered leatherback sea turtles (*Dermochelys coriacea*).

Oyster restoration activities in the Tred Avon River would occur during winter months, and are not expected to have negative impacts on any of the listed species. MDNR has received a permit from USACE-Regulatory for similar restoration work in Harris Creek, another tributary of the Choptank River.

USACE-Baltimore has determined that there will be no negative impacts to rare, threatened, and endangered resources or critical habitats by this action. The Section 7 ESA Assessment is attached. USACE-Baltimore is requesting NOAA concurrence with this determination for compliance with Section 7 of the Endangered Species Act. Please provide a response within 30 days of the date of this letter. If you have any questions, please call Ms. Angie Sowers at (410) 962-7440.

Sincerely,

Daniel Bierly
Acting Chief, Civil Projects Development Branch

Enclosure

CF:
Peyton Robertson, NCBO

Tred Avon River Oyster Restoration

Section 7 Endangered Species Act Assessment

Prepared by U.S. Army Corps of Engineers, Baltimore District

March 2014

DESCRIPTION OF PROPOSED ACTION

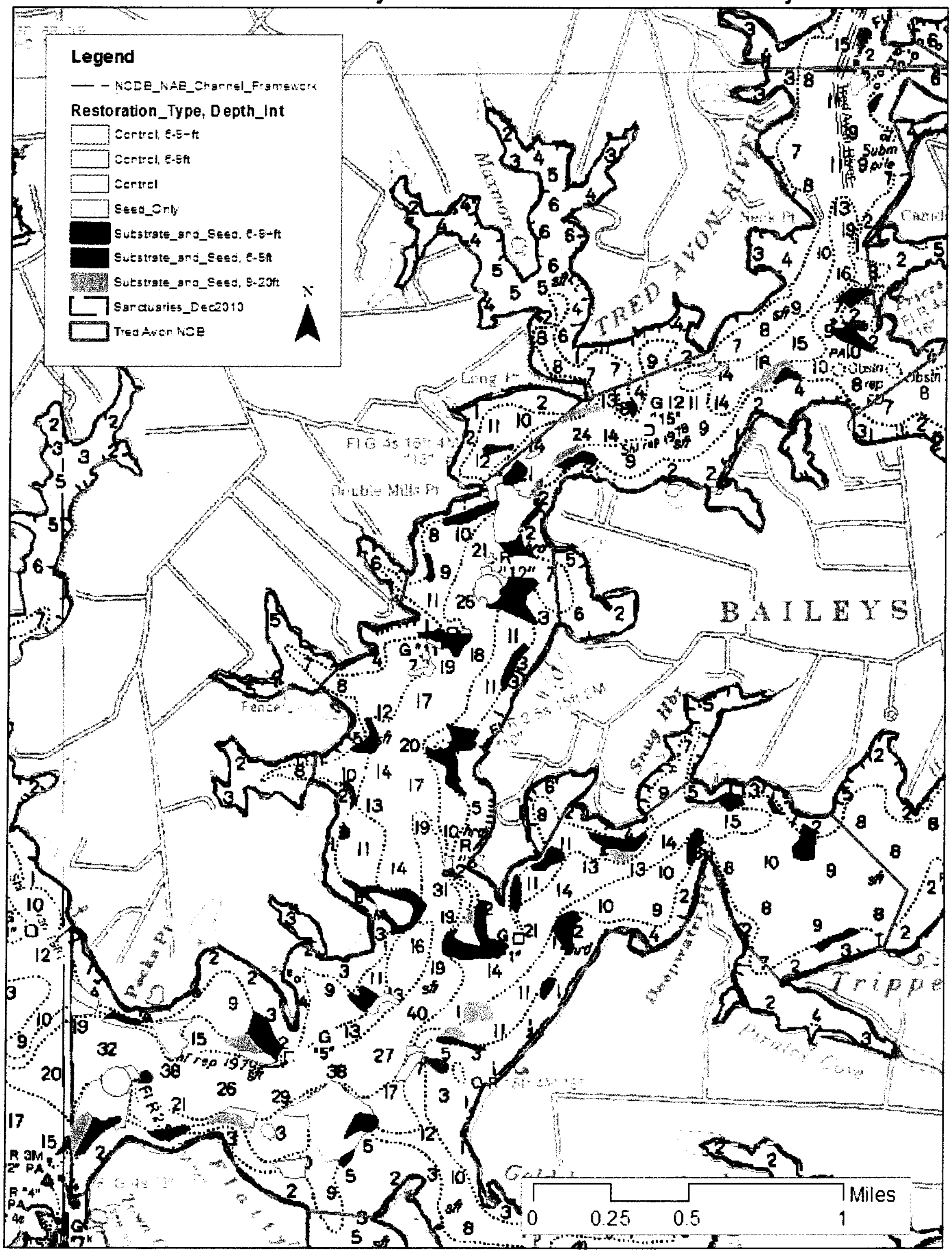
The Baltimore District of the U.S. Army Corps of Engineers (USACE-Baltimore), in cooperation with the Maryland Department of Natural Resources (MD DNR, non-federal sponsor), the National Oceanic Atmospheric Administration (NOAA), and the Oyster Recovery Partnership (ORP) is seeking to undertake large-scale native oyster restoration in the Tred Avon River, a tributary of the Choptank River. All work would be located within the boundaries of the oyster sanctuary and natural oyster bars (NOBs) within the Tred Avon River.

USACE is authorized under Section 704(b) of the Water Resources Development Act (WRDA) of 1986, as amended, to restore reef habitat for native oysters in the Chesapeake Bay. In 1996, the USACE-Baltimore produced a report entitled *Chesapeake Bay Oyster Recovery Project, Maryland* that identified six Oyster Recovery Areas (ORAs) including the Choptank River complex. In May 2002, the Baltimore District prepared an additional decision document to include project construction beyond 2000 and to increase the total project cost. This construction, known as Phase II, continues today. In May 2009, the Baltimore District completed a separate standalone EA that evaluated the use of alternate substrate materials for constructing reef habitat due to the shortage of fossilized shell entitled *Chesapeake Bay Oyster Restoration Using Alternate Substrate, Maryland.*

Also in 2009, the *Chesapeake Bay Protection and Restoration Executive Order* (E.O. 13508) was signed, calling on all federal agencies involved in Chesapeake Bay oyster restoration to formulate comprehensive strategies and to set clear and measurable goals for restoring native oyster habitat and populations in 20 tributaries by 2025. In response to the executive order, the USACE-Baltimore recognized that a more coordinated Bay-wide approach was needed throughout the Maryland and Virginia portions of the Chesapeake Bay to guide future oyster restoration efforts and the investment of federal funding. As a result, the 2012 USACE *Native Oyster Restoration Master Plan* (Master Plan) evaluated problems and opportunities for oyster restoration in tributaries of the Chesapeake Bay, formulated broad plans, and offered recommendations for implementation of large-scale oyster restoration. USACE and NOAA are co-leads for undertaking actions to meet the oyster objectives of E.O. 13508.

The Chesapeake Bay Program Sustainable Fisheries Goal Implementation Team (GIT) convened a Maryland Interagency Workgroup (MIW) to coordinate Maryland oyster restoration efforts. The members of MIW are USACE-Baltimore, NOAA, MDNR, and ORP. MIW has prioritized Maryland tributaries for restoration. The first tributary, that is currently undergoing large-scale oyster restoration, is Harris Creek. The Tred Avon River is the next tributary selected that involves USACE action. MIW has drafted a tributary plan and identified specific restoration sites. The sites would be restored using one of two restoration techniques. Those sites that have an exposed shell base and some nominal oyster population are planned to receive spat-on-shell (young oysters). Sites that have been determined to have a suitable hard bottom, but do not currently have oysters will receive up to 12 inches of alternate substrate plus spat-on-shell. The overall tributary plan for the Tred Avon River has targeted 193 acres for oyster restoration within water depths of 4 and 20 feet MLLW (Figure 1). There are 120 acres of the 193 acre target that are designated as areas for substrate addition with spat-on-shell planting; the remaining 73 acres

Tred Avon River Oyster Restoration Tributary Plan



Created by USACE 3/4/2014

Figure 1. Tred Avon Restoration Plan

only require spat-on-shell. Of the 120 acres, 25 acres are at depths greater than 9 ft. The remaining 95 acres lie between 6 – 9 ft MLLW. The majority of sites targeted for reef construction, USACE's primary role in Maryland, are located at depths shallower than 9 ft MLLW.

Ideally, oyster shell would be used to construct reef habitat, but there is an insufficient supply available to meet restoration needs. As such, potential alternate substrate for restoration includes (but is not limited to) clam shell, marl, concrete, stone, brick, and cinderblock. Any concrete rubble to be placed would be free of building debris such as wiring, pipes and other debris. No protruding re-bar is allowed. Concrete may also include man-made products formed into various shapes to provide benthic habitat (i.e., reef balls).

Alternate substrate reef habitat is constructed to elevate the oysters out of the bottom sediments. Typically, most reefs are built to a height of 12 inches (1 ft) off the bottom. A 1-foot reef height requires 1,613 cubic yards of substrate per acre. Therefore, to restore the proposed 120 acres, a total of 193,560 cubic yards of substrate will be placed in the Tred Avon River across 82 sites (58 substrate plus seed sites and 24 seed only sites). Sources of alternate materials vary. Stone is acquired from regional quarries. Mixed shell is available from wholesalers. Many of the shell sources are byproducts of commercial harvests including commercial clamming and other shellfish operations in the Mid-Atlantic, typically New Jersey and Delaware. Crushed concrete is generally produced from a demolition project such as the replacement of a bridge or building and is intermittently available. Cinderblock, porcelain, and brick are readily available for purchase or can possibly be obtained intermittently from demolition projects. Marl or marl limestone is a calcium carbonate or lime-rich stone which contains variable amounts of clays and aragonite. Marl is mined and is readily available. All materials used in this project would be clean and free of contaminants and hazardous materials. Stone (granite) and mixed shell are used almost exclusively.

Materials will be placed using a crane/excavator or front-end loader to place material on the oyster bar. Restored areas will also be planted with spat on shell. Spat-on-shell is planted by being washed overboard using high pressure water hoses or cannons off of a barge, with the vessel moving continuously through the planting area to control the thickness and acreage of the planting. Surface water pumped from the vicinity of the barge is used to wash the spat-on-shell overboard.

SPECIES OF CONCERN

The National Marine Fisheries Service (NMFS) has confirmed via email (dated January 28, 2014 from Christine Vaccaro) that four species of federally threatened and endangered sea turtles may be found in the project area as well as the federally endangered shortnose sturgeon (*Acipenser brevirostrum*) and Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*). The sea turtles potentially found in the project area are typically small juveniles with the most abundanct being the federally threatened loggerhead (*Caretta caretta*) followed by the federally endangered Kemp's ridley (*Lepidochelys kempi*). Federally endangered green sea turtles (*Chelonia mydas*) and federally endangered leatherback sea turtles (*Dermochelys coriacea*) also occur seasonally in the Chesapeake Bay.

Sea Turtles
Sea turtles are transient to the Chesapeake Bay, but very unlikely to be found in the project area. Sea turtles are typically found at highest densities near the Bay mouth. Kemp's ridley and loggerhead turtles are the most frequent visitors to the Chesapeake Bay. Loggerheads account for nearly 90% of the summer sea turtle population in the Chesapeake Bay (CBP 2005). Loggerheads have stranded as far north as Hart Miller Island, Baltimore County (Litwiler 2001). Leatherbacks have been found stranded as far north as Kent Island and Chester River Beach (Litwiler 2001). Kemp's ridleys have also been found stranded on Kent Island (Litwiler 2001). Leatherback sea turtles typically continue migrating north in the Atlantic Ocean past the Chesapeake Bay, but have been found stranded as far north as Kent Island and Chester River Beach, in Queen Anne's county. Sea turtles generally nest on high energy sand beaches along the eastern seaboard, south of the State of Maryland. No nesting is known to occur within the Chesapeake Bay (Evans et al. 1997).

Sea turtle presence in the Chesapeake Bay is tied to water temperatures. Sea turtles are present in the Chesapeake Bay in warmer months, typically May through late November, once water temperatures warm to greater than approximately 52°F (11°C) (Morrealle and Standora 2005). The greatest concentration of sea turtles is present from June through October. With declining fall water temperatures, sea turtles leave their coastal habitats and migrate southward. Water temperatures in the Tred Avon River are expected follow the same temporal pattern as those of the larger Chesapeake Bay. An analysis of water temperature data collected between January 1, 2009 and December 31, 2013 by the Chesapeake Bay Program shows that waters warm to above 52°F in April and cool to lower than 52°F in November at a Choptank River station outside the mouth of the Tred Avon River (CBP 2013).

The lower Chesapeake Bay is an important developmental and foraging habitat for sea turtles in the summer months. After overwintering in southern waters, sea turtles migrate north along the Atlantic coast to feed during the summer months. Loggerheads feed mostly on shellfish such as horseshoe crabs, clams, mussels, and other invertebrates. Kemp's ridleys prefer horseshoe crabs, but will consume other crustaceans, sea grasses, sponges, fish, mollusks, and snails. Loggerheads typically use channel edges (mean water depth of 9.4 m) whereas ridleys occupy shallower areas (mean water depth of 4.6 m) (Byles 1988). Kemp's ridleys distribution may be closely related to the location of seagrass beds where they can find a plentiful supply of crustaceans (Lutcavage and Musick 1985). Leatherbacks have been reported in the upper Bay (Hardy 1969 cited by Byles 1988*)* but are most frequently found at the Bay mouth. Leatherbacks are most likely drawn to the mouth to feed on jellyfish; the main constituent of their diet (Keinath et al. 1987). Young green turtles feed on worms, young crustaceans, aquatic insects, grasses and algae, but become strictly herbivorous as adults. Green turtles were historically recorded in the Chesapeake, but are now rarely found (Keinath et al. 1987). Sea turtles are not believed to be sensitive to increases in suspended sediments. However, increased sedimentation that impacts their prey, could indirectly affect sea turtles.

The greatest threats to sea turtles in the Chesapeake Bay are injury and death from boat propellers, accidental capture in pound nets, and ingestion of plastic refuse.

The Marine Mammal and Sea Turtle Stranding Program was established by the Maryland Department of Natural Resources (MDNR) at the Cooperative Oxford Laboratory (COL) in the fall of 1990. The network is responsible for the retrieval and examination of all dead stranded marine mammals and sea turtles in Maryland. The stranding network collects species identification, stranding location, and life history (morphometric) data in addition to investigating causes of death, and assessing human interaction from boat strikes, fisheries interactions, and entanglement or ingestion of marine debris.

308 dead stranded sea turtles were reported in Maryland (Chesapeake Bay and Atlantic Coast) between 1991 and 2003 (Kimmel 2004). Of the 308 reported, 123 were found in the Chesapeake Bay. The remaining 185 were reported from the Maryland portion of the Atlantic Coast and the coastal bays. Strandings of all four federally listed species have been reported in Maryland. Within the Maryland portion of the Chesapeake Bay, strandings have occurred from Tangier Sound to the mouth of Back River, but strandings were most heavily concentrated in Calvert and Saint Mary's counties along the western shore. Of the Chesapeake Bay strandings, loggerhead accounted for 91% of all stranding (n=112 turtles), 6% were leatherback (n=6), 3% were Kemp's ridley (n=3), and less than 1% (n=1) were unknown. No green sea turtles have been reported in the Chesapeake Bay (Kimmel 2004), although one was found along the Maryland Atlantic Coast in 2000. Monthly strandings data characterizes sea turtle use of the Chesapeake Bay during warm months. Sea turtle strandings occurred from May to November with a small number (2) being recorded in January. The highest concentration of strandings was in June (81), followed by July. No strandings were reported in the Tred Avon River, but three strandings have been recorded in the Choptank River between 1991 and 2014 (C.Driscoll, MDNR, personal communication).

Shortnose sturgeon
Shortnose sturgeons (*Acipenser brevirostrum)* are an estuarine species most prevalent in the upper Chesapeake Bay and within the Potomac River. SNS have been documented in the Chesapeake Bay since the 1600s, when settlers first colonized America. Historical records indicate that SNS were commonly found to inhabit the Potomac River in Maryland in the 1800s (Uhler and Lugger 1876). Few SNS have been reported in the Chesapeake Bay since the last known resident populations were considered extirpated in the 1970s (Dadswell et al. 1984). There is, however, a documented resident population in the Delaware River (Hastings et al. 1987).

Prior to 1998, no juveniles or spawning activity had been observed in the Chesapeake Bay for decades, leading to the assumption that a distinct population segment, or resident population, did not exist in the Chesapeake Bay. Speculation has been that overfishing, loss of habitat, and spawning impediments such as the Conowingo Dam have contributed to their decline or extirpation. When SNS were found in the bay over the last 20 years, it was generally believed that they were infrequent transients, non-resident adults that had traveled through the Inland Waterway, or C&D Canal, from the Delaware Bay into the Chesapeake Bay. Genetic assessments of the SNS in the Chesapeake Bay have indicated that those specimens analyzed are genetically similar to the Delaware River population that is currently stable (Wirgin et al. 2002).

Suitable and/or critical habitat for SNS in the Chesapeake Bay is currently unknown, due to their infrequent detection in the Bay. Spawning habitat has not been identified in the Chesapeake Bay. Spawning occurs in upper, freshwater areas, typically below the fall line (Kynard 1997) with cobble/gravel substrate, and areas of high flow. Feeding and overwintering activities may occur in both fresh and saltwater habitats. There is limited data available about the distribution, foraging, and overwintering of shortnose sturgeon in the Chesapeake Bay. SNS usually occur in the Chesapeake Bay at depths between 3.3 and 39.4 ft (1 and 12 m) (Kieffer and Kynard 1993, Savoy and Shake 2000, Welsh et al. 2000) although captures have been made at depths up to 60 ft. Typically, shortnose sturgeon are found at the deepest water depths with suitable dissolved oxygen and salinity. Due to the stress caused by high temperatures of summer surface waters SNS seek deep, cooler waters during warm seasons. They are opportunistic bottom forages.

The Maryland Sturgeon Reward Program provided a monetary reward to commercial fisherman for capture of sturgeon between October 1 and May 31 from 1996 and 2012. The program resulted in the reporting and documentation of SNS as incidental bycatch in gillnets, pound nets, catfish traps, fyke nets, hoop nets, and eel traps of watermen in the Chesapeake Bay. The reports came almost entirely from commercial fishermen so this was not an inclusive assessment of the areas where sturgeon might occur and the data was strongly influenced by the placement of fishing gear. Just because an area did not report captures does not indicate that sturgeon were absent. It could mean that there is simply no commercial fishing activity in that area. The ten year review of the program documented 75 captures of the endangered shortnose sturgeon with two of these sturgeon captured multiple times (USFWS 2007) and as of November 30, 2008, a total of 80 individual shortnose sturgeon had been captured in the Chesapeake Bay and its tributaries; with three additional recaptures (NOAA 2012). Most of the Reward Program captures occurred in the upper Bay, from Kent Island to the mouth of the Susquehanna River and the C&D Canal; in Fishing Bay and around Hoopers Island in the mid-Bay; and in the Potomac River toward the south (Skjeveland et al. 2000, Litwiler 2001, and Welsh et al. 2002).

There is no data to suggest the presence of SNS in the project area and none have been documented within the Tred Avon River. There is not suitable spawning habitat for shortnose sturgeon in the Tred Avon River. A Biological Assessment focused on SNS completed by USACE-Baltimore for dredging operations in the Chesapeake Bay documents no SNS captures from the Reward Program in the Choptank River system or within the Tred Avon River (USACE 2007). In fact, there was only one SNS capture identified in any tributary below the Chester River on the eastern shore of the Chesapeake Bay. Figure 2 shows the location of Reward Program captures.

Atlantic sturgeon

The Chesapeake Bay Atlantic sturgeon DPS was listed as endangered on February 6, 2012. Investigations have identified that the Chesapeake Bay population is a mixture of stocks from the Hudson River, Delaware River, and Chesapeake Bay (King et al. 2001). Atlantic sturgeon are found throughout the tidal waters of the Chesapeake Bay. The James River has the only known spawning population in the Chesapeake Bay. However, spawning may also occur in the York River, VA, and there is historical evidence that spawning did also occur in the Potomac, Susquehanna, and Rappahannock Rivers. Atlantic sturgeon are anadromous. Spawning adults migrate upriver between April-May in the mid-Atlantic. Spawning occurs below the fall line. Juveniles stay in brackish waters until reaching a size of 30-36 inches and then move to nearshore coastal waters (NOAA 2013). Subadults and adults primarily inhabit estuarine and marine waters, typically in shallow (10-50 m) nearshore waters with gravel and sand bottom

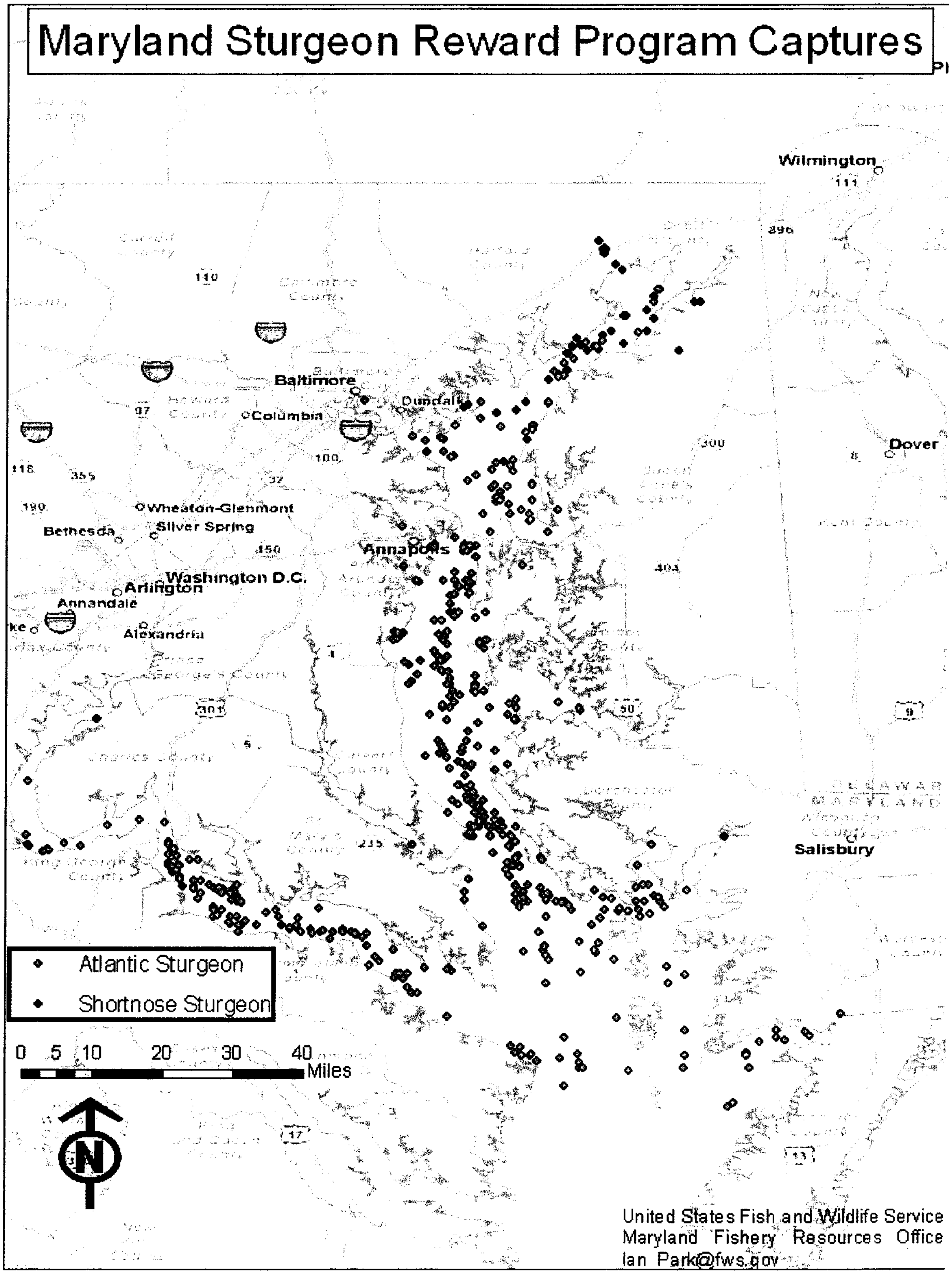


Figure 2. Maryland Sturgeon Reward Capture Locations (1996-2012)
Image provided by DNR.

(NOAA 2013). Atlantic sturgeon are benthic foragers feeding on crustaceans, worms, and mollusks (NOAA 2013).

There were 1,395 documented wild Atlantic sturgeon captures and 566 hatchery-reared Atlantic sturgeon captures between 1996 and 2006 (program terminated in 2012) through the Atlantic Sturgeon Reward Program (USFWS 2007). Some of these reports are multiple recaptures of individual fish. Captures were reported throughout the Chesapeake Bay in Maryland. The majority of captures occurred in the spring between April and June during the commercial pound net season (USFWS 2007). Virtually all Atlantic sturgeon captured or observed in Maryland's portion of the Chesapeake Bay since 1955 have been sub adults between 1 and 5 feet in length. No young of year fish have been captured.

Threats to Atlantic sturgeon include boat strikes, by-catch in other fisheries, degraded water quality, and habitat alterations from dredging.

A Biological Assessment focused on SNS completed by USACE-Baltimore for dredging operations in the Chesapeake Bay documents six Atlantic sturgeon captures by gill net in the Choptank River (USACE 2007). No captures were recorded within the Tred Avon River or any of the other smaller tributaries on the northern shore of the Choptank River system. Figure 2 shows the location of Reward Program captures.

DETERMINATION OF POTENTIAL IMPACTS

Sea Turtles
The proposed project is not expected to have any negative impacts on sea turtles. There have been no sea turtles identified in the Tred Avon River. Additionally, construction is projected for the time of year when sea turtles are not present in the Bay. Therefore, the potential impact to these species is high unlikely. In general, restored oyster reef habitat would be expected to enhance foraging habitat for Loggerheads and Kemp's Ridleys.

Shortnose sturgeon
The project is not anticipated to have any negative impacts on shortnose sturgeon. Shortnose sturgeon do not spawn in the Tred Avon River. The Tred Avon River system could be potential foraging and wintering grounds for shortnose sturgeon, but it is unlikely given the location of Reward Program Captures. If shortnose sturgeon were in the vicinity during construction, it is expected that they would be able to move from the area to avoid harm. Shortnose sturgeon are bottom feeders; they hunt for benthic animals such as mollusks, crustaceans, and worms in the mud. Restoration sites have been selected as to avoid mud bottom habitats. Therefore, it is expected that foraging habitat would not be negatively impacted by the placement of substrate reefs. Oyster reef habitat restoration is expected to increase the populations of reef-associated benthic organisms, and positively affect water quality; both, of which, could benefit shortnose sturgeon.

Atlantic sturgeon
The project is not anticipated to have any negative impacts on Atlantic sturgeon. Atlantic sturgeon do not spawn in the Tred Avon River. The Tred Avon River system could be potential

foraging and wintering grounds for Atlantic sturgeon, but it is unlikely given the location of Reward Program Captures. Atlantic sturgeon have been captured along the southern shore of the Choptank River, but not within the Tred Avon river, which lies on the northern shore. Available information states that Atlantic sturgeon prefer deep water (>10m) as wintering habitat. Restoration sites are situated between 6 and 20 ft MLLW which does not overlap the preferred depths of Atlantic sturgeon habitat. If Atlantic sturgeon were in the vicinity during construction, placement of materials into the water column and water removal for use in washing spat-on-shell from barges are the two actions that introduce potential impacts. Water for the cannons is removed from the surface and is therefore an unlikely risk to bottom dwelling sturgeon. It is expected that Atlantic sturgeon would be able to move from the area to avoid harm from placement of materials. Additionally, Atlantic sturgeon forage in the mud for prey. Restoration sites have been selected as to avoid mud bottom habitats. Therefore, it is expected that foraging habitat would not be negatively impacted by the placement of substrate reefs. Oyster reef habitat restoration is expected to increase the populations of reef-associated benthic organisms, and positively affect water quality; both, of which, could benefit Atlantic sturgeon.

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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
NORTHEAST REGION
55 Great Republic Drive
Gloucester, MA 01930-2276

FEB -6 2014

Mr. Daniel Bierly
Acting Chief, Civil Projects Development Branch
Baltimore District, Army Corps of Engineers
P.O. Box 1715
Baltimore, MD 21203-1715

Attn: Angie Sowers

Re: Tred Avon River Shallow Water Oyster Restoration, EFH Assessment

Dear Mr. Bierly,

We have reviewed the essential fish habitat (EFH) assessment submitted in association with the supplemental Environmental Assessment (EA) prepared to investigate expanding oyster restoration activities within the Tred Avon River, of Maryland's Eastern Shore. Specifically, you are proposing to remove the existing 8-foot clearance standard above restored oyster reefs in the Tred Avon River and replace it with a shallower 5-foot clearance standard. This change would allow for the expansion of reef building and seeding activities in areas of the Tred Avon oyster sanctuary with depths between 6 and 9 ft. MLLW, thus increasing the acreage available for oyster restoration activities designed to meet the goals of the Chesapeake Bay Protection and Restoration Executive Order (E.O. 13508).

Your office previously coordinated with Mr. John Nichols of our Annapolis, MD field office on the 2009 *Chesapeake Bay Oyster Recovery Using Alternative Substrate, Maryland* EA. As indicated in your *Shallow Water Oyster Restoration in the Tred Avon River Oyster Sanctuary* EFH assessment, the placement of natural shell or alternative substrate (non-shell) will be conducted at existing oyster bars within the Tred Avon River at water depths between 6 and 9 ft. MLLW. Some areas of substrate placement will occur adjacent (within 300 ft.) to existing submerged aquatic vegetation (SAV), designated a habitat area of particular concern (HAPC) for federally managed red drum and summer flounder. Mr. Nichols indicated in his email response (February 9, 2009) that a time of year restriction may be necessary to protect SAV from elevated turbidity within 500 yards of substrate placement for reef restoration. Provided the placement of reef material occurs between December and March of any year, as indicated in your EFH assessment, minimal adverse impact to adjacent SAV or HAPC is anticipated.

We support efforts underway by your office, the Chesapeake Bay Program's Sustainable Fisheries Goal Implementation Team (GIT) and Maryland Interagency Workgroup (MIW) to restore oyster reef habitat, critically important to various life stages of numerous state and federally managed species, in Maryland tributaries such as the Tred Avon River. Therefore, we concur with your determination that shallow water oyster restoration (between 6 and 9 ft. MLLW) in the Tred Avon River will not have a significant adverse effect on EFH or HAPC, and that over time the reefs will benefit water quality and aquatic habitat. Please feel free to contact Mr. David L. O'Brien of our Virginia field office at 804-684-7828 (david.l.o'brien@noaa.gov) if you have any questions or require additional information.

Sincerely,

Christopher Boelke
Field Offices Supervisor
Habitat Conservation Division

cc. Stephanie Westby, NOAA Restoration Center

From:	Christine Vaccaro - NOAA Federal
To:	Sowers, Angela NAB
Cc:	Armetta, Robin E NAB
Subject:	[EXTERNAL] Re: USACE Tred Avon River Oyster Restoration
Date:	Friday, March 13, 2015 9:58:10 AM

Hi Angie,
Yes, the changes to the project do not constitute the need to initiate consultation with us.

Good luck!

-Chris

Chris Vaccaro
Fisheries Biologist
Protected Resources Division
NOAA Fisheries
Gloucester, MA
Phone: 978-281-9167
Email: christine.vaccaro@noaa.gov

On Fri, Mar 13, 2015 at 9:47 AM, Sowers, Angela NAB <Angela.Sowers@usace.army.mil> wrote:

Hi Christine,

I hope you are doing well. I wanted to update you on our Tred Avon oyster restoration efforts. We are continuing to work on the supplemental EA for oyster restoration in the Tred Avon for which we received the attached letter from your office for consultation under Section 7 of the Endangered Species Act. We have a few changes to the plan that I wanted to coordinate with you for the ESA.

1. We have done some extensive coordination with local waterways users. From their input, it is necessary to increase the navigational clearance we were going to allow from 5 ft MLLW to 6 ft MLLW. This reduces the footprint slightly of our alternate substrate sites, but also adds the inclusion of 6-inch reefs to the previous plan which was exclusively 1-foot reefs. We are now planning for 60 acres of shallow water reef restoration. This includes 40 acres of 1-foot reefs between 7-9 ft MLLW as well as 20 acres of 6-inch reef in 6.5-9 ft MLLW. We also are in the process of constructing 24 acres of oyster reefs in waters deeper than 9 ft MLLW under our previous NEPA.

2. We would like to expand the supplemental EA from one that focused solely on expansion of our restoration efforts into shallow water depths (6-9 ft MLLW) to a supplemental EA that evaluates the full tributary plan that USACE, MDNR, and NOAA have developed. The difference is that the supplemental EA thus far evaluates our expansion of planting alternate substrates into shallow waters. If we broaden the EA, it will cover not only the placement of alternate substrates, but also the planting of spat-on-shell at shallower depths as well as spat-on-shell (seed only) plantings on existing oyster reefs between 4 and 20 ft MLLW. There are 105 acres of seed only reefs in the Tred Avon. Completing the alternate substrate reefs and the seed only plantings will result in a total restoration of 189 acres of oyster reef habitat in the Tred Avon. The spat-on-shell is all produced at the University of Maryland Horn Point Hatchery in Cambridge, MD. Only native oyster shell is used for setting.

Could you review the attached map and provide a determination as to whether NOAA is still in concurrence that the proposed project is not likely to adversely affect any species listed as threatened or endangered under the ESA? Please let me know if you would like any additional information in order to make your decision. We are shooting for a signed FONSI by the end of July.

Thank you,

From:	Guy, Chris
To:	Sowers, Angela NAB
Subject:	[EXTERNAL] Re: Tred Avon Oyster Restoration (UNCLASSIFIED)
Date:	Friday, July 10, 2015 10:09:36 AM

It is my understanding that the original FWCA and T and E request was for restoration in the Tred Avon watershed, It seems to me that the supplemental EA is really shifting strategies within the area we considered in our prior analysis. Therefore, we do not need to reevaluate the project. I appreciate if you can continue to keep me updated on the status of the project, so we can continue to support the oyster restoration efforts. Let me know if you have any further questions or need additional coordination with our office.

Thanks

Christopher P. Guy
US Fish and Wildlife Service
Chesapeake Bay Field Office
177 Admiral Cochrane Drive
Annapolis MD 21401
410-573-4529 Office
chris_guy@fws.gov

Chesapeake Bay Field Office e-newsletter at http://chesapeakebay.fws.gov

On Thu, Jul 9, 2015 at 11:20 AM, Sowers, Angela NAB <Angela.Sowers@usace.army.mil> wrote:

Classification: UNCLASSIFIED
Caveats: NONE

Hi Chris,
We are working to complete our shallow water Environmental Assessment for future Tred Avon River oyster restoration. We are not on track to meet the end of July deadline documented in the email below, however, I am working to wrap up loose ends. I provided the email below back in March. I don't recall a response as to whether there is any further coordination required for FWCA and ESA with the expansion of the scope of the Tred Avon River oyster restoration environmental assessment. Could you please let me know if the expansion of the scope of the supplemental EA described below to include seeding on existing reefs as well as seeding the proposed alternate substrate sites requires any additional coordination?

Thanks,
Angie

-----Original Message-----
From: Sowers, Angela NAB
Sent: Tuesday, March 10, 2015 2:31 PM
To: 'chris_guy@fws.gov'
Subject: (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Hi Chris,
I hope you are doing well. I am back from maternity leave. We had our third son, Luke, in November. We are

all great.

I wanted to update you on our Tred Avon oyster restoration efforts. We have some changes to the plan that I wanted to coordinate with you for the Fish and Wildlife Coordination Act as well as the Endangered Species Act. First, we have done some extensive coordination with local waterways users. From their input, it is necessary to increase the navigational clearance we were going to allow from 5 ft MLLW to 6 ft MLLW. This reduces the footprint slightly of our alternate substrate sites, but also adds the inclusion of 6-inch reefs to the previous plan for 1-foot reefs. We are now planning for 60 acres of shallow water restoration. This includes 40 acres of 1-foot reefs between 7-9 ft MLLW as well as 20 acres of 6-inch reef in 6.5-9 ft MLLW. We also are in the process of constructing 24 acres of oyster reefs in waters deeper than 9 ft MLLW under our previous NEPA.

Additionally, we want to expand the supplemental EA for oyster restoration in the Tred Avon from one that focused on expansion of our restoration efforts into shallow water depths (6-9 ft MLLW) to a supplemental EA that evaluates the full tributary plan. The difference is that the supplemental EA thus far evaluates our expansion of planting alternate substrates into shallow waters. If we broaden the EA, it will cover not only the placement of alternate substrates, but also the planting of spat-on-shell at shallower depths as well as seed plantings on existing oyster reefs between 4 and 20 ft MLLW. There are 105 acres of seed only reefs in the Tred Avon. This totals to restoration of 189 acres when efforts are complete in the Tred Avon.

Could you review the attached map and provide a determination as to whether the Fish and Wildlife Service is still in support of this project for FWCA and ESA? Please let me know if you would like any additional information. We are shooting for a signed FONSI by the end of July.

Thanks,
Angie

Classification: UNCLASSIFIED
Caveats: NONE

From:	Michelle Magliocca - NOAA Federal
To:	Sowers, Angela NAB
Subject:	[EXTERNAL] Re: FW: USACE Tred Avon River Oyster Restoration (UNCLASSIFIED)
Date:	Wednesday, July 15, 2015 9:30:43 AM

Hi Angie,

Thanks for the email. Our comments wouldn't be any different, so there is no need for further coordination on the supplemental. I appreciate all the updates as the restoration efforts evolve.

Michelle

On Thu, Jul 9, 2015 at 11:17 AM, Sowers, Angela NAB <Angela.Sowers@usace.army.mil> wrote:

Classification: UNCLASSIFIED
Caveats: NONE

Hi Michele,

We are working to complete our shallow water Environmental Assessment for future Tred Avon River oyster restoration. We are not on track to meet the end of July deadline documented in the email below, however, I am working to wrap up loose ends. I provided the email below to David back in March and I think it got overlooked in coordinating the spring deep water work. Could you please let me know if the expansion of the scope of the supplemental EA (documented in #20 below) to include seeding on existing reefs as well as seeding the proposed alternate substrate sites requires any additional coordination?

Thank you,
Angie Sowers

-----Original Message-----
From: Sowers, Angela NAB
Sent: Friday, March 13, 2015 9:29 AM
To: David L O'Brien
Cc: Armetta, Robin E NAB
Subject: USACE Tred Avon River Oyster Restoration

Hi David,

I hope you are doing well. I wanted to update you on our Tred Avon oyster restoration efforts. We are continuing to work on the supplemental EA for oyster restoration in the Tred Avon for which we received the attached EFH letter from your office. We have some changes to the plan that I wanted to coordinate with you for the Magnuson-Stevens Act.

1. We have done some extensive coordination with local waterways users. From their input, it is necessary to increase the navigational clearance we were going to allow from 5 ft MLLW to 6 ft MLLW. This reduces the footprint slightly of our alternate substrate sites, but also adds the inclusion of 6-inch reefs to the previous plan which was exclusively 1-foot reefs. We are now planning for 60 acres of shallow water reef restoration. This includes 40 acres of 1-foot reefs between 7-9 ft MLLW as well as 20 acres of 6-inch reef in 6.5-9 ft MLLW. We also are in the process of constructing 24 acres of oyster reefs in waters deeper than 9 ft MLLW under our previous NEPA.

2. We would like to expand the supplemental EA from one that focused solely on expansion of our restoration

efforts into shallow water depths (6-9 ft MLLW) to a supplemental EA that evaluates the full tributary plan that USACE, MDNR, and NOAA have developed. The difference is that the supplemental EA thus far evaluates our expansion of planting alternate substrates into shallow waters. If we broaden the EA, it will cover not only the placement of alternate substrates, but also the planting of spat-on-shell at shallower depths as well as spat-on-shell (seed only) plantings on existing oyster reefs between 4 and 20 ft MLLW. There are 105 acres of seed only reefs in the Tred Avon. Completing the alternate substrate reefs and the seed only plantings will result in a total restoration of 189 acres in the Tred Avon. The spat-on-shell is all produced at the University of Maryland Horn Point Hatchery in Cambridge, MD. Only native oyster shell is used for setting.

Could you review the attached map and provide a determination as to whether NMFS is still in support of this project for EFH and HAPC? Please let me know if you would like any additional information. We are shooting for a signed FONSI by the end of July.

Thank you,

Angie Sowers

Classification: UNCLASSIFIED
Caveats: NONE

--

Michelle Magliocca
NOAA Fisheries

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Larry Hogan, Governor
Boyd Rutherford, Lt. Governor

David R. Craig, Secretary
Wendi W. Peters, Deputy Secretary

Maryland Department of Planning
Maryland Historical Trust

November 2, 2015

Angie Sowers
Integrated Water Resources Management Specialist
U.S. Army Corps of Engineers
Baltimore District-Planning Division
10 South Howard St.
Rm 11700-E
Baltimore, Maryland 21201

Re: Tred Avon Oyster Restoration

Angie,

The State Historic Preservation Office, the Maryland Historical Trust (Trust) has completed review of 82 project areas identified in the Tred Avon River which are proposed for development as part of the Tred Avon Oyster Restoration Plan. The Trust understands that activities within these areas include placement of alternate substrate and seed on hard bottom containing little or no oyster shell, and placement of seed and oysters on existing oyster reefs.

Our library and program records currently indicate that there are no known historic properties or potential historic properties within the project areas. No cultural resources reconnaissance, identification, or evaluation studies have been undertaken and undocumented historic properties could exist within the project areas.

The Trust understands that acoustic and diver-led surveys typically are conducted by USACE, NOAA, MD DNR, or other agencies and organizations prior to placement of shell, alternate substrate, seed and/or oysters and/or as part of monitoring activities for ongoing oyster restoration projects in Maryland. The Trust requests notification if objects, structures, or geophysical anomalies that could indicate the presence of a historic property (e.g. structural timbers, rigging, machinery, and glass, ceramic, and/or metal artifacts that could indicate the presence of a historic shipwreck; concentrations of bone, stone, and/or ceramic artifacts that could indicate the presence of a prehistoric archeological site; or magnetic or bathymetric anomalies, side scan sonar contacts, or sub-bottom reflectors that could indicate the presence of the aforementioned items) are known or discovered by project partners and associates within or adjacent to the Tred Avon River oyster restoration project areas. The Assistant State Underwater Archeologist, Troy J. Nowak [troy.nowak@maryland.gov_(410) 514-7668], and/or the State Underwater Archeologist, Dr. Susan B. Langley [susan.langley@maryland.gov (410) 514-7662], should be contacted via telephone and email within 48 hours of the discovery.

If you have questions or require further assistance, please contact me at troy.nowak@maryland.gov or (410) 514-7668.

Sincerely,

Troy J. Nowak
Assistant State Underwater Archeologist
Maryland Historical Trust

Tred Avon River Oyster Sanctuary

USCG Coordination Record

U.S. Department of Homeland Security
United States Coast Guard

Commander
United States Coast Guard
Fifth Coast Guard District

431 Crawford Street
Portsmouth, Va. 23704-5004
Staff Symbol: (dpw)
Phone: (757) 398-6230
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Email: john.r.walters@uscg.mil

16670
November 09, 2012

J. Richard Jordan, III
Colonel, Corps of Engineers
District Engineer
Baltimore District, U.S. Army Corps of Engineers
P.O. Box 1715
Baltimore, Md. 21203-1715

Dear Colonel Jordan:

As requested in your letter of August 27, 2012, and following up on our interim response of September 13, 2012 and phone conversation on November 01, 2012, where you requested the Coast Guard's input and guidance on navigational concerns and constraints, I have thoroughly reviewed the Oyster Restoration Plan for Harris Creek with respect to navigation hazards. I have come to the conclusion that this plan, as proposed, will create a significant navigational risk and obstruction to mariners by placing oyster sanctuaries and reefs in marked channels. Due to the widespread distribution of the oyster sanctuaries and reefs outlined in this project, I am unable to ameliorate the risk, either by relocating the existing Aids to Navigation (AtoN) or by increasing their density. This inability to mitigate the risk could result in the removal of the AtoN altogether and virtual closure of the waterway to marine traffic.

The Coast Guard is providing comments to the Corps of Engineers to ensure navigational safety, while at the same time, remaining cognizant of the rationale for creating the oyster sanctuaries and reefs, which is restoration of the oyster population to Chesapeake Bay. For much of the past twenty years, as mentioned in the background section of the Tributary Plan, the Coast Guard has reviewed the proposed location of oyster reefs on a case by case basis, assessing individual sites in the context of existing AtoN, and has worked closely with the Corps of Engineers and state permitting agencies to place oyster reefs in various waterways throughout Chesapeake Bay. Primarily, the Coast Guard has recommended that reef materials be placed outside the marked waterway, i.e., between the shoreline and the existing AtoN, in order to not interfere with existing waterway use.

In an effort to provide you with navigation recommendations in response to your request, please accept the following recommendations for Harris Creek and all future restoration projects:

- Establishment of oyster sanctuaries and reefs to remain a minimum of 250 feet from established AtoN to allow for safe navigation and accessibility of servicing units. Placement of sanctuary or reef material should allow servicing units unobstructed ingress and egress access to the aid from the main channel;
- Oyster sanctuaries and reefs remain a minimum of 150 feet outside/shoreward of maintained channel limits;

- Where no established and maintained channel exists, establishment of oyster sanctuaries and reefs are to remain outside/shoreward of line segments extended between adjacent AtoN;
- If it is not possible to adhere to the reef placement recommendations provided above, conduct an Army Corps Waterways Risk Assessment to determine the effect of placing reef-based obstructions in a waterway. This methodology is currently being incorporated into the placement of renewable energy installations in the coastal marine environment and is conducted by the renewable energy infrastructure owner/permit applicant. Reef restoration projects should be assessed in a similar manner, since both reefs and offshore energy installations are obstructions being introduced into a waterway, thereby changing vessel operating conditions.

The Coast Guard sincerely appreciates the recent multi-agency and multi-state approach that your office has taken to restore oyster habitat throughout Chesapeake Bay. I hope that you are able to incorporate our recommendations, not only in this project, but future projects as you move forward.

If you have any questions or concerns, please feel free to contact Mr. John Walters at 757-398-6230.

Sincerely,

G.D. Case

G.D. CASE
Captain, U.S. Coast Guard
Chief, Prevention Division

Copy: CG Sector Baltimore

U.S. Department of Homeland Security
United States Coast Guard

Commander
Fifth Coast Guard District

431 Crawford Street
Portsmouth, Va. 23704-5004
Staff Symbol: (dpw)
Phone: (757) 398-6230
Fax: (757) 398-6303
Email: john.r.walters@uscg.mil

16670
March 6, 2013

Colonel J. Richard Jordan, III
District Engineer
U.S. Army Corps of Engineers Baltimore District
P.O. Box 1715
Baltimore, Md. 21203-1715

Dear Colonel Jordan:

As part of the ongoing dialogue with regard to navigation concerns as they relate to the oyster restoration in Harris Creek, I wanted to discuss some of the progress made and reiterate the Coast Guard's position. Since my last letter dated November 9, 2012, I discovered that there are two concurrent projects occurring in the Harris Creek tributary. The first one is your project that was initiated by Executive Order 13508. The second proposal is from the State of Maryland for which the State is separately applying for a USACE permit. My Waterways Management staff recently met with the geographic information system (GIS) experts from Maryland State Department of Natural Resources to discuss navigational aid placement in Harris Creek. As of our last dialogue with them, they intended to develop a chart to show the relationship between the oyster restoration conducted by the USACE and proposed State projects in relation to the navigable channel.

I remain concerned since these projects are still proceeding with oyster restoration in the middle of the navigable channel in Harris Creek. My recommendation, as outlined in my previous letter, is that USACE conduct a Waterways Risk Assessment, including an analysis of vessel traffic and consultation with local waterway users, to determine the effect of placing reef-based obstructions in a navigable waterway and ensure the permitted elevations are consistent with anticipated oyster restoration activity. Should the results indicate that eight foot project depths are acceptable for that waterway, then I recommend that USACE work closely with NOAA to ensure that the charts for Harris Creek are updated to reflect all of the restoration areas and associated project depths so mariners are duly informed.

As always, my staff is available should you need assistance on any of the recommendations outlined above. I appreciate your consideration. If you have any questions or concerns, please feel free to contact the Waterways Management section chief, Mr. John Walters, at 757-398-6230.

Sincerely,

G.D. Case

G.D. CASE
Captain, U.S. Coast Guard
Chief, Prevention Division

Copy: Commandant, U. S. Coast Guard (CG-5PW)
Commander, U. S. Coast Guard Sector Baltimore
Maryland Department of Natural Resources

From:	Albert.L.Grimes@uscg.mil on behalf of Grimes, Albert L CIV
To:	Sowers, Angela NAB
Cc:	Francis, Woody NAB
Subject:	RE: [EEMSG-SPAM: Suspect] Re: [EXTERNAL] FW: Reviewing (UNCLASSIFIED)
Date:	Wednesday, March 05, 2014 3:53:41 PM

Can you send shp files as you did with Harris Ck, so the cg can better make a navigational review. The chartlet(s) you forwarded leave multiple questions.

-----Original Message-----
From: Angela.Sowers@usace.army.mil [mailto:Angela.Sowers@usace.army.mil]

Sent: Thursday, February 20, 2014 8:39 AM
To: Grimes, Albert L CIV
Cc: Francis, Woody NAB
Subject: RE: [EEMSG-SPAM: Suspect] Re: [EXTERNAL] FW: Reviewing (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Hi Albert,
I don't have a chart made that will serve your purposes so I am providing the files. Attached is a GIS layer of the latest blueprint containing all the sites. If that doesn't work, the original GIS spatial database can be downloaded from NOAA's ftp site at http://ftp.ncbo.cgclientx.com/ecoscience/SWAP/For_MD_IA_Oyster_Work_Group/Tred_Avon_Blueprint/.

You would want the file named
Tred_Avon_BluePrint_GeoDatabase_02_11_2014.rar

Please let me know if neither of these routes work for you.

Thanks,
Angie

-----Original Message-----
From: Albert.L.Grimes@uscg.mil [mailto:Albert.L.Grimes@uscg.mil]
Sent: Tuesday, February 11, 2014 3:45 PM
To: Sowers, Angela NAB
Cc: Francis, Woody NAB; Stephanie Westby - NOAA Federal; Gross, Kimberly NAB; Weissberger, Eric
Subject: RE: [EEMSG-SPAM: Suspect] Re: [EXTERNAL] FW: Reviewing (UNCLASSIFIED)

When you return I will need to get a chart that has a better resolution or the files so we can chart. There are some areas that need a closer investigation.

-----Original Message-----
From: Angela.Sowers@usace.army.mil [mailto:Angela.Sowers@usace.army.mil]

Sent: Tuesday, February 11, 2014 3:02 PM
To: Grimes, Albert L CIV
Cc: Francis, Woody NAB; Stephanie Westby - NOAA Federal; Gross, Kimberly NAB; Weissberger, Eric
Subject: RE: [EEMSG-SPAM: Suspect] Re: [EXTERNAL] FW: Reviewing (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Hi Albert,
Here is the map of the Tred Avon River Oyster Restoration Plan. I will be out of the office until Feb 18, but after that I can discuss or answer any questions that you might have.

Thanks,
Angie

-----Original Message-----
From: Albert.L.Grimes@uscg.mil [mailto:Albert.L.Grimes@uscg.mil]
Sent: Monday, February 10, 2014 11:47 AM
To: Sowers, Angela NAB
Subject: RE: [EEMSG-SPAM: Suspect] Re: [EXTERNAL] FW: Reviewing (UNCLASSIFIED)

Let's start with the map please.

-----Original Message-----
From: Angela.Sowers@usace.army.mil [mailto:Angela.Sowers@usace.army.mil]

Sent: Monday, February 10, 2014 6:42 AM
To: Grimes, Albert L CIV
Subject: [EEMSG-SPAM: Suspect] Re: [EXTERNAL] FW: Reviewing (UNCLASSIFIED)

Hi Albert,
Would you like a map or the actual data in GIS?

Thanks,
Angie

----- Original Message -----
From: Grimes, Albert L CIV [mailto:Albert.L.Grimes@uscg.mil]
Sent: Friday, February 07, 2014 02:15 PM
To: Sowers, Angela NAB
Subject: [EXTERNAL] FW: Reviewing (UNCLASSIFIED)

Could you please provide proposed sites in the Tred Avon Waterway

-----Original Message-----
From: WOODY.FRANCIS@usace.army.mil [mailto:WOODY.FRANCIS@usace.army.mil]

Sent: Friday, February 07, 2014 1:30 PM
To: Grimes, Albert L CIV; Johnson, Tiffany LT
Cc: DaVia, Joseph NAB; Policarpo, John N NAB
Subject: RE: Reviewing (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Thanks Albert for info on Little Chop. As I explained we are addressing now the deep water work and the shallow water work will be on PN sometime in late Feb or early March.

Suggest you contact Angie Sowers Angela.sowers@usace.army.mil for info on Tred Avon, Regulatory is not involved with that action.

woody
-----Original Message-----
From: Albert.L.Grimes@uscg.mil [mailto:Albert.L.Grimes@uscg.mil]
Sent: Friday, February 07, 2014 1:18 PM
To: Francis, Woody NAB
Cc: Johnson, Tiffany LT
Subject: [EXTERNAL] Reviewing

LT Johnson and I are finalizing the Little Choptank information and hope to have that back to first of next week. We will confirm provided charted data. Please note Ron H has passed Sectors comments to us. Also could you please forward any Tred Avon preliminary information. That is a dynamic waterway with multiple users!

Albert Grimes
5th District Coast Guard (dpw)
VA./MD. Waterways Manager
757-398-6360 (W)
757-398-6303 (F)

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

From:	Grimes, Albert L CIV
To:	Sowers, Angela NAB
Subject:	[EXTERNAL] RE: Tred Avon River Oyster Restoration (UNCLASSIFIED)
Date:	Wednesday, October 07, 2015 7:12:45 AM
Attachments:	Simpson Douglas.vcf

Thank you, will forward to the district regulatory office, Doug, for his review and am sure he will get back with you if he has any questions comments. Take care.

-----Original Message-----
From: Sowers, Angela NAB [mailto:Angela.Sowers@usace.army.mil]
Sent: Tuesday, October 06, 2015 4:17 PM
To: Grimes, Albert L CIV
Cc: Stephanie Westby - NOAA Federal; Armetta, Robin E NAB; Ohl, Carol A NAB
Subject: Tred Avon River Oyster Restoration (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Hi Albert,
I hope this email finds you well. We have incorporated the general oyster restoration guidelines that you provided previously, but we wanted to provide you the opportunity to review the Tred Avon River Tributary Plan, if you would like. This plan was developed through the same process as the Harris Creek Oyster Restoration Tributary Plan by us, MD DNR, NOAA, and the Oyster Recovery Partnership. I believe we provided you an earlier version. We have incorporated the general guidelines that you provided as part of the Harris Creek process in identifying sites in this plan. USACE-Regulatory has also reviewed the plan. There are 24 acres of deep water (> 9 ft MLLW) reefs that we have existing NEPA covering. As such, we started work on these sites. 16 acres were constructed last spring/early summer and we are working to have the remaining 8 acres constructed this winter. The remainder of the work is alternate substrate reef construction between 6.5 and 9 ft MLLW or existing reefs that are planned to receive only spat-on-shell. The restoration target is 147 acres within the sanctuary. USACE is working on drafting a supplemental EA that evaluates the shallow water reef restoration.. As part of the process, we completed a resident survey that requested the water depths needed for navigation by the local waterway users as well as information on their typical paths throughout the tributary. Based on public input, we are proposing to provide 6 ft of water clearance above all restoration sites (as opposed to the 5 ft of clearance that is provided in Harris Creek). If it would be helpful, I can provide a GIS shapefile of the proposed sites.

Would it be possible to get any additional input by the end of October?

Thank you,
Angie

Angie Sowers, Ph.D.
U.S. Army Corps of Engineers
Baltimore District- Planning Division
Civil Project Development Branch
Integrated Water Resources Management Specialist

From:	Grimes, Albert L CIV
To:	Sowers, Angela NAB
Subject:	[EXTERNAL] RE: Tred Avon River Oyster Restoration (UNCLASSIFIED)
Date:	Tuesday, November 10, 2015 9:02:59 AM
Attachments:	Simpson Douglas.vcf

-----Original Message-----
From: Sowers, Angela NAB [mailto:Angela.Sowers@usace.army.mil]
Sent: Tuesday, November 10, 2015 8:58 AM
To: Grimes, Albert L CIV
Cc: Armetta, Robin E NAB; Bachur, Beth NAB
Subject: [Non-DoD Source] RE: Tred Avon River Oyster Restoration (UNCLASSIFIED)

Hi Albert,
Could you forward this email to Doug in your regulatory office? I apologize, but I don't have his last name or email.

We have done some additional analysis that includes identifying the navigational pathway in the Tred Avon River. Please see the attached figure and the discussion below that we have drafted to more completely address the analyses completed based on the guidelines USCG previously provided.

The guidelines provided for oyster restoration plan development (during the initial Harris Creek planning efforts) are:
1. Establishment of oyster sanctuaries and reefs to remain a minimum of 250 feet from established Aid to Navigation (A to N) to allow for safe navigation and accessibility of servicing units. Placement of sanctuary or reef material should allow servicing units unobstructed ingress and egress access to the aid from the main channel; 2. Oyster sanctuaries and reefs remain a minimum of 150 feet outside/shoreward of maintained channel limits (Note- maintained channel means Corps maintained channels-pers. comm. from John Walters USCG to Woody Francis Corps.) 3. Where no established and maintained channel exists, establishment of oyster sanctuaries and reefs are to remain outside/shoreward of line segments extended between adjacent A to N; 4. If it is not possible to adhere to the reef placement recommendations provided above, conduct an Army Corps Waterways Risk Assessment to determine the effect of placing reef-based obstructions in a waterway. This methodology is currently being incorporated into the placement of renewable energy installations in the coastal marine environment and is conducted by the renewable energy infrastructure owner/permit applicant. Reef restoration projects should be assessed in a similar manner, since both reefs and offshore energy installations are obstructions being introduced into a waterway, thereby changing vessel operating conditions.

These guidelines have been incorporated to the extent possible to enable large-scale restoration goals to be met. Recommendation #1 and 2 were fully incorporated. With regards to #3, there is no established and maintained channel in the Tred Avon River. Therefore, USACE conducted outreach with residents and commercial waterway users to address recommendation #4. A navigational path between the Aids to Navigation is depicted in the attached figure. This identifies the proposed restoration sites that fall within the area that USCG requested restoration avoid. Proposed restoration sites are largely along the edge of navigational path. With the exception of the area of Double Mills Point, the navigational pathway is largely clear of restoration sites, but there are a number of proposed sites along the edge of the navigational path. The navigational area off Double Mills Point in the middle of the sanctuary, contains largely control sites (grey in Figure 7) where no restoration will occur, or seed only areas (blue in Figure 7) that are currently existing oyster reefs and would experience a depth change of only 1 - 3 inches following restoration actions, but there are a few substrate placement sites within that area of the navigational pathway where water depths would be reduced up to 15 inches (up to 12 inches of substrate plus 1-3 inches of spat-on-shell). These sites proposed for reef construction are largely in waters deeper than 9 feet, but do typically have shoreward edges that are shallower than 9 feet. Some of these shallow edges are within the navigational pathway and some are shoreward of it. Due to the narrow course of the Tred Avon River and the limited suitable habitat available in the Tred Avon, USACE and MIW partners are proposing the plan with the sites included within the navigational pathway in order to enable large-scale oyster restoration goals to be achieved. There is sufficient water depth throughout this central area within the navigational pathway to provide a pathway for navigation and to prevent the restoration sites from obstructing navigation. Further, no issues were raised on these sites through the public outreach completed to evaluation navigational needs by resident and commercial waterway users.

Please let us know at your earliest convenience is you have any additional comments on the Tred Avon River Oyster Restoration Plan.

Thank you,
Angie Sowers

Angie Sowers, Ph.D.
U.S. Army Corps of Engineers
Baltimore District- Planning Division
Civil Project Development Branch
Integrated Water Resources Management Specialist
10 S. Howard St.
Rm 11700-E
Baltimore, MD 21201
angela.sowers@usace.army.mil
(410)962-7440

-----Original Message-----
From: Sowers, Angela NAB
Sent: Thursday, October 08, 2015 7:25 AM
To: Grimes, Albert L CIV <Albert.L.Grimes@uscg.mil>
Subject: RE: Tred Avon River Oyster Restoration (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Thank you.

-----Original Message-----

From: Grimes, Albert L CIV [mailto:Albert.L.Grimes@uscg.mil]
Sent: Wednesday, October 07, 2015 7:12 AM
To: Sowers, Angela NAB
Subject: [EXTERNAL] RE: Tred Avon River Oyster Restoration (UNCLASSIFIED)

Thank you, will forward to the district regulatory office, Doug, for his review and am sure he will get back with you if he has any questions comments. Take care.

-----Original Message-----
From: Sowers, Angela NAB [mailto:Angela.Sowers@usace.army.mil]
Sent: Tuesday, October 06, 2015 4:17 PM
To: Grimes, Albert L CIV
Cc: Stephanie Westby - NOAA Federal; Armetta, Robin E NAB; Ohl, Carol A NAB
Subject: Tred Avon River Oyster Restoration (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Hi Albert,

I hope this email finds you well. We have incorporated the general oyster restoration guidelines that you provided previously, but we wanted to provide you the opportunity to review the Tred Avon River Tributary Plan, if you would like. This plan was developed through the same process as the Harris Creek Oyster Restoration Tributary Plan by us, MD DNR, NOAA, and the Oyster Recovery Partnership. I believe we provided you an earlier version. We have incorporated the general guidelines that you provided as part of the Harris Creek process in identifying sites in this plan. USACE-Regulatory has also reviewed the plan. There are 24 acres of deep water (> 9 ft MLLW) reefs that we have existing NEPA covering. As such, we started work on these sites. 16 acres were constructed last spring/early summer and we are working to have the remaining 8 acres constructed this winter. The remainder of the work is alternate substrate reef construction between 6.5 and 9 ft MLLW or existing reefs that are planned to receive only spat-on-shell. The restoration target is 147 acres within the sanctuary. USACE is working on drafting a supplemental EA that evaluates the shallow water reef restoration.. As part of the process, we completed a resident survey that requested the water depths needed for navigation by the local waterway users as well as information on their typical paths throughout the tributary. Based on public input, we are proposing to provide 6 ft of water clearance above all restoration sites (as opposed to the 5 ft of clearance that is provided in Harris Creek). If it would be helpful, I can provide a GIS shapefile of the proposed sites.

Would it be possible to get any additional input by the end of October?

Thank you,
Angie

Angie Sowers, Ph.D.
U.S. Army Corps of Engineers
Baltimore District- Planning Division
Civil Project Development Branch
Integrated Water Resources Management Specialist
10 S. Howard St.
Rm 11700-E
Baltimore, MD 21201

From: Doug Simpson
To: Sowers, Angela NAB
Cc: douglas.c.simpson@uscg.mil
Subject: [EXTERNAL] Tred Avon Restoration Project
Date: Tuesday, March 22, 2016 10:21:21 AM

Angela,
I have reviewed the proposed plan and see no showstoppers. When I return to the office on Friday, I will summarize my findings and any recommendations and send them to you. My findings will simply point out areas that graphically represent potential infringement into the vicinity of aids to navigation. As long as the 250-foot radius around ATON is maintained, these instances will not be problematic. The recommendations will mainly focus on outreach to stakeholders who use waters away from the USACE maintained channel, hopefully drawing their attention to reefs or other depth changes in they areas they routinely use during the public comment period.
Sincerely,
Doug Simpson

Sent from my iPhone

From:	Simpson, Douglas C CIV
To:	Sowers, Angela NAB
Cc:	Houck, Ronald L CIV
Subject:	CG Comments on Tred Avon Oyster Restoration Project
Date:	Tuesday, March 29, 2016 3:06:01 PM
Attachments:	TredAvon_NavImpactsAnalysisFinal.docx Tred Avon Restoration.ppt

Hi Angela,

I reviewed the proposed plan using the TredAvon_NavImpactsAnalysisFinal.docx document. Although you provided a data layer, I was unable to import it into my geographic information system programs to provide thorough assessment. In lieu of this, I conducted side-by-side reviews of the project using graphics from the NavImpacts document against charts and GIS tools. In addition to comments below, I attached slides that depict areas under CG comment. Sincerely,

Doug Simpson

USCG Fifth District Waterways Management Branch

1. Charting. Please work closely with NOAA to ensure changes to the bottom are charted appropriately.

2. Trippe Creek. Because there are no federal channels within or above the project boundaries, there are no established controlling depths that this part of the maritime transportation system is specifically designed to meet, nor are there specific channel boundaries that make for an easy evaluation. To identify an area for an assessment of safe navigation, USACE proposed using the areas bounded generally by the assigned positions of USCG aids to navigation (ATON), based on an approach USACE used when conducting a previous assessment of a different waterway. We concur that this is a reasonable means to approach the assessment, as long as other regularly navigated waterways within the project area, like Trippe Creek, are similarly evaluated. If the 555 residents in the mass mailing included those on Trippe Creek, then we agree that navigation safety on that regularly used, but unmarked, waterway was addressed. Otherwise, please ensure outreach to residents on the creek is conducted. Addresses of such residents would include Baileys Neck Rd, Deep Water Dr, Hedges Ln, Pirates Cove Rd, Westland Rd, Canterbury Dr & Ct, Harleigh Ln, Country Club Dr, and Waterloo Dr in the 21601 and 21654 area codes.

3. Commercial use. USACE initially proposed using 5-feet of depth at MLLW as design criteria for the project. After reaching out to recreational waterway users, USACE changed the criteria to 6 feet depth within the marked waterway. A review of Nautical Chart 12266 indicates the Tred Avon marked waterway is a natural slough from its entrance to the northern reaches of commercial navigation at Easton, MD. The shallowest portion of the slough appears to be 7 feet, which occurs in the vicinity of Tred Avon River Light 18 (depicted in the very upper right corner of Figure 8 in the NavImpacts document). We do know that Vulcan Materials is at least one commercial entity upriver of the project which is dependent on the marine transportation system for the movement of goods by towing vesels. A review of historical (2011-2013) towing AIS density products from marinecadastre.gov indicates that towing vessels use the marked portion of Tred Avon (bu not unmarked areas like Trippe Creek). Proposed reef SS_55 appears to be directly in the path of towing vessels and barges. When issuing public notice, please contact Vulcan Materials and their marine transportation partners to see what depths they use when loading barges, ensuring they have the opportunity to review and comment on the proposed project. Reefs SS_55, SS_13, SS_58, and others may present risks to commercial traffic and should be evaluated against operating depths used by commercial traffic on the river.

4. Project activities near ATON. USACE used the rule of thumb of not placing seed or reefs within 250’ of

ATON. We agree with that distance. However, it appears that the graphically depicted buffer zones are not centered over many of our ATON. Please ensure 250' buffer exists around ATON.

5. Reefs projecting past fixed ATON. SS-13 and the reef immediately to the northeast of it project into the marked waterway past Light 10, SS_58 extends into the waterway past Daybeacon 11, SS_18 extends into the channel beyond Daybeacon 12. These reefs may require us to relocate fixed aids to navigation. Further analysis of the before and after bathymetry will be needed for us to determine whether relocating fixed ATON will be required.

6. NOAA's Tred Avon Lighted Data Buoy A appears to be inside the bounds of a proposed reef. Contact information for NOAA is attached in the slides.

From:	Simpson, Douglas C CIV
To:	Sowers, Angela NAB
Cc:	Houck, Ronald L CIV
Subject:	[EXTERNAL] RE: CG Comments on Tred Avon Oyster Restoration Project
Date:	Monday, April 11, 2016 11:56:21 AM

Angela,
Great summary. Here are CG responses to the open actions in your summary:
SS-58 - Please delete.
SS-18 - no probs.
SS-13 - So if you redraw the line connecting ATON, please remove that section of the reef channelward of that line.
Thanks again for taking the time to make sure CG's concerns are addressed!!
Sincerely,
Doug

Doug Simpson
Marine Information Specialist
USCG 5th District Waterways Management Branch
(757) 398-6346

-----Original Message-----
From: Sowers, Angela NAB [mailto:Angela.Sowers@usace.army.mil]
Sent: Tuesday, April 05, 2016 10:02 AM
To: Simpson, Douglas C CIV
Cc: Houck, Ronald L CIV
Subject: RE: CG Comments on Tred Avon Oyster Restoration Project

Hi Doug,
It was a pleasure working through the Tred Avon restoration plans with you
yesterday. Please see the attached memorandum for a record of the decisions

we made. I have that USCG is going to further review SS_13. Please also see
the questions I included for SS_58 and 18. I didn't capture our precise decision about 58 and we overlooked reviewing 18.

Please let me know if I captured any of our discussion incorrectly and when
you might be able to have a final decision about the few remaining sites. I

am working to wrap up outstanding reviewer comments and edits by the end of this week. I don't know how quickly you can turn around a response, but whatever you can do to help me resolve these last 3 sites, would be greatly appreciated. Also, when you get a chance, please ARMDEC the vessel trackline
and/or density data to me.

Thank you for working through this with us,
Angie Sowers

-----Original Message-----
From: Simpson, Douglas C CIV [mailto:Douglas.C.Simpson@uscg.mil]

Sent: Tuesday, March 29, 2016 3:03 PM
To: Sowers, Angela NAB <Angela.Sowers@usace.army.mil>
Cc: Houck, Ronald L CIV <Ronald.L.Houck@uscg.mil>
Subject: CG Comments on Tred Avon Oyster Restoration Project

Hi Angela,
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document. Although you provided a data layer, I was unable to import it
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In
lieu of this, I conducted side-by-side reviews of the project using graphics

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USCG Fifth District Waterways Management Branch

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555 residents in the mass mailing included those on Trippe Creek, then we
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Proposed reef SS_55 appears to be directly in the path of towing vessels and

barges. When issuing public notice, please contact Vulcan Materials and
their
marine transportation partners to see what depths they use when loading
barges, ensuring they have the opportunity to review and comment on the
proposed project. Reefs SS_55, SS_13, SS_58, and others may present risks
to
commercial traffic and should be evaluated against operating depths used by
commercial traffic on the river.

4. Project activities near ATON. USACE used the rule of thumb of not
placing
seed or reefs within 250' of ATON. We agree with that distance. However,
it
appears that the graphically depicted buffer zones are not centered over
many
of our ATON. Please ensure 250' buffer exists around ATON.

5. Reefs projecting past fixed ATON. SS-13 and the reef immediately to the

northeast of it project into the marked waterway past Light 10, SS_58
extends
into the waterway past Daybeacon 11, SS_18 extends into the channel beyond
Daybeacon 12. These reefs may require us to relocate fixed aids to
navigation. Further analysis of the before and after bathymetry will be
needed for us to determine whether relocating fixed ATON will be required.

6. NOAA's Tred Avon Lighted Data Buoy A appears to be inside the bounds of
a
proposed reef. Contact information for NOAA is attached in the slides.

Memorandum for Record
April 4/11, 2016
Tred Avon River Oyster Restoration – Project Coordination with U.S. Coast Guard (USCG)

On March 29, 2016, the U.S. Coast Guard (Doug Simpson, USCG Fifth District Waterways Management Branch) provided CENAB- Planning (Angie Sowers) the following comments on the proposed oyster restoration activities in the Tred Avon River via email.

On April 4, 2016, Doug Simpson and Angie Sowers met via webinar/phone to discuss USCG comments. Following each item below is a summary of the discussion, resolution, and/or path forward of each USCG comment. Follow-up conversation was conducted on April 11, 2106 to finalize the approach for SS_58, SS_13, and SS_18.

1. Charting. Please work closely with NOAA to ensure changes to the bottom are charted appropriately.

RESPONSE: Concur. USACE will continue ongoing efforts to have restored reef locations added to navigation charts.

2. Trippe Creek. Because there are no federal channels within or above the project boundaries, there are no established controlling depths that this part of the maritime transportation system is specifically designed to meet, nor are there specific channel boundaries that make for an easy evaluation. To identify an area for an assessment of safe navigation, USACE proposed using the areas bounded generally by the assigned positions of USCG aids to navigation (ATON), based on an approach USACE used when conducting a previous assessment of a different waterway. We concur that this is a reasonable means to approach the assessment, as long as other regularly navigated waterways within the project area, like Trippe Creek, are similarly evaluated. If the 555 residents in the mass mailing included those on Trippe Creek, then we agree that navigation safety on that regularly used, but unmarked, waterway was addressed. Otherwise, please ensure outreach to residents on the creek is conducted. Addresses of such residents would include Baileys Neck Rd, Deep Water Dr, Hedges Ln, Pirates Cove Rd, Westland Rd, Canterbury Dr & Ct, Harleigh Ln, Country Club Dr, and Waterloo Dr in the 21601 and 21654 area codes.

RESPONSE: Yes, residents in the Trippe Creek area were included in the mass mailing. We received responses from residents living on Baileys Neck Road, Pirates Cover Road, and Harleigh Lane. USCG and USACE agreed the restoration plan is appropriate for Trippe Creek waterway.

3. Commercial use. USACE initially proposed using 5-feet of depth at MLLW as design criteria for the project. After reaching out to recreational waterway users, USACE changed the criteria to 6 feet depth within the marked waterway. A review of Nautical Chart 12266 indicates the Tred Avon marked waterway is a natural slough from its entrance to the northern reaches of commercial navigation at Easton, MD. The shallowest portion of the slough appears to be 7 feet, which occurs in the vicinity of Tred Avon River Light 18 (depicted in the very upper right corner of Figure 8 in the NavImpacts document). We do know that Vulcan Materials is at least one commercial entity upriver of the project which is dependent on the marine transportation system for the movement of goods by towing vesels. A review of historical (2011-2013) towing AIS density products from marinecadastre.gov indicates that towing vessels use the marked portion of Tred Avon (but not unmarked areas like Trippe Creek). Proposed reef SS_55 appears to be directly in the path of towing vessels and barges. When issuing

public notice, please contact Vulcan Materials and their marine transportation partners to see what depths they use when loading barges, ensuring they have the opportunity to review and comment on the proposed project. Reefs SS_55, SS_13, SS_58, and others may present risks to commercial traffic and should be evaluated against operating depths used by commercial traffic on the river.

RESPONSE: USACE reviewed the restoration plans for these sites with USCG in GIS. USACE shared with USCG that coordination has occurred with Vulcan Materials. Input from Vulcan identified that their barges draw 8.5 to 9 ft, with a maximum of 9.5 ft.

Investigating site SS_55, it was discovered that this site was coded incorrectly in the tributary plan database as a shallow water site, when it is actually a deep water site in greater than 13 ft of water depth. With that information, USCG concurred that this site is not a concern for navigation in the waterway given that restoration efforts would still provide 11.75 ft of clearance upon the implementation of a 12 inch reef with a 1-3 inch spat on shell planting.

SS_13 was reviewed together. USCG captured a screen shot of the detailed bathymetry data from the webinar and will review further. The edge of this site that is closest to the ATON in the shallowest water may be adjusted or some other amendment may be proposed to the edge that is in the navigational pathway. Follow-up conversation on April 11 (documented via email) agreed to revising the navigational pathway line to connect the existing location of the ATONs in the vicinity of SS_13. The portion of SS_13 channelward of the redrawn navigational pathway line will be removed from the plan.

SS_58 was reviewed. Given that Vulcan needs 9.5 ft, it was agreed that this site would be removed from the plan.

USACE also identified that SS_08 may be an issue as it is located in the navigational pathway. USCG concurred, and this site will be removed from the restoration plan.

4. Project activities near ATON. USACE used the rule of thumb of not placing seed or reefs within 250’ of ATON. We agree with that distance. However, it appears that the graphically depicted buffer zones are not centered over many of our ATON. Please ensure 250’ buffer exists around ATON.

RESPONSE: USACE shared the following information on how the position of the ATONs were located in the tributary plan database to explain the discrepancy between the locations in the plan and those on the NOAA navigation charts:
The ATON point data comes latitudes and longitudes that USCG recorded on site and published in their Lightlist 2012 v2 and that were transcribed and converted to GIS (they do not disseminate digital spatial data) in 2013. NOAA nav charts are pictures that are rubbersheeted based on a few control points, so there will always be some error relative to actual GPS derived coordinates.

USCG concurred and agrees that based on the position of the ATONs in the Lightlist 2012 v2, that the restoration plans are correctly positioned outside the 250’ buffer. It was decided that to ensure that restoration activities do not mistakenly get placed within the 250’ buffer, the location of ATONs will be verified against the most current Lightlist when a construction contract award is being prepared. Also, language will be added into the contract to specify that the contractor should not build within 250’ of an ATON and if a contractor finds themselves within that buffer that they should contact USACE/work with QA/QC representative to not construct within that buffer.

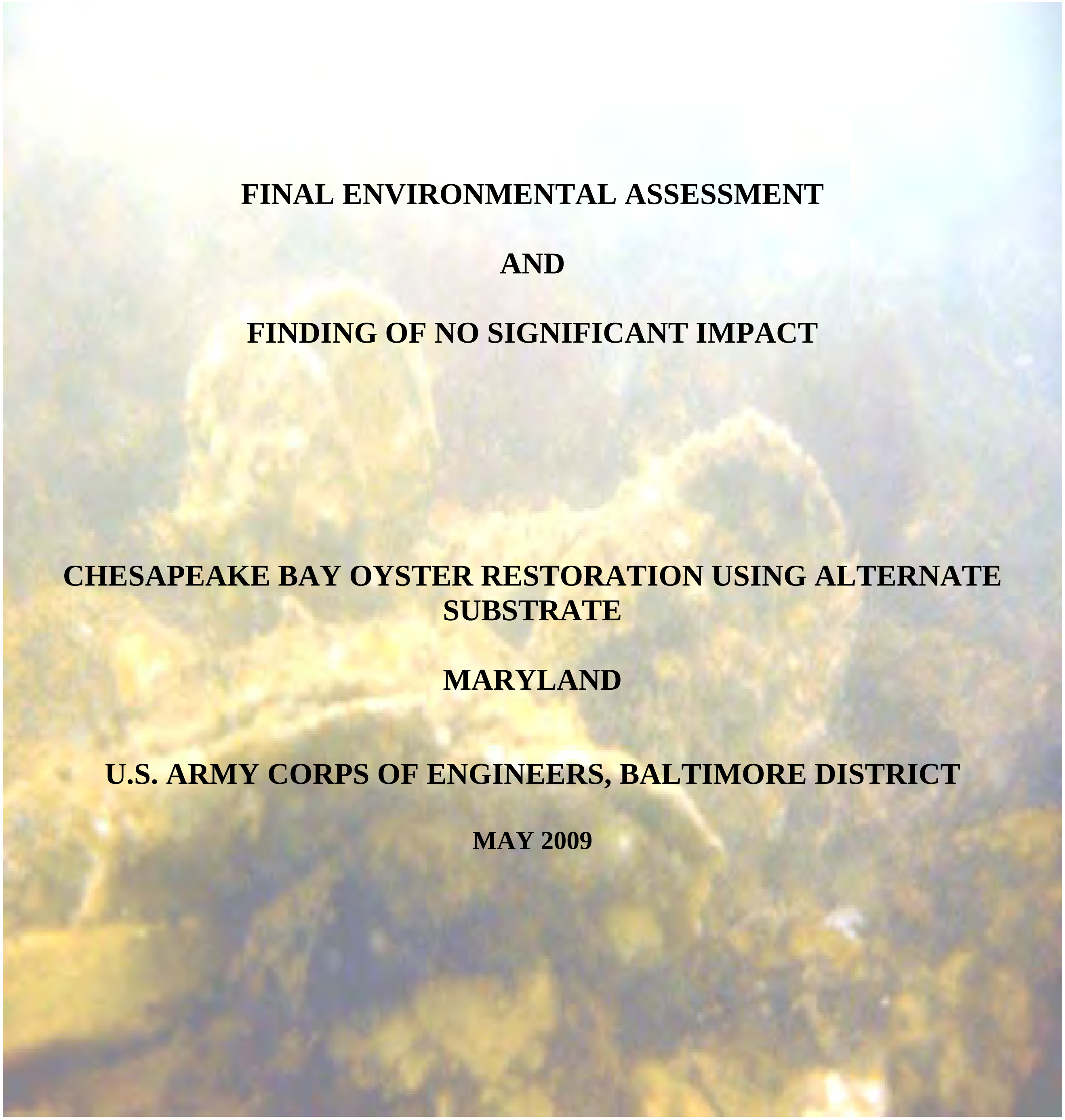
5. Reefs projecting past fixed ATON. SS-13 and the reef immediately to the northeast of it project into the marked waterway past Light 10, SS_58 extends into the waterway past Daybeacon 11, SS_18 extends into the channel beyond Daybeacon 12. These reefs may require us to relocate fixed aids to navigation. Further analysis of the before and after bathymetry will be needed for us to determine whether relocating fixed ATON will be required.

RESPONSE: These sites were reviewed together in GIS. SS_13 is under further review by USCG to determine any necessary boundary adjustments.

SS_58- addressed above

SS_18 – As the portion of this site that is within the navigational pathway is in water depths > 13.5 ft, it was agreed that this site will be kept, as is.

Appendix H – USACE 2009 Final Environmental Assessment and Finding of No Significant Impact: Chesapeake Bay Oyster Restoration Using Alternate Substrate Maryland.



FINAL ENVIRONMENTAL ASSESSMENT

AND

FINDING OF NO SIGNIFICANT IMPACT

CHESAPEAKE BAY OYSTER RESTORATION USING ALTERNATE SUBSTRATE

MARYLAND

U.S. ARMY CORPS OF ENGINEERS, BALTIMORE DISTRICT

MAY 2009

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DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1715
BALTIMORE, MARYLAND 21203-1715

FINDING OF NO SIGNIFICANT IMPACT

CHESAPEAKE BAY OYSTER RESTORATION USING ALTERNATE (NON-OYSTER SHELL) SUBSTRATE

MARYLAND

In 1996, U.S. Army Corps of Engineers, Baltimore District (USACE) completed a report, the *Chesapeake Bay Oyster Recovery Project*, Maryland which documents the plan formulation conducted by USACE and the non-Federal sponsor, Maryland Department of Natural Resources (MD DNR) for restoration in the Chesapeake Bay within the Oyster Recovery Areas of the Chester, Choptank, Patuxent, Severn, Magothy, and Nanticoke Rivers. Implementation of the eastern or American oyster (*Crassostrea virginica*) restoration recommendations made by this plan began in 1997 and is ongoing, but is restricted to using only oyster shell for substrate. A supplemental Environmental Assessment (EA) was prepared in 1999 to evaluate the construction of seed bars in the Eastern Bay of Queen Anne's County, Maryland. Additionally, another supplemental EA was prepared in 2002 that evaluated the cost effectiveness of USACE-led oyster restoration in order to continue construction activities. Oyster shell is in short supply. This has hampered past activities and is expected to impact future oyster restoration activities if alternate substrate is not used to create oyster bars and reefs.

USACE proposes the use of alternate substrate in addition to oyster shell to construct oyster bars and reefs within the Maryland portion of the Chesapeake Bay and its tidal tributaries. Restoration projects assessed for this action would be performed under the Corps' authority to restore native oysters codified in 33 U.S.C. § 2263. This construction is targeted to begin in spring/summer 2009, and will continue in annual cycles thereafter, subject to availability of funding. Potential substrate includes (but is not limited to) clam shell, marl, concrete, stone, slag, brick, and cinderblock. Any substrate utilized would be clean material and free of building debris such as wiring, pipes and other debris. No protruding re-bar would be allowed. Concrete may also include man-made products formed into various shapes to provide benthic habitat (i.e., reef balls).

USACE has prepared an EA documenting the expected project impacts of using alternate substrate for Corps projects implemented in the Maryland portion of the Chesapeake Bay. This EA was prepared in accordance with the provisions of the National Environmental Policy Act of 1969, as amended. Potential impacts from the proposed action were assessed with regard to the physical, chemical, and biological characteristics of the aquatic and terrestrial ecosystem, endangered and threatened species, hazardous and toxic materials, aesthetics and recreation, cultural resources, and the general needs and welfare of the public. This EA documents the overall effects of the proposed action and finds that there will be minor, temporary impacts, during construction to benthic organisms, local turbidity, recreational and commercial fishermen, fish (eggs, larval, and juvenile stages) as well as noise levels and aesthetics for residents. There will be a long-term beneficial impact and no long-term adverse impacts associated with the project.

In accordance with Section 404 of the Clean Water Act, a Section 404(b)(1) analysis was conducted for the proposed action. The analysis determined that the use of alternate substrate to create oyster bars and reefs would result in beneficial impacts to the aquatic environment. On August 13, 2008 USACE (Baltimore Operations Division) signed a FONSI and issued a permit under Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act to allow MD DNR to use alternate substrate materials to construct oyster sanctuaries and harvest reserves (Permit # CENAB-OP-RMN (MD DNR/Alternate Material) 2007-03659-M24).

Upon reviewing the EA, I find that the potential negative impacts to benthic and open water habitat associated with the implementation of the project will occur over a small area and will be short-term. The project will produce a net beneficial impact to the environment through the creation of habitat for oysters and other species associated with oyster communities and does not constitute a major Federal action significantly affecting the quality of the human environment. Based upon this finding, preparation of an Environmental Impact Statement (EIS) is not required.

Peter W. Mueller
Colonel, Corps of Engineers
District Engineer

Date: 29 May 2009

EXECUTIVE SUMMARY

As part of the Chesapeake Bay Oyster Recovery Project, Maryland the U.S. Army Corps of Engineers, Baltimore District (USACE) is undertaking the preparation of this environmental assessment (EA) to construct and cost share eastern or American oyster (*Crassostrea virginica* bar and reef restoration in the Maryland portion of the Chesapeake Bay and its tributaries using alternate (non-oyster shell) substrate, as authorized by Section 5021 of Water Resources Development Act (WRDA) of 2007. Previous oyster restoration efforts in this area by USACE have been limited to the use of clean oyster shell as substrate, which has become increasingly unavailable. The purpose of this proposed action is to enhance oyster propagation efforts in the Chesapeake Bay and six tidal tributaries (Chester, Choptank, Patuxent, Severn, Magothy, and Nanticoke Rivers) by seeding native oysters on alternate (non-oyster shell) materials. Taking this action within Maryland natural oyster bars (NOB's) will assist the regional effort of establishing an abundant and self-sustaining oyster population. These efforts support the Chesapeake Bay Program 2000 Agreement and 2005 Oyster Management Plan (OMP). The proposed project is located in the Chesapeake Bay and its tidal tributaries in Maryland. The non-Federal sponsor is the Maryland Department of Natural Resources (MD DNR).

Construction using alternate substrate rather than oyster shell is targeted to begin in spring/summer 2009 and continue thereafter in annual placement cycles subject to the availability of funds. Potential alternate substrate for construction includes (but is not limited to) clam shell, marl, concrete, stone, slag, brick, and cinderblock. Any concrete rubble to be placed would be free of building debris such as wiring, pipes and other debris. No protruding re-bar is allowed. Concrete may also include man-made products formed into various shapes to provide benthic habitat (i.e., reef balls). On August 13, 2008, USACE (Baltimore District Engineer) signed a Finding of No Significant Impact (FONSI) in response to a Permit Evaluation and Decision Document (EA) to permit MD DNR to use alternate materials to construct oyster sanctuaries and harvest reserves.

The Baltimore District prepared oyster restoration decision documents in 1996, 1999, and 2002. These reports address the use of oyster shell; not alternate substrate. Areas considered and addressed in the 1996 report are designated Oyster Recovery Areas (ORA's) within the following tributaries: Patuxent, Severn, Magothy, Chester, Choptank and Nanticoke Rivers. A supplemental EA was prepared in 1999 to evaluate the use of the Eastern Bay as a seed bar area for the project. Additionally, another supplemental EA was prepared in 2002 that evaluated the cost effectiveness of USACE-led oyster restoration in order to continue construction activities.

This project is authorized under Section 704(b) of WRDA 1986, as amended by Section 505 of WRDA 1996, Section 342 of WRDA 2000, Section 113 of the Energy and Water Development Appropriations Act (EWDA) of 2002, and Section 5021 of WRDA 2007. Section 505 of WRDA 1996 increased the authorization limit from $5 million to $7 million. Section 342 of WRDA 2000 further increased the project authorization limit to $20 million, as well as provided guidance on allowable project activities. Section 113 of the EWDA further modified the authorization to permit the non-Federal interest to provide its share, including the provision of suitable shell stock, as in-kind services, and permits USACE to consider such services provided on or after October 1, 2000. The authorization for the program is codified at 33 U.S.C. 2263, entitled ‘Study of Corps Capability to Conserve Fish and Wildlife’. One of the provisions of WRDA 2007 provides the USACE with authority to construct restore and rehabilitate habitat for fish, including native oysters, in the Chesapeake Bay and its tributaries in Maryland and Virginia, and to evaluate and use appropriate alternative substrate material for these projects.

The analysis conducted in this supplemental EA identifies minor, temporary, and short term adverse impacts from using alternate substrate. There is a net beneficial impact from this proposed action that will contribute to the restoration of oyster populations and overall ecology of the Chesapeake Bay.

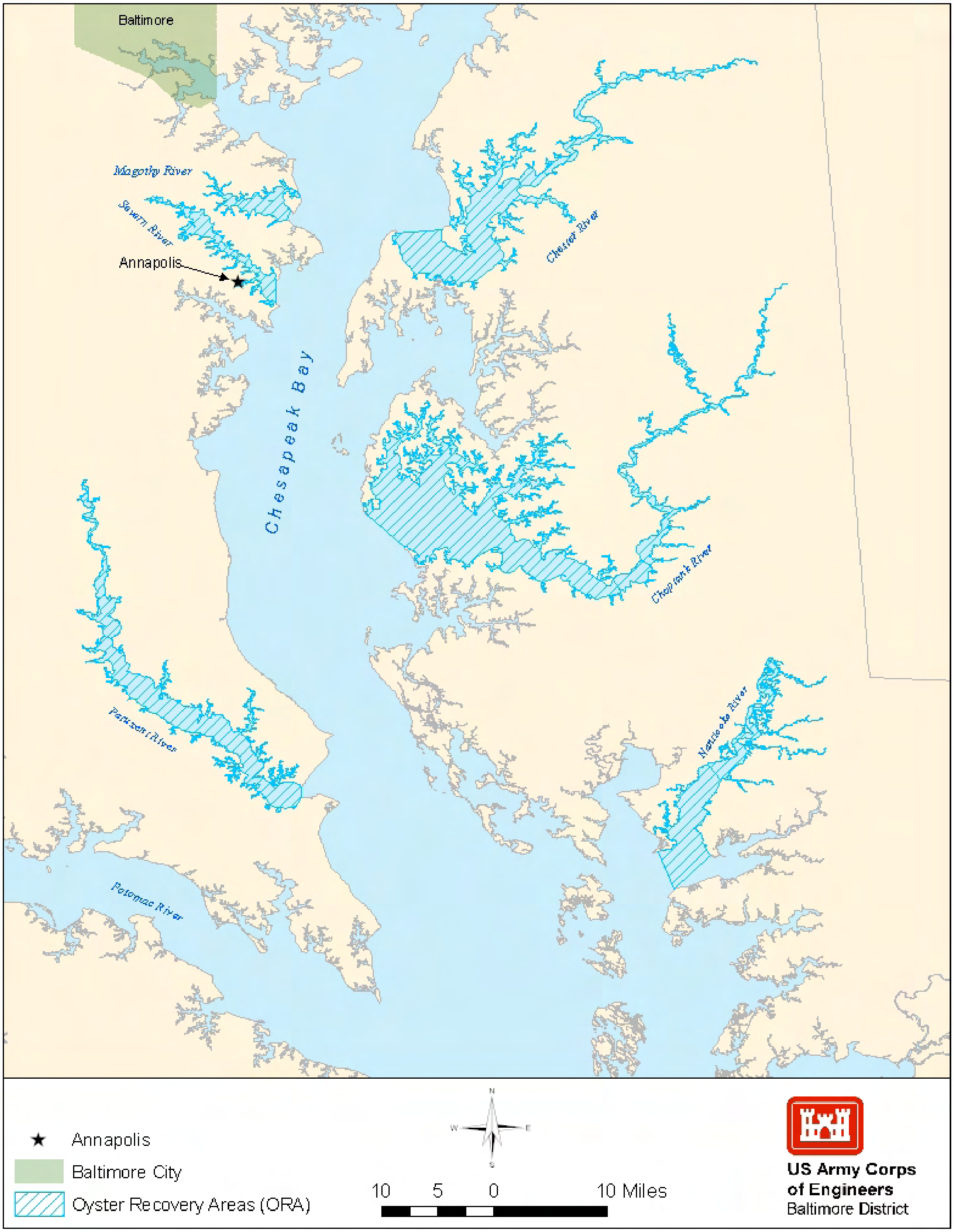
TABLE OF CONTENTS

1.0 INTRODUCTION

The U.S. Army Corps of Engineers, Baltimore District (USACE) is preparing this environmental assessment (EA) in compliance with the National Environmental Policy Act (NEPA). The EA addresses the use of alternate (non-oyster shell) substrate in Maryland waters as part of the USACE Chesapeake Bay Oyster Recovery Project. The overall purpose of the proposed alternate substrate project is to enhance eastern or American oyster (*Crassostrea virginica)* propagation efforts in the Chesapeake Bay and its tidal tributaries, specifically the Chester, Choptank, Patuxent, Severn, Magothy, and Nanticoke Rivers, in Maryland, by seeding native oysters on alternate substrate within natural oyster bars (NOBs). All previous oyster restoration efforts by USACE have been limited to the use of clean oyster shell as substrate which has become increasingly unavailable due to overharvesting and disease. This work, similar to all previous oyster restoration efforts by USACE in the Maryland portion of the Bay and its tributaries, aids in the rehabilitation of oyster bar habitat and the re-establishment of an abundant and self-sustaining oyster population. These efforts support the Chesapeake Bay Program (CBP) 2000 Agreement and 2005 Oyster Management Plan (OMP) prepared by the Environmental Protection Agency (EPA).

In 1996, USACE completed a report, the *Chesapeake Bay Oyster Recovery Project*, which documents the plan formulation conducted by USACE and the non-Federal sponsor, Maryland Department of Natural Resources (MD DNR). This supplemental EA for alternate substrate is consistent with the goal and authority of this recovery project which provides the bar and reef development material upon which to construct future bars and reefs. Implementation of the recommendations made by this plan began in 1997 and is ongoing, but is restricted to using only oyster shell for substrate. The 1996 EA proposed the following: creation of new oyster bars and rehabilitation of existing non-productive bars; construction of seed bars for production and collection of seed oysters or spat; planting of hatchery produced and seed bar spat on new and rehabilitated bars; and monitoring of implemented projects. Areas addressed in the 1996 report are designated Oyster Recovery Areas (ORA's) of the following tributaries: Patuxent, Severn, Magothy, Chester, Choptank and Nanticoke Rivers (Figure 1). A supplemental EA was prepared in 1999 to include the construction of seed bars in the Eastern Bay area. Additionally another supplemental EA was prepared in 2002 that evaluated the cost effectiveness of USACE-led oyster restoration in order to continue construction activities. Appendix F contains cover pages and authorization letters for these oyster decision documents.

Figure 1. Chesapeake Bay Oyster Recovery Areas



All previous oyster restoration efforts by USACE in these areas have been limited to the use of clean oyster shell as substrate. In order for USACE to construct and cost share oyster bar and reef restoration using alternate substrate, as was authorized by the Water Resources Development Act (WRDA) of 2007, USACE is undertaking the preparation of this EA. Construction using alternate substrate rather than oyster shell is targeted to begin in spring/summer 2009 and continue annually thereafter subject to the availability of program funds. Potential alternate substrate for construction includes (but is not limited to) clam shell, marl, concrete, stone, slag, brick, and cinderblock. Any concrete rubble to be planted would be free of building debris such as wiring, pipes and other debris. No protruding re-bar is allowed. Concrete may also include man-made products formed into various shapes to provide benthic habitat (i.e., reef balls).

On August 13 2008, USACE (Baltimore Operations Division) signed a Finding of No Significant Impact (FONSI) and issued a permit to MD DNR to use alternate materials to construct oyster sanctuaries and harvest reserves (Permit #CENAB-OP-RMN (MD DNR/Alternate Material) 2007-03659-M24) (Appendix E). The proposed action of this EA is the USACE-led equivalent of the permitted MD DNR action.

1.1 Authority

This project is authorized under Section 704(b) of WRDA 1986, as amended by Section 505 of WRDA 1996, Section 342 of WRDA 2000, Section 113 of the Energy and Water Development Appropriations Act (EWDA) of 2002, and Section 5021 of WRDA 2007. Section 505 of WRDA 1996 increased the authorization limit from $5 million to $7 million. Section 342 of WRDA 2000 further increased the project authorization limit to $20 million, as well as provided guidance on allowable project activities. Section 113 of the EWDA further modified the authorization to permit the non-Federal interest to provide its share, including the provision of suitable shell stock, as in-kind services, and permits USACE to consider such services provided on or after October 1, 2000. The authorization for the program is codified at 33 U.S.C. 2263, entitled 'Study of Corps Capability to Conserve Fish and Wildlife'. One of the provisions of WRDA 2007 provides the USACE with authority to construct restore and rehabilitate habitat for fish, including native oysters, in the Chesapeake Bay and its tributaries in Maryland and Virginia, and to evaluate and use appropriate alternative substrate material for these projects.

1.2 Study Area

The proposed project is located in the Chesapeake Bay and its tidal tributaries in Maryland and specifically on the designated ORA's of the following tributaries: Patuxent, Severn, Magothy, Chester, Choptank and Nanticoke Rivers (Figure 1) which is the same project area established in the 1996 document. The plantings of alternate material would take place on NOB's in the Chesapeake Bay.

1.3 Recent and Proposed Federal Actions Affecting the Study Area

The Chesapeake Bay Oyster Recovery Project has been performed in two phases: Phase I was conducted in 1996-2000 and Phase II activities were beyond 2000. A 2002 decision document entitled *Chesapeake Bay Oyster Recovery Project, Maryland* completed by USACE initiated Phase II construction beyond 2000. This document provided the basis to amend the project cooperation agreement (PCA) to extend the duration of construction activities and increased the project cost to $6.7 million. As in Phase I, MD DNR was the local sponsor. The activities implemented in Phase II projects were identical to those implemented under Phase I. Of the six areas authorized in Phase I, Phase II activities were limited to the Chester, Choptank, and Patuxent Rivers. The areas excluded for Phase II construction were judged to not have suitable substrate and environmental conditions. Phase II activities have resulted in the construction of 250 acres in the Chester, Choptank, and Patuxent Rivers between 2001 and 2008.

The original Phase I project was described in the C*hesapeake Bay Oyster Recovery Project, MD* report prepared by the Baltimore District in May 1996. The 1996 report covered construction activities and potential environmental impacts for the four-year period of 1997 through 2000. The report addressed alternatives, risk management, and included an EA and FONSI that were fully coordinated with the public and resource agencies. The 1996 report and EA recommended hatchery upgrades, seed bar construction, seed bar harvests and replanting, new bar construction, planting of hatchery-produced seed, and planting disease-resistant strains of native oyster in various locations in the Bay. This report evaluated actions in six ORAs: Chester, Choptank, Severn, Magothy, Nanticoke, and Patuxent Rivers plus the construction of seed bars near James Island and Smith Island in the lower portion of the Chesapeake Bay in Maryland. The Smith Island, James Island and the Eastern Bay (1999 EA) areas are not ORA's but are suitable for the growing of oysters to be used as seed oysters at ORAs.

Although evaluated as an alternative, the 1996 recommended plan did not include the use of alternate materials for bar construction other than the use of dredged material in geotextile tubes. At the time, the construction of oyster bars and reefs through the use of concrete and other materials was being addressed by the Maryland Artificial Reef Program and the CBP, and was therefore not included in further USACE projects. Phase I project construction activities through 2000 resulted in the creation of 99 acres of new bars at a cost of $3.3 million. The construction was carried out in the Choptank, Magothy, Patuxent, Chester, and Severn Rivers.

A supplemental EA *Construction of Seed Bars in Eastern Bay as part of Chesapeake Bay Oyster Recovery Project, MD* was completed by USACE-Baltimore in 1999. The 1999 report evaluated seed bar construction in Eastern Bay, the use of dredged material in geotextile tubes as an alternate substrate, and planting of hatchery seed. The use of dredged material for oyster restoration was determined to be infeasible due to time and funding constraints. Additionally, due to hatchery seed limitations at the time, the construction of seed bars in Eastern Bay was deemed to provide a better source of seed for restoration activities.

Additionally, the non-profit group, Oyster Recovery Partnership (created in 1994) works with experts in their respective fields and management agencies including National Oceanic and Atmospheric Agency (NOAA), USACE, and MD DNR to coordinate oyster restoration efforts among state and federal governmental agencies, scientists, watermen and conservation organizations. Experts include scientists from the University of Maryland Center for Environmental Science (UMCES) environmental organizations like the Chesapeake Bay Foundation and Maryland watermen. Since 1994, the Maryland Oyster partners have planted more than 1.6 billion oysters on 1,100 acres, a majority of which are permanently protected and managed. Production output has increased from 15 million oysters per year, to a record 525 million, disease-free, spat on shell in 2008 https://www.oysterrecovery.org/.

Baywide funds contributed by Maryland, Virginia and Federal government agencies such as the NOAA, USACE, and others, to support in-water restoration of the native oyster population and recovery of the fishery throughout the Chesapeake Bay totaled approximately $17 million for sanctuaries and $41 million for harvest areas from 1994 through 2006 (USACE, 2008). The current high rate of loss of oyster habitat from overharvesting and disease is estimated at 2,600 acres per year (USACE, 2008). This high rate of loss combined with the disappearance of sources of oyster shell for enhancing habitat are generally recognized as major obstacles to all oyster restoration efforts. As implemented to date, management programs have produced no substantial increase in oyster harvests over the past decade. The likelihood of attaining the Chesapeake 2000 goal of a standing oyster population that is 10 times greater than the 1994 baseline by the year 2010 appears small (USACE, 2008).

Currently, the USACE, Baltimore and Norfolk Districts are jointly preparing a Native Oyster Restoration Master Plan (NORMP) that will be instrumental in large scale oyster restoration for the entire Bay. Maryland and Virginia historically have managed oysters in their respective portions of the Bay separately, using a combination of harvest restrictions, size limits, habitat enhancement, and planting of seed oysters to support the oyster fishery.

In addition to the development of the NORMP, each state continues to have separate programs for restoration in their respective portions of the Chesapeake Bay. Over the next three years, MD DNR plans on implementing recommendations made by the Oyster Advisory Commission (OAC) report. This report was released in 2009 and includes investing in training and infrastructure to encourage aquaculture, undergoing oyster bar rehabilitation, reopening the Piney Point Hatchery for seed production, and investing in cameras to monitor oyster sanctuaries to deter poaching. The Virginia Marine Resources Commission (VMRC) plans on implementing recommendations made by the Blue Ribbon Oyster panel report which was released in 2007 including the creation of larger oyster sanctuaries, rotating oyster bars for harvesting, and developing a commercial fishery for cownose rays which are a predator of oysters. NOAA was recently appropriated $4.6 million dollars for Fiscal Year (FY) 2009 for MD and VA oyster restoration activities; specific activities to be carried out by NOAA with this funding are still being determined.

2.0 PURPOSE AND NEED

NEPA requires the preparers of an EA to develop specific definitions of the purpose and need of a proposed action so that reasonable alternatives can be formulated for objective and consistent analysis and evaluation.

2.1 Purpose

The purpose of the project is to evaluate the use of alternate substrate to restore oyster habitat and to increase populations of the eastern oyster in the Chesapeake Bay. In addition to having economic value as a commercial fishery, oysters provide significant environmental benefits. Oysters are a keystone species in the Chesapeake Bay, serving both water quality and habitat functions. There is no substitute for a thriving oyster community in the Bay. The oysters filter the water, play an important role in sediment and nutrient removal, and provide a hard structure that serves as habitat for not only future oyster generations, but also a variety of fish and benthic species, including economically important species such as juvenile striped bass and blue crabs. It is anticipated that restoring functioning oyster bars and reefs would provide habitat and water quality improvements, at least locally, that will promote a healthy estuarine system.

Oyster restoration is a significant component of current efforts to restore the Chesapeake Bay ecosystem. The proposed project supports objectives of CBP and the Maryland Oyster Roundtable. The project is also consistent with the *Agreement of Federal Agencies on Ecosystem Management in the Chesapeake Bay* of 1994 and other USACE oyster restoration projects and reports.

The Maryland OAC released a 2008 Legislative Report that recommended a multi-faceted strategy for restoring the Chesapeake's native oyster population and specifically highlighted the need to identify new sources of substrate:

> "*Increasing and diversifying sources of disease free oyster seed and identifying new sources of substrate to meet future ecologic and economic needs.*"

2.2 Need

A need exists to restore the ecological role of oysters in the Bay that would restore lost functions such as sediment and nutrient removal.

The oyster was historically found in extensive bars and reefs many acres in size throughout its range in the Chesapeake Bay watershed. These bars and reefs covered an estimated 200,000 to 400,000 acres prior to harvesting by European settlers. Today, oyster stock is estimated to be just one percent of its historical abundance. The current estimate of oyster bar and reef area in the Bay is 20,000 acres, and remaining bars and reefs are in very poor condition. It is estimated that 2,600 acres of habitat are degraded and lost per year (USACE, 2008).

2.3 Problem Identification

Oyster populations in Maryland have declined dramatically since the turn of the century, largely due to parasitic diseases, historic overharvesting, declining water quality, and the loss of habitat. Various decision documents USACE (1996, 1999, 2002) as discussed in previous sections, discuss these problems in detail. Extensive research confirming the decline of oyster populations in the Chesapeake Bay have been conducted by various agencies such as the Chesapeake Bay Program, NOAA, University of Maryland, and the National Research Council (NRC) and there are many reports supporting these conclusions such as the CBP (2007) *Chesapeake Bay 2006 Health and Restoration Report, Part One: Ecosystem Health;* Newell (1988) *Ecological Changes in Chesapeake Bay: Are they the Result of Overharvesting the Eastern Oyster;* NRC (2004) *Nonnative Oysters in the Chesapeake Bay;* Rothschild et al. (1994) *Decline of the Chesapeake Bay Oyster Population: a Century of Habitat Destruction and Overfishing;* and Smith et al. (2005) *Assessment of Recent Habitat Conditions on Crassostrea virginica bars in Mesohaline Chesapeake Bay*.

The main focus of the proposed action is to use alternate substrate to address habitat loss and subsequent scarcity of oyster shell for restoration activities.

2.3.1 Habitat Loss

Much of the historical range of oyster habitat has been lost, and total oyster habitat in the Maryland portion of the Bay has been estimated to be one percent or less of what it was in the late 1800s. Harvesting directly removes habitat by removing shell, culminating in a flattening and fragmenting of oyster bars. Flattening of bars places oysters lower in the water column exposing them to reduced currents, food availability, and oxygen. Increased sediment loads in the Chesapeake Bay from agricultural and urban runoff, and construction activities impact water quality and have adversely affected oyster habitat (CBP, 2005). Free-swimming oyster larvae attach to oyster shells or other hard substrate in a process known as "setting." Larval setting has been impaired as habitat has been reduced, fragmented, and dispersed. Siltation of oyster bars further reduces the amount of suitable habitat for larval setting and impairs the health of adult oysters.

2.3.2 Scarcity of Oyster Shell for Restoration

Programs to replenish or recondition hard bottom oyster substrate have been under way for more than 100 years. Numerous Federal, State, and Local entities have come together under a broad commitment agreement called Chesapeake 2000 (C2K) and set a goal to restore oysters 10-fold by 2010 (estimated to be approximately 10,000 acres). Recently, this goal has been refined to implementing oyster restoration practices on 2,466 acres of oyster bar and reef habitat between 2007 and 2010 (CBP, 2008). Following the C2K efforts, there was a sharp increase in the need for dredge shell; in fact, so much that the existing available sources are being rapidly depleted, and new sources or alternatives are being sought. In order to restore long-term goals of significant acreage and a sustainable population, many of the historic sites will need to be reshelled.

The oyster-shell dredging and planting program in Maryland began in 1960. Buried shells were dredged, washed, and transported to productive oyster bars, where they were planted with oyster spat. Due to stakeholder concerns regarding shell dredging practices altering the bottom substrate, thereby impacting other fisheries and creating sediment plumes, the shell-dredging program ceased in 2006 (USACE, 2008). The MD DNR has investigated alternative means of enhancing substrate suitable for oysters. One alternative is shell reclamation. This involves retrieving previously planted shell that has been reburied due to siltation. Another management technique, seed-area plantings, involves planting shell located in areas of high salinity where large spat sets are most likely to occur, and the resulting spat are moved to areas of lower salinity to attempt to protect them from disease (MSX and Dermo) that occur in the higher salinity waters.

Prior to significant degradation of the oyster population, oyster shell was readily available in the region and was used not only for restoration and repletion, but also for roadbed and driveways, and as crushed calcium sources, fertilizer additives, and chicken feed. As oyster populations collapsed in the past 50 years, not only have oyster shell resources become scarce, but the collapse in itself has resulted in a greater need for shell for restoration. Numerous Federal, State, and Local entities committed to the Chesapeake 2000 goal of restoring oysters 10-fold by 2010 which equates to more than 10,000 acres at 10,000 to 100,000 bushels of dredged oyster shell per acre. Although this goal has bee recently refined to 2,466 acres between 2007 and 2010, the original goal speaks to the scale of restoration that needs to be met to restore a long-term sustainable oyster population.

In recent decades, clean oyster shell for restoration was available from shucking houses and restaurants, but the primary source has been dredged fossil oyster shell deposits. Fossil shell deposits had been dredged from the northern Bay tributaries at levels that have reached approximately 2 to 3 million bushels in any given year (E. Campbell, MD DNR, personal communication February 17, 2009). However, many of the shell deposits fall within traditional fishery management protection zones because they are seasonally important spawning or nursery grounds for anadromous and other commercially important fish species. Dredging fossils shell produces turbidity and sediment-related impact issues on water quality and habitat. Recently, there have been concerns with the environmental impacts of dredging, specifically to spawning and nursery grounds of commercially important fish species. As a result, the dredging of fossil shell deposits was discontinued in Maryland in 2006. Fossil oyster shell had constituted approximately 95 percent of the substrate placed for oyster restoration since 1986 (MD DNR, Chris Judy, email dated Feb 6, 2009). Without the ability to dredge fossil shell, oyster restoration using clean oyster shell has come to a halt. Restaurants and shucking houses do not currently produce the volumes necessary to restore the desired acres of oyster beds. MD DNR plans to submit a permit to dredge fossil shell in limited areas.

3.0 EXISTING CONDITIONS

As allowed by 40 CFR 1508 information from previous Baltimore District and Norfolk District reports are incorporated by reference. Appendix F contains the cover pages and approval letters (FONSI or Record of Decision) for the following documents incorporated by reference in the report:

Chesapeake Bay Oyster Recovery Project Report January 1996.

Environmental Assessment for the Construction of Seed Bars in Eastern Bay as Part of the Chesapeake Bay Oyster Recovery Project, July 1999.

Decision Document Chesapeake Bay Oyster Recovery Project, Maryland; dated May 2002.

Programmatic Environmental Impact Statements for Oyster restoration in Chesapeake Bay Including the Use of a native and/or Nonnative dated October 2008.

The project sites are open water with hard shell bottom, portions of which have been previously dredged for over 40 years for oyster restoration efforts. The plantings of alternate material could take place on NOBs in the Chesapeake Bay within the ORAs of the Chester, Choptank, Patuxent, Severn, Magothy, and Nanticoke Rivers.

3.1 Physical Environment

3.1.1 Physiography and Topography

The Chesapeake Bay proper encompasses over 2,200 square miles. If tributaries are included, this area becomes approximately 4,400 square miles. Nineteen principal rivers and 400 lesser creeks and streams are tributaries to the Bay (Lippson and Lippson 1984).

The Bay lies within the Atlantic Coastal Plain Physiographic Province. Coastal plain topography exhibits rolling hills and broad open valleys with streams that have flat slopes and shallow channels. The Chester, Choptank, and Nanticoke rivers are located on the Eastern Shore of Maryland. The Magothy, Severn, and Patuxent rivers are on the Western Shore of Maryland. The Patuxent River drains piedmont and coastal plain areas encompassing approximately one-tenth of the land area in Maryland. The estuarine reaches of the Patuxent River are narrow, and some reaches are enclosed by high banks. The Patuxent River is the deepest Maryland tributary to the Bay with depths over 130 feet, but it has sufficient shallow areas to support a large amount of oyster habitat.

The Chesapeake Bay is an estuary, which is defined as a semi-enclosed coastal body of water where the flow of freshwater mixes with high-salinity ocean water (White, 1989). Salinity increases from the head of the Bay and the head of each Bay tributary in a downstream direction to an average of about 15 parts per thousand (ppt) in the mid-Bay. Salinity of ocean water averages 30 to 35 ppt. Salinity levels within the Bay vary widely, both seasonally and from year to year depending on the volume of flowing freshwater. The average depth of the mainstem of the Bay is less than 30 feet, and the average depth of the entire system, including all tidewater tributaries, is 20 feet. The vast expanses of relatively shallow water in the Bay support a wide variety of bottom life. The tidal range of the Bay is about 3 feet at the mouth, gradually decreasing to 1 foot in the vicinity of Annapolis, from where it increases to approximately 2 feet at the head of the Bay.

3.1.2 Geology

The Chesapeake Bay lies within the Atlantic Coastal Plain Physiographic Province. The Coastal Plain consists of layers of sediment laid down in ancient marine, estuarine, and riverine environments tens of millions of years ago. These sedimentary deposits originated from changes in sea level over geologic time that allowed deposition of sediment when the area was flooded by ancient seas.

3.1.3 Soils

The aquatic substrate is firm sand, firm silt, mud and shells. The project sites are open water with hard shell bottom, portions of which have been previously dredged for over 40 years for oyster restoration efforts.

3.1.4 Prime and Unique Farmlands

Prime farmland is available land that provides the best combination of physical and chemical characteristics for producing crops. As the project would be constructed in open water, there are no prime or unique farmlands located within the project area.

3.1.5 Bathymetry

The mean depth of existing oyster habitat in Maryland's portion of the Bay is 13 feet, with a range of 6 feet to 30 feet (USACE, 2008).

3.1.6 Water Quality

The waters that flow into the Bay carry effluent from wastewater treatment plants and septic systems serving a population of 18 million people, and nutrients, sediment, and toxic substances from a variety of anthropogenic sources, such as agricultural lands, industrial discharges, automobile emissions, and power generating facilities. Five major rivers contribute 90 percent of the freshwater delivered to the Bay: Susquehanna, Potomac, Rappahannock, James, and York (USACE, 2008).

Hypoxic waters generally occur in the Bay during the summer of each year in deep areas of the mainstem and at the mouths of the major tributaries. From 1985 to 2006, during the period June through September, on average 1.44 percent of the volume of the mainstem was anoxic, and 5.25 percent was hypoxic (CBP, 2007). Water quality data gathered between 2004 and 2006 indicate that only about 33 percent of the Bay's tidal waters met standards for dissolved oxygen (DO). DO levels are the concentrations established by regulatory agencies as appropriate for biota that occupy different habitats in the Bay, including open water, deep water, and deep channel during the months of June through September (http://www.chesapeakebay.net/do.htm).

Impaired water quality in the Bay is linked to nutrient over-enrichment and high concentrations of suspended sediment. Forest clearing, agricultural practices, and urban development contribute large amounts of nutrients and sediment that are transported to the Bay by its tributaries. Increased algal growth (from nutrient over-enrichment) and sediment runoff also contribute to reducing water clarity in Chesapeake Bay.

Water clarity is usually low in the upper Bay (above 39ºN latitude). The lower Bay generally has the clearest waters. Water clarity is also low in most of the tributaries. Recent CBP data show a trend toward decreasing water clarity in many tributaries, including the Patuxent, Potomac, York, James, and Choptank rivers, the smaller tributaries of the lower eastern shore of Maryland, Tangier Sound, and the mainstem of the Bay. Only 7 percent of the Bay's waters had acceptable water clarity in 2006 relative to water clarity goals established by the CBP (http://www.chesapeakebay.net).

3.1.7 Climate

The project area has a continental type of climate with four well-defined seasons. The coldest months are January and February with temperatures averaging about 30 degrees Fahrenheit. The warmest month is July with temperatures averaging in the upper 80's (°F). Annual precipitation ranges from 40 to 44 inches, distributed fairly evenly throughout the year. The greatest rainfall intensities occur in summer and early fall, the season for severe thunderstorms and part of the hurricane season while winter low pressure systems moving up the Atlantic Coast cause most of the precipitation during the cold months. Snowfall occurs on about eleven days per year on the average, but snow accumulations of one inch or greater happen only about six days annually.

The prevailing winds are southerly from May through September and west-northwesterly to northwesterly during the rest of the year. Hurricanes, blizzards, and tornadoes are infrequent.

Climate and subsequent changes in salinity affect the distribution and intensity of MSX and Dermo. Due to the inflow of freshwater to the Bay and decreased salinity, disease is generally less virulent in years of high rainfall.

3.1.8 Air Quality

The six air pollutants commonly found throughout the United States are ozone, carbon monoxide, nitrogen dioxide, particulate matter, sulfur dioxide and lead. These pollutants can injure health, harm the environment, and damage property. The EPA calls these air pollutants "criteria pollutants". According to the Maryland Department of the Environment (MDE), all of Maryland is in attainment for four of the six criteria pollutants. The D.C. metropolitan area which includes Prince George's County and Baltimore County, Maryland, are designated as a serious ground level ozone non-attainment area by the EPA, as well as being in nonattainment for particulates (PM 2.5). Non-attainment areas are designated regions where air pollution levels do not meet National Ambient Air Quality Standards (MDE website).

Additionally the principal pollutants from atmospheric deposition that affect the Chesapeake Bay are nitrogen oxides (NOX) and chemical contaminants. Some of the NOX deposited in the Bay is converted into a form that is useable by algae, thereby increasing nutrient enrichment that contributes to causing anoxic conditions in the Bay. The CBP estimates that a quarter of the total nitrogen load to the Bay comes from atmospheric deposition; 75 percent of that load is deposited on land and later transported to the Bay by surface water runoff and groundwater flow. The remaining 25 percent is deposited directly into the Bay. NOX emissions in the watershed have increased by 3.5 million tons since 1970, and this trend is likely to continue in the immediate future as the population increases within the Bay's watershed.

3.1.9 Wild and Scenic Rivers & American Heritage Rivers

Maryland's Scenic and Wild Rivers Act of 1968 recognizes specific rivers as significant environmental resources for the State. The Act directs the MD DNR Secretary to "provide for wise management...and preservation" of the land resources as well as the scenic and wild qualities of these rivers. The Patuxent and Severn are two rivers located within the project area that are designated as State scenic rivers as stipulated in the 1968 Maryland Scenic and Wild Rivers Act.

A river designated as an American Heritage River by EPA enables local communities to receive Federal assistance to restore and protect their rivers. There are no EPA designated American Heritage Rivers located within the project area.

3.2 Biological Resources

3.2.1 Submerged Aquatic Vegetation

The Virginia Institute of Marine Science (VIMS) conducts annual aerial surveys of submerged aquatic vegetation (SAV) in the Bay. SAV has been documented in the tributaries where the designated ORA's are located. However, due to the associated water depths, SAV does not usually occur within oyster bars (SAV is typically not found in areas greater than 6 feet deep depending on water clarity).

3.2.2 Wetlands and Wetland Vegetation

There are no wetlands in the vicinity of the project footprint.

3.2.3 Upland Vegetation

There are no uplands in the vicinity of the project footprint.

3.3 Animal Resources

3.3.1 Benthic Macroinvertebrates

Benthic communities play a central role in the transfer of materials from the water column to higher levels in the food web. Much of the productivity of fisheries in Chesapeake Bay is linked directly to the benthos through feeding (Virnstein 1977; Holland et al. 1988; Diaz and Schaffner 1990).

The variety and density of benthic organisms generally increase with increasing salinity in the Bay. Tidal freshwater habitats are numerically dominated by tubeworms and insect larvae, and the Asian clam (*Corbicula fluminea*). Mesohaline (5 to 18 ppt) regions exhibit high densities of bivalves (e.g., clams, oysters), except where low oxygen conditions prevail; segmented worms (i.e., polychaete annelids), small crustacea, and suspension-feeding bivalves (*Rangia cuneata*, *Macoma* spp.) dominate these areas. Suspension feeding polychaetes and tunicates are important contributors to biomass in high-salinity environments.

Human activities have increased the volume of sediment and nutrients that enter the Bay and have contributed to altering the Bay from one dominated by benthic production and SAV to one heavily influenced by pelagic (water column) processes (mainly phytoplankton production). In 2006, 59 percent of the Bay's benthic habitat was considered degraded according to the Benthic Index of Biotic Integrity (B-IBI) (CBP, 2007). The percentage of habitat classified as degraded in 2006 was substantially greater than the values for 2004 and 2005, probably as a result of prolonged persistence of low DO during 2006 (USACE, 2008).

Oyster habitat is a unique feature of Bay benthic habitats. The bars and reefs themselves provide hard structure used by a diversity of macroinvertebrates and fish. As it settles, sediment covers oyster bars and reefs and other hard-bottom substrate that oysters need to settle on; most of the historical oyster shell substrate in Chesapeake Bay is now covered with sediment consequently, which may limit future increases in oyster abundance. Most suitable substrate occurs within areas where the MD DNR has planted shell recently; however, planted shell becomes covered with sediment after an average of 5.5 years in the Bay (Smith et al. 2005). Excessive sediment loads delivered by increased runoff bury shell faster than current oyster populations can create new shell, resulting in a severe and continuing decline in habitat suitable for oysters.

3.3.1.1 Eastern Oysters

The Eastern oyster was once so abundant in Chesapeake Bay that it inspired the Algonquin to name the bay Chesepiook, meaning "great shellfish bay." The eastern oyster occurs subtidally throughout the Bay, mostly in water depths ranging from 6 to 30 feet. Oysters tolerate a wide range of salinities from 5 to 30 ppt, although salinities must remain at or above 9 ppt for successful reproduction. Oyster bars and reefs are formed by the continual attachment of individual oysters. The Eastern oyster is a keystone species that provides a variety of ecological services within the Chesapeake Bay ecosystem including improved water clarity via filter feeding, and oyster bar and reef habitat for fish and other species in the Bay.

Oysters can affect other organisms by changing the physical and chemical environment of the Bay ecosystem. Oysters filter water while feeding, thereby removing sediment and other particles from the water and depositing it on the bottom in pellets called pseudo-feces. Filtration by large numbers of oysters can reduce the time that sediment remains suspended in the water column and increase the clarity of the filtered water. Oysters' pseudo-feces are rich in nutrients and, therefore, help to support primary production among bottom-dwelling organisms in areas immediately surrounding oyster bars and reefs. Local nutrient enrichment also stimulates the exchange of various forms of nitrogen and nitrogen compounds from one part of the system to another (Newell et al. 2002). In addition to filtering suspended particles, large populations of oysters create bars and reefs of accumulated shell that are unique among kinds of habitat in Chesapeake Bay. Successive generations of oysters growing on the shells of previous generations gradually accrete large, three-dimensional structures that can compensate for sedimentation, if the rate of growth of the oyster bar or reef exceeds the rate of sedimentation.

The elevated structure of an oyster bar provides habitat for oyster spat, barnacles, mussels, hydroids, nudibranchs, and algae. These communities support blue crabs (*Callinectes sapidus*) and finfish, such as oyster toadfish (*Opsanus tau*), naked goby (*Gobiosoma bosci*), striped blenny (*Chasmodes bosquianus*), Atlantic croaker (*Micropogonias undulatus*), summer flounder (*Paralichthys dentatus*), striped bass (*Morone saxitilis*), white perch (*Morone americana*), and spotted sea trout (*Cynoscion nebulosus*).

In addition to its ecological functions, the Eastern oyster provides an important commercial fishery. Commercial landings of oysters in Chesapeake Bay declined steadily during the late 19th and early 20th centuries. Major factors believed to have contributed to that decline include intense fishing pressure, mechanical destruction of habitat, siltation of optimal substrate, and stock over fishing (Rothschild et al. 1994). Dredging for oysters began to degrade the physical integrity of centuries-old bars and reefs (DeAlteris 1988) by breaking off shell and oysters that were too small to harvest, thereby reducing the population and the habitat available for future production and harvest. Declining water quality also contributed to reducing the oyster population.

The Bay's oyster population is now estimated to be less than 1 percent of its size during the 1800s (Newell 1988). The more recent decline in the population has been attributed primarily to the introduction of two foreign diseases to which the Eastern oyster had no resistance: Dermo and MSX. Oysters infected with Dermo, generally live only two or three years, and oysters infected with MSX generally die within one year. High mortality rates caused by these diseases not only remove oysters potentially available for harvest, but also reduce the number of large, highly reproductive oysters that are left to propagate. Overall, oyster populations in the Bay are now strongly controlled by disease pressure (Ford and Tripp 1996) in addition to being negatively affected by harvest, degraded oyster habitat, poor water quality, and complex interactions among these factors (Hargis 1999; NRC 2004).

3.3.1.2 Clams

Oyster bars or reefs provide valuable habitat for many organisms such as clams which are important food items for higher order prey. Suspension-feeding bivalves, such as clams, dominate the soft-bottom benthic community in mesohaline regions of Chesapeake Bay (Holland et al. 1987). Two key species of bivalves considered to be representative of the soft-bottom benthic community are the hard clam and the Baltic clam. These two species occupy different salinity regimes covering the range of salinities in which oysters occur (hard clams are found predominantly in higher salinities and Baltic clams in lower salinities), and both are filter-feeding infauna (i.e., species that live completely or mostly buried within the bottom sediment). Commercially important species within the project area include the softshell clam (*Mya arenaria*). The soft-shell clam is a bivalve mollusk found over a wide range of bottom types, but prefers substrate with mixes of fine sand and silt. Clams are harvested in subtidal areas ranging in depth from 6 to 20 feet. Clam dredging is restricted within 150 feet of legal oyster bars.

The major potential mechanisms for these species to interact with oysters are through competition for food and space. Competition for space could occur on a local scale if an increase in oyster population causes an expansion of hard-bottom habitat over existing soft-bottom habitat. Increased competition between clams and oysters for food could result in a reduction in the abundance of infaunal bivalves.

3.3.2 Blue crab

Oyster bars and reefs provide valuable habitat for many organisms, including the blue crab which is a commercially important species in the Bay. The blue crab is an important predator of bivalves, such as young oysters, in the Bay as well. The blue crab occupies a variety of aquatic habitats ranging from the mouth of the Bay to fresher rivers and creeks and occupies different trophic levels during various stages of its life cycle. Throughout the year, crabs may burrow into the bottom, shed and mate in shallow waters and beds of SAV, or swim freely in open water.

Both juvenile and adult blue crabs forage on the bottom and hibernate there through the winter. During spring, blue crabs migrate from the southern part of the Chesapeake to tidal rivers and northern portions of the Bay. During the rest of the year, adult blue crabs are dispersed throughout the Bay.

Although adult oysters are too large for blue crabs to open and prey upon (White and Wilson 1996), crabs feed readily and opportunistically on juvenile oysters (Eggleston, 1990). Oysters attain a partial refuge from predation at low densities (Eggleston, 1990), but predation by blue crabs might increase with increasing oyster abundance. Mobile predators such as the blue crab produce strong direct effects of predation and disturbance on the benthic communities in Chesapeake Bay (Hines et al. 1990). Changes in the community structure and population density of predators and of prey species resulting from complex interactions with introduced species usually have cascading trophic effects that alter the entire structure of an ecosystem, as documented for the Hudson River estuary (Strayer et al. 1999) and San Francisco Bay (Carlton et al. 1990). An increase in the oyster population could increase the food supply for blue crabs. An increase in the abundance of SAV resulting from increased filtration by oysters could enhance the blue crab population by providing more refuge for juvenile crabs.

Annual commercial harvests of blue crabs from Chesapeake Bay since 2004 have been approximately 60 million pounds, which is well below the 73-million-pound annual average for the period 1968 to 2004 (CBP 2007). This is attributed to low exploitable stock abundance and restrictive harvest management measures enacted in 2001 and 2002. In 2006, the abundance of adult crabs was about 57 percent of the CBP's interim restoration goal of 232 million crabs (CBP 2007).

3.3.3 Fish

Approximately 267 species of fish can be found in the Chesapeake Bay (White 1989). The fishes of the Bay are either resident or migratory. Migratory fish fall into two categories: (1) anadromous fish, which spawn in the Bay or its tributaries, and (2) catadromous fish, which spawn in the ocean. Anadromous fish migrate varying distances to spawn in freshwater. Striped bass spawn in the tidal freshwater areas of the Bay and major tributaries; younger fish remain in the Bay to feed while many adults migrate to ocean waters after spawning. Shad and herring are truly anadromous, traveling from the ocean to freshwater to spawn and returning to the ocean to feed. Eels are the only catadromous species in Chesapeake Bay. Other migratory fish use the Bay strictly for feeding. Some species, like croaker, drum, menhaden, weakfish, and spot, journey into the Bay while still in their larval stage to take advantage of the rich supply of food. Bluefish generally enter the Bay as juveniles or adults (USACE, 2008).

Fish in the Bay can also be categorized as planktivorous, reef-oriented, or piscivorous. Planktivorous fish are a key part of the food web in Chesapeake Bay. They consume plankton, and are preyed upon by larger fishes such as striped bass and bluefish (piscivores). The larval and early juvenile stages of all fish species in the Bay feed on plankton; however, bay anchovy and menhaden are the only two major species in Chesapeake Bay that feed primarily on plankton throughout their life cycles. Because oysters also feed on some types of phytoplankton, and phytoplankton serve as a food source for zooplankton, the mechanism of interaction between oysters and planktivorous fishes would be through the food chain. The primary mechanism of interaction between oysters and planktivorous fish would be the potential to compete for food.

Oyster bars provide habitat for several species of fish (reef-oriented), many of which are important in commercial and recreational fisheries. The naked goby resides on oyster bars throughout its juvenile and adult lifestages (Breitburg 1991) and is considered an exclusively reef-dwelling species. Black sea bass (*Centropristis striata*), which is considered to be a temperate reef fish, is found seasonally on oyster bars and other hard substrate and structures in the middle and lower Bay during warm months. Although black sea bass generally migrate to ocean waters during the winter, they are reef dependent for a significant portion of each year. A third category of reef-oriented fish includes species that use a variety of habitats but frequent hard-bottom habitat, such as oyster bars; the Atlantic croaker is an example of such reef-aggregating species. These three species, naked goby, black sea bass, and Atlantic croaker, represent the suite of species that orient to and may be affected by changes in the availability of oyster-reef habitat.

3.3.4 Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act (Section 305(b)(2)) requires that essential fish habitat (EFH) areas be identified for each fishery management plan and that all

Federal agencies consult with National Marine Fisheries Service (NMFS) on all Federal actions that might adversely affect EFH. Under the Magnuson-Stevens Act each Federal agency is required to prepare an EFH Assessment for all proposed actions that occur within coastal waters of the United States.

The 1996 amendments to the Magnuson-Stevens Fishery Act strengthened the ability of NMFS to protect and conserve the habitat of marine, estuarine, and anadromous finfish, mollusks, and crustaceans." Essential fish habitat is defined in 50 Code of Federal Regulations (CFR) part 600 as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity.

After consultation with John Nichols, NMFS, Maryland Habitat Office, (personal communication Feb 12, 2009) it was determined that some areas of the Bay under consideration for alternate substrate for oyster restoration as part of this project placement lie within the general area that may provide EFH for some of the species managed by NMFS. Species of concern are: Summer flounder, Windowpane flounder (*Scopthalmus aquosus*), Bluefish (*Pomatomus saltatrix*)**,** Cobia (*Rachycentron canadum*), Red drum (*Sciaenops ocellatus*), King mackerel (*Scomberomorus cavalla*), and Spanish mackerel (*Scomberomorus maculates*). Due to specific habitat needs, it is unlikely that cobia, king mackerel, Spanish mackerel, or windowpane flounder would be in the project area (Murdy et al., 1994). Windowpane flounder prefers sandy substrates which would be avoided for this project. As a result, the EFH analysis focused on bluefish, summer flounder, and red drum. The EFH assessment was prepared and is located in Appendix B. Coordination regarding EFH is ongoing with NMFS.

3.3.5 Avifauna

The Chesapeake Bay is located along the Atlantic flyway, which channels the annual seasonal flights of millions of migratory waterfowl to the Bay. The shallow waters and wetlands of the Bay and its temperate climate offer a fertile and diverse environment for waterfowl. Four categories of waterfowl inhabit Chesapeake Bay: dabbling ducks, diving ducks, geese, and swans. All four kinds depend on agricultural areas, bay bottom, and wetlands for food and nesting habitat. Black ducks (*Anas rubripes*) depend upon the condition of the bottom of the bays and wetlands in which they feed. Diving ducks such as canvasbacks (*Aythya valisineria*) depend totally on aquatic habitats throughout their life cycle. They feed on plants and animals in wetlands and shallow benthic habitats.

Numerous avian species in the Chesapeake Bay watershed use benthic species as a primary food source such as the American oystercatcher (*Haematopus palliates*), black duck, and canvasback. These waterfowl may feed on or around oyster bars. The primary mechanism of interaction between oysters and these benthic-feeding birds is indirect, through changes in the kinds and distribution of benthic invertebrates that could result from competition with oysters for food and habitat.

Oystercatchers were once hunted almost to extinction but are now conspicuous shorebirds found throughout the Chesapeake Bay region. Oystercatchers at times consume oysters by using their brightly colored bills to open the shells of bivalves. Several studies have shown that a decrease in shellfish stocks negatively affects the oystercatcher population (Goss-Custard et al. 2003; Atkinson et al. 2003; Tuckwell and Nol 1997). The primary mechanism of interaction for oystercatchers is direct, through a change in the availability of oysters as a food source. A secondary mechanism of interaction could be through competition between oysters and other shellfish, which could shift the prey-suite for oystercatchers. Many avian piscivore species use the abundant fish populations of Chesapeake Bay as their primary food sources. Two of the species documented best in the literature are the bald eagle (*Haliaeetus leucocephalus*) and the North American osprey (*Pandion haliaetus*).

3.3.6 Mammals

Numerous mammals inhabit the Bay watershed. Many piscivorous mammals inhabit the shores and waters of Chesapeake Bay such as the raccoon (*Procyon lotor*) and river otter (*Lontra Canadensis*). The raccoon is an omnivorous nocturnal mammal that prefers to inhabit trees near streams, springs, or rivers. The river otter spends most of its life in the rivers, marshy ponds, and wooded riparian areas of the Chesapeake and its tributaries. Although these mammals do not feed directly on oysters to any significant extent, a change in oyster populations could affect them indirectly through competition between oysters and planktivorous fish, which are food for piscivorous mammals.

3.3.7 Rare, Threatened, and Endangered Species

Species of plants and animals that have been designated as rare, threatened, or endangered (RTE) are protected under Federal and State regulations. The Endangered Species Act (ESA) of 1973 (16 USC 1531-1543) regulates activities affecting plants and animals classified as endangered or threatened, as well as the designated critical habitat of such species.

A few of the federally listed species of marine turtles may occur within project areas. Several species of turtles, including the threatened loggerhead turtle (*Caretta caretta*), the endangered Kemp's ridley turtle (*Lepidochelys kempiz*), and the endangered leatherback turtle (*Dermochelys coriacea*), occasionally move into the central and upper Chesapeake Bay during warm weather months. Additionally the Atlantic sturgeon (*Acipenser oxyrhynchus oxyrhynchus*) may occur in the project area. An email was received from Ms. Julie Crocker, NFMS, dated March 12, 2009, which concurred with USACE (marine turtles, and Atlantic sturgeon may occur in the project area). Coordination with Dr. Roland Limpert, MD DNR (personal communication February 24, 2009) indicated that at this time, there are no State listed RTE species within the project site under the agency’s purview. A letter was received from USFWS dated February 10, 2009 indicating that no RTE under their purview are expected in the project area.

3.4 Community Settings

3.4.1 Land Use

The watershed of the Chesapeake includes parts of New York, Pennsylvania, West Virginia, Delaware, Maryland, and Virginia, and the entire District of Columbia. Before European settlement, forests covered about 95 percent of the Chesapeake Bay watershed. Now, forests are concentrated in the Appalachian region of Pennsylvania and West Virginia and account for only 60 percent of the total land area in the watershed. Agricultural land is most common in the coastal lowlands north and east of the Bay and accounts for 28 percent of the total land area of the watershed. Developed lands and wetlands each account for about 3 percent to 4 percent of the total land area; the remaining 5 percent is open water and other land uses.

3.4.2 Recreation

The hospitable climate and abundant natural resources of the Chesapeake Bay make it a heavily utilized area for recreation. Hunting, camping, swimming, boating, waterskiing, and crabbing are major attractions. Sportfishing is another major recreational activity in the Chesapeake. The Chesapeake Bay provides one of the primary focal points for tourism in Maryland and tourism attracted almost 28 million people to Maryland in 2005. Those visitors spent more than $10 billion on accommodations, services, and attractions throughout the state (MD Tourism Development Board 2006). Boating on Chesapeake Bay is a popular recreational activity and an important component of the economy of Maryland. Approximately 209,500 boats are registered in Maryland (MD Sea Grant 2004). In 2000, recreational boating contributed approximately 1.6 billion dollars in revenue for Maryland and supported 28,200 jobs in the state (MD Sea Grant 2004). Fish species supported by oyster communities are key elements in providing recreational opportunities.

3.4.3 Cultural and Historic Resources

The project, as a Federal undertaking, falls within the review requirements of the National Historic Preservation Act of 1966, as amended, and its implementing regulations 36 CFR, Part 800. These regulations require the agency to identify, evaluate and mitigate impacts to National Register eligible or listed cultural resources prior to project initiation, in consultation with the appropriate State Historic Preservation Officer (SHPO), and at times, the Advisory Council on Historic Preservation (ACHP).

Coordination with the Maryland Historical Trust (MHT) (the SHPO) occurred at the inception of the Chesapeake Bay Oyster Recovery Project in 1996. MHT indicated areas that should be avoided due to known or suspected historical resources. Subsequent shell placement activities have been conducted since 1997 and have avoided those areas MHT identified in the project area. There have been no adverse impacts on historical resources thus far. The alternate substrate project has the same footprint, as it is part of the Chesapeake Bay Oyster Recovery Project.

Follow up coordination to notify MHT of the change in substrate ensued on December 22, 2008 (Public Notice was issued) and USACE received a letter from Maryland Department of Planning on January 8, 2009 stating that MHT was forwarded a copy of the Public Notice by the State Clearinghouse which requested that if MHT (among other agencies) had comments they were to inform USACE directly by February 4, 2009; USACE received no comments from MHT at this time.

3.4.4 Hazardous, Toxic, and Radioactive Waste

In order to plan specific sites for project activities, a listing of Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) and Resource Conservation Recovery Information System (RCRIS) sites within the project area were generated by the Baltimore District for the 1996 Decision Document.

3.4.5 Socioeconomic Conditions

According to the most recent census (2000) the population of Maryland is 5,618,344. Eight-four percent of the population are high school graduates and 31 percent are college graduates. Also the average income for Maryland is $25,614 http://quickfacts.census.gov/qfd/states/24000.html. Table 3-1 summarizes additional population statistics of Maryland.

Table 3-1. Summary of Population Statistics

Percent	Parameter
30	African American
0.3	Native American
5	Asian
24.2	Under 18

The Eastern oyster is highly valued as a source of food, a symbol of heritage, an economic resource supporting families and businesses, and a contributor to the health of the Chesapeake Bay ecosystem. Harvesting, selling, and eating oysters has historically been a central component and driver of social and economic development in the region. From the colonial period to the 20th century, oyster harvests supported a vibrant regional industry, which in turn supported secondary industries, fishing communities, and a culinary culture centered on the bivalve.

Oysters are an economic resource that supports unique communities and an industry that is an important component of the region’s heritage and identity. Within these communities, oysters are a source of income for families of watermen and those employed in the processing of oysters (e.g., shuckers); they support multigenerational businesses and contribute to a regional economy.

The seafood industry contributes approximately $400 million each year (State of MD 2006) to Maryland’s total gross domestic product of $257.8 billion (http://www.bea.gov/regional/gsp/). In 2005, commercial fisheries landings (i.e., the weight, number and/or value of a species of seafood caught and delivered to a port) alone earned $63,669,831 million in the state of Maryland (NMFS, 2006). Direct users include watermen, oyster growers, and oyster processors, packagers, shippers, and retailers.

More than 6,600 watermen work Chesapeake Bay, providing seafood to 74 seafood processing plants in Maryland; these plants employ more than 1,300 people (MD Seafood 2005). These jobs represent an assortment of positions including day laborers, sales representatives, managers, maintenance workers, delivery personnel, and others. The sector relies on immigrant workers, particularly in oyster and crab processing facilities (Kirkley 2005).

In Maryland, most oysters are harvested from public grounds during the winter (depending on the kind of equipment used, a designated time frame between October and March; MD DNR 2006). During the 1990s, more than 96 percent of the oyster harvest in Maryland came from public beds. Although oystering earns watermen much less money than they earn from crabbing during the spring and summer, dredging or tonging for oysters during fall and winter enables them to continue to earn a small income, providing a financial safety valve for watermen and their families (NRC 2004).

In Maryland, anyone seeking to harvest oysters must first obtain an Oyster Harvesting License (OHL) or a Tidal Fish License (TFL), which allows the holder to harvest a range of commercially valuable, marine species in the Bay. To qualify to harvest oysters in any particular year, holders of an OHL or TFL must pay an annual oyster surcharge, which currently costs $300. In any given year, many TFL holders elect not to fish for oysters; consequently, the number of oyster surcharges purchased by OHL and TFL holders is the best indicator of the number of Maryland harvesters active in the fishery during a year. In 2001, more than 1,000 watermen in Maryland paid the oyster surcharge. That same year, these harvesters earned an estimated $5,300 per license (either OHL or TFL) (NRC 2004). In 2004, only 284 watermen in Maryland paid the oyster surcharge (MD DNR 2006).

Aquaculture operations are equally diverse and can include growers singly engaged in oyster aquaculture, wild harvesters who also grow oysters, and processors engaged in aquaculture to serve their shucking needs. A small number of active growers operate in Maryland. Intensive aquaculture of native oysters can be undertaken in several different ways to serve a variety of markets. Historically, oyster grow-out operations involved moving wild seed to privately leased ground (Murray and Oesterling 2006). Due to increased rates of disease and mortality, this type of aquaculture is rarely practiced today. Intensive native aquaculture is conducted in contained racks, floats, or bags either on-bottom or off-bottom. Growers' dependence on oysters varies with the size and nature of their operation, the degree to which they are diversified or vertically integrated, and the markets they target. A significant number of growers are employed in oyster aquaculture part-time.

Despite the effects of severely reduced harvest levels, oysters in Chesapeake Bay remain important culturally and economically at the regional, community, at the regional, community, and household levels.

3.4.6 Environmental Justice

On February 11, 1994, President Clinton issued Executive Order (E.O.) 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations." The

E.O. requires Federal agencies to identify and address any disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations.

As defined by the "Final Guidance for Addressing Environmental Justice Under NEPA" (CEQ, 1997), "minority" includes persons who identify themselves as Asian or Pacific Islander, Native American or Alaskan Native, black (not of Hispanic origin) or Hispanic. A minority population exists where the percentage of minorities in an affected area either exceeds 50 percent or is meaningfully greater than in the general population. Low-income populations are identified using the Census Bureau's statistical poverty threshold, which is based on income and family size. The Census Bureau defines a "poverty area" as a Census tract with 20 percent or more of its residents below the poverty threshold and an "extreme poverty area" as one with 40 percent or more below the poverty level (Census Bureau, 1995). Only two areas in the project area have poverty levels above the State average of 8.3 percent: Kent County has a poverty level of 12.7 percent and Dorchester County has a poverty level of 13.7 percent.

Based on recent survey work by the University of Maryland, no low-income or minority populations appear to be significantly involved in harvesting oysters in the Bay. Historically, significant numbers of African-Americans were employed in shucking houses, but today most shuckers are immigrant Hispanic workers. Most employment in the oyster industry today consists of harvesters, growers, and processors (including buyers); harvesters are the largest group. Although minorities participate in these activities, none dominate. Harvesters' incomes generally fall in the middle to lower-middle levels, and growers' and processors' into somewhat higher levels. Additionally there is no evidence of significant Native American involvement in oystering or the oyster industry in the Bay (UMD, 2008).

3.4.7 Visual and Aesthetic Resources

The Chesapeake Bay's diverse landscape has long been revered for its scenic beauty. The western shore of Chesapeake Bay in Maryland, from the Susquehanna River to the Potomac River, has comparatively high topographic relief, sandy beaches, and actively eroding coastal bluffs. Vegetation ranges from uplands dominated by oak and loblolly pine to bald cypress swamps and freshwater marshlands in the region's series of smaller tributaries. Low topographic relief, irregular shoreline, and offshore islands characterize the eastern shore of Chesapeake Bay and provide a unique aesthetic appeal. Areas of open water and extensive wetlands with tall marsh grasses, shrubs, and trees characterize much of the middle and lower eastern shore. Hummock-and-hollow microtopography (upland mounds surrounded by lowlands) is predominant in the near-shore habitats in this region.

In addition to the Chesapeake's natural beauty, the traditional waterfront communities are of particular aesthetic value. The historic watermen's communities along the Chesapeake's western and eastern shores offer an aesthetic charm and have contributed greatly to tourist-based industries in these areas. Traditional workboats operating in these areas bring aesthetic appeal to the region as well as cultural value. Notably, Maryland's historic skipjack fleet has become a visual symbol of the state and has received attention as the nation's last sail-powered, commercial fishing fleet.

3.4.8 Public Health and Safety

Contamination of oysters and other shellfish with bacteria and viruses has been associated with sewage discharges, septic leaching, and stormwater runoff. Oyster harvest is restricted in various areas by MDE for public health reasons, including areas with excessive coliform bacteria counts, and setbacks from marinas and municipal discharges. Consumption of oysters infected with MSX or Dermo does not affect humans.

3.4.9 Noise

Excess noise levels are not only annoying, but may cause adverse health effects in humans and disrupt wildlife behaviors. For purposes of regulation, noise is measured in dBA or A-weighted decibels. This unit uses a logarithmic scale and weights sound frequencies. Individuals with good hearing perceive a change in sound of 3 dB as just noticeable, a change of 5 dB as clearly noticeable and 10 dB is perceived as doubling (or halving) of the sound level. The threshold of human hearing is 0 dBA. Values above 85-90 dBA would be considered very loud (Table 2.1) and have the potential to harm hearing given sufficient exposure time. Noise levels above 140 dBA can cause damage to hearing after a single exposure. The proposed project area can be generally classified as urban with moderate noise levels. Ambient noise levels through the proposed project area include noise related to traffic along business/commercial roadways, public gatherings, and passive recreational activities (walking and bicycle riding). These activities can vary widely in the amount of noise produced, but according to the League for the Hard of Hearing (LHH), background noise levels are about 40 dBA on a quiet residential street. A typical maximum permitted sound level in rural and suburban areas is 55 dBA.

Table 2-1. Typical Noise Levels and Subjective Impressions

Source	Decibel Level (dBA)	Subjective Impression
Normal Breathing	30	Threshold of hearing
Soft Whisper	30	--
Library	40	Quiet
Normal conversation	60	--
Television Audio	70	Moderately loud
Ringing Telephone	80	--
Snowmobile	100	Very Loud
Shouting in Ear	110	--
Thunder	120	Pain Threshold

While the background noise level for residents within the vicinity of the project area might typically be 40 dBA, a resident may also hear acute noise sources, particularly in the daytime, associated with suburban neighborhoods such as a power mower, which will generate 65-95 dBA at 50 ft or a leafblower (110 dBA at 50 ft). Freeway traffic is in the range of 70 dBA at 50 ft, although large trucks may typically generate 90 dBA (LHH 2006). Sensitive noise receptors in the vicinity include, residents living near the water.

3.5 Executive Orders

3.5.1 Children's Protection Executive Order Compliance

On April 23, 1997, President Clinton issued Executive Order 13045, "Protection of Children from Environmental Health Risks and Safety Risks." Under this Executive Order, Federal agencies are required to make it a high priority to identify and assess environmental health risks and safety risks resulting from its policies, programs, activities, and standards that my disproportionately affect children.

> *"A growing body of scientific knowledge demonstrates that children may suffer disproportionately from environmental health risks and safety risks…Therefore, …each Federal agency: (a) shall make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children; and (b) shall ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks." (Executive Order 13045, April 21, 1997).*

In Maryland 24.2 percent of the population are less than 18 years of age. Children are not expected to be in the vicinity of the proposed project area because it is open water.

3.5.2 Floodplain Protection Executive Order Compliance

On May 24, 1977, President Carter issued Executive Order 11988 "Floodplain Management". This E.O. requires Federal agencies to provide leadership and take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains.

The project area is not in a floodplain area as it is located in open water.

4.0 ALTERNATIVES ANALYSIS

As discussed previously, habitat is a limiting factor for oyster populations. Phase I and Phase II construction activities were limited to restoration of oyster bars using clean oyster shell. With the discontinuation of dredging fossil shell in 2006 and the scarcity of oyster shell from shucking houses and restaurants, the remaining substrate option available to restore the hard substrate required for oyster habitat and enable oyster bed restoration is the use of alternate substrate.

The purpose of this EA is to evaluate the use of alternate substrate to restore oyster beds as was recently authorized by WRDA 2007.

4.1 Alternatives Considered

Alternative 1 No action alternative: The continuation of currently approved Chesapeake Bay Oyster Recovery Project activities (pending availability of clean shell).

Under this alternative, approved *Chesapeake Bay Oyster Recovery Project* restoration activities would continue with the use of clean oyster shell for oyster bar restoration which has limited availability. This alternative could also use fossilized oyster shell to the extent that it is available. However, in recent years fossilized shell has become less available because of concerns for the fishery habitat value of fossilized oyster shellbeds.

New bars could be constructed and existing bars enhanced in the targeted tributaries within the boundaries of natural oyster bars (NOBs) depending on availability of clean oyster shell. Bars would be constructed in flat and mounded morphologies. Depending upon location and availability of seed, new bars would be planted with hatchery-produced seed, with natural seed, or could remain unseeded to receive a natural set.

Alternative 2 Rehabilitate shell from existing oyster bars that are covered with sediment.

This alternative would involve locating and then rehabbing shell from existing NOBs that are currently covered by sediment. Rehabbing occurs when oyster dredges are used to pull up the shell, allowing the sediment to be washed off of the surface. The oyster shell is then replaced on the bar. This activity would occur in the targeted tributaries within the boundaries of NOBs using this shell resource. Once clean of sediment, bars could receive additional substrate to increase their elevation in the water column. Also, depending upon location and availability of seed, new bars could be planted with hatchery-produced seed, with natural seed, or could remain unseeded to receive a natural set.

Alternative 3 Reclaim buried shell that has been previously placed through repletion programs or to restore oyster bars.

This alternative would involve locating and then dredging shell that has been placed in the past to restore oyster bars or provide seed bars through repletion programs. Millions of bushels of fresh and dredged fossil oyster shell have been placed since the 1960s in order to restore oyster habitat and provide seed bars. The shell may be currently buried under sediment or may be clean shell that was placed in areas no longer receiving productive spat sets. New bars could be constructed and existing bars enhanced in the targeted tributaries within the boundaries of NOBs using this shell resource. Bars would be constructed in flat and mounded morphologies. Depending upon location and availability of seed, new bars would be planted with hatchery-produced seed, with natural seed, or could remain unseeded to receive a natural set.

Alternative 4 (Proposed Action) Use alternate substrate for the restoration and rehabilitation of oyster bars within the boundaries of NOBs.

New bars could be constructed and existing bars enhanced in the targeted tributaries within the boundaries of NOBs using (but not limited to) any of the following alternate substrate: clam shell, marl, concrete, stone, slag, brick, and cinderblock. Any concrete rubble to be planted would be free of building debris such as wiring, pipes, and other debris. No protruding re-bar would be allowed. Concrete may also include man-made products formed into various shapes to provide benthic habitat (i.e., reef balls). Bars would be constructed in flat and mounded morphologies. Depending upon location and availability of seed, new bars would be planted with hatchery-produced seed, with natural seed, or could remain unseeded to receive a natural set. Further, advances in technology and research may identify new substrate that could be used for the construction of oyster bars and reefs once approved by state and federal resource agencies.

4.2 Ecosystem Benefits

The following ecological functions are provided by oyster bars and reefs:

1. enhanced recruitment, growth, and survival of oyster populations
2. water filtration and regulation of water column phytoplankton dynamics
3. enhanced nitrogen (N) cycling between the benthic and pelagic system components
4. enhanced phosphorus (P) burial in sediments
5. nursery and predation refuge habitat for a diverse community of invertebrates and small fishes
6. foraging habitat for transient piscivorous and benthivorous fishes

(Rodney and Paynter, 2006; Newell, et al. 2004)

Oysters can affect other organisms by changing the physical and chemical environment of the Bay ecosystem. Oysters filter water while feeding, thereby removing sediment and other particles from the water and depositing it on the bottom in pellets called pseudo-feces. Filtration by large numbers of oysters can reduce the time that sediment remains suspended in the water column and increase the clarity of the filtered water. Oysters' pseudo-feces are rich in nutrients and, therefore, help to support primary production among bottom-dwelling organisms in areas immediately surrounding oyster bars and reefs. Local nutrient enrichment also stimulates the exchange of various forms of nitrogen and nitrogen compounds from one part of the system to another (Newell et al. 2002).

A study by Rodney and Paynter (2006) investigated the community supported by restored oyster bars and reefs. Total macrofaunal (animals visible to the naked eye) abundance (free living macrofauna plus fouling (sessile) organisms) was an order of magnitude higher on restored bars and reefs compared to unrestored bars and reefs, free living macrofauna were twice as abundant on restored bars and reefs and fouling organisms were two orders of magnitude more abundant. Epifaunal organism densities were on average 3 times higher in restored bars and reefs. Demersal (dwelling at or near the bottom) fish density was four times higher in restored plots. They found an average of 14.9 species on restored bars and reefs versus 12 on unrestored bars and reefs. Restored bar and reef plots supported a higher level of secondary production. Many of the organisms that were significantly more abundant on restored bars and reefs are also known to be important food items for several commercially and recreationally important finfish species. Additionally, Peterson et al. (2003) determined that $10m^2$ of restored oyster bars and reefs in southeast United States would likely yield an additional 2.6 kg/yr of production of fish and large mobile crustaceans over the functional lifetime of a bar or reef.

With respect to the nutrient sequestration ability of oyster bars and reefs, Newell et al. (2004) evaluated the potential of increased oyster populations to remove nitrogen (N) and phosphorus (P) in the Choptank River. Seasonal N and P removal of current oyster densities in summer in Choptank River is approximately 5 percent N and approximately 34 percent P (based on hydrochemical modeling performed by the study). An increase in oyster density to $10/m^2$ would increase N removal to approximately 50 percent and P removal to approximately 340 percent. On an annual basis, removal of N and P by current oyster stocks is 0.6 percent and 8 percent, respectively. On a restored bar or reef with 10 oysters per meter squared expected annual removal increases to 6 percent N and 80 percent P. This work determined that the value of the Choptank River oyster stock to remove 13,080 kg N per year is $314,836 which sums to $3.1 million over the lifetime of the oysters.

4.3 Evaluation of Alternatives

Alternative 1 No action/continuation of current Chesapeake Bay Oyster Recovery Project activities

Although, oyster shell is the preferred material for providing hard substrate for oyster bar restoration, it has become extremely scarce. In recent decades, clean oyster shell for restoration was available from shucking houses and restaurants, but the primary source has been dredged fossil oyster shell deposits. As discussed in Section 2.3.2, the dredging of fossil oyster shell was discontinued in 2006 due to concerns over the environmental impact to important spawning or nursery grounds for anadromous and other commercially important fish species. MD DNR plans to request a permit to dredge fossil shell in limited areas, but as of now the action is not authorized. Currently, the need for oyster shell for restoration greatly exceeds the amount of available shell. This alternative would provide for a very limited extent of oyster bar restoration, likely only a few acres per year. This assumes that USACE can obtain a great portion of the available clean oyster shell from restaurants and oyster shucking houses. Currently a significant portion of available shucking house shell in Maryland is bought by MD DNR and used in their hatchery to produce oysters. Since 1986, on average only 5 percent of the substrate placed for restoration has been clean shell from restaurants and shucking houses (MD DNR, Chris Judy, email Feb 6, 2009). If all the available shell (obtained from restaraunts and shucking houses) were devoted to restoration, it is estimated that roughly 500 to 600 acres of habitat could be restored based on available shell resources (MD DNR, Chris Judy, email Feb 6, 2009). The shell however, would not all be available to USACE as there are many groups involved with oyster restoration that would be competing for the limited resource of clean oyster shell. Furthermore this would not leave shell for the hatchery to use to produce oysters. Since it is also estimated that 2600 acres of oyster habitat are lost each year in the Chesapeake Bay due to sediment and poor water quality, and lack of recruitment (USACE, 2008), this action alone will not result in a net benefit of increasing oyster habitat within the Bay. This alternative would provide the benefits discussed in Section 4.2, but on a limited scale. The alternative would not meet the objectives of the project due to its inability to restore significant acres of oyster bars and reefs and is therefore not considered acceptable. This alternative would contribute very minimally to Chesapeake 2000 goals of restoring significant oyster bar habitat in the Chesapeake Bay.

Alternative 2 Rehabilitate shell from existing oyster bars that are covered with sediment.

The MD DNR currently funds watermen to recover shell from existing oyster bars that have been buried by sediment. It is projected that 1000 acres can be reclaimed on an annual basis with given funding levels. Given that 2600 acres of oyster habitat are lost each year in the Chesapeake Bay due to sediment and poor water quality, and lack of recruitment (USACE, 2008) this action alone will not result in a net benefit of increasing oyster habitat within the Bay. Any bars restored by cleaning the sediment from the shell would provide the environmental benefits discussed in Section 4.2 however, there would be negative impacts associated with the recovery of the shell. Cleaning the sediment from the shell would result in a temporary increase in turbidity to the water column. Resources such as SAV would be negatively impacted by the sediment disturbed by the dredging. It is likely this activity would be restricted in areas near SAV resources. The release of nutrients into the water column from disturbed sediments could also be significant and would need to be assessed.

Alternative 3 Reclaim buried shell that has been previously placed through repletion programs or to restore oyster bars.

At this time, this alternative is not a permitted action within the State of Maryland. Therefore, it is not viewed as feasible at this time. However, MD DNR has recently submitted a permit that would enable them to recover historically placed shell. This alternative could recover vast amounts of shell that have been placed since the 1960s, which could substantially contribute to restoring significant oyster habitat acreage. Any bars restored using reclaimed shell would provide the environmental benefits discussed in Section 4.2, however, there would be negative impacts associated with the recovery of the shell. Recovering buried shell would result in a temporary increase in turbidity (that moves out of oyster habitat area) to the water column. Resources such as SAV would be negatively impacted by the sediment disturbed by the dredging. It is likely this activity would be restricted in areas near SAV resources. The release of nutrients into the water column from disturbed sediments could also be significant and would need to be assessed.

Alternative 4 Use alternate substrate for the restoration and rehabilitation of oyster bars within the boundaries of NOBs.

Table 4-1 provides a summary of potential alternate substrate, their costs, and availability, as well as a performance rating that was assigned based on completed scientific research and professional experience of restoration practitioners.

Table 4-1. Costs, Performance, and Availability of Alternate Substrate

Substrate	Delivered Cost per cy	Estimated Performance Rating***	Available
Dredged Oyster Shell	$15**	High	Not available
"Shucked" Oyster shell	$25*	High	Low
Hard Clam	$21*	Low	High
Surf Clam Shell	$15*	Low	High
Stone (gabion 2-7")	$26*	Medium	Moderate
Crushed Concrete (2-8")	$45**	High	Intermittent
Marl (marine limestone)	$50*	High	High
Slag	$23*	Undetermined	Moderate
Reef balls	$60*	High	High

Source: *NOAA alternative substrate website:
http://chesapeakebay.noaa.gov/alternativesubstrates.aspx; **MD DNR;***USACE

Field trials to date have shown that free-swimming oyster larvae (in both a natural and hatchery setting) will settle on virtually all hard substrate tested or available. Significant differences exist, however, in the setting density and subsequent survival of those oyster spat. This apparently results from the significant differences in surface area of the various substrates, both of the individual pieces, and of the interstitial space between piles or layers of the material. Monitoring also suggests that the refuge provided by the irregular surfaces and pore spaces of certain materials (natural oyster shell, stone, crushed concrete, and marl) provide better predation protection than those materials that eventually align themselves such that surface area and crevices are minimized (clam shell and surf clam shell).

One benefit alternate substrate may provide over oyster shell is that burrowing organisms (e.g., oyster drills, etc) which predate on oysters may not be able or desire to burrow into the more dense and thicker alternate substrate. Therefore, there may be a reduction in burrowing organisms that have detrimental effects on oysters. Alternatively, some alternative substrates such as clam shell do not provide interstitial space comparable to natural oyster shell bars and reefs. The interstices within substrate provide oysters with increased surface area on which to set and protection from predation. When choosing an appropriate alternate substrate, interstitial space provided by any given substrate is a significant consideration. If substrates such as clam shell that become consolidated and do not provide sufficient interstitial space are chosen for construction, a veneer of oyster shell and living oyster shell should be placed on top to provide good bar or reef structure.

Although no conclusive research program has evaluated the performance and benefits of all potential alternate substrate, there are multiple study results available that support the successful use of alternate substrate. Limestone has been used since the 1990s in Louisiana to catch oyster spat and has performed exceptionally well likely due to its calcium content. Although oyster larvae will set upon a variety of hard surface, calcium carbonate (or perhaps simply calcium) seems to be an important component of an effective substrate to attract larval sets (Hidu et al., 1975; Sonia et al., 1990). A concrete modular reef deployed subtidally in the Rappahannock River in 2000 had extremely good success. The reef was sampled after being deployed for 4.5 years and held densities of 1,085 oysters/m^2 of river bottom amongst a diverse assemblage of benthic organisms. This is 1000 times the average density of oysters on existing unrestored oyster habitat. Additionally, the size structure of oysters indicated the presence of four year classes, with approximately half of all oysters more than two years old and therefore of reproductive age (Lipcius and Burke 2006).

4.4 Preferred Alternative

Based on the evaluations discussed in Section 4.3, the preferred alternative is Alternative 4- Use alternate substrate for the restoration and rehabilitation of oyster habitat within the boundaries of NOBs. This is the only alternative that is able to achieve project objectives due to the scarcity of clean oyster shell and the degraded quality of existing oyster habitat. With the discontinuation of dredging fossil oyster shell, enough clean oyster shell does not exist to restore any significant level of oyster habitat. No other alternative, alone, is currently able to produce a net increase of oyster habitat. Acreage restored using alternate substrate would achieve similar benefits to those discussed in Section 4.2. Selecting this alternative does not eliminate the use of oyster shell. It is anticipated that alternate substrates would be used in conjunction with any available oyster shell.

5.0 IMPACT EVALUATION

This section is an assessment of impacts from the recommended plan. This section presents *direct* and *indirect* impacts resulting from the project. Direct impacts are those that occur directly as a result of the project while indirect impacts would occur as a result of natural or other processes modifying the project or adjacent areas.

The original Phase I project was described in the C*hesapeake Bay Oyster Recovery Project, Maryland*, report prepared by the Baltimore District in May 1996. The 1996 report covered construction activities and potential environmental impacts for the four-year period of 1997 through 2000. The report addressed alternatives, risk management, and included an EA and FONSI that were fully coordinated with the public and resource agencies. The magnitudes of the direct or indirect impacts are also considered. *Insignificant* impacts are those impacts having little effect on the environment. Insignificant impacts range from *minor to moderate* and may be referred to as such throughout this document.

Further, the direct or indirect impacts are evaluated from the standpoint of whether they are *short-term or long-term*. Short-term or temporary effects would last only during the project construction period while long-term effects would persist for many years.

This section also investigates the *cumulative impacts* of the project. Cumulative impacts result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of which agency (Federal or non-Federal) or person undertakes such actions.

Furthermore, it is the intent of this document to assess the impacts of the proposed concepts in the entire watershed, beyond the physical construction footprint of the recommended alternative or real estate easement area. Hazardous, toxic, and radioactive waste (HTRW), environmental, social and cultural impacts have all been addressed in the watershed context and not solely based on specific stream alignments or treatment strategies. Therefore, design changes to the recommended alternative, which may result from buildability, constructability, operability or value added engineering are considered to be covered under this document (provided resource agency coordination occurs) unless proven to be substantial.

5.1 Physical Environment

5.1.1 Physiography and Topography

Oyster bar creation/alternate substrate placement activities will increase the elevation of the existing substrate, but will not impact existing drainage patterns. Due to the limited size and extent of underwater activities, they are not expected to have any hydraulic impacts.

5.1.2 Geology

Historically, oyster bar and reef communities covered large portions of the Bay bottom and its tributaries. Proposed activities will restore a small portion of their historic range. No impacts to geology are expected.

5.1.3 Soils

To minimize the potential for siltation and burial of alternate substrate, substrate will be placed on firm bottoms of sand, shell, gravel. No impacts to soils are expected.

5.1.4 Prime and Unique Farmlands

Since no prime and unique farmlands are located within the project area, there will be no impacts to this resource.

5.1.5 Bathymetry

According to Eric Campbell of MD DNR, existing oyster habitat in the project area is normally 6 to 8 inches and placement of oyster shell/alternate substrate would bring the oyster habitat to no more than 1 foot in depth (with a minimum of 8 feet of clearance) (E. Campbell, MD DNR personal communication March 3, 2009). Alternate substrate will not be placed in depths of less than -8 feet. Bathymetry will be affected by project activities, but no adverse impacts are anticipated.

5.1.6 Water Quality

Only clean alternate substrate will be utilized for the project. A temporary minor detrimental impact to water quality is anticipated as a result of the proposed project. A temporary increase in turbidity within the water column is expected during placement of alternate material. However, long-term impacts to water quality as a result of the creation and restoration of oyster habitat using alternate substrate are expected to be positive due to the ability of oysters to filter water at a rate of about two gallons per hour per oyster. In abundance, oysters help clarify the water, which allows bay grasses to receive more sunlight. Then in turn, plentiful grasses increase oxygen levels, reduce wave energy and shoreline loss, and habitat for aquatic life.

5.1.7 Climate

There will be no impact to climate due to project implementation.

5.1.8 Air Quality

Because the project area is located in a non-attainment area for ozone and particulate matter, a conformity analysis was completed. The basic intent of the Federal Conformity Program is to ensure that all Federal actions comply with the requirements of the applicable State

Implementation Plan (SIP) and do not cause or contribute to a new violation of the National Ambient Air Quality Standards in non-attainment or maintenance areas.

Ozone is created at ground level by a chemical reaction between nitrogen oxides (NOx) and volatile organic compounds (VOCs). The annual emission rates for these criteria pollutants in a non-attainment area are 25 tons/year for NOx and 25 tons/year for VOCs.

The term "particulate matter" (PM) includes both solid particles and liquid droplets found in air. Many manmade and natural sources emit PM directly or emit other pollutants that react in the atmosphere to form PM. These solid and liquid particles come in a wide range of sizes. Particles less than 10 micrometers in diameter tend to pose the greatest health concern because they can be inhaled into and accumulate in the respiratory system. Particles less than 2.5 micrometers in diameter are referred to as "fine" particles. Sources of fine particles include all types of combustion (motor vehicles, power plants, wood burning, etc.) and some industrial processes. On July 17 2006, EPA published a direct final rule (71 FR 40420) establishing a 100 tons per year (TPY) *de minimis* levels for PM2.5, SO2, NOx, and 50 TPY for VOCs.

Total emissions from project activities were estimated to demonstrate that they are below established emission rate thresholds for non-attainment areas. The estimates from project construction represent only 1 percent of the annual limit for NOx, and less than 1 percent of the annual limit for VOCs, SO2 and PM 2.5. Although construction activities would result in short-term, increased air emissions, these emissions would be less than the *de minimus* thresholds. Further details on air quality emissions are located in Appendix D. No major, long-term or adverse impacts are anticipated. Coordination with MDE regarding air quality is ongoing at this time.

5.1.9 Wild and Scenic Rivers

The project is expected to benefit the aquatic environment, and will not result in adverse impacts to the two State-designated scenic rivers (Patuxent and Severn).

5.2 Biological Resources

5.2.1 Submerged Aquatic Vegetation

SAV coverage from the years 2002 through 2006 (VIMS, 2009) were compared with NOB boundaries. Over the vast extent SAV and oyster habitat are separate or adjacent. SAV bed locations and densities fluctuate annually, and therefore there are some small areas, particularly in the Choptank and Severn Rivers where SAV and oyster habitat overlapped. No oyster habitat will be restored where SAV grows on oyster bars and reefs. No long-term adverse impacts are expected to SAV.

5.2.2 Wetlands and Wetland Vegetation

Since the project is not located on shallow water or on land, no impacts to wetlands or wetland vegetation are expected.

5.2.3 Upland Vegetation

Since the project is not located on shallow water or on land, no impacts to uplands or upland vegetation are expected.

5.3 Animal Resources

5.3.1 Benthic Macroinvertebrates

The proposed project is expected to result in beneficial impacts to benthic macroinvertebrates. Through the creation of new seed bars a portion of historic oyster habitat will be restored. Placement of alternate substrate and seeding activities will form an elevated bar/reef structure with greatly increased surface area for the attachment of sessile organisms (e.g. algae, barnacles, sponges, bryozoans, and tube-building worms). Some of the benthic organisms will be impacted by the placement of alternate substrate. The benthic community will be altered in the placement areas; benthic organisms that prefer soft (mud) bottom will not benefit, however, there is much more available soft bottom habitat in the Bay and there is a shortage of hard bottom substrate. It is expected that benthic macroinvertebrates will colonize the alternate substrate shortly after placement.

Oysters can affect other organisms directly through biological mechanisms of interaction such as competition and predation. Oysters feed primarily on phytoplankton and may compete for food with other filter-feeding invertebrates (e.g., hard clams, *Mercenaria mercenaria,* and Baltic clams, *Macoma balthica*), planktivorous fish (i.e., fish that eat minute, free-floating plants and animals collectively called plankton), and zooplankton (i.e., minute aquatic invertebrate animals) (Kennedy et al. 1996; NRC 2004). The extent of such competition depends on the food preferences of the competing species; moreover, significant competition is likely to occur only when the concentration of phytoplankton in the water is low in relation to the number of consumers. Currently, competition for phytoplankton is believed to be minimal because oyster numbers are low compared with their historical abundance and because nutrient input and the resultant production of phytoplankton are high (Newell 1988). No long-term impacts to benthic macroinvertebrates are expected.

<u>5.3.1.1 Eastern Oyster</u>

The proposed project is expected to result in beneficial impacts to the Eastern oyster as portions of historic oyster habitat will be restored.

Placement of alternate substrate is expected to increase oyster populations. Consideration will be taken when designing bars and reefs with alternate substrate to ensure appropriate interstitial space to protect oyster from predation and to mimic natural bar and reef structures as closely as possible.   There are no anticipated adverse impacts.

5.3.1.2 Clams

The proposed project is expected to result in beneficial impacts to clams. Through the placement of alternate substrate a portion of historic oyster habitat will be restored, and will form an elevated bar/reef structure with greatly increased surface area for the attachment of clams. Some of the clams that prefer soft substrate will be covered, but, this type of habitat is plentiful throughout the bay. However the proposed areas are NOBs and are likely to have more hard than soft bottom. No long-term, adverse impacts to clams are expected.

5.3.2 Blue Crabs

The proposed project is expected to result in beneficial impacts to blue crabs. Through the placement of alternate substrate, elevated bar/reef structure will be formed which will provide shelter and good cover for crabs. Clams are important food items for blue crabs and epibenthic fish (Hines et al. 1990). Therefore, the potential for reduction in the abundance of infaunal bivalves due to an increase in the abundance of oysters is an indirect mechanism of interaction that could trigger a shift in the prey selections of crabs from clams to oysters. Blue Crabs are usually only able to prey on young oysters. There are no long-term, adverse impacts expected.

5.3.3 Fish

The proposed project has the potential to indirectly benefit fish, as a result of rehabilitating oyster bar habitat, which provide valuable habitat for fish, and improves water quality. The project will provide bar/reef structure that will provide shelter and cover for finfish. The three-dimensional habitat of an oyster bar results in a higher level of primary and secondary production than is produced inmost-other benthic substrate.

Alternate substrate placement activities may cause resuspension of sediments and generate turbidity which could potentially impact fish eggs, larvae, and juvenile stages. However, this impact would be temporary, minor, and confined to a limited area. Most project activities will occur in June and July, which is after the spawning season for most anadromous fish. In addition, most spawning occurs in shallow, low salinity areas, which would not be used as a part of this project.

An increase in the amount (area and volume) of oyster bars and reefs in Chesapeake Bay could directly affect the populations of some species of bar/reef-oriented fish and indirectly affect others through increases in the availability of prey items and valuable habitat associated with bars and reefs. For the bar/reef dependent species, an increase in the amount of available habitat and the resultant increase in food resources could affect the population size. For bar/reef aggregating species, a change in bar/reef habitat could change the food resources associated with the habitat and, thus, the size of the croaker population. For species that prefer soft bottom there will be some loss. However, since the proposed areas are NOBs, the surfaces are most likely primarily hard substrate and therefore not primary habitat for these species. Therefore, the project is not expected to have an adverse impact on these species.

Additionally, a change in the oyster population (abundance and distribution) could influence planktivorous fish directly through competition for food, and piscivorous fish could be influenced by the associated change in the availability of their fish and non-fish prey. No long-term impacts, adverse impacts are expected.

5.3.4 Essential Fish Habitat

USACE, after reviewing fisheries information, has determined that the proposed action is not likely to significantly affect EFH or species covered under the Magnuson-Stevens Act and is more likely to benefit these protected species than to have an adverse effect on them. The full EFH assessment is in Appendix B. NMFS concurred with the EFH assessment and recommended the placement of some of the substrate as “mounds” to provide some vertical relief for EFH conservation. USACE will follow NMFS EFH conservation recommendation and will place substrate in a few locations that will bring the area to a height of 3 to 6 feet above soft bottom bay floor. The “mounds” will be incorporated into the site design to provide heterogeneity and varying vertical relief to constructed oyster habitat.

5.3.5 Avifauna

The proposed project has the potential to indirectly benefit avifauna as a result of rehabilitating oyster bar habitat, which provide valuable habitat for fish, blue crabs and other aquatic species on which they predate. The mechanism of interaction between some avian piscivores species such as the bald eagle and North American osprey species is indirect: a change in the oyster population could cause changes in the populations of planktivorous fish (particularly menhaden) through competition for food, which could affect avian piscivores. No long-term, adverse impacts to avifauna are expected.

5.3.6 Rare, Threatened, and Endangered Species

The proposed project is not expected to jeopardize the continued existence or critical habitat of any RTE species. A USFWS letter received February 10, 2009, and a follow-up email from Mr. George Ruddy (USFWS) on February 12, 2009, states that they do not expect any adverse effects on RTE’s. Coordination with NMFS (email from J. Crocker on March 12, 2009) confirmed that NMFS does not expect any impacts to RTE species under their purview.

5.3.7 Mammals

The proposed project has the potential to indirectly benefit mammals such as raccoons or otters as a result of rehabilitating oyster bar habitat, which provide valuable habitat for fish, blue crabs and other aquatic species on which they predate. No long-term, adverse impacts are expected.

5.4 Community Setting

5.4.1 Land Use

Historically, oyster bar/reef communities covered large portions of the bottom of the Bay mainstem and its tributaries. Proposed activities will restore a small portion of their historic range. No detrimental or beneficial impacts are predicted for land use in the area as a result of the proposed work as the project is compatible with current land use. Additional shoreline development is not anticipated as a result of the project.

5.4.2 Recreation

It is expected that oyster habitat restored as a result of the proposed project will support blue crabs and various species of finfish. This will have a minor positive impact to blue crab and finfish populations, and therefore to recreational fisheries. Oyster bars and reefs are a desirable place to fish for some recreational boaters because of the habitat they provide. Consequently, there are expected to be some benefits for recreational fishermen. However, during construction there will be temporary adverse impacts on recreational fishing of finfish and shellfish, which will be temporarily disrupted by the work. However oystering is not permitted in the summer which is when alternate substrate for the project would be placed. During placement some recreational boaters may be displaced due to barge activity; impacts to recreational boaters will be short-term and temporary. The oyster bars and reefs will not have great enough heights to impact navigation routes; therefore, long-term, adverse impacts to recreational or commercial boaters are not expected.

5.4.3 Cultural and Historic Resources

Since the approval of the 1996 project, USACE and its restoration partners have been actively working within the identified area, placing shell and spat. The alternate substrate would be placed along the same footprint as outlined in the 1996 report. The placement of alternate substrate would be done in the same manner and within the same footprint as the previously approved project. No deviation to the footprint or manner of placement is proposed. This footprint and the activity of placing shell on top of this footprint was coordinated with MHT in 1996. Based upon coordination with MHT, site selection would be sensitive to the nature of submerged resources. Project sites would be selected to avoid submerged resources in areas that have been previously surveyed or would be in locations with a low potential for containing significant cultural resources. Because of the large areas for placement, sensitive areas have been easily avoided and would continue to be avoided; therefore it is unlikely that the alternate substrate placement would have any adverse impacts to 106 resources. However, USACE and MHT agreed that additional investigations could become necessary if sensitive areas are selected for oyster recovery actions with the potential to affect significant cultural resources.

Project activities will continue to avoid submerged resources in areas that have been previously surveyed or will be in locations with a low potential for containing significant cultural resources.

5.4.4 Hazardous, Toxic, and Radioactive Wastes

The proposed project is not expected to result in the use or production of hazardous materials. All alternate substrate chosen for oyster bar and reef restoration would be determined to be clean and environmentally suitable by previous studies. Any concrete rubble to be planted would be free of building debris such as wiring, pipes, and other debris. No protruding re-bar is allowed. Determination of project sites would include coordination with appropriate agencies and a review of historical data concerning potential contaminants. The project will avoid known CERCLIS and RCRIS sites. No significant levels of contaminants would be released into the water column. Further, any new substrate identified by advances in technology or research that could be used for the construction of oyster bars/reef would be required to be clean and free of toxics and would be approved by state and federal resource agencies prior to use.

5.4.5 Socioeconomic Conditions

The proposed project is expected to have slight, temporary adverse impacts on recreational and commercial fishing of finfish and shellfish, which will be temporarily disrupted by the work. However oystering is not permitted in the summer which is when alternate substrate for the project would be placed. Upon completion of the work, however, it is likely that shellfish and finfish will return to the project areas. As a result of previous oyster projects, oyster populations in the Chesapeake Bay have increased, benefiting watermen harvesting oysters. A minor temporary beneficial impact by providing employment for a marine contractor and a few employees will occur. No long-term adverse impacts on population or growth are expected.

5.4.6 Environmental Justice

Environmental justice is the protection of every person regardless of color, race, or income from negative health, environmental, and economic impacts from a Federal project http://www.epa.gov/compliance/environmentaljustice/index.html. The project is expected to comply with Executive Order 12989, dated February 11, 1994 (*Environmental Justice in Minority Populations and Low-Income Populations)*. Any change in the Bay's oyster population that affects water quality and habitat in the Bay will affect all residents of the Bay area, regardless of minority or economic status. To the extent that minorities or low-income individuals are involved in oystering or in other components of the oyster industry they would be positively affected by alternatives that result in increases in oyster populations or oyster-related businesses. The project is not expected to adversely impact any minority or low-income communities. The economic and environmental impacts of the recommended plan of using alternate substrate for oyster restoration are expected to be beneficial, so there would be no adverse impact, either short- or long-term, related to environmental justice for all persons.

5.4.7 Visual and Aesthetics Values

Transport vehicles, boats, and heavy equipment associated with the proposed project could be a temporary adverse impact to aesthetics of the area. The location of the substrate would occur under water, and it would not have a visual impact once the project is complete. No long-term adverse impacts are expected.

5.4.8 Public Health and Safety

The proposed project is not expected to impact human health. Determination of project locations avoid pollution sources and areas where shellfish harvest is restricted.

5.4.9 Noise

The proposed project will generate noise through the use of barges and tugboats to transport alternate substrates to project sites and the use of a water cannon. The dBA level for a tug is estimated to be 82 at 50 feet, a barge is 79 at 160 feet, and the water cannon is 72 at 50 feet (E. Price, UMD email on March 17, 2009). In addition, no work is expected to take place in close proximity to residences. Noise would be no greater than current oyster restoration project which is ongoing.

5.5 Additional Executive Orders

5.5.1 Children's Protection Executive Order Compliance 13045

No health or safety risks to children associated with the project have been identified. The types of activities associated with the project will not generate chemical constituents that may pose health risks to children. Additionally, because the project is located offshore, children will not have general access to construction areas located on site.

5.5.2 Floodplain Protection Executive Order Compliance 11988

No detrimental or beneficial impacts are predicted for flood heights and drift as a result of the proposed work. No detrimental or beneficial impacts are predicted for floodplain values as a result of the proposed work.

5.6 Cumulative Impacts

In regulations implementing the procedural provisions of NEPA (40 CFR 1500-1508), CEQ defines cumulative effects as follows:

"…the impact on the environment which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions…" (40 CFR 1508.7)

The proposed action evaluated in this EA achieves the purpose as stated in Section 2.1; it would affect local (and possibly beyond local) habitat and water quality and promote a healthy estuarine system in the Chesapeake Bay. The CBP (www.chesapeakebay.net) addresses in detail all major "…past, present and reasonably foreseeable future actions…." that may affect the Chesapeake Bay which is summarized below. Since its inception in 1983, the CBP has documented the major problems facing the Chesapeake Bay and the actions needed to resolve those problems. An overview of past, current and future stressors drawn from the CBP web page provides a context for addressing the cumulative effects of oyster restoration.

The major pollutants affecting the Bay are excess nutrients, which come from agriculture, urban/suburban runoff, vehicle emissions, and many other sources. Excess nutrients fuel the growth of algae blooms, which block sunlight that underwater grasses need to grow. When algae die, they are decomposed in a process that depletes the water of oxygen, which all aquatic animals need to survive. Other major stressors on the Bay include erosion, chemical contaminants, air pollution, and landscape changes. Natural factors can have a great direct influence on the Chesapeake Bay ecosystem and also on the magnitude and scope of the effects of human activities. Total river flow into the Bay can vary dramatically from year to year, causing large fluctuations in salinity that affect the Bay's biological communities and oysters in particular, dramatically. Droughts result in high salinity throughout much of the Bay, which contribute to the range expansion and increase in severity of diseases that affect the Eastern oyster population. In wet years, when precipitation is frequent and heavy, normally brackish regions of the Bay can become fresh and cause mortality of oysters and other animals and plants that cannot survive in fresh waters. Some scientists contend that extremes of precipitation will become more frequent in the future due to climate change. Climate change and variability have caused water temperatures in the Bay to exhibit greater extremes during the 20th century than during the previous 2,000 years. Sea-level rise related to climate change is contributing to the loss of vital coastal wetlands. The amounts of pollutants entering the Bay continue to exceed target levels established by the CBP to restore the Bay's water quality. The human population in the Bay watershed is now growing by about 130,000 residents annually. The cumulative impact of centuries of population growth (currently nearly 17 million) and landscape change has taken its toll.

Historical over-harvest compounded by the effects of poor water quality and disease has resulted in the current low abundance of oysters in the Bay. Excess suspended sediment is one of the largest contributors to the Bay's impaired water quality. The culprits are the tiny clay- and silt-sized fractions of sediment. These particles frequently are suspended in the water because of their size and can be carried long distances during storms. In excess, these smaller grains of sediment cloud the water, reducing the amount of sunlight that reaches submerged grasses. Without enough sunlight, these underwater grasses are not able to grow and provide habitat for young fish and blue crabs. The excess suspended sediment can carry chemical contaminants that may affect fish and other living things in the Bay, as well as humans and animals that swim in it. When it settles to the bottom, the excess sediment also covers and degrades hard-bottom habitat that is essential for the growth of the oyster population and the well being of other aquatic organisms that require that kind of habitat.

The use of alternate substrate would permit oyster restoration to continue on a scale that could address goals of restoring significant oyster bar/reef acreage and could result in ecosystem changes that would counteract some of the cumulative effects of watershed development and pollutant loading to the Bay, on a local scale. It is expected that in conjunction with the use of alternate substrate, other oyster restoration activities would also continue by various groups including some amount of restoration using oyster shell (Alternative 1) and rehabilitating oyster habitat that has been covered by sediment (Alternative 2). However, without the use of alternate substrate, it is extremely unlikely that significant acreage could be restored and long-term goals achieved.

Other restoration activities include the activities discussed in the *Draft Programmatic Environmental Impact Statement for Oyster Restoration in Chesapeake Bay Including the Use of a Native and/or Nonnative Oyster* (Released October 17, 2008 by U.S. Army Corps of Engineers, Norfolk District). For this project the proposed actions include introducing a non-native species, *Crassostrea ariakensis*, and to continue efforts to restore the native Eastern oyster. Another project that is occurring is the development of the Native Oyster Restoration Management Plan (NORMP) by both the Baltimore and Norfolk Districts of USACE. The NORMP presents a plan for pursuing wide-scale oyster restoration throughout the Bay that complements other Bay-wide restoration efforts and future uses of Chesapeake Bay. The MD DNR has recently been permitted to conduct an alternate substrate restoration project (described in Section 1) which involves the placement of alternate substrates within Maryland charted oyster bars in the Chesapeake Bay. MD DNR will also be developing infrastructure and training for aquaculture, continuing bar rehabilitation, (1000 acres planned over the next three years), reopening Piney Point Hatchery to produce spat, and placing cameras to continuously monitor oyster sanctuaries to deter poaching. Additionally there is a bill now under consideration to permit non-private entities to lease the Maryland Bay bottom. It contains restrictions that would require leaseholders to submit a “use” plan and if there is no proof of use, the lease will be transferred to another individual (exception is demonstration leases). Over the last 10 years, NOAA has coordinated community based restoration projects, hatchery infrastructure support, and oyster research and monitoring in the Bay. A recently passed Omnibus bill includes 2.4 million dollars for NOAA to conduct oyster restoration activities in MD; no specific plans have been developed yet. In the last 10 years through the Chesapeake Bay Oyster Recovery Project USACE has established new oyster habitat in the Choptank, Patuxent, and Chester Rivers (437 acres), and placed spat in the project area (1997-2008).

There are Federal channels that are periodically maintained by dredging as needed within all six tributaries. Any dredging of channels that occurs within 500 yards of an oyster bar is subject to time of year restrictions. Hydraulic dredging is restricted from June 1 to September 30 because of concerns over the potential of entrainment of larvae. Mechanical dredging is restricted from December 15 to March 14 due to concerns with increased turbidity.

This alternate substrate project is expected to increase the acreage of available oyster bar/reef habitat as well as enhance recruitment, growth, and survival of oyster populations. The cumulative impact of this project and other oyster restoration projects constructed by MD DNR, ongoing Oyster Recovery Project activities, NOAA and various non-profit and citizens groups is expected to be positive, with the creation of more diverse and productive habitat) improve water quality and promote a healthy estuarine system in the Chesapeake Bay.

6.0 ENVIRONMENTAL COMPLIANCE AND COORDINATION

In addition to the environmental impacts discussed in this EA, a review of the proposed action has been made with regard to other potential areas of concern. Due to the expected impacts, a 404(b)(1) evaluation of the proposed project on waters of the United States was performed pursuant to the guidelines promulgated by the Administrator, U.S. EPA., under authority of Section 404 of the Clean Water Act. A report of that evaluation can be found in Appendix A along with the approved Section 401 Water Quality Certification for all Chesapeake Bay Oyster Recovery Project activities which will expire in April 2010.

EFH coordination was initiated by a letter sent to NMFS on December 22, 2008. NMFS provided technical information in an email dated February 9, 2009. Based on this coordination an EFH assessment was completed (Appendix B) and was submitted to NMFS for review and approval. NMFS concurred with the EFH assessment.

Coordination for Section 7 of the ESA and Fish and Wildlife Coordination Act were initiated by a letter sent to USFWS December 22, 2008. A USFWS response letter dated February 10, 2009, stated that the USFWS expects that there would be no impacts to federally listed or proposed endangered or threatened species under USACE jurisdiction, the letter also discussed recommendations for using alternate substrate and potential shortcomings of this new substrate when compared to native oyster shell substrate. A follow-up phone call with Mr. Ruddy took place on March 17, 2009. Overall, Mr. Ruddy is satisfied with USACE coordination up to this point and was open to continuing the coordination as the project progresses to design, construction, and monitoring phases. He suggested that monitoring include the investigation of the ecological community of constructed bars and reefs and use and coverage of spat on bars and reefs.

Coordination with NMFS regarding endangered species has been completed as of March 12, 2009. No adverse impacts to species under their purview are expected. Verbal coordination with Mr. Roland Limpert of MD DNR, on February 25, 2009, confirmed that no State listed rare or threatened species will be impacted by the placement of alternate substrate at the oyster bars in the project areas.

A Study Initiation Notice announcing an EA was being prepared for the project was issued on December 22, 2008. A public notice announcing the availability of the draft document was issued on April 13, 2009. The notice was distributed to Federal, State, and local agencies, special interest groups, and other interested parties. The notice was also available on the USACE website, and available for review at select public libraries.

The public review period ended on May 13, 2009. A letter received from Maryland Department of Planning informing USACE that the EA was received by the State Clearinghouse Review Process and that the following agencies were forwarded a copy of the document for review: the Counties of Calvert, Caroline, Charles, Dorchester, Wicomico, Anne Arundel, Prince George's, Queen Anne's, Somerset, St. Mary's, and Talbot; the Maryland Department of Planning including MDE, Maryland Department of Transportation (MDOT), MD DNR, and the Maryland Historical

Trust (SHPO). During this time, three coordinating agency comments were received. MDE corrected a statement in section 5.1.8 clarifying that the current *de minimis* levels for MD are 50 tons for VOC, 100 for NOx, SO2 and PM2.5. This change was made to the final document. NMFS recommended the placement of some of the substrate as "mounds" to provide some vertical relief for EFH conservation. USACE will follow NMFS recommendation and will place substrate in a few locations that will bring the area to a height of 3-6 feet above soft bottom bay floor. The "mounds" will be incorporated into the site design to provide heterogeneity and varying vertical relief to constructed oyster habitat. Additionally, MDE recommended that actual batches of alternate substrate (if the source and specific composition is unknown) be tested to assure that there are no unexpected contaminants that would not be a problem in air but could leach into water. USACE will follow MDE recommendations. The non-profit agency, the Oyster Recovery Partnership sent an email dated, May 7, 2009 suggesting the removal of the abbreviation of "ORP" to reduce confusion between the organization and the USACE program, as well as adding text describing the various Maryland partners that do work together in the oyster recovery efforts. These comments were incorporated into the final document. No comments were received from the general public.

A Section 401 Water Quality Certification for the Chesapeake Bay Oyster Recovery Project has been issued by MDE. The proposed project complies with and will be conducted in a manner consistent with Maryland's federally approved Coastal Zone Management (CZM) Program. The Public Notice for this EA requested the State's concurrence with this determination which was received. Table 6-1 outlines the statutes and executive orders that are potentially applicable to the project, including the level of compliance.

In compliance with the National Environmental Policy Act of 1969 and the Clean Water Act, the proposed project has been coordinated with concerned resource agencies and members of the public. USACE is working with a number of government agencies and non-profit organizations to facilitate oyster restoration in the Chesapeake Bay. The focus of the coordination efforts with Federal and State resource agencies is to ensure that environmental factors are considered while planning and executing a prudent and responsible project. These coordination efforts are expanded upon in Appendix C.

Table 6-1. Compliance with Applicable Federal Laws, Regulations, and Executive Orders

Federal Statutes	**Level of Compliance**[1]
Archeological and Historic Preservation Act	Full
Clean Air Act	Full
Clean Water Act	Full
Coastal Barrier Resources Act	N/A
Coastal Zone Management Act	Full
Comprehensive Environmental Response, Compensation and Liability Act	Full
Endangered Species Act	Full
Estuary Protection Act	Full
Federal Water Project Recreation Act	N/A
Fish and Wildlife Coordination Act	Full
Land and Water Conservation Fund Act	Full
Magnuson-Stevens Act	Full
Marine Mammal Protection Act	Full
National Historic Preservation Act	Full
National Environmental Policy Act	Full
Resource Conservation and Recovery Act	N/A
Rivers and Harbors Act	Full
Watershed Protection and Flood Prevention Act	Full
Wild and Scenic Rivers Act	N/A
Executive Orders, Memoranda, etc.	
Migratory Bird (E.O. 13186)	Full
Protection and Enhancement of Environmental Quality (E.O. 11514)	Full
Protection and Enhancement of Cultural Environment (E.O. 11593)	Full
Floodplain Management (E.O. 11988)	N/A
Protection of Wetlands (E.O. 11990)	Full
Prime and Unique Farmlands (CEQ Memorandum, 11 Aug. 80)	N/A
Environmental Justice in Minority and Low-Income Populations (E.O. 12898)	Full
Invasive Species (E.O. 13112)	Full
Protection of Children from Health Risks & Safety Risks (E. O. 13045)	Full

[1] *Full Compliance (Full):* Having met all requirements of the statute, E.O., or other environmental requirements for the current stage of planning. *Non-Compliance (NC):* Violation of a requirement of the statute, E.O., or other environmental requirement. *Not Applicable (N/A):* No requirements for the statute, E.O., or other environmental requirement for the current stage of planning. *Partial:* In process of meeting requirements of statute.

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APPENDICES

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APPENDIX A

Clean Water Act Section404(b)(1) Evaluation
Chesapeake Bay Oyster Recover Project Section 401Water
Quality Certification

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CLEAN WATER ACT SECTION 404(B)(1) EVALUATION

Chesapeake Bay Oyster Restoration Using Alternate (Non-Oyster Shell) Substrate

CHESAPEAKE BAY OYSTER RECOVERY PROJECT, MARYLAND
April 2009

1. PROJECT DESCRIPTION

A. Location

The Project would occur within the Maryland portion of the Chesapeake Bay. Project activities would occur in Oyster Recovery Areas (ORA's) established by the Maryland Oyster Roundtable Action Plan in the Chester, Choptank, Nanticoke, Patuxent, Magothy, and Severn Rivers.

B. General Description

The United States Army Corps of Engineers (USACE) Oyster Recovery Project is recommending the use of alternate substrates to construct oyster bar and reef habitat.

C. Purpose

The purpose of the proposed project is to use alternate substrate for the approved native oyster restoration project in the Maryland portion of the Chesapeake Bay due to limited availability of native oyster shell. In addition to having economic value as a commercial fishery, oysters provide significant environmental benefits. Oysters are a keystone species in the Chesapeake Bay, serving both a water quality and habitat function. There is no substitute for a thriving oyster community in the Bay. The oysters filter the water, playing an important role in sediment and nutrient removal, and provide a hard structure that serves as habitat for not only future oyster generations, but also a variety of fish and benthic species, including juvenile striped bass and blue crabs. It is anticipated that restoring functioning oyster bars and reefs would provide habitat and water quality improvements, at least locally, that would promote a healthy estuarine system. Even in low setting areas, these materials are important as habitat to prepare a base for the planting of hatchery seed.

Oyster restoration is a significant component of current efforts to restore the Chesapeake Bay ecosystem. The proposed project supports objectives of the Chesapeake Bay Program and the Maryland Oyster Roundtable Action Plan. The project is also consistent with the *Agreement of Federal Agencies on Ecosystem Management in the Chesapeake Bay* of 1994.

D. General Description of Material

(1) Characteristics of Material- The alternate (non-oyster shell) materials suitable for use include, but are not limited to clam shell, marl, concrete, stone, slag, brick, porcelain, and cinderblock. Any concrete rubble to be used would be free of building debris such as wiring, pipes, and other debris. No protruding re-bar is allowed. Concrete may also include man-made products formed into various shapes to provide benthic habitat (i.e., reef balls). Only clean material free of contaminants and hazardous materials are suitable for disposal within State waters and would be used. Further, advances in technology and research may identify new substrates that could be used for the construction of oyster habitat once approved by State and Federal resource agencies. The size of individual pieces of material used would vary with the material type and project purpose. The larger the material, the greater the relief provided for the benthic population. No materials other than reef balls would be utilized larger than 12 inches in size.

(2) Fill Material Quantities -Fill material quantity is essentially dependent on funding and availability of resources such as substrate and oyster spat. Given sufficient substrate and spat, funding levels ultimately determine the amount of oyster habitat that can be restored. On average, an acre of oyster habitat receives 900 cubic yards (cy) of substrate material. This provides a base of hard substrate elevated 6 inches off the Bay floor. Some sites would be planted less than 6 inches thick (a 3 inch thickness equates to 450 cy/acre) and others include higher mounds. Based upon current cost projections for the procurement, transportation, and planting of alternate materials, it is estimated that approximately 25 to 40 acres of material could be planted per million dollars of available funding, requiring the placement of 22,500 to 36,000 cy of alternate substrate material.

(3) Source of Material -Sources of alternate materials varies. Some substrates such as reef balls are purchased from companies that make the reef balls. Stone can be purchased from regional quarries. Clam shell is available from wholesalers and is readily available. However, many of the substrates are byproducts of other uses and may only be available sporadically. Slag is a byproduct of metal smelting and has become increasing less available in recent years. Crushed concrete is generally produced from a demolition project such as the replacement of a bridge or building and is intermittently available. Cinderblock, porcelain, and brick are readily available for purchase or can possibly be obtained intermittently from demolition projects. Marl or marl limestone is a calcium carbonate or lime-rich stone which contains variable amounts of clays and aragonite. Marl is mined and is readily available. All materials used in this project would be clean and free of contaminants and hazardous materials.

E. Description of the Proposed Discharge Sites

New oyster habitat would be constructed in the targeted tributaries within the boundaries of natural oyster bars (NOBs). Targeted tributaries include the Chester, Choptank, Patuxent, Severn, Magothy, and Nanticoke Rivers. Specific locations for project activities would be determined based on bottom composition, salinity, water depth, water currents, levels of dissolved oxygen, and disease prevalence. GIS mapping would be utilized to identify sites.

F. Description of Placement Method

Project activities would involve the placement of alternate substrates to create oyster habitat. Alternate materials would be placed primarily by tugboat and barge but large workboats may also be used. With either barges or large workboats, the material would be washed overboard using high pressure water hoses or cannons, with the vessel moving continuously through the planting area to control the thickness and acreage of the planting. Materials may also be placed using a crane/excavator or front-end loader to place material on the oyster bar. To date, the majority of alternate material placements have been less than one foot in height off of the bottom. Restored areas may also receive a thin veneer of native oyster shell, if available; and would be planted with spat on shell.

2. FACTUAL DETERMINATIONS

A. Physical Substrate Determinations

(1) Substrate Elevation and Slope-The elevation of the discharge site would range from +3 inches to a (+) few feet off existing bottom. All elevations would maintain 8 feet of open water clearance above them. The minimum water depth in the oyster placement areas would be -8 feet.

(2) Sediment Type- Oyster bars and reefs would be constructed on firm bottom.

(3) Discharge Material Movement - It is not expected that the material would move off site once placed on a bar. There would likely be some settling of the material. Smaller pieces of material would likely be displaced off of higher relief bars and reefs and settle at the base of these bars and reefs.

(4) Other Effects-None expected.

(5) Actions Taken to Minimize Impacts- The substrate material would be discharged in a manner that minimizes the disruption of bottom sediments. Environmental protection measures, such as time-of-year restrictions on construction and proper site selection to avoid sensitive areas, would be employed at project sites to avoid and minimize impacts to the aquatic environment. Construction specification would state that compliance is mandatory for all applicable environmental protection regulations for pollution control and abatement.

Measures to protect SAV: The placement of alternate materials would not be permitted within 300 feet of submerged aquatic vegetation as mapped and reported annually by the Virginia Institute of Marine Sciences (VIMS) in coordination with the Maryland Department of Natural Resources (MDNR) Resource Assessment Service. Any concrete rubble to be placed would be free of building debris such as wiring, pipes, and other debris. No protruding re-bar is allowed.

Measures to protect existing oyster habitat: Time-of-year restrictions apply to activities occurring within 500 yards of NOBs.

B. Water Circulation, Fluctuation, and Salinity Determinations

(1) Water Quality-Temporary, localized changes may occur in clarity, color, and quality of Bay waters in the immediate vicinity during substrate placement. No negative impacts are expected following construction.

(a) Salinity – No change expected.
(b) Chemistry – No negative impacts expected.
(c) Clarity – Minor and temporary changes are possible in the immediate vicinity during construction due to turbidity. There would likely be localized improvements in clarity due to oyster filtration following establishment of an oyster population on the substrate.

(d) Color – Minor and temporary changes are possible in the immediate vicinity during construction due to turbidity.
(e) Odor – No change expected.
(f) Taste – Not applicable.
(g) Dissolved Oxygen Levels –No change expected.
(h) Nutrients – Not expected to occur. There would likely be localized improvements in nitrogen (N) and phosphorus (P) due to oyster filtration following establishment of an oyster population on the substrate.
(i) Eutrophication – Not expected to occur.
(j) Temperature – No Change expected.

(2) Current Patterns and Water Circulation

(a) Current Patterns and Flow- Minimal effects are expected, but would likely be a positive improvement that benefits the restored oyster habitat. Elevation of an oyster bar or reef may increase flow and turbulence in the vicinity of the bar or reef, resulting in enhanced mixing and food delivery downstream.
(b) Velocity- No significant change in velocity is expected.
(c) Stratification- No change expected.
(d) Hydrologic Regime- No significant changes are expected.

(3) Normal Water Level Fluctuation-No change is expected.

(4) Salinity Gradients-Not applicable.

(5) Actions That Will Be Taken to Minimize Impacts-Not applicable

C. Suspended Particulate/Turbidity Determinations

(1) Expected Changes in Suspended Particulates and Turbidity Levels in Vicinity of Placement Site-A minor and temporary increase in suspended sediment and turbidity is expected in the immediate vicinity of the placement sites. Suspended sediment and turbidity in the vicinity of restored oyster habitat is likely to be reduced after habitat is restored due to stabilizing the sediments with the hard substrate and oyster filtering capabilities.

(2) Effects (degree and duration) on Chemical and Physical Properties of the Water Column

(a) Light Penetration-Minor, temporary, and localized reduction in light penetration due to turbidity would occur in the immediate vicinity of the substrate plantings during placement. Light penetration would depend on placement thickness and the density of the material. Oyster bars and reefs are in 6 to 30 ft. depths and not in the photic zone.

(b) Dissolved Oxygen-Minor, temporary, and localized reduction in dissolved oxygen in conjunction with elevated turbidity levels may occur in the immediate vicinity of placement operations. However, sites that are typically characterized by low oxygen levels would likely be avoided for oyster habitat restoration.

(c) Toxic Metals and Organics-Placement operations are not expected to result in the release of any measurable amounts of contaminants into the water column.

(d) Pathogens-No pathogens are expected to be released into the water column.

(e) Aesthetics-Transport vehicles, boats, and heavy equipment associated with the proposed project would be a temporary negative impact. Project activities would occur under water, and therefore would not impact visual and aesthetic values.

(f) Temperature- No change expected.

(3) Actions Taken to Minimize Impacts-Construction activities would be limited to the immediate project area except for the barge loading sites which would vary with material type. All sites would be within NOB's. All alternate substrates chosen for oyster habitat restoration would be determined to be clean and free of toxics. Any concrete rubble to be placed would be free of building debris such as wiring, pipes, and other debris. No protruding re-bar is allowed. The placement of alternate materials would not be permitted within 300 feet of submerged aquatic vegetation as mapped and reported annually by VIMS in coordination with the MD DNR Resource Assessment Service.

D. Contaminant Determinations

All alternate substrates chosen for oyster habitat restoration would be determined to be clean and free of toxics. Any concrete rubble to be planted would be free of building debris such as wiring, pipes, and other debris. No protruding re-bar is allowed. Determination of project sites would include coordination with appropriate agencies and a review of historical data concerning potential contaminants. No significant levels of contaminants would be released into the water column.

E. Aquatic Ecosystem and Organism Determinations

(1) Effects on Plankton -As construction is a very short-term event and plankton are mobile, no effect is expected. The areas restored to oyster bars and reefs from open water would still be available to the plankton community.

(2) Effects on Benthos-The placement of alternate substrates would permanently cover the existing substrate and benthos. Non-sessile dwellers may be able to avoid burial, but sessile species could be buried. However, the restored oyster habitat would provide enhanced habitat for recolonization by benthic epifauna. Oyster bars and reefs are three-dimensional structures which provide more surface area for the attachments of oysters and other sessile organisms (mussels, barnacles, hydroids, algae, etc.) than that provided by relatively flat bottom.

(a) Primary Production/Photosynthesis-Any turbidity generated during construction may reduce photosynthesis within the area of the oyster bar or reef and possibly slightly outside.
(b) Suspension/ Filter Feeders-Minor, temporary, and localized impacts due to turbidity may occur during construction.
(c) Sight Feeders-Minor, temporary, and localized impacts due to turbidity may occur during construction.

(3) Effects on Nekton-No long-term negative impacts are expected. Nekton would be temporarily disturbed during construction, but would be able to avoid the area during substrate placement. Following construction, the restored oyster bar or reef would provide an enhanced habitat for species that rely on structure for habitat, protection, and foraging such as fish, amphipods, shrimp, worms, and crabs.

(4) Effects on Food Web-No adverse, long term effects are expected. The long-term project effects are expected to be positive by providing bar and reef habitat and subsequent oyster populations and associated assemblages. A great diversity of macroinvertebrates, fish, and shellfish have been shown to colonize restored oyster habitats (Rodney and Paynter 2006). Organisms associated with oyster habitat recycle nutrients and organic matter, and are prey for commercially and recreationally important finfish species.

(5) Effects on Special Aquatic Sites-Oysters are generally restricted to subtidal areas from 6 to 30 feet in depth. Therefore, project activities are not expected to displace or adversely impact SAV. However, appropriate measures such as time-of-year restrictions to minimize impact to NOBs and restrictions on construction near SAV, would be implemented during substrate placement to protect special aquatic sites in adjacent areas from elevated turbidity. There would be no significant negative impacts or effects to other special aquatic sites including marine sanctuaries and refuges, wetlands, or tidal flats.

(a) Sanctuaries and Refuges- Temporary and minor impacts would occur to designated oyster sanctuaries since the material would be placed within existing areas designated as sanctuaries by MDDNR. These impacts would include temporary increased turbidity and covering the benthos with the newly placed substrate. There would be no impacts to any other marine sanctuaries or refuges.

(b) Wetlands- There would be no impacts to wetlands as wetlands do not occur in the project area.

(c) Tidal flats- No impacts since tidal flats do not occur in the project area.

(d) SAV – SAV habitat coverage of the Bay bottom is variable from year to year. A comparison was made of SAV coverage within the past 5 years using maps produced by VIMS to NOBs. There are some minor areas where SAV has occurred within the boundaries of NOBs. Any areas containing SAV would be avoided during site selection. Also, existing restrictions on construction within 300 yards of existing SAV beds would be upheld to prevent negative impacts associated with construction such as increased turbidity.

(e) Riffle and Pool Complexes- None in project area.

(6) Threatened and Endangered Species-No adverse effects are anticipated to threatened and endangered species as a result of this project.

(7) Other Wildlife- Construction would have expected noise associated with the machinery used to place the material. This noise would temporarily disrupt some species of wildlife during periods of work. Also, the presence of humans and equipment may disturb some species. Species are expected to return when construction is completed and the equipment leaves the area.

(8) Actions to Minimize Impacts-Construction activities would be limited to the immediate project area. All sites would be within NOBs. All alternate substrates chosen for oyster habitat restoration would be determined to be clean and free of toxics. Any concrete rubble to be placed would be free of building debris such as wiring, pipes, and other debris. No protruding re-bar is allowed. The placement of alternate materials would not be permitted within 300 feet of submerged aquatic vegetation as mapped and reported annually by VIMS in coordination with the MD DNR Resource Assessment Service.

F. Proposed Placement Site Determinations

(1) Mixing Zone Determinations- Not applicable.

(2) Compliance with Applicable Water Quality Standards Determinations-Alternate substrates used would be clean and would meet all applicable water quality standards. The proposed work would be performed in accordance with all applicable State of Maryland water quality standards. All work would be conducted in compliance with conditions specified in the project's Water Quality Certification.

(3) Potential Effects on Human Use Characteristics Determinations

(a) Municipal and Private Water Supply-No effect is expected.

(b) Recreational and Commercial Fisheries-The project is expected to enhance and create habitat for oysters and other organisms, including finfish and blue crabs.

(c) Water Related Recreation- As an indirect benefit of the proposed work, some increase in recreational fishing may occur following establishment of communities on the restored bars and reefs.

(d) Aesthetics-Minor during construction.

(e) Parks, National and Historical Monuments, National Seashore, Wilderness Areas, Research Sites, and Similar Preserves- No effect expected.

G. Determination of Cumulative Effects on the Aquatic Ecosystem

The use of alternate substrates would permit oyster restoration to continue on a scale that could address goals of restoring significant oyster habitat acreage. Without the use of alternate substrates it is extremely unlikely that significant acreage could be restored due to the current degraded condition of existing oyster habitat and the limited availability of native oyster shell for habitat restoration. The project is expected to increase the acreage of available oyster habitat as well as enhance recruitment, growth, and survival of oyster populations. The cumulative impact of this project and other oyster restoration projects constructed by MDNR, Federal agencies, and various non-profit and citizens groups is expected to be positive, with the creation of more diverse and productive habitat.

H. Determination of Secondary Effects on the Aquatic Ecosystem

Secondary effects are expected to be positive, resulting in increased habitat for finfish, blue crabs, and other species. Additional benefits from oyster restoration would include water filtration and regulation of water column phytoplankton dynamics; enhanced nitrogen (N) cycling between the benthic and pelagic system components; enhanced phosphorus (P) burial in sediments; nursery and predation refuge habitat for a diverse community of invertebrates and small fishes; and foraging habitat for transient piscivorous and benthivorous fishes.

The mandatory sequence of the Section 404(b)(l) Guidelines has been applied in evaluation of the proposed action. The proposed use of alternate substrates to restore oyster habitat is in compliance with the Section 404(b)(l) Guidelines. Parts II and IV of the analysis show that the proposed use of alternate substrates do not contribute to the significant degradation of waters of the United States and as such, the proposed project and proposed use of the placement sites comply with the requirements of 40 CFR 230.10(c). Appropriate steps to minimize potential impacts of the placement of the alternate substrate in aquatic systems would be followed.

3. FINDING OF COMPLIANCE

a. Adaptation of the Section 404(b)(1) Guidelines to This Evaluation - No adaptations of the Guidelines were made relative to this Evaluation.

b. Evaluation of Availability of Practicable Alternatives to the Proposed Discharge Site Which Would Have Less Adverse Impact on the Aquatic Ecosystem. – None of the alternatives are expected to provide the same benefits with fewer impacts.

c. Compliance with Applicable State Water Quality Standards. – In full compliance. WQC 05-WQ-001.

d. Compliance with Applicable Toxic Effluent Standard or Prohibition under Section 307 of the Clean Water Act. – N/A.

e. Compliance With Endangered Species Act of 1973 – In full compliance. No impacts are anticipated to these resources.

f. Compliance with Specified Protection Measures for Marine Sanctuaries Designated by the Marine Protection, Research, and Sanctuaries Act of 1972 – N/A.

g. Evaluation of Extent of Degradation of Waters of the United States – No adverse impacts, permanent or temporary, to the aquatic ecosystem diversity, productivity, stability, recreation, and aesthetics and economic values would occur as a result of this project.

h. Appropriate and Practicable Steps Taken to Minimize Potential Adverse Impacts of the Discharge on the Aquatic Ecosystem – Best management practices such as targeted placement of material at bars and reefs would occur.

i. On the Basis of the Guidelines, the Proposed Disposal Site(s) for the Discharge of Dredged or Fill Material - On the basis of the guidelines, the proposed discharge sites for the material is specified as complying with the inclusion of appropriate and practical conditions to minimize pollution or adverse effects on the aquatic ecosystem.

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WATER QUALITY CERTIFICATION

NABOP

CERTIFICATION 05-WQ-001

PUBLIC NOTICE DATE August 24, 1995

**TO: Planning Division
Baltimore District, Corps of Engineers
P.O. Box 1715
Baltimore, MD 21203-1715**

RE: Implementation of the Chesapeake Bay Oyster Recovery Project involving numerous restoration and remediation activities to increase oyster habitat and populations.

This water quality certification is issued under authority of Section 401 of the Federal Water Pollution Control Act and its Amendments and the Environment Article, Sections 9-313 - 9-323, inclusive, Annotated Code of Maryland. A copy of this required certification has been sent to the Corps of Engineers. This certification does not relieve the applicant of responsibility for obtaining any other approvals, licenses or permits in accordance with federal, State, or local requirements and does not authorize commencement of the proposed project. The Maryland Department of the Environment has determined from a review of the plans that the construction of this facility and its subsequent operation as noted herein will not violate Maryland's water quality standards, provided that the following conditions are satisfied.

The applicant shall comply with the conditions marked (X) below:

(X) (1) The proposed project shall be constructed in a manner which will not violate Maryland's Water Quality Standards as set forth in COMAR 26.08.02. The applicant is to notify this department ten (10) days prior to commencing work. Verbal notification is to be followed by written notice within ten (10) days.

(X) (2) The proposed project shall be constructed in accordance with the plan and its revisions as approved by the:

**(X) (a) Corps of Engineers
( ) (b) Water Management Administration**

(X) (3) All fill and construction materials not used in the project shall be removed and disposed of in a manner which will prevent their entry into waters of this State.

(X) (4) The applicant shall notify this Department upon transferring this ownership or responsibility for compliance with these conditions to another person. The new owner/operator shall request transfer of this water quality certification to his/her name.

(X) (5) The certification holder shall allow the Maryland Department of the Environment or its representative to inspect the project area at reasonable times and to inspect records regarding this project.

Page Two Water Quality Certification

( ) (6) Construction of any bulkhead shall be completed prior to filling behind the bulkhead. The bulkhead shall be constructed in such a manner so as to prevent the loss of fill material to waters of this State. Only clean fill, which is free of organic, metallic, toxic or deleterious materials shall be used.

( ) (7) The disturbance of the bottom of the water and sediment transport into the adjacent State waters shall be minimized. The applicant shall obtain and certify compliance with a grading and sediment control plan which has been approved by the:

( ) (a) ____________________ Soil Conservation District or
( ) (b) Erosion and Control Representative, Division of Environmental Services, Bureau of Highways, Department of Public Works of the City of Baltimore or
( ) (c) The Department of the Environment, Water Management Administration or
( ) (d) Montgomery County Department of Environmental Protection.

The approved plan shall be available at the project site during all phases of construction.

( ) (8) The spoil disposal area(s), including dikes where applicable, shall be constructed to limit the suspended solids content in the discharge to the waters of this State to four hundred (400) parts per million or less.

( ) (9)____________ shall be done only in the period ____________________.

( ) (10) Stormwater runoff from impervious surfaces shall be controlled to prevent the washing of debris into the waterway. The natural vegetation shall be maintained and restored when disturbed or eroded. Stormwater drainage facilities shall be designed, implemented, operated and maintained in accordance with the requirements of the applicable approving authority.

( ) (11) ____ shall provide to the Water Management Administration a stormwater management plan including cross-sections which incorporates effective pollutant removal strategies in uplands to treat a minimum of the first one-half inch of runoff from impervious surfaces prior to release of stormwater into State waters or wetlands. There shall be no discharge of untreated stormwater to State waters or wetlands. The plan shall be provided by ________________ and shall be implemented by________________________________.

( ) (12) ____ shall provide to the Water Management Administration a mitigation plan for the construction of ________________ acre(s) of ____________________ wetland for review and approval by ____________________________. The plan shall be implemented by ____________________________. The plan shall show:

- the source of hydrology for the constructed wetland
- the source and amount of soil to be used in constructing the wetland
- the species, size and density of vegetation to be planted in the constructed wetland and a planting schedule.
- a monitoring/maintenance plan.

( ) (13) ____ shall monitor the mitigation site for a period of five years and shall determine whether the wetland construction has been successful. A successful mitigation project shall result in: ______ plants/acre and 85% survivability of plants in forested and scrub/shrub wetlands and plants covering 85% of the area for emergent wetlands. If these standards are not met, ________________________________ shall determine the reason(s) for failure, the problem(s) shall be corrected, and the area(s) shall be replanted and monitored.

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( ) (14) The mitigation site shall be constructed in accordance with the plan, dated________________________.

( ) (15) ____ shall provide a _________________________________ plan for review and approval by _______________________. This plan shall be implemented by ____________________________________.

( ) (16) At least one culvert in every stream crossing shall be depressed at least one foot below existing stream bottom under the low flow condition. A low flow channel shall be provided through any riprap structures. The culvert shall be constructed and any riprap placed so as not to obstruct the movement of aquatic species.

( ) (17) Stormwater discharges from ponds, stormwater management outfalls, and stormwater facilities shall have a velocity no greater than four feet per second for the two year storm in order to prevent erosion in the receiving waterway or wetland.

( ) (18) Future stormwater discharges to certified pond(s) are prohibited unless the first one half inch of stormwater runoff from impervious surfaces is managed in uplands for effective pollutant removal.

( ) (19) Authorized stormwater detention ponds shall have a maximum detention time of ______________________ hours.

( ) (20) _____________________________ shall restore and revegetate all temporarily disturbed waters and wetlands to original contours upon completion of construction.

Failure to comply with these conditions shall constitute reason for suspension or revocation of the Water Quality Certification and legal proceedings may be instituted against the applicant in accordance with the Annotated Code of Maryland. In granting this certification, the Department reserves the right to inspect the operations and records regarding this project at anytime.

CERTIFICATION APPROVED

Ellen A. Ghigiarelli
Water Management Administration

April 15, 2010
Expiration Date

APPENDIX B

Essential Fish Habitat Assessment

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Chesapeake Bay Oyster Restoration Using Alternate (Non-Oyster Shell) Substrate

Chesapeake Bay Oyster Recovery Project, Maryland

Essential Fish Habitat Assessment

May 2009

Prepared By: Baltimore District, U.S. Army Corps Of Engineers

Pursuant to Section 305 (b)(2) of the Magnuson-Stevens Fishery Conservation & Management Act, the U.S. Army Corps of Engineers (USACE) is required to prepare an Essential Fish Habitat [EFH] Assessment for the placement of alternate substrate on natural oyster bars (NOBs) as part of the Chesapeake Bay Oyster Recovery Project, Maryland that began in 1996.

Based on the prescribed protocol for preparation of an EFH Assessment, the assessment is comprised of the following components:

1. A description of the proposed action;
2. A listing of the life stages of all species with EFH designated in the project area;
3. An analysis of the effects of the proposed action;
4. The Federal agency's opinions regarding the effects of the proposed action; and,
5. Proposed mitigation, if applicable.

DESCRIPTION OF THE PROPOSED ACTION

The Baltimore District, U.S. Army Corps of Engineers proposes to place alternate (non-shell) substrate at existing oyster bars within Oyster Recovery Areas (ORAs) in Maryland of the following tributaries: Patuxent, Severn, Magothy, Chester, Choptank and Nanticoke Rivers. Figure 1 provides a map of the project area. The material would be brought to the project area by tug and barge and it would be removed from the barge by means of a water cannon, a crane, or other mechanical means. All previous oyster restoration efforts by USACE have been limited to the use of clean oyster shell as substrate. Construction using alternate substrates rather than oyster shell is targeted to begin in spring/summer 2009. In subsequent years, additional placement of substrates would occur between June and September. Potential alternate substrates for construction could include, but are not limited to clam shell, marl, concrete, stone, slag, brick, and cinderblock. Any concrete rubble to be used would be free of building debris such as wiring, pipes and other debris. No protruding re-bar is allowed. Concrete may also include man-made products formed into various shapes to provide benthic habitat (i.e., reef balls). Further, advances in technology and research may identify new substrates that could be used for the construction of oyster bars and reefs once approved by state and federal resource agencies.

SPECIES WITH EFH DESIGNATED IN THE PROJECT AREA

After consultation with John Nichols, NMFS, (email dated February 9, 2009- Appendix C) it was determined that some areas of the Bay under consideration for oyster restoration as part of this project lie within the general area that may provide EFH for some of the species managed by NMFS. Species for which EFH is a concern are as follows: summer flounder (*Paralichthys dentatus*), juvenile and adult life stages; bluefish (*Pomatomus saltatrix*), juvenile and adult life stages; windowpane flounder (*Scopthalmus aquosus*), juvenile and adult life stages; cobia (*Rachycentron canadum*), all life stages; red drum (*Sciaenops ocellatus*), all life stages; king mackerel (*Scomberomorus cavalla*), all life stages; and Spanish mackerel (*Scomberomorus maculatus*) (National Marine Fisheries Service, Northeast Region, Habitat Conservation Division EFH web site; *www.nero.nmfs.gov/ro/doc/hcd.htm*).

Due to specific habitat needs, it is unlikely that cobia, king mackerel, Spanish mackerel, or windowpane flounder would be in the project area (Murdy et al., 1994). Windowpane flounder prefers sandy substrates which would be avoided for this project. Cobia more commonly inhabit areas of higher salinity than would be found at most of the project area. Spanish mackerel are most abundant from the mouth of the Chesapeake Bay region to south Florida. They prefer polyhaline regions (18-30ppt) of the lower Bay. Finally, none of the life stages of king mackerel are typically found within the project area. As a result, this EFH analysis will focus on bluefish, summer flounder, and red drum.

IMPACTS TO SPECIES WITH EFH DESIGNATED IN THE PROJECT AREA

The following section provides a brief overview of pertinent natural history information of: 1) bluefish, 2) summer flounder, and 3) red drum. Additionally, an analysis of the direct, secondary, and cumulative impacts of the proposed use of alternate substrate on federally managed species, and prey species consumed by managed species that occur in the project vicinity is provided.

1. BLUEFISH (*Pomatomus saltatrix*) (juvenile and adult stages)

Bluefish are usually found high in the water column. In some years, large numbers of bluefish penetrate far up the Bay; in other years, bluefish schools are sparse, with larger bluefish concentrating in Virginia waters. For juveniles, all major estuaries between Penobscot Bay, Maine and St. Johns River, Florida are considered EFH.

Juvenile and adult bluefish enter the Chesapeake Bay during spring through summer, leaving the Bay in late fall.

Adults – Adults are uncommon north of Annapolis, and generally do not occur above the U.S. 50 bridge, except during years of greater up-Bay salt wedge encroachment. Adults are not typically bottom feeders and are strong swimmers. No impacts expected.

Juveniles - Juveniles tend to concentrate in shoal waters. In contrast to adults, the young have a wide range of salinity tolerance and penetrate much farther up the Bay and its tributaries, where they can be found in shallow waters of very low salinity (Murdy et al., 1997). Therefore, juveniles are more common in the upper Bay above the U.S. 50 Bridge, occurring as far north as the Susquehanna Flats and the lower Elk River (Lippson, 1973).

Spawning - Spawning is oceanic and does not occur in the Chesapeake Bay.

Prey- Juveniles tend to be opportunistic feeders, foraging on a wide variety of estuarine life in the pelagic zone and over a variety of bottom types (Lippson, 1973). Small fish such as Menhaden that bluefish prey upon are widely dispersed across the Bay and do not depend upon the bottom. With respect to prey, there is nothing particularly unique or valuable to bluefish at the project area. Therefore, bluefish prey species should not experience adverse effects on population levels from the proposed project.

Impact on Bluefish- Adults and juveniles would occur in the Bay at the same time as project activities. However, no significant impacts are expected to bluefish as a result of project activities. The use of alternate substrate is not expected to have any negative impacts on any life stage of bluefish. No impacts are expected because there is sufficient open water habitat outside of the project area during the short construction season and turbidity impacts are expected to be local, minimal, and short-lived. As a transient species, bluefish are expected to be able to avoid any direct, minor construction impacts to water quality.

Cumulative impacts: The use of alternate substrates would permit oyster restoration to continue on a scale that could address goals of restoring significant oyster bar and reef acreage. It is expected that in conjunction with the use of alternate substrates, other oyster restoration activities would also continue by various groups and include some amount of restoration using oyster shell to rehabilitate oyster habitat that has been covered by sediment. However, without the use of alternate substrates it is extremely unlikely that significant acreage could be restored and long-term goals achieved. The project is expected to increase the acreage of available oyster bar and reef habitat as well as enhance recruitment, growth, and survival of oyster populations. The cumulative impact of this project and other oyster restoration projects constructed by MD DNR, ORP and various non-profit and citizens groups is expected to be positive, with the creation of more diverse and productive habitat. No adverse negative cumulative impacts are expected.

There would be short-term increases in turbidity and possibly the release of nutrients from bottom sediments during placement of substrate, whether alternate substrates or native shell. This impact is expected to be direct, but minor and temporary. Alternate substrates used for restoration would be clean and would not impact water quality negatively. Long-term impacts to local water quality as a result of the restoration of oyster habitat are expected to be positive throughout the Bay.

Other restoration activities include the activities discussed in the *Draft Programmatic Environmental Impact Statement for Oyster Restoration in Chesapeake Bay Including the Use of a Native and/or Nonnative Oyster* (Released October 17, 2008 by U.S. Army Corps of Engineers, Norfolk District). For this project, the proposed actions include introducing a non-native species, the Suminoe oyster, and to continue efforts to restore the native Eastern oyster. Another project that is occurring is the development of the Native Oyster Restoration Management Plan (NORMP) by both the Baltimore and Norfolk Districts of USACE. The NORMP presents a plan for pursuing wide-scale oyster restoration throughout the Bay that complements other Bay-wide restoration efforts and future uses of Chesapeake Bay. Finally, the MD DNR has a permitted alternate substrate restoration project within Maryland charted oyster bars in the Chesapeake Bay

Cumulatively, the oyster restoration impacts are not anticipated to have any significant impacts, either direct or secondary to bluefish populations within the Bay.

2. SUMMER FLOUNDER (*Paralicthys dentatus*) (juvenile and adult stages)

Juvenile and adult summer flounder enter the Chesapeake Bay during spring and early summer, and exit the Bay in fall (Murdy, 1997). Both adults and juveniles exhibit a marked preference for sandy bottom and/or submerged aquatic vegetation (SAV) beds, particularly areas near shorelines (Murdy, 1997). The Magnuson-Stevens Act has identified SAV as a Habitat of Particular Concern for both juvenile and adult summer flounder. Summer flounder is not known to use oyster bars.

Adults - Summer flounder adults inhabit shallow coastal and estuarine waters during warmer months. Adults utilize deep channels, ridges, sandbars, and shallow water with sandy bottoms.

Juveniles- Juveniles prefer shallower waters.

Spawning- Summer flounder are ocean spawners. Larvae are not likely to be present in the project area during placement because they begin to migrate into the Bay in October well after summer construction activities are completed.

Prey- Summer flounder feed mainly on fish, squids, shrimp, and crabs. The summer flounder prefers sandy substrate and is frequently seen near sandy shores, partly buried in the sand.

Impact on Summer Flounder- Juvenile and adult summer flounder would occur in the Bay during project activities. However, no significant direct negative impacts are expected on adults or juveniles as a result of proposed activities. Secondarily, it is likely that the creation of oyster bars and reefs would serve as an attractant and provide habitat for the small creatures that the summer flounder prey upon.

Since oysters are generally restricted to water depths between- 6 and- 30 feet (MLW), oyster reef restoration using alternate substrates would not generally occur within SAV growing range. However, restored oyster bars and reefs do occur in areas adjacent to SAV beds. To minimize any potential direct impacts, no alternate material placement would occur within 300 feet of SAV beds. Further, NMFS has indicated that time-of-year restrictions may be necessary to protect SAV from elevated turbidity within 500 yards of the activity. Given these provisions, no adverse impacts to SAV are anticipated as a result of the proposed project.

Successful oyster restoration is expected to improve local water quality which would benefit SAV beds in the local vicinity. Therefore, oyster restoration would provide secondary beneficial impacts to summer flounder by promoting SAV habitat, which is designated as a Habitat of Particular Concern for summer flounder.

Finally, cumulative effects from other projects discussed in the bluefish section are not anticipated to have any significant negative impacts, either direct or secondary, to summer flounder.

3. RED DRUM (*Sciaenops ocellatus*)

Red drum are bottom-feeding fish. The young prefer grassy (SAV) or mud bottoms.

EFH for red drum includes all of the following habitats to a depth of 50 meters offshore: tidal freshwater; estuarine emergent vegetated wetlands (flooded salt marshes, brackish marsh, tidal creeks); estuarine scrub/shrub (mangrove fringe); submerged rooted vascular plants (sea grasses); oyster bars and reefs and shell banks; unconsolidated bottom (soft sediments); ocean high salinity surf zones; and artificial bars and reefs. The area covered includes Virginia through the Florida Keys (Reagan, 1985).

Adults- Adults are found in SAV beds and on mud bottoms, but another preferred habitat is oyster bars and reefs. During construction, it is expected that any adults in the vicinity of the project area would be temporarily displaced. As transient species, adult red drum would be able to avoid the disrupted area and find comparable habitat in the nearby vicinity. Restored oyster bars and reefs would provide enhanced habitats for adult red drum.

Juveniles- Juveniles occur throughout Chesapeake Bay from September to November.

Spawning – Spawning is oceanic.

Prey - Red drum prey includes crabs, shrimp and fish. No negative impacts to prey are expected. Oyster bar and reef restoration would provide habitat for red drum prey species and therefore is expected to increase desired species.

Impact on Red Drum- The use of alternate substrates is not expected to have any negative impacts on any life stage of red drum and would likely have a positive secondary impact by promoting prey species that use oyster bars and reefs for habitat. As oyster bars and reefs are designated EFH for red drum, oyster bar and reef restoration would directly improve and increase EFH habitat for red drum.

As discussed in the section on bluefish, the proposed action is not expected to negatively impact SAV. Alternatively, successful oyster restoration is expected to improve local water quality which would benefit SAV beds in the local vicinity. Therefore, oyster restoration would provide secondary beneficial impacts to red drum by promoting SAV habitat, which is designated as EFH for red drum.

Finally, cumulative effects from other projects discussed in the bluefish section are not anticipated to have any significant negative impacts, either direct or secondary, to red drum.

FEDERAL AGENCY'S OPINION ON PROJECT IMPACTS TO EFH

1. Discharge from the site during alternate shell placement operations must comply with state (Maryland Department of the Environment) water quality standards, and should result in only short term, minor perturbations to local water quality.

2. There would be short-term increases in turbidity and possibly the release of nutrients from bottom sediments during construction. This impact is expected to be direct, but minor and temporary. Alternate substrates used for restoration would be clean and would not impact water quality negatively. Long-term impacts to local water quality as a result of the restoration of oyster habitat are expected to be positive.

3. The proposed project is expected to result in direct and secondary, beneficial impacts to aquatic resources. Through the restoration of existing non-productive oyster bars, a portion of historic oyster habitat would be directly restored. Placement of alternate substrates would form an elevated bar/reef structure with greatly increased surface area for the attachment of sessile organisms (e.g. algae, barnacles, sponges, bryozoans, and tube-building worms). In addition, this bar/reef structure would provide, as a secondary benefit, shelter and cover for mobile invertebrates and finfish.

4. Most project activities would occur between June and September, when most species identified are present in the Bay. However, as discussed in the individual sections, no direct negative impacts are expected to the identified species as they are transient and similar habitat is abundant throughout the Bay, or prefer different habitats than those being targeted with the project. Impacts to spawning are not a concern as this is after the spawning season for most anadromous fish and most spawning occurs outside the project area in oceanic waters or in shallow, low salinity areas, which are not expected to be used as a part of this project.

5. The proposed action is not expected to negatively impact SAV. Alternatively, successful oyster restoration is expected to improve local water quality which would

benefit SAV beds in the local vicinity. Therefore, oyster restoration would provide secondary beneficial impacts to SAV habitat.

6. The proposed project would directly increase EFH for red drum by restoring oyster bars and reefs. The proposed project would indirectly benefit EFH for red drum and Habitat of Particular Concern for summer flounder by promoting SAV habitat.

7. The Baltimore District, after reviewing fisheries information, has determined that the proposed action is not likely to have significant negative, direct or secondary, affects on EFH or species covered under the Magnuson-Stevens Act and is more likely to benefit these protected species than to have an adverse effect on them.

Mitigation: No significant adverse environmental impacts are expected as a result of the proposed project and mitigation is not necessary.

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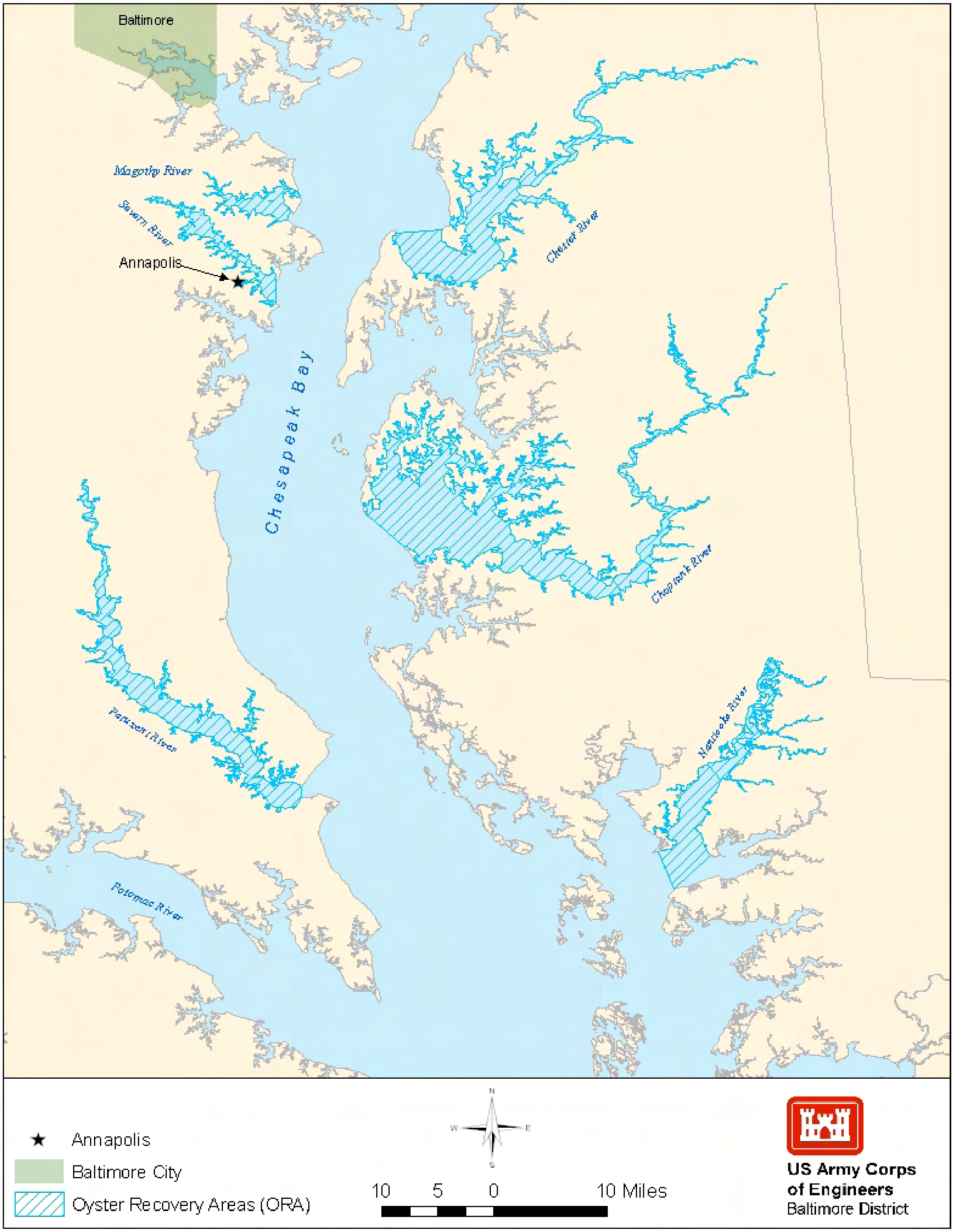
Figure 1. Chesapeake Bay Oyster Recovery Areas



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APPENDIX C

Agency Coordination

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AGENCY COORDINATION

Coordination for the following applicable Federal Laws, Regulations, and Executive Orders was performed:

(1) Fish and Wildlife Coordination Act requires coordination with the USFWS,
(2) Endangered Species Act requires coordination with USFWS, MD DNR, and NMFS,
(3) Magnuson-Stevens Act (MS), as amended, requires coordination with NMFS on EFH,
(4) National Historic Preservation Act requires coordination with MHT (SHPO),
(5) Clean Water Act, as amended requires coordination with MDE,
(6) Clean Air Act, as amended requires coordination with MDE, and
(7) Coastal Zone Management Act, as amended requires coordination with MDE

22 December 2008	Public notice initiating study published notifying interested parties of USACE's intent to prepare an Environmental Assessment evaluating the use of alternate (non-oyster shell) substrate for oyster reef restoration.
22 December 2008	Coordination letter from USACE to John Nichols at NMFS initiating coordination for compliance with the provisions of the Magnuson-Stevens Fishery Conservation and Management Act, as amended and requesting information to support development of an Essential Fish Habitat (EFH) assessment.
22 December 2008	Coordination letter from USACE to Bob Zepp at USFWS initiating coordination for compliance with the Fish and Wildlife Coordination Act and requesting information on the presence of Federally protected species in the project area listed by Section 7 of the Endangered Species Act (ESA).
8 January 2009	Letter received from Maryland Department of Planning informing USACE that the Public Notice was received by the State Clearinghouse Review Process and that the following agencies were forwarded a copy of the Public Notice for review: Maryland Department of the Environment, Maryland Department of Transportation, Maryland Department of Natural Resources, and the Maryland Department of Planning including the Maryland Historical Trust (SHPO).

27 January 2009 Letter received from Maryland Department of the Environment (MDE) informing USACE that the Public Notice was received by the State Clearinghouse Review Process and that this project is consistent with MDE's plans, programs, and objectives.

9 February 2009 Email received from John Nichols at NMFS communicating NMFS's support for using alternate substrates and identifying EFH species of concern.

10 February 2009 Letter from USFWS to USACE communicating USFWS recommendations and issues to consider when using artificial substrates. The letter was followed up by an email sent 12 February 2009 to George Ruddy at USFWS from USACE requesting additional information on ESA species and confirmation of compliance with Fish and Wildlife Coordination Act. These issues were not mentioned in letter received from USACE.

12 February 2009 Email received from George Ruddy at USFWS confirming that letter dated 10 February 2009 fulfilled ESA and Fish and Wildlife Coordination Act requirements.

25 February 2009 Dr. Roland Limpert, MD DNR was contacted via phone and was asked if there are any State listed rare or threatened species that could be affected by the placement of alternate substrate at the oyster bars in the project areas. He said a review was undertaken for the State's permit application and it was determined that there are no listed species in the area the USACE is considering.

12 March 2009 Email received from Julie Crocker at NFMS confirming that there is no indication that the proposal to use alternate substrate as opposed to shell for the proposed oyster rehabilitation project would negatively impact any RTE species. This conclusion is consistent with the determinations made by USACE and NMFS for other similar projects (i.e., the Lynnhaven River oyster rehab project in VA and the Potomac River fisheries commission project).

13 April 2009 A public notice released announcing the availability of the draft document. The public review period ended on 13 May 2009.

28 April 2009 Letter received from Maryland Department of Planning informing USACE that the EA was received by the State

Clearinghouse Review Process and that the following agencies were forwarded a copy of the document for review: the Counties of Calvert, Caroline, Charles, Dorchester, Wicomico, Anne Arundel, Prince George's, Queen Anne's, Somerset, St. Mary's, and Talbot; the Maryland Department of Planning including the Maryland Department of the Environment, Maryland Department of Transportation, Maryland Department of Natural Resources, and the Maryland Historical Trust (SHPO).

5 May 2009	Email received from Brian Hug at MDE confirming that the emission's created from the USACE air quality analysis fall below the current de minimis thresholds for general conformity.
11 May 2009	A memo was received from John Nichols at NMFS confirming that the agency is in support of the proposed activities. NMFS recommended the placement of some of the substrate as “mounds” to provide some vertical relief for Essential Fish Habitat (EFH) conservation. NMFS suggests mounds of 5-6 feet in areas that are prone to silt accumulation that are not subject to commercial harvest activities. A follow-up conversation with Mr. Nichols occurred on May 13, 2009 clarifying that substrate placement will occur on existing hard bottom habitat that often has a vertical height (above bay bottom) already as shown by MGS Bathymetry data. Mr. Nichols changed his recommendation to from 5-6 to 3-6 feet "mounds." USACE provided a written response confirming that recommendations will be adopted into the alternate substrate placement plan.
12 May 2009	A memo was received from Ms. Joane Mueller at MDE. MDE recommended that unless the source and specific composition is known, actual batches of alternate substrate should be tested to assure that there are no unexpected contaminants that would not be a problem in air but could leach into water. USACE provided a written response confirming that recommendations will be adopted into the alternate substrate placement plan.
22 May 2009	A letter was received from MDE stating that MDE concurs with USACE findings of impacts and that the project is consistent with the federal Coastal Zone Management Act
5 June 2009	A public notice released announcing the availability of the singed Finding of No Significant Impact Statement.

Included for reference: Original Oyster Recovery Project MHT coordination

26 October 1995 Letter from MHT to USACE communicating MHT recommendations to conduct a Phase I underwater survey before work can proceed and requesting maps to look at specific areas to aid in determination.

2 December 1995 Letter from MHT to USACE communicating that MHT compared the maps, provided by USACE of natural and legal oyster bars in a number of Maryland rivers with their records of submerged cultural resources and listed potential areas that may be impacted by the oyster recovery project that should be avoided.

Planning Division

US Army Corps of Engineers
Baltimore District

PUBLIC NOTICE
CHESAPEAKE BAY OYSTER RECOVERY PROJECT, MARYLAND

ALL INTERESTED PARTIES: DEC 12 2008

The U.S. Army Corps of Engineers, Baltimore District (USACE) Chesapeake Bay Oyster Recovery Project is preparing an Environmental Assessment (EA) in compliance with the National Environmental Policy Act (NEPA). The EA addresses the use of artificial (non-oyster shell) substrate in Maryland waters.

The USACE has authority to construct oyster habitat under Section 704(b) of the Water Resources Development Act of 1986 (amended recently by Section 5021 of the Water Resources Development Act (WRDA) of 2007), which authorizes the construction of alternative or beneficially modified habitats for indigenous fish and wildlife, including man-made reefs for fish habitat in the Maryland portion of the Chesapeake Bay. In 1996, USACE completed a report, the Chesapeake Bay Oyster Recovery Project, which documents the plan formulation conducted by USACE and the non-Federal sponsor, Maryland Department of Natural Resources (MDNR). Implementation of the recommendations made by this plan began in 1997 and is ongoing, but is restricted to using only oyster shell for substrate. Areas addressed in the 1996 report are designated Oyster Recovery Areas (ORA's) of the following tributaries: Patuxent, Severn, Magothy, Chester, Choptank and Nanticoke Rivers, and near Smith and James Islands. A supplemental report/EA was also prepared in 2002 that evaluated the cost effectiveness of USACE-led oyster restoration.

In order for USACE to construct and cost share oyster reef restoration using alternative (non-oyster shell) substrates, as was authorized by the Water Resources Development Act of 2007, USACE is undertaking the preparation of an EA. Construction using alternative substrates rather than oyster shell is targeted to begin in spring 2009. Potential alternate substrates for construction include clam shell, marl, concrete, stone, slag, brick, and cinderblock. Any concrete rubble to be planted would be free of building debris such as wiring, pipes and other debris. No protruding re-bar is allowed. Concrete may also include man-made products formed into various shapes to provide benthic habitat (i.e. reef balls).

On 13 August 2008, USACE (Baltimore Operations Division) signed a Finding of No Significant Impact (FONSI) in response to a Permit Evaluation and Decision Document (EA) to permit MDNR to use alternative materials to construct oyster sanctuaries and harvest reserves (CENAB-OP-RMN (MDNR/Alternate Material) 2007-03659-M24). The proposed action is the USACE-led equivalent of the permitted MDNR action.

Sincerely,

Amy M. Guise

Amy M. Guise
Chief, Civil Project Development Branch
Planning Division

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, U.S. ARMY CORPS OF ENGINEERS
P. O. BOX 1715
BALTIMORE, MARYLAND 21203-1715

REPLY TO
ATTENTION OF

Planning Division

22 December 2008

Mr. Bob Zepp
Chesapeake Bay Field Office
U.S. Fish & Wildlife Service
177 Admiral Cochrane Drive
Annapolis, MD 21401

Dear Mr. Zepp:

This letter is in reference to the U.S. Army Corps of Engineers, Baltimore District (USACE) Chesapeake Bay Oyster Recovery Project, Maryland. USACE currently has authority to construct oyster habitat under Section 704(b) of the Water Resources Development Act of 1986 (amended recently by WRDA 2007, Section 5021) which authorizes the construction of alternative or beneficially modified habitats for indigenous fish and wildlife, including man-made reefs for fish habitat in the Maryland portion of the Chesapeake Bay. In 1996, USACE completed a report, the Chesapeake Bay Oyster Recovery Project, which documents the plan formulation conducted by USACE and the non-Federal sponsor, Maryland Department of Natural Resources (MDNR). Implementation of the recommendations made by this plan began in 1997 and is ongoing, but is restricted to using only oyster shell for substrate. Actions are not limited to, but have been focused in designated Oyster Recovery Areas (ORAs) of the following tributaries: Patuxent, Severn, Magothy, Chester, Choptank and Nanticoke Rivers, and near Smith and James Islands. A supplemental report/Environmental Assessment (EA) was also prepared in 2002.

In order for USACE to construct and cost share oyster reef restoration using alternative (non-oyster shell) substrates, as was authorized by the Water Resources Development Act of 2007, USACE is undertaking the preparation of an EA. Construction using alternative substrates rather than oyster shell is targeted to begin in spring 2009.

On 13 August 2008, USACE (Baltimore Operations Division) signed a Finding of No Significant Impact (FONSI) in response to a Permit Evaluation and Decision Document (EA) to permit MDNR to use alternative materials to construct oyster sanctuaries and harvest reserves (CENAB-OP-RMN (MDNR/Alternate Material) 2007-03659-M24). The proposed action is the USACE-led equivalent of the permitted MDNR action.

The purpose of this letter is to initiate coordination for compliance with all requirements of the Fish and Wildlife Coordination Act. USACE is also requesting any information your office may have on the presence of and potential impacts you foresee to federally protected species listed under Section 7 of the Endangered Species Act (ESA) from the use of alternative substrates in oyster restoration. Please provide this office with any preliminary comments for this project by 30 January 2009.

If you have any questions regarding this matter, please contact Ms. Angie Sowers, Ph. D., at 410-962-7440.

Sincerely,

Amy Guise

Amy Guise, Chief
Civil Project Development Branch

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, U.S. ARMY CORPS OF ENGINEERS
P. O. BOX 1715
BALTIMORE, MARYLAND 21203-1715

REPLY TO
ATTENTION OF

Planning Division

22 December 2008

Mr. John Nichols
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Chesapeake Bay Field Office
410 Severn Avenue, Suite 107A
Annapolis, MD 21403

Dear Mr. Nichols:

This letter is in reference to the U.S. Army Corps of Engineers, Baltimore District (USACE) Chesapeake Bay Oyster Recovery Project, Maryland. USACE currently has authority to construct oyster habitat under Section 704(b) of the Water Resources Development Act of 1986 (amended recently by WRDA 2007, Section 5021) which authorizes the construction of alternative or beneficially modified habitats for indigenous fish and wildlife, including man-made reefs for fish habitat in the Maryland portion of the Chesapeake Bay. In 1996, USACE completed a report, the Chesapeake Bay Oyster Recovery Project, which documents the plan formulation conducted by USACE and the non-Federal sponsor, Maryland Department of Natural Resources (MDNR). Implementation of the recommendations made by this plan began in 1997 and is ongoing, but is restricted to using only oyster shell for substrate. Actions are not limited to, but have been focused in designated Oyster Recovery Areas (ORAs) of the following tributaries: Patuxent, Severn, Magothy, Chester, Choptank and Nanticoke Rivers, and near Smith and James Islands. A supplemental report/Environmental Assessment (EA) was also prepared in 2002.

In order for USACE to construct and cost share oyster reef restoration using alternative (non-oyster shell) substrates, as was authorized by the Water Resources Development Act of 2007, USACE is undertaking the preparation of an EA. Construction using alternative substrates rather than oyster shell is targeted to begin in spring 2009.

On 13 August 2008, USACE (Baltimore Operations Division) signed a Finding of No Significant Impact (FONSI) in response to a Permit Evaluation and Decision Document (EA) to permit MDNR to use alternative materials to construct oyster sanctuaries and harvest reserves (CENAB-OP-RMN (MDNR/Alternate Material) 2007-03659-M24). The proposed action is the USACE-led equivalent of the permitted MDNR action.

The purpose of this letter is to initiate coordination for compliance with all requirements of the Magnuson-Stevenson Fishery Management and Conservation Act. USACE is requesting any information your office may have on the presence of and potential impacts you foresee to essential fish habitats from the use of alternative substrates in oyster restoration. Please provide this office with any preliminary comments for this project by 30 January 2009.

If you have any questions regarding this matter, please contact Ms. Angie Sowers, Ph. D., at 410-962-7440.

Sincerely,

Amy Guise

Amy Guise, Chief
Civil Project Development Branch

MDP
Maryland Department of Planning

January 8, 2009

Ms. Amy M. Guise
Chief, Civil Project Development Branch, Planning Division
U.S. Army Corp of Engineers, Baltimore District
P.O. Box 1715
Baltimore, MD 21203-1715

STATE CLEARINGHOUSE REVIEW PROCESS
State Application Identifier: MD20090107-0010
Reviewer Comments Due By: February 4, 2009
Project Description: EA: Chesapeake Bay Oyster Recovery Project: to allow use of artificial (non-oyster) substrate in the State's waters: per Public Notice 2007-03659-M24; FONSI signed on 8/13/08
Project Location: Maryland
Clearinghouse Contact: Bob Rosenbush

Dear Ms. Guise:

Thank you for submitting your project for intergovernmental review. Participation in the Maryland Intergovernmental Review and Coordination (MIRC) process helps ensure project consistency with plans, programs, and objectives of State agencies and local governments. MIRC enhances opportunities for approval and/or funding and minimizes delays by resolving issues before project implementation.

The following agencies and/or jurisdictions have been forwarded a copy of your project for their review: the Maryland Departments of Natural Resources, the Environment, Transportation; and the Maryland Department of Planning; including the Maryland Historical Trust. They have been requested to contact your agency directly by **February 4, 2009** with any comments or concerns and to provide a copy of those comments to the State Clearinghouse for Intergovernmental Assistance. Please be assured that after **February 4, 2009** all MIRC requirements will have been met in accordance with Code of Maryland Regulations (COMAR 14.24.04). The project has been assigned a unique State Application Identifier that should be used on all documents and correspondence.

A "Project Survey" form is enclosed with this letter. Please complete and return it within 14 days of the date of this letter. If you need assistance or have questions, contact the State Clearinghouse staff noted above at 410-767-4490 or through e-mail at brosenbush@mdp.state.md.us. Thank you for your cooperation with the MIRC process.

Sincerely,

Linda C. Janey

Linda C. Janey, J.D., Assistant Secretary
for Clearinghouse and Communications

LCJ:BR
Enclosure
cc: Beth Cole - MHT*
Greg Golden – DNR*
Nat Brown - MPA
Roland Limpert – DNR*
Joane Mueller – MDE*
Cindy Johnson – MDOT*
Tracey Gordy – MDPLL*
Steve Allan – MDPL*

09-0010_NDC.NEW.doc

MDP
Maryland Department of Planning

Martin O'Malley
Governor
Anthony G. Brown
Lt. Governor

Richard Eberhart Hall
Secretary
Matthew J. Power
Deputy Secretary

PROJECT SURVEY

Would you please take a few moments and tell us the source of information used by your agency to apply to the **U.S. Department of Defense (DOD/ARMY)** for this grant and/or service. Please complete this form and return it to the State Clearinghouse within 14 days of **January 8, 2009,** to the address or fax number noted below.

TO: **Maryland State Clearinghouse**
Maryland Department of Planning
301 West Preston Street
Room 1104
Baltimore, MD 21201-2305

DATE: ____________________
(Date form completed)

FROM: ______________________________
(Name of person completing this form.)

PHONE: _____-_____-________
(Area Code & Phone number)

RE: State Application Identifier: MD20090107-0010
Project Description: EA: Chesapeake Bay Oyster Recovery Project: to allow use of artificial (non-oyster) substrate in the State's waters: per Public Notice 2007-03659-M24; FONSI signed on 8/13/08

☐ Chronicle of Philanthropy	☐ GrantsNet	☐ Nonprofit Organization Website
☐ Commerce Business Daily	☐ Health Grants and Contracts Weekly	☐ Previous Grantee
☐ Community Health Funding Report	☐ LISTSERV	☐ Red Book (Catalog of State Assistance)
☐ E-Mail Automatic Notification	☐ Local/State Funding Report and Grant Alert	☐ Seminar or Workshop Attended
☐ Federal Agency Website	☐ Maryland Department of Planning Website	☐ State Agency Website
☐ Federal Assistance Monitor	☐ Maryland Grants (MD Grants)	☐ The Catalog of Federal Domestic Assistance (CFDA)
☐ Federal Grants and Contracts Weekly	☐ Maryland Register	☐ The Foundation Center
☐ Federal Register	☐ NIH Guide for Grants and Contracts	☐ Grants.Gov
☐ Please Identify Other Source(s) Not Listed Above:		

Thank you.

Spivers returned call to Rosenbush on 22 Jan 09
Agreed this is not applicable to us+
I clarified that 8/13/08 FNSI was separate action.

MDPCH-1K

MDE

MARYLAND DEPARTMENT OF THE ENVIRONMENT

1800 Washington Boulevard • Baltimore, Maryland 21230
410-537-3000 • 1-800-633-6101 • http://www.mde.state.md.us

January 27, 2009

Ms. Amy M. Guise
Chief, Civil Project Development Branch
U.S. Army Corps of Engineers
P.O. Box 1715
Baltimore, MD 21203

RE: State Application Identifier: MD20090107-0010
Project: Chesapeake Bay Oyster Recovery Project

Dear Ms. Guise:

Thank you for providing the Maryland Department of the Environment (MDE) with the opportunity to comment on the above-referenced project. Copies of the documents were circulated throughout MDE for review, and it has been determined that this project is consistent with MDE's plans, programs and objectives.

Again, thank you for giving MDE the opportunity to review this project. If you have any questions or need additional information, please feel free to call me at (410) 537-4120.

Sincerely,

Joane D. Mueller

Joane D. Mueller
MDE Clearinghouse Coordinator
Science Services Administration

cc: Bob Rosenbush, State Clearinghouse

From: John Nichols [John.Nichols@noaa.gov]
Sent: Monday, February 09, 2009 3:17 PM
To: Sowers, Angela NAB02
Subject: COE Oyster Recovery Project

Angie:
This pertains to your letter, dated December 22, 2008, concerning issues on the proposed modifications to the Corps of Engineers, Baltimore District, Chesapeake Bay Oyster Recovery Project. Modifications include use of alternative (non-oyster shell) substrates for modifying habitats for indigenous fish in the Maryland portion of the Bay.

NOAA Fisheries had no objections to the Maryland Department of Natural Resources proposed placement of alternative cultch materials for oyster recovery purposes. Similarly, we do not object to the Corps' use of alterative non-shell materials for enhancing fish habitat.

We understand that your agency is preparing as Essential Fish Habitat Assessment for the proposed modification to this project. As was done doing your previous EFH consultation on this project, your assessment should address impacts to the same federally managed species and life stages, listed below.

bluefish (juvenile and adult stages)
summer flounder (juvenile and adult stages) windowpane (juvenile and adult stages)
cobia, red drum, Spanish mackerel, King mackerel (all life stages for each)

Based on ecological and salinity tolerance parameters for each species, we anticipate that only bluefish (juveniles and adults), summer flounder (juveniles and adults), and red drum (juveniles) will be affected by this project.

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Chesapeake Bay Field Office
177 Admiral Cochrane Drive
Annapolis, MD 21401
410/573-4575

February 10, 2009

Amy Guise
Chief, Civil Project Development Branch
U.S. Army Corps of Engineers
P.O. Box 1715
Baltimore, MD 21203-1715

Attn: Angie Sowers

Re: Chesapeake Bay Oyster Recovery Project

Dear Ms. Guise:

This responds to your letter dated December 22, 2008, requesting comments on your proposal to use alternative (i.e., non-oyster shell) substrates to construct oyster reefs in numerous areas of the Maryland portion of the Chesapeake Bay and tributaries. Your letter did not describe the types of alternative substrates that are being considered, but a subsequent discussion with Angie Sowers on February 2 revealed the existence of an undated Public Notice which described the material as consisting of clam shell, marl, concrete rubble (must be free of wiring, pipes, and protruding rebar), stone, slag, brick, cinderblock, and preformed products such as reef balls.

We believe these materials are suitable to use in the Bay for establishing human-made reef habitat. They appear to be free of pollutants and the non-shell products are generally dense enough to resist being moved about by waves and currents. We expect that there would be no impacts to federally listed or proposed endangered or threatened species under our jurisdiction.

However, the alternative substrate materials have some noteworthy shortcomings in their ability to replace oyster shell in oyster reef restoration efforts. While oysters can be expected to attach to any of the identified hard substrates, studies have indicated that the degree to which they do so will vary, and none are expected to be as attractive as oyster shell (Haven et al. 1987; Mann et al. 1990; Haywood et al. 1999). In contrast to oyster shell, the alternative materials would not provide the abundant small interstices where oysters can set and be more protected from predation (Haven et al. 1987; Bartol and Mann 1999; O'Beirn 2000). Therefore, the best use of the alternative substrates may be as core material that supports an outer layer of oyster shell and living oysters above the surrounding bottom.

All substrates tend to become colonized by fouling organisms that successfully compete with oysters for space and by organisms that may be direct predators of oysters (e.g., bay anemone predation on larval oysters). Sedimentation on the hard substrates is also a progressive problem that greatly diminishes the likelihood of a good spat set. Management actions such as the use of bagless dredging to resuspend sediment and expose clean cultch on the reef would be precluded or made less effective with the non-shell substrates. The harvesting of oysters for the purpose of replanting seed, removing diseased oysters, or accomplishing commercial profit (from the harvest reserves) would be more difficult on reefs developed on many of the alternative substrates.

We encourage you to consider these shortcomings as you decide how to best utilize these alternative materials in your oyster restoration effort. If there are any questions, please contact George Ruddy at (410) 573-4528.

Sincerely,

Leopoldo Miranda
Field Office Supervisor

Citations:

Bartol, I.K. and R. Mann. 1999. Small-scale patterns of recruitment on a constructed intertidal reef: the role of spatial refugia. Pp. 159-170 in M. Luckenbach, R. Mann, and J. Wesson (eds) Oyster reef habitat restoration: a synopsis and synthesis of approaches; proceeding from the symposium, Williamsburg, VA April 1995.

Haven, D.S., J.M. Zeigler, J.T. Dealteris, and J.P. Whitcomb. 1987. Comparative attachment, growth and mortalities of oyster (*Crassotrea virginica*) spat on slate and oyster shell in the James River, Virginia. Journal of Shellfish Research 6(2): 45-48.

Haywood, E.L., III, T.M. Soniat, and R.C. Broadhurst, III. 1999. Alternatives to clam and oyster shell as cultch for eastern oysters. Pp. 295-304 in M. Luckenbach, R. Mann, and J. Wesson (eds) Oyster reef habitat restoration: a synopsis and synthesis of approaches; proceeding from the symposium, Williamsburg, VA April 1995.

Mann, R., B.J. Barber, J.P. Whitcomb, and K.S. Walker. 1990. Settlement of oysters, *Crassostrea virginica* (Gmelin 1791), on oyster shell, expanded shale and tire chips in the James River, Virginia. Journal of Shellfish Research 9(1): 173-175.

O'Beirn, R.X., M.W. Luckenbach, J.A. Nestlerode, and G.M. Coates. 2000. Toward design criteria in constructed oyster reefs: oyster recruitment as a function of substrate type and tidal height. Journal of Shellfish Research 19(1): 387-395.

From: George_Ruddy@fws.gov
Sent: Thursday, February 12, 2009 11:59 AM
To: Sowers, Angela NAB02
Cc: Bob_Zepp@fws.gov
Subject: RE: Proposal for Use of Alternative Oyster Substrates

Angie: As stated in the letter, we expect that there will be no effect on T&E Federally listed species under our jurisdiction. You should check with NMFS for their opinion on possible effects to sturgeon and sea turtles. In the past some have suggested that the Eastern oyster should be listed, but of course this has not happened. I suppose that if the Asian oyster is introduced, the possibility of listing the Eastern oyster might be revisited. Our letter can be taken as an acknowledgment of your coordination and compliance with the ESA and the FWCA. However, your letter was quite general and did not give me a good impression of the scale and precise use of the alternative substrates. I trust that the oyster restoration program includes adaptive management provisions to determine how well the alternative substrate material is functioning. --George

"Sowers, Angela NAB02" <Angela.Sowers@usace.army.mil>
02/12/2009 10:22 AM

To: <George_Ruddy@fws.gov>
cc:
Subject: RE: Proposal for Use of Alternative Oyster Substrates

Thanks George. Did you want to identify any RTE species that we should discuss in our evaluations. Can I state that this response covers coordination for both ESA and the Fish and Wildlife Coordination Act?

Thanks,
Angie

-----Original Message-----
From: George_Ruddy@fws.gov [mailto:George_Ruddy@fws.gov]
Sent: Thursday, February 12, 2009 10:18 AM
To: Sowers, Angela NAB02
Subject: Proposal for Use of Alternative Oyster Substrates

Angie: I am attaching a copy of our response letter which has been signed and mailed. --George (See attached file: oyster substrates.doc)

From Mark Mendelsohn (CENAB-PL)
To: Anna Compton (CENAB-PL)
February 25, 2009

Phone conversation with Mr. Roland Limpert, Heritage Program, Maryland Department of Natural Resources on February 25, 2009.

I asked Dr. Limpert if there are any state listed rare or threatened species that could be impacted by the placement of alternative substrate at the oyster bars in the project areas. He said a review was undertaken for the State’s permit application and it was determined that there are no listed species in the area the Corps is considering.

Prepared by

Mark Mendelsohn
Biologist

USACE-CENAB-PL

PHONE CONVERSATION RECORD

SUBJECT: Oyster Project Essential Fish Habitat
CONTACT: John Nichols at National Marine Fisheries Service (NMFS)
DATE: March 9, 2009

I called Mr. Nichols to ask about species and essential fish habitat (EFH). He said that as far as EFH the species of concern are: Summer Flounder, Bluefish, Window Pane Flounder, Cobia, King Mackerel, Spanish Mackerel and Red Drum. He said the ones of primary concern are Summer Flounder, Bluefish, and Red Drum.

Prepared by

Mark Mendelsohn
Biologist
USACE -PL

Compton, Anna M NAB

From: Mendelsohn, Mark NAB02
Sent: Thursday, March 12, 2009 3:44 PM
To: Sowers, Angela NAB02; Compton, Anna M NAB
Subject: FW: Oyste rEA
Attachments: Julie_Crocker.vcf

Some good news!

From: Julie Crocker [mailto:Julie.Crocker@Noaa.Gov]
Sent: Thursday, March 12, 2009 2:33 PM
To: Mendelsohn, Mark NAB02
Subject: Re: Oyste rEA

Hi Mark.

As you know, several species listed by NMFS as threatened or endangered occur in the project area (sea turtles and shortnose sturgeon). Based upon the information you provided in your 3-9-09 email, there is no indication that the proposal to use alternative substrate as opposed to shell for the proposed oyster rehabilitation project would negatively impact any of these species. This conclusion is consistent with the determinations made by ACOE and NMFS for other similar projects (i.e., the Lynnhaven River oyster rehab project in VA and the Potomac River fisheries commission project).

Julie

Mendelsohn, Mark NAB02 wrote:
Dear Ms. Crocker:

The Baltimore District, USACE, has determined that oyster reef construction using alternative substrate is not likely to impact any of the endangered species under your purview. We are requesting your concurrence. Project information is enclosed. Please contact me if you need further information.

Thank You.

Mark Mendelsohn
Biologist
Baltimore District
USACE-PL
(410) 962-9499

Compton, Anna M NAB

From: Sowers, Angela NAB02
Sent: Thursday, March 19, 2009 3:04 PM
To: Gomez, Michele NAB02; Compton, Anna M NAB
Subject: Summary of phone conversation with George Ruddy on 17 Mar 2009

All,
I had a phone conversation with George Ruddy on Tuesday, March 17, 2009 regarding the alternative substrate EA for oysters restoration. We discussed any specific ideas he had for monitoring sites restored using alternative substrates. I told George that typically we monitor growth, density, and disease. Recently we have also looked at mapping the extent and profile of reefs. He raised some ideas in designing the reefs. He suggested we vary profile and relief, but highlighted that he wouldn't expect the orientation of the reef to be that significant in Maryland since these tributaries experience much weaker currents than Virginia waters. We discussed how to control placement of the material to achieve the desired profiles. Our recent monitoring has shown that earlier placement of materials did not usually achieve the even distribution across the targeted area, but rather tracked the course of the boat. So, we realize the difficulty with achieving precise geometry, but should still include plans to look at different profiles and relief. The other issue we discussed was since the alternative substrates are likely heavier and denser than natural oyster shell, there could be some issue with settlement into the bottom. That is, how well will the bottom support the heavier materials? I think the profile mapping Ken Paynter has been doing for us could assess any settlement issues. George proposed that we look at ecological benefits. That is, do reefs constructed with alternative substrates provide habitat for the same reef community that uses reefs constructed of oyster shell? There is the possibility that not all the critters that attach to natural shell would attach to alternative substrates. Now, this can get complicated and affect some species possitively and some negatively- I won't get into that in an email, but he had been thinking there could only be negative consequences and I think I convinced him that there would be some trade-offs in the food web. We discussed whether the alternative substrate would provide sufficient reef characteristics for oysters or whether a veneer of shell would need to be placed on top of the alternative substrate. I explained to George that we always seed our reefs with spat on shell. He did not know this. I think he thought we just put the substrate out and we looking for it to catch a natural spat set. Given that we seed, I don't think this is as big an issue anymore, but is still worth doing some comparisons of reefs constructed with alt. substrate and then seeded with those constructed with alt. substrate, a shell veneer, and then seeded. One final point we discussed monitoring is how well does spat placed cover the artificial substrate.

Overall, he is satisfied with our coordination up to this point and was open to us continuing the coordination as we go through the design and construction phases and into monitoring. I requested an email stating this, but am not sure we will get one since I haven't seen anything yet.

In summary, points to include in a monitoring plan
-density
-growth
-disease
-WQ
-profile, placement, settlement
-ecological community and use
-coverage of spat on substrate used for base
-include comparison of reefs constructed only of alternative substrate with spat on shell with reefs that also hold a veneer of oyster shell on top of the alternative substrate

I am planning on pulling together a page or two for Claire describing a basic monitoring plan.

Thanks,
Angie

Angie Sowers, Ph.D.
U.S. Army Corps of Engineers
Baltimore District- Planning Division
Civil Project Development Branch
Biologist

MARYLAND
HISTORICAL
TRUST

Archaeology Office

October 26, 1995

Dr. James F. Johnson, Chief
Planning Division
Baltimore District, Corps of Engineers
P.O. Box 1715
Baltimore, Maryland 21203-1715

Dr. Johnson:

This office has reviewed only the underwater sections of the Public Notice application (and are therefore speaking for underwater concerns - terrestrial issues will be addressed by our compliance office) for the Chesapeake Bay Oyster Recovery Project in Maryland. Our office recognizes that several areas on the proposed project have significant historical properties within their boundaries. In order to preserve and protect these properties, this office should be contacts on specific areas selected, to preform our review and make appropriate determinations. Some zones represented may require a Phase I underwater survey before work can proceed. For example, Kedges Straits is an historically important area with a high potential for significant submerged cultural resources. A Phase I survey will be required here.

We also have concerns about comments made in the Corps letter of October 11, 1995, "Generally, the actions will mimic historic oystering activities in the same areas, which have been done for centuries. The bed formation will only minimally impact the surface of the submarine sites". While it is true bed formation will have minimal impact, harvesting will have and historically has had, a devastating effect on submerged heritage resources. Hence our concern that beds be created only in areas where cultural remains have first been inventoried, assessed, evaluated, and where necessary avoided or mitigated.

This office should be contacted for each specific area selected as the project proceeds, so the effect can be determined. Phase I underwater survey should be carried out by a qualified professional archeologist, and performed in accordance with the "Standards and Guidelines for Archeological Investigations in Maryland" (Shaffer and Cole 1994) and with Archeology and Historic Preservation; Secretary of the Interior's Standards and Guidelines (1983). Based upon the results of the survey, we will be able to determine whether or not the project will effect any submerged archeological resources and make appropriate recommendations. Further consultation with our office will be necessary to fulfill compliance with Section 106 of the National Historic Preservation Act of 1966; and we will discuss field methods and techniques with the archeologist selected to perform the requested survey.

Thank you for your cooperation and assistance. If you have any questions or require further information, please contact Dr. Susan Langley at (410) 514-7662 or Mr. Bruce Thompson at (410) 514-7663.

Sincerely,

Susan B.M. Langley, Ph.D.
State Underwater Archaeologist

SBML/BFT/SRB
9502235
cc: Mr. William Matuszeski
Ms. Elizabeth Gillelan
Mr. Timothy E. Goodger
Mr. Jeri L. Berc, Ph.D.
Ms. Elizabeth J. Cole
Honorable Jane T. Nishida
Mr. Daniel J. O'Leary
Mr. W. Peter Jensen
Honorable John R. Griffin
Mr. William C. Baker
Mr. John P. Wolflin
Mr. Roy E. Denmark, Jr.
Mr. W. Michael McCabe
Mr. Mark Mendelsohn
Dr. Gary Shaffer

MARYLAND
HISTORICAL
TRUST

Archaeology Office

Parris N. Glen
Gov

Patricia J. Payne
Secretary, DHCD

December 2, 1995.

Dr. James F. Johnson, Chief
Planning Division
Baltimore District, Corps of Engineers
P.O. Box 1715
Baltimore, MD 21203-1715

Dr. Johnson:

This office has compared the maps, provided by your office, of natural and legal oyster bars extant in a number of Maryland rivers with our records of submerged cultural resources and NOAA charts for these same areas. Remains which may be potentially impacted by the proposed oyster seeding and subsequent dredging are highlighted in green. Discussion of these follows with additional commentary on areas where survey is recommended.

Figure 4a: Chester River - activities do not appear to impact known cultural resources.
Figure 7a: Magothy River - only one site may be impacted; however, because of the scale and schematic nature of the maps provided it is difficult to determine the exact placement of the site. Activities in this area may proceed with caution.
Figure 5a: Choptank River - five sites, all in Section C, fall within or lie extremely close to proposed activity areas; these areas may be avoided or plans for further investigation for assessment and evaluation made through a Phase I survey.
Figure 6a: Severn River - eight sites, all in Section A, fall within or lie extremely close to proposed activity areas; these areas may be avoided or plans for further investigation for assessment and evaluation made through a Phase I survey.
Figures 8a: Kedges Straits and 3a: Nanticoke River - on both maps the legend obscures areas where oyster bars exist. Few sites are documented for these areas because they have not yet been surveyed and the only information at hand is from NOAA charts. Because of the historic significance of the former and the absence of records for the latter, Phase I survey is recommended for areas where activities are planned for both of these regions.
Figure 2a: Patuxent River - fifteen sites fall within or lie in close proximity to proposed activity areas. However, for the most part these sites tend to cluster and this should facilitate avoidance; some also appear to lie within Navy restricted areas. It is presumed that areas farther up this river are not being considered for activity. Because of the presence of the remains of the entire Chesapeake Flotilla which served, under the command of Commodore Joshua Barney, during the War of 1812 activities outside of

Division of Historical and Cultural Programs
100 Community Place ● Crownsville, Maryland 21032 ● (410) 514-7661

Section C are not recommended without Phase I survey. Plans for a remote sensing survey in this region are currently being formulated by the Maryland Historical Trust in cooperation with the U.S. Navy and Maryland National Capital Park and Planning. It is also presumed that no activities are planned at this time for the areas of the Potomac (eg. Breton Bay) which appears at the bottom of this figure.

Phase I underwater survey should be carried out by a qualified professional archaeologist and performed in accordance with the "Standards and Guidelines for Archaeological Investigations in Maryland" (Shaffer and Cole 1994) and with Archaeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines (1983). Based upon the results of the survey, we will be able to determine whether or not the project will affect any submerged archaeological resources and make appropriate recommendations. Further consultation with our office will be necessary to fulfill compliance with Section 106 of the National Historic preservation Act of 1966; and we will discuss field methods and techniques with the archaeologist selected to perform the requested survey.

We appreciate your cooperation and assistance. If you have any questions or require further information, please contact me at (410) 514-7662.

Sincerely,

Susan B.M. Langley, Ph.D
State Underwater Archaeologist

/sl
9502235
cc: Mr. William Matuszeski
Ms. Elizabeth Gillelan
Mr. Timothy E. Goodger
Dr. Jeri L. Berc
Ms. Elizabeth J. Cole
Honorable Jane T. Nishida
Mr. Daniel J. O'Leary
Mr. W. Peter Jensen
Honorable John R. Griffin
Mr. William C. Baker
Mr. John P. Wolfin
Mr. Roy E. Denmark, Jr.
Mr. W. Michael McCabe
Mr. Mark Mendelsohn
Dr. Gary Shaffer

US Army Corps of Engineers
Baltimore District

Notice of Availability

APR 13 2009

CHESAPEAKE BAY OYSTER RESTORATION USING ALTERNATE (NON-OYSTER SHELL) SUBSTRATE

CHESAPEAKE BAY OYSTER RECOVERY PROJECT, MARYLAND

ALL INTERESTED PARTIES: In accordance with the National Environmental Policy Act (NEPA) of 1969, as amended, the U.S. Army Corps of Engineers, Baltimore District (USACE) has prepared an Environmental Assessment (EA) for the use of alternate substrates including, but not limited to clam shell, marl, concrete, stone, slag, brick, and cinderblock, as part of the Chesapeake Bay Oyster Recovery Project, Maryland. This project is being conducted under the authority of Section 704(b) of the Water Resources Development Act (WRDA) of 1986, as amended.

In conjunction with the ongoing Chesapeake Bay Oyster Recovery Project, an EA has been prepared for the actions relating to the placement of alternate (non-oyster shell) substrate in designated Oyster Recovery Areas (ORA's) of the following tributaries: Patuxent, Severn, Magothy, Chester, Choptank and Nanticoke Rivers (see attached Figure). Oyster restoration activities have occurred in these areas since 1996 as part of the Chesapeake Bay Oyster Recovery Project with oyster shell only, and are expected to continue annually, as funding allows.

Potential impacts were assessed with regard to the physical, chemical, and biological characteristics of the aquatic and terrestrial ecosystem; temporary construction impacts to water, air, navigation, and traffic; endangered and threatened species; hazardous and toxic materials; aesthetics and recreation; cultural resources; and the general needs and welfare of the public.

Any person who has an interest in the project may make comments and/or request a public hearing within 30 days of the date of publication of this notice. Comments must clearly set forth the interest that may be adversely affected by this proposed action and the manner in which the interest may be adversely affected.

USACE has determined that the proposed activity complies with and will be conducted in a manner consistent with Maryland's federally approved Coastal Zone Management Program. By copy of this public notice, the USACE is requesting the State's concurrence with this determination.

Individuals wishing to obtain a copy of, or wanting more information about the EA or draft Finding of No Significant Impact, may write to the U.S. Army Corps of Engineers, Baltimore District, ATTN: Anna Compton, U.S. Army Corps of Engineers, Baltimore District, CENAB-PL-P, P.O. Box 1715, Baltimore, Maryland 21203-1715 or by electronic mail to Anna.M.Compton@usace.army.mil or by telephone at (410) 962-4633. The EA is available at the USACE website: http://www.nab.usace.army.mil/PN/CW/OysterEA_April2009.pdf. The EA will also be available at the following libraries:

Kent County Public Library, 408 High Street, Chestertown, MD, 21620

Wicomico County Free Library, 122 S. Division Street, Salisbury, MD, 21801

Somerset County Library, 11767 Beechwood Street, Princess Anne, MD 21853

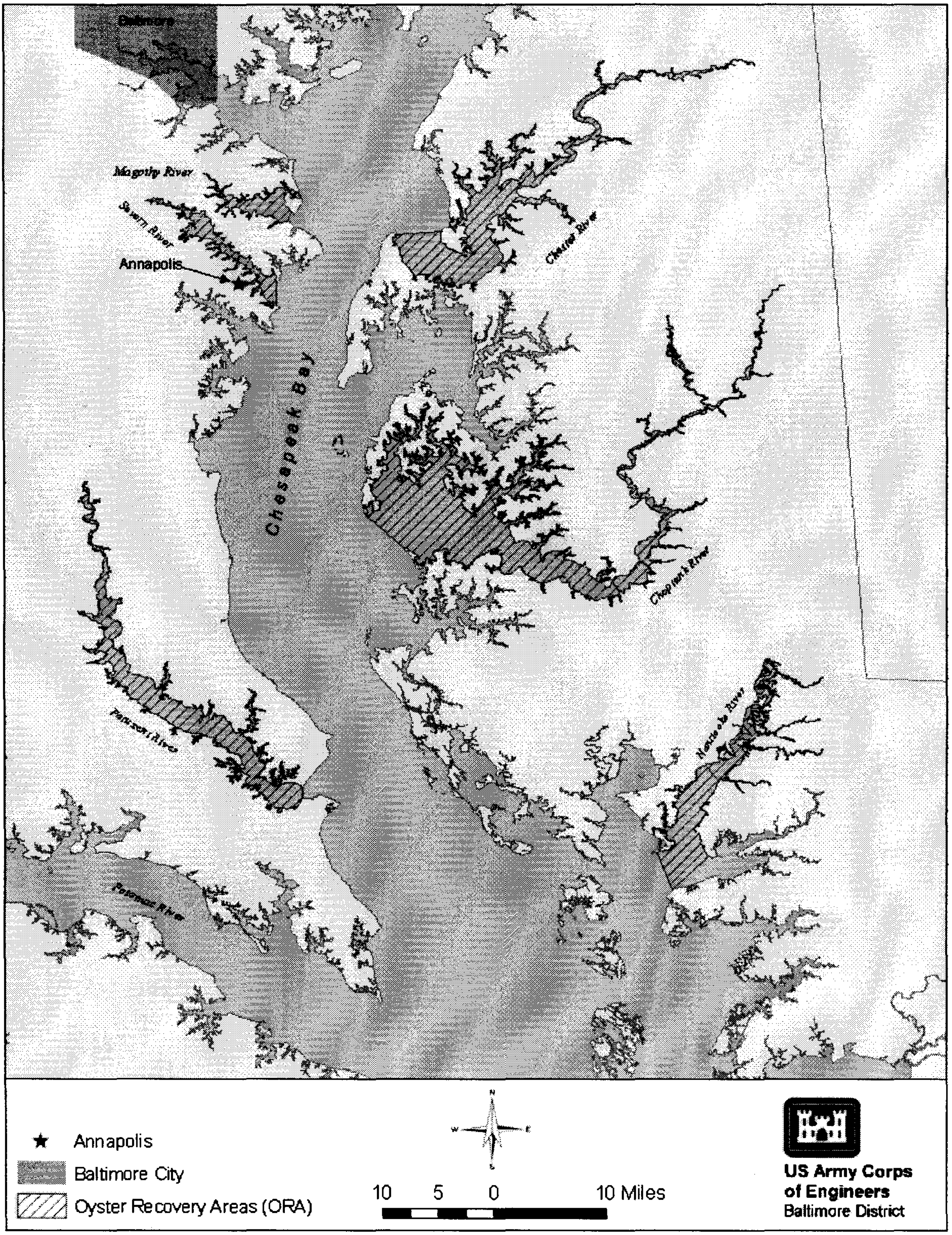
Calvert County Public Library, 20 Duke Street, Prince Frederick, MD 20678

Dorchester County Public Library, 303 Gay Street, Cambridge, MD 21613

Anne Arundel County Public Library, 1410 West Street, Annapolis, MD 21401

Amy M Guise
Chief, Civil Project Development Branch
Planning Division

Figure 1. Chesapeake Bay Oyster Recovery Areas



Compton, Anna M NAB

From: Brian Hug [bhug@mde.state.md.us]
Sent: Tuesday, May 05, 2009 1:37 PM
To: Compton, Anna M NAB
Cc: Gomez, Michele NAB02
Subject: Re: Draft EA-Oyster Alternate Substrate

We did and MDE concurs that the emission's created from this analysis fall below the current de minimis thresholds for general conformity

one correction - the current de mimimis levels for MD are 50 tons for VOC, 100 for NOx, SO2 and PM2.5

Brian J. Hug
Deputy Program Manager
Air Quality Planning Program
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, Maryland 21230
410-537-4125

>>> "Compton, Anna M NAB" <Anna.M.Compton@usace.army.mil> 5/5/2009 1:14
>>> PM >>>
Brian-

I just wanted to confirm that you received the Draft EA-Chesapeake Bay Oyster Restoration using Alternate Substrate which was distributed on April 13 for a 30-day public review and comment period. Please let me know if you received the document and if you concur with USACE findings regarding the Air Quality Conformity Analysis.

Please let me know of any questions or comments.

Thanks,

Anna Compton
Study Manager, Planning Division
Baltimore District, Corps of Engineers
10 South Howard Street
Baltimore, MD 21201
Phone: (410) 962-4633
Fax: (410) 962-4698

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northeast Region
Habitat Conservation Division
410 Severn Avenue, Suite 107A
Annapolis, MD 21403
Commercial Phone: (410) 267-5675
FAX#: (410) ~~267-5666~~ (410) 295-3154

FAX TRANSMITTAL

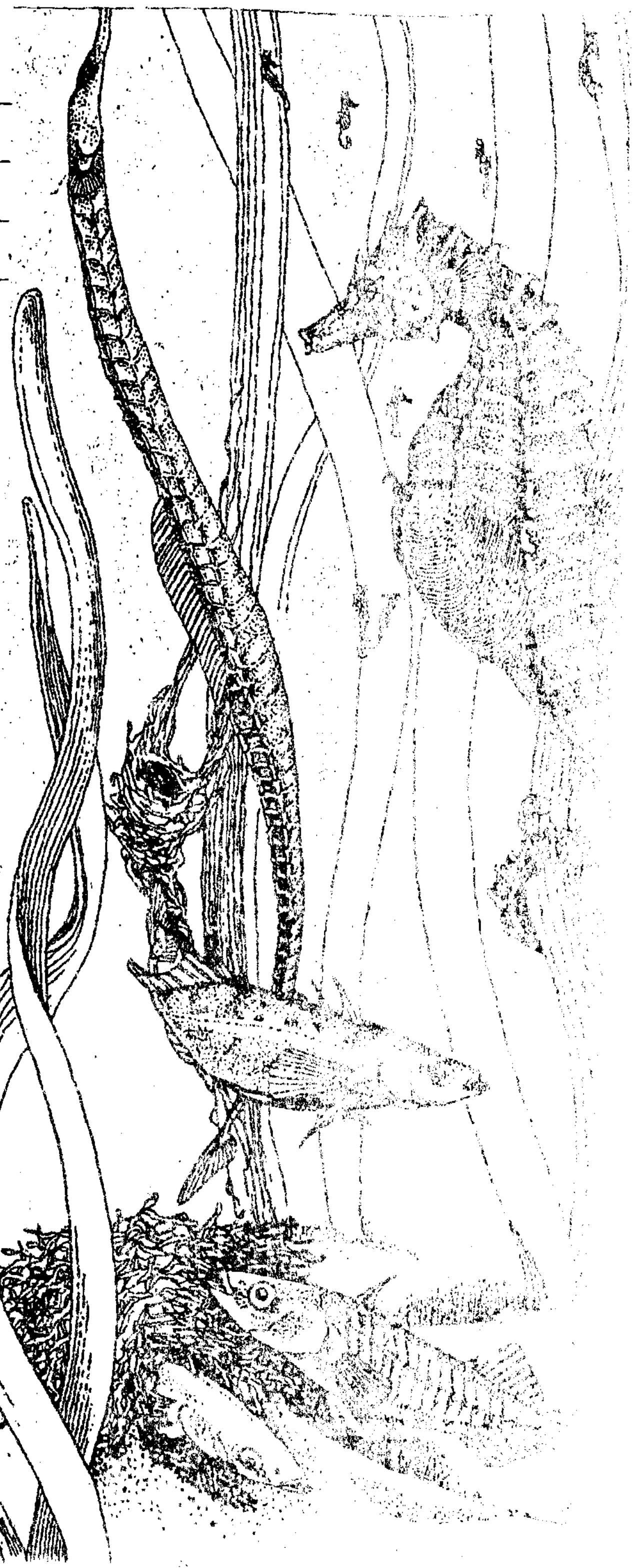
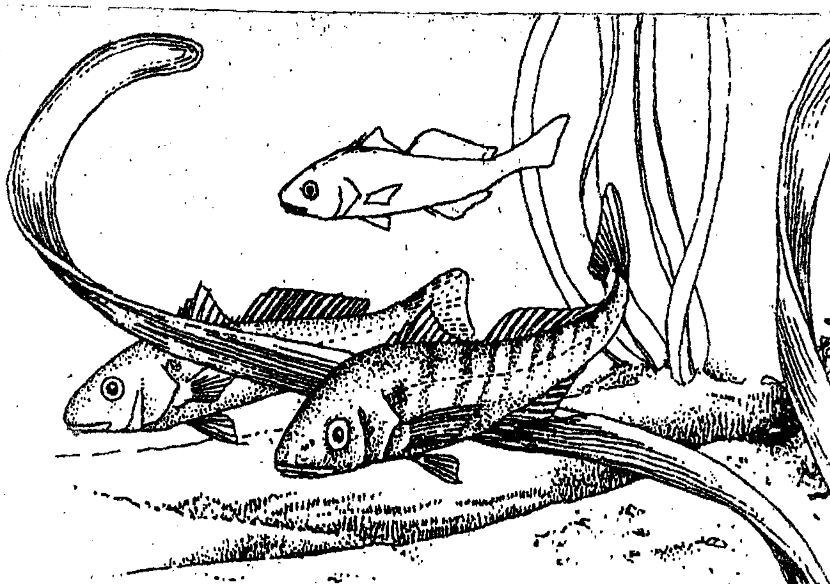
TO: Mark Mendelsohn

LOCATION: Planning Division

NUMBER: (410) 962-9499

FROM: John Nichols

Number of Pages (2), Including Transmittal

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Habitat Conservation Division
Chesapeake Bay Program Office
410 Severn Ave., Suite 107A
Annapolis, Maryland 21403

May 7, 2009

MEMORANDUM TO: Amy M. Guise
Chief, Civil Project Development Branch, Planning Division
Baltimore District, Corps of Engineers

FROM: John Nichols JN

SUBJECT: Chesapeake Bay Oyster Restoration Using Alternative Substrate

National Marine Fisheries Service (NMFS) has reviewed the draft Environmental Assessment & Finding of No Significant Impact, and Essential Fish Habitat Assessment, dated April 2009, for the proposed Chesapeake Bay Oyster Restoration Using Alternative Substrate, Maryland.

NMFS has been an advocate of using alternative substrate materials as oyster cultch, to replace dwindling fossil shell supplies. Therefore, we are supportive of this proposal.

As discussed in your EFH Assessment, oyster cultch, including alternative materials, provides finfish habitat enhancement in the way of improved shelter and forage opportunities. The way in which cultch is deployed on the bottom also affects the degree of fish habitat use. For example, mounding of cultch increases surface area of and interstitial pockets within the material for fouling community development and fish shelter. Mounded cultch, similar to that of materials used for fish reefs, also structurally diversifies the bottom, providing cover for fish over a broad area adjacent to and between mounds.

In accordance with Section 305(b)(4)(A) of the Magnuson-Stevens Fishery Conservation & Management Act (MSA), we provide the following EFH Conservation Recommendation.

1. For deployment of alternative materials by mechanical means other than use of water cannon, mounding of materials on the oyster bar bottom should be practiced in some locations. Mounds should be approximately 5 – 6 feet in height above the bottom surface, especially in areas prone to silt accumulation, to elevate the cultch above the bottom silt layer. Mounding of cultch materials may be most appropriate on bars not subject to commercial harvest activities (e.g., oyster sanctuaries).

Section 305(b)(4)(B) of the MSA requires the Corps of Engineers to provide NMFS with a detailed written response to these EFH Conservation Recommendations, including a description of measures adopted for mitigating project impacts. In the case of a response that is inconsistent with NMFS' recommendation, your agency must explain its reasons for not following the recommendation. Included in such reasoning would be the scientific justification for any disagreement with NMFS over the anticipated effects of the proposed action and measures needed to mitigate such effects [50 CFR 600.920(k).

If you have any questions, please contact me at (410) 267-5675.

MDP

Maryland Department of Planning

Martin O'Malley
Governor
Anthony G. Brown
Lt. Governor

Richard Eberhart Hall
Secretary
Matthew J. Power
Deputy Secretary

April 28, 2009

Ms. Amy Guise, Chief, Civil Projects Development Branch
U.S. Army Corps of Engineers, Baltimore District
CENAB-PL-P
P.O. Box 1715
Baltimore, MD 21203-1715

STATE CLEARINGHOUSE REVIEW PROCESS
State Application Identifier: MD20090422-0447
Reviewer Comments Due By: May 10, 2009
Project Description: Draft Environmental Assessment and FONSI: Chesapeake Bay Oyster Restoration Using Alternate Substrate: completed Water Quality Certification and Department of Army's Permit Evaluation and Decision Document (see MD20090107-0010)
Project Location: Maryland
Clearinghouse Contact: Bob Rosenbush

Dear Ms. Guise:

Thank you for submitting your project for intergovernmental review. Participation in the Maryland Intergovernmental Review and Coordination (MIRC) process helps ensure project consistency with plans, programs, and objectives of State agencies and local governments. MIRC enhances opportunities for approval and/or funding and minimizes delays by resolving issues before project implementation.

The following agencies and/or jurisdictions have been forwarded a copy of your project for their review: the Maryland Departments of Transportation; the Counties of Calvert, Caroline, Charles, Dorchester, Wicomico, Anne Arundel, Prince George's, Queen Anne's, Somerset, St. Mary's, and Talbot; the Maryland Department of Planning including the Maryland Historical Trust. They have been requested to contact your agency directly by **May 10, 2009** with any comments or concerns and to provide a copy of those comments to the State Clearinghouse for Intergovernmental Assistance. Please be assured that after **May 10, 2009** all MIRC requirements will have been met in accordance with Code of Maryland Regulations (COMAR 14.24.04). The project has been assigned a unique State Application Identifier that should be used on all documents and correspondence.

A "Project Survey" form is enclosed with this letter. Please complete and return it within 14 days of the date of this letter. If you need assistance or have questions, contact the State Clearinghouse staff noted above at 410-767-4490 or through e-mail at brosenbush@mdp.state.md.us. Thank you for your cooperation with the MIRC process.

Sincerely,

Linda C. Janey

Linda C. Janey, J.D., Assistant Secretary
for Clearinghouse and Communications

LCJ:BR
Enclosure
cc: Beth Cole – MHT*
09-0447_NDC.NEW.doc
Greg Golden – DNR
Cindy Johnson – MDOT*
Gregory Bowen – CLVT*
Katheleen Freeman – CRLN*
Joane Mueller – MDE*
Reed Faasen – CHAS*
Steven Dodd – DRCH*
Gary Pusey – WCMC*
John Dodds – ANARP*
Beverly Warfield – PGEO*
J. Steven Cohoon – QANN*
Samuel Boston – SMST*
John Savich – STMA*
Stacey Dahlstrom – TLBT*

MDP

Maryland Department of Planning

Martin O'Malley
Governor

Anthony G. Brown
Lt. Governor

Richard Eberhart Hall
Secretary

Matthew J. Power
Deputy Secretary

PROJECT SURVEY

Would you please take a few moments and tell us the source of information used by your agency to apply to the **U.S. Department of Defense (DOD/ARMY)** for this grant and/or service. Please complete this form and return it to the State Clearinghouse within 14 days of **April 28, 2009,** to the address or fax number noted below.

TO: **Maryland State Clearinghouse**
Maryland Department of Planning
301 West Preston Street
Room 1104
Baltimore, MD 21201-2305

DATE: ____________________
(Date form completed)

FROM: ____________________________
(Name of person completing this form.)

PHONE: _____-_____-________
(Area Code & Phone number)

RE: State Application Identifier: MD20090422-0447

Project Description: Draft Environmental Assessment and FONSI: Chesapeake Bay Oyster Restoration Using Alternate Substrate: completed Water Quality Certification and Department of Army's Permit Evaluation and Decision Document (see MD20090107-0010)

☐ Chronicle of Philanthropy	☐ GrantsNet	☐ Nonprofit Organization Website
☐ Commerce Business Daily	☐ Health Grants and Contracts Weekly	☐ Previous Grantee
☐ Community Health Funding Report	☐ LISTSERV	☐ Red Book (Catalog of State Assistance)
☐ E-Mail Automatic Notification	☐ Local/State Funding Report and Grant Alert	☐ Seminar or Workshop Attended
☐ Federal Agency Website	☐ Maryland Department of Planning Website	☐ State Agency Website
☐ Federal Assistance Monitor	☐ Maryland Grants (MD Grants)	☐ The Catalog of Federal Domestic Assistance (CFDA)
☐ Federal Grants and Contracts Weekly	☐ Maryland Register	☐ The Foundation Center
☐ Federal Register	☐ NIH Guide for Grants and Contracts	☐ Grants.Gov
☐ Please Identify Other Source(s) Not Listed Above:		

Thank you.

COMPTON spoke with Rita Wallace on 12-May 2009 and she confirmed this form does not need to be filled out

MDPCH-1K

301 West Preston Street • Suite 1101 • Baltimore, Maryland 21201-2305
Telephone: 410.767.4500 • Fax: 410.767.4480 • Toll Free: 1.877.767.6272 • TTY Users: Maryland Relay
Internet: www.MDP.state.md.us

MDE

MARYLAND DEPARTMENT OF THE ENVIRONMENT

1800 Washington Boulevard • Baltimore, Maryland 21230
410-537-3000 • 1-800-633-6101 • http://www.mde.state.md.us

May 12, 2009

Ms. Amy Guise
U.S. Army Corps of Engineers, Baltimore District
CENAB-PL-P
P.O. Box 1715
Baltimore, MD 21203

RE: State Application Identifier: MD20090422-0447
Project: Chesapeake Bay Oyster Restoration Using Alternate Substrate

Dear Ms. Guise:

Thank you for the opportunity to review the above referenced project. The document was circulated throughout the Maryland Department of the Environment (MDE) for review, and the following comment is offered for your consideration.

1. Unless the source and specific composition is known, actual batches of alternate substrate should be tested to assure that there are no unexpected contaminants that would not be a problem in air but could leach into water.

Again, thank you for giving MDE the opportunity to review this project. If you have any questions, please feel free to call me at (410) 537-4120.

Sincerely,

Joane DM

Joane D. Mueller
Clearinghouse Coordinator

cc: Bob Rosenbush, State Clearinghouse

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1715
BALTIMORE, MARYLAND 21203-1715

Planning Division

Ms. Joane Mueller
Maryland Department of the Environment,
1800 Washington Blvd
Baltimore, MD 21230

JUN 4 2009

Dear Ms. Mueller:

This letter is in reference to the U.S. Army Corps of Engineers, Baltimore District (USACE) Chesapeake Bay Oyster Restoration Using Alternate (Non-Oyster Shell) Substrate, Draft Environmental Assessment (EA).

USACE received a comment on May 12, 2009 (Maryland Department of the Environment State Application Identifier: MD20090422-0447) from your agency. The comment provided is as follows:

"Unless the source and specific composition is known, actual batches of alternate substrate should be tested to assure that there are no unexpected contaminants that would not be a problem in air but could leach into water."

USACE will follow MDE's recommendation to test actual batches of alternate substrate, if materials from an unknown source are used, to ensure that no unexpected contaminants leach into the air or water. USACE intends to utilize clean material, free of contaminants and hazardous materials that are suitable for disposal within State waters as alternate substrate for oyster restoration. Additionally, USACE intends to use only material in which the source and specific composition is known. All material will be examined for foreign material prior to placement.

If you have any questions or comments regarding this matter, please contact Ms. Anna Compton, at (410) 962-4633, or email Anna.M.Compton@usace.army.mil.

Sincerely,

Amy M. Guise, Chief
Civil Project Development Branch

MARYLAND DEPARTMENT OF THE ENVIRONMENT
1800 Washington Boulevard • Baltimore MD 21230
410-537-3000 • 1-800-633-6101

Martin O'Malley
Governor

Anthony G. Brown
Lieutenant Governor

Shari T. Wilson
Secretary

Robert M. Summers, Ph.D.
Deputy Secretary

May 22, 2009

Anna Compton
Study Manager, Planning Division
Baltimore District, Corps of Engineers
10 South Howard Street
Baltimore, MD 21201

RE: Chesapeake Bay Oyster Restoration Using Alternate Substrate

Dear Ms. Compton:

I am responding to the Corps of Engineers' (Corps) request for a Federal Consistency determination, pursuant to Section 307 of the Federal Coastal Zone Management Act of 1972, as amended (CZMA), for the referenced project. The Maryland Department of the Environment (MDE) has reviewed the Draft Environmental Assessment (EA) and Finding of No Significant Impact, Chesapeake Bay Oyster Restoration Using Alternate Substrate, Maryland, released by the Corps in April, 2009. The non-Federal sponsor of the project is the Maryland Department of Natural Resources (DNR).

The Draft EA evaluates the proposed use of alternate substrate in addition to oyster shell to construct oyster bars and reefs within the Maryland portion of the Chesapeake Bay and its tidal tributaries. The use of alternate substrate has become necessary due to the dwindling supply of oyster shell.

Construction using alternate substrate rather than, or in addition to, oyster shell is scheduled to begin in spring/summer 2009 and continue thereafter in annual placement cycles subject to the availability of funds. Potential alternate substrate includes, but is not limited to, clam shell, marl, concrete, stone, slag, brick, and cinderblock. Any concrete rubble to be placed would be free of building debris such as wiring, pipes and other debris. No protruding re-bar would be allowed. Concrete may also include man-made products formed into various shapes to provide benthic habitat (i.e., reef balls). It is also noted that the Corps and the State issued authorizations to DNR in 2008 for the use of alternate substrate to construct oyster sanctuaries and harvest reserves.

The document assesses the overall effects of the use of alternate substrate and finds that there will be minor, temporary impacts during construction to benthic organisms, local turbidity, recreational and commercial fishermen, and fish (eggs, larval, and

Ms. Anna Compton
May 22, 2009
Page 2

juvenile stages). It concludes that there will be a long-term beneficial impact to the aquatic environment and no long-term adverse impacts associated with the project.

MDE concurs with the findings and conclusions of the Draft EA. Accordingly, the proposed action is consistent with the Maryland Coastal Zone Management Program, as required by Section 307 of the CZMA. In addition, MDE issued a Section 401 Water Quality Certification (WQC) for the Oyster Restoration Project on April 15, 2005, which does not specify the type of substrate (WQC # 05-WQ-001). The WQC remains in effect until April 15, 2010. Please note that the Corps must request an extension of the WQC prior to the expiration date.

If you have any questions, please contact me at (410) 537-3763 or by e-mail at eghigiarelli@mde.state.md.us.

Sincerely,

Elder A. Ghigiarelli

Elder Ghigiarelli, Jr.
Deputy Administrator
Federal Consistency Coordinator
Wetlands and Waterways Program

US Army Corps of Engineers
Baltimore District

PUBLIC NOTICE

JUN 4 2009

FINDING OF NO SIGNIFICANT IMPACT
CHESAPEAKE BAY OYSTER RESTORATION USING ALTERNATE (NON-OYSTER SHELL) SUBSTRATE, MD

ALL INTERESTED PARTIES:

In accordance with the National Environmental Policy Act (NEPA) of 1969, as amended, the U.S. Army Corps of Engineers, Baltimore District (USACE) prepared an Environmental Assessment (EA) for the use of alternate substrates including, but not limited to clam shell, marl, concrete, stone, slag, brick, and cinderblock, as part of the Chesapeake Bay Oyster Recovery Project, Maryland. This project is being conducted under the authority of Section 704(b) of the Water Resources Development Act (WRDA) of 1986, as amended.

In conjunction with the ongoing Chesapeake Bay Oyster Recovery Project, an EA was prepared for the actions relating to the placement of alternate (non-oyster shell) substrate in designated Oyster Recovery Areas (ORA's) of the following tributaries: Patuxent, Severn, Magothy, Chester, Choptank and Nanticoke Rivers (see attached Figure). Oyster restoration activities have occurred in these areas since 1996 as part of the Chesapeake Bay Oyster Recovery Project with oyster shell only, and are expected to continue annually, as funding allows.

The Draft EA was made available for a 30-day public review period on April 13, 2009 which ended on May 13, 2009. The EA found that the potential negative impacts to benthic and open water habitat associated with the implementation of the project will occur over a small area and will be short-term. The project will produce a net beneficial impact to the environment through the restoration of habitat for oysters and other species associated with oyster communities and does not constitute a major Federal action significantly affecting the quality of the human environment. Based upon this finding, preparation of an Environmental Impact Statement (EIS) was not required and the USACE Baltimore District Engineer signed a Finding of No Significant Impact (FONSI) on May 29, 2009.

Should you have any questions, you may write to the U.S. Army Corps of Engineers, Baltimore District, ATTN: Anna Compton, U.S. Army Corps of Engineers, Baltimore District, CENAB-PL-P, P.O. Box 1715, Baltimore, Maryland 21203-1715 or by electronic mail to anna.m.compton@usace.army.mil or by telephone at (410) 962-4633.

Amy M Guise

Amy M. Guise, Chief
Civil Project Development Branch

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1715
BALTIMORE, MARYLAND 21203-1715

Planning Division

JUN 8 2009

Mr. John Nichols
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Chesapeake Bay Field Office
410 Severn Avenue, Suite 107A
Annapolis, MD 21403

Dear Mr. Nichols:

This letter is in reference to the U.S. Army Corps of Engineers, Baltimore District (USACE) Chesapeake Bay Oyster Restoration Using Alternate (Non-Oyster Shell) Substrate, Draft Environmental Assessment (EA).

USACE received written comments on May 7, 2009, from you which stated that your agency, National Marine Fisheries Service (NMFS), is in support of the proposed activities and included the recommendation of "...mounding of materials on the oyster bar bottom in some locations." The recommended height was 5 to 6 feet. In a telephone conversation with Ms. Anna Compton from my office on May 12, 2009, you provided a final recommendation of 3 to 6 feet due to the fact that the substrate placement will occur on existing hard bottom habitat that often has a vertical height (above bay bottom) as shown by Maryland Geological Survey bathymetry data.

In response to your letter, USACE will follow NMFS recommendation to place substrate in a few locations that will bring the area to a height of 3 to 6 feet above soft bottom bay floor. The "mounds" will be incorporated into the site design to provide heterogeneity and varying vertical relief to constructed oyster habitat.

In accordance with Section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act, USACE is required to provide NMFS with a detailed written response to Essential Fish Habitat (EFH) Conservation recommendations, including a description of measures adopted for mitigating project impacts. This letter provides the required response and is consistent with NMFS recommendations.

If you have any questions or comments regarding this matter, please contact Ms. Anna Compton, at (410) 962-4633, or email Anna.M.Compton@usace.army.mil.

Sincerely,

Amy M. Guise

Amy M. Guise, Chief
Civil Project Development Branch

20090272

F
COE
BAS

APR 13 2009

US Army Corps of Engineers
Baltimore District

Notice of Availability

CHESAPEAKE BAY OYSTER RESTORATION USING ALTERNATE (NON-OYSTER SHELL) SUBSTRATE

RECEIVED
APR 17 2009
By

The Maryland Historical Trust has determined that this undertaking will have no adverse effect on historic properties.

Date 5/21/09

CHESAPEAKE BAY OYSTER RECOVERY PROJECT, MARYLAND

ALL INTERESTED PARTIES: In accordance with the National Environmental Policy Act (NEPA) of 1969, as amended, the U.S. Army Corps of Engineers, Baltimore District (USACE) has prepared an Environmental Assessment (EA) for the use of alternate substrates including, but not limited to clam shell, marl, concrete, stone, slag, brick, and cinderblock, as part of the Chesapeake Bay Oyster Recovery Project, Maryland. This project is being conducted under the authority of Section 704(b) of the Water Resources Development Act (WRDA) of 1986, as amended.

In conjunction with the ongoing Chesapeake Bay Oyster Recovery Project, an EA has been prepared for the actions relating to the placement of alternate (non-oyster shell) substrate in designated Oyster Recovery Areas (ORA's) of the following tributaries: Patuxent, Severn, Magothy, Chester, Choptank and Nanticoke Rivers (see attached Figure). Oyster restoration activities have occurred in these areas since 1996 as part of the Chesapeake Bay Oyster Recovery Project with oyster shell only, and are expected to continue annually, as funding allows.

Potential impacts were assessed with regard to the physical, chemical, and biological characteristics of the aquatic and terrestrial ecosystem; temporary construction impacts to water, air, navigation, and traffic; endangered and threatened species; hazardous and toxic materials; aesthetics and recreation; cultural resources; and the general needs and welfare of the public.

Any person who has an interest in the project may make comments and/or request a public hearing within 30 days of the date of publication of this notice. Comments must clearly set forth the interest that may be adversely affected by this proposed action and the manner in which the interest may be adversely affected.

USACE has determined that the proposed activity complies with and will be conducted in a manner consistent with Maryland's federally approved Coastal Zone Management Program. By copy of this public notice, the USACE is requesting the State's concurrence with this determination.

Individuals wishing to obtain a copy of, or wanting more information about the EA or draft Finding of No Significant Impact, may write to the U.S. Army Corps of Engineers, Baltimore District, ATTN: Anna Compton, U.S. Army Corps of Engineers, Baltimore District, CENAB-PL-P, P.O. Box 1715, Baltimore, Maryland 21203-1715 or by electronic mail to Anna.M.Compton@usace.army.mil or by telephone at (410) 962-4633. The EA is available at the USACE website: `http://www.nab.usace.army.mil/PN/CW/OysterEA_April2009.pdf`. The EA will also be available at the following libraries:

Kent County Public Library, 408 High Street, Chestertown, MD, 21620

APPENDIX D:

Air Quality Conformity Calculations

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Chesapeake Bay Oyster Restoration Using Alternate (Non-Oyster Shell) Substrate

Chesapeake Bay Oyster Recovery Project, Maryland

General Conformity Review and Emission Inventory

May 2009

The 1990 Clean Air Act Amendments include the provision of Federal Conformity, which is a regulation that ensures that Federal Actions conform to a nonattainment area's State Implementation Plan (SIP) thus not adversely impacting the area's progress toward attaining the National Ambient Air Quality Standards (NAAQS).

In the case of the *Chesapeake Bay Oyster Restoration Using Alternate (Non-Oyster Shell) Substrate*, Maryland, the Federal action is to place alternate substrate such as clam shell, concrete, and rubble on existing oyster beds (25-40 acres) at several locations in Maryland portions of the Chesapeake Bay on an annual basis, subject to availability of funding. The U.S. Army Corps of Engineers, Baltimore District would be responsible for construction.

There are two types of Federal Conformity: Transportation Conformity (TC) and General Conformity (GC). TC does not apply to this project because the project would not be funded with Federal Highway Administration money and it does not impact the on-road transportation system because all project activities will be on the water. GC however is applicable. The oyster restoration activities would be subject to detailed conformity determinations unless these actions are clearly considered *de minimus* emissions; use of these thresholds assures that the conformity rule covers only major federal actions. The Baltimore region and D.C. metropolitan region are in non-attainment status for particulate matter 2.5 (PM2.5) per EPA final rule of January 5, 2005. On July 17 2006, EPA published a direct final rule (71 FR 40420) establishing a 100 tons per year (TPY) *de minimis* levels for PM2.5,SO2 and NOX, 50 TPY for VOCs.

On March 29, 2007 the EPA published specific guidance on requirements for states to update SIPS to meet the new federal PM 2.5 standard. This rule is general in nature and does not change the requirements of the July, 2006 direct rule. It simply provides direction on the approach states must follow to consistency with federal requirements. State plans must be completed by April 2008. Compliance with the new ambient PM2.5 standard is required by 2010.

Jim Matters of Langenfelder Marine (contractor that has performed shell placement for USACE since 1996) was contacted to provide guidance on assumptions for equipment, hours of operation, and engine size for this project. In general it is assumed that the project will be 15, 10-hour workdays, and a water cannon will be used 2 hours out of the work day. The tug boat and water pump engines would be 800 hp. Calculations for air emissions and fuel consumption expected from project activities are shown in Table 1 and total emission rates from project activities are shown in Table 2.

Conclusions

The total estimated emissions that would result from this project construction are 1.26 tons of NOx 0.022 tons of VOCs, 0.216 tons of SO2 and 0.029 tons of PM 2.5. These emissions are below the GC trigger levels of 100 tons per year. The estimates from project construction represent only 1% of the annual limit for NOx, less than 1% of the annual limit for VOCs, SO2 and PM 2.5. Although construction activities would result in short-term, increased air emissions, these emissions would be less than the *de minimus* thresholds. Because projected emissions are below threshold levels, the action is exempt from further Conformity analysis.

Table 1 Marine Engine Emission Factor and Fuel Consumption Algorithms (in g/kW-hr for all marine engines)

Pollutant	Exponent(x)	Intercept (b)	Coefficient (a)
PM	1.5	0.2551	0.0059
NOx	1.5	10.4496	0.1255
NO2	1.5	15.5247	0.18865
SO2	0	0	2.3735
CO	1	0	0.8378
HC	1.5	0	0.0667
CO2	1	648.6	44.1

1 All regression but SO2 are in the form of:
Emissions Rate (g/kW-hr) = a (fractional load)-x + b

2 Fractional load is equal to actual engine output divided by rated engine output

3 The SO2 regression is the form of:
Emissions rate (g/kW-hr) = a(fuel sulfur flow in g/kW-hr) + b

4 Fuel Consumption (g/kW-hr) = 14.12/(fractional load) + 205.717

5 n/a means not applicable, n/s means not statistically significant

Fuel Sulfur Concentration	3300	ppm
Fuel consumption	233.957	g/kW-hr
Assuming Load Factor of	50%	

Table 2 Marine Engine Emission Rate based on Table 1

Pollutant	Emission Rate (g/kW-hr)	**lb/hp-hr**	
PM	0.272	**0.0004**	**assume all PM is PM 2.5**
NOx	10.805	0.0175	
NO2	16.058	0.026	
SO2	1.832	0.003	
CO	1.676	0.0027	
VOC	0.189	0.0003	

		lbs	Tons
For marine tug (800 hp) PM 2.5 emissions would be :	**800 hp x 0.0004 X 10 hrs/day x 15 days =**	**48**	**.024**
For water cannon (800 hp) PM 2.5 emissions would be :	**800 hp x 0.0004 X 2 hrs/day x 15 days =**	**9.6**	**.005**
	Total PM 2.5		**.029**
For marine tug (800 hp) NOX emissions would be :	**800 hp x 0.0175 X 10 hrs/day x 15 days =**	**2100**	**1.05**
For water cannon (800 hp) NOX emissions would be :	**800 hp x 0.0175 X 2 hrs/day x 15 days =**	**420**	**.21**
	Total NOX		**1.26**
For marine tug (800 hp) NO2 emissions would be :	**800 hp x 0.026 X 10 hrs/day x 15 days =**	**3120**	**1.56**
For water cannon (800 hp) NO2 emissions would be :	**800 hp x 0.026 X 2 hrs/day x 15 days =**	**624**	**.312**
	Total NO2		**1.872**
For marine tug (800 hp) SO2 emissions would be :	**800 hp x 0.003 X 10 hrs/day x 15 days =**	**360**	**.18**
For water cannon (800 hp) SO2 emissions would be :	**800 hp x 0.003 X 2 hrs/day x 15 days =**	**72**	**.036**
	Total SO2		**.216**
For marine tug (800 hp) CO emissions would be :	**800 hp x 0.0027 X 10 hrs/day x 15 days =**	**324**	**.162**
For water cannon (800 hp) CO emissions would be :	**800 hp x 0.0027 X 2 hrs/day x 15 days =**	**64.8**	**.032**
	Total CO		**.194**
For marine tug (800 hp) VOC emissions would be :	**800 hp x 0.0003 X 10 hrs/day x 15 days =**	**36**	**.018**
For water cannon (800 hp) VOC emissions would be :	**800 hp x 0.0003 X 2 hrs/day x 15 days =**	**7.2**	**.004**
	Total VOC		**.022**

APPENDIX E:

Department of the Army Permit Evaluation and Decision Document: MD DNR Alternate Material Placement

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Department of the Army Permit Evaluation and Decision Document

APPLICATION NUMBER: CENAB-OP-RMN (MD DNR/Alternate Material)2007-03659-M24

This document constitutes my Environmental Assessment, Statement of Findings, and review and compliance determination according to the 404(b)(1) Guidelines for the proposed work (applicant's preferred alternative) described in the enclosed public notice.

MEMORANDUM FOR RECORD

SUBJECT: Department of the Army Environmental Assessment and Statement of Finding for Above-Numbered Permit Application.

I. Applicant:

Maryland Department of Natural Resources
Fisheries Service
580 Taylor Avenue B-2
Annapolis, MD 21401

II. Location, Existing Site Conditions, Project Description, Changes to Project:

A. *Location*: The proposed project is located in the Chesapeake Bay and its tidal tributaries in Maryland and Maryland's Coastal Bays (See attached drawings.)

B. *Existing Site Conditions*: The project sites are open water with hard shell bottom, portions of which have been previously dredged over the past 40+ years for oyster restoration efforts. The plantings of alternate material will predominantly take place on charted Natural Oyster Bars and Historic Oyster Bars in the Chesapeake Bay, but may also occur in the Maryland Coastal Bays, where the oyster bars have not been mapped. Alternate materials will be placed in harvest, reserve and sanctuary areas.

C. *Project Description*: This project will permit the Maryland Department of Natural Resources (MD DNR) to plant alternate (non-oyster shell) materials within Maryland charted oyster bars in the Chesapeake Bay for the purpose of rehabilitating oyster bar habitat to work towards the re-establishment of an abundant and self-sustaining oyster population in support of the Chesapeake Bay Program 2000 Agreement and 2005 Oyster Management Plan.

<u>Permit Time Period</u>: A 10-year period from 2008 through 2017 is being requested.

<u>Location of Alternate Material Plantings</u>: Alternate material plantings will be made in the Maryland Chesapeake Bay and its tributaries upon charted oyster bars as mapped on the legal oyster bar charts maintained by the Department.

The identification of alternate material planting areas will be coordinated on an annual basis with the Oyster Advisory Commission, the Tidewater Oyster Committees composed of harvesters, and other interested parties, and will be consistent with the guidelines provided in the Chesapeake Bay Program Oyster Management Plan.

Alternate material plantings may occur within the following oyster bar management designations: sanctuaries, harvest reserves and open harvest areas.

<u>Type of Alternate Materials</u>: This permit will approve the planting of the following alternate (non-oyster shell) materials: clam shell, marl, concrete, stone, slag, brick, and cinderblock. Any concrete rubble to be planted would be free of building debris such as wiring, pipes, and other debris. No protruding re-bar is allowed. Concrete may also include man-made products formed into various shapes to provide benthic habitat (i.e. reef balls).

<u>Sizes of Alternate Materials</u>: The size of individual pieces of material used will vary with the material type and project purpose. For example, a harvest bar would be planted with smaller sized material (1" to 3" estimated) that would not interfere with harvest gear, while a sanctuary area could use larger materials to provide relief for the benthic population. No materials will be utilized larger than 12" in size.

Note that even in low setting areas, these materials are important as habitat to prepare a base for the planting of hatchery seed. If other types of materials become available, MD DNR will present the new information to the regulatory agencies, Oyster Advisory Commission and the Tidewater Oyster Committees for review to determine if the planting of this material could be approved through an amendment to this permit, or if a new permit application would be required.

<u>Amount & Acreage of Alternate Material</u>: Authorization is requested for the planting of up to 1.5 million cubic yards of alternate material from 2008-2018. This volume can create about 1,600 acres of habitat at a planting thickness of approximately 6" per acre. Some sites will be planted less than 6" thick and others higher, therefore the value of 1,600 acres is a reasonable estimate for this program.

The amount of material to be planted on an annual basis will be based upon the objectives and strategies of Maryland's oyster recovery program as well as the availability of the materials and funding. Based upon current cost projections for the procurement, transportation, and planting of alternate materials, it is estimated that approximately 25 acres of material could be planted per million dollars of available funding (assumes average planting thickness of 6-inches).

<u>Planting Methods</u>: Alternate materials will be planted primarily by tugboat and barge but may also be planted using large workboats. With either barges or large workboats, the material will be washed overboard using high pressure water hoses or cannons, with the vessel moving continuously through the planting area to control the thickness and acreage of the planting. Alternate materials may also be planted using a crane/excavator or front-end loader to place material on the oyster bar. To date, the majority of alternate material plantings have been less than one foot in height off of the bottom.

Additional Planting Restrictions:

- *Minimum water column clearance:* The planting of alternate materials will maintain a minimum eight feet of clearance in the water column at mean low water.
- *Protection of submerged aquatic vegetation:* The planting of alternate materials will not be permitted within 300 feet of submerged aquatic vegetation as mapped and reported annually by the Virginia Institute of Marine Sciences in coordination with the MD DNR Resource Assessment Service.

D. *Changes to Project*: In a letter dated April 28, 2008, the Maryland Historic Trust (MHT) has determined that the planting of alternate materials seed will have no adverse effect on historical or archeological properties in a majority of the oyster bars within the original "area of review." However, MHT has requested that the Corps defer approval for the 246 oyster bars that are in proximity to historic and/or archeological sites. MHT provided a list of these 246 oyster bars and as a result, MD DNR has eliminated those 246 oyster bars from the project area.

III. Project Purpose:

A. *Basic*: To deposit alternate material on charted oyster bars in attempts to reestablish an abundant and self-sustaining oyster population within the Chesapeake Bay.

B. *Overall*: The overall purpose of the proposed projects is to enhance oyster propagation efforts in the Chesapeake Bay, Coastal Bays and its tributaries in Maryland. The planting of alternate material is an essential component in attempts to reestablish an abundant and self-sustaining oyster population within the Chesapeake Bay. The alternate materials may be seeded with native oysters.

IV. Scope of Analysis:

A. Department of the Army authorization is required for this work and the degree of Corps discretion over this project relates to its impact on navigable waters of the United States under Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act.

B. There has been no Federal financial aid given to this project.

C. The overall Federal involvement with this project is not sufficient to turn this private action into a Federal action.

D. The extent of cumulative Federal control and responsibility relates to evaluation of the DA permit application pursuant to Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act.

V. Statutory Authority: These applications for DA authorization were reviewed pursuant to Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act.

VI. Other Federal, State, and Local Authorizations Obtained or Required and Pending:

A. *State water quality certification (WQC)*: Since it has been over six months since the project was advertised on public notice, WQC is considered waived.

B. *Coastal Zone Management (CZM) consistency determination:* Since it has been over six months since the project was advertised on public notice, CZM is considered waived.

C. *Other authorizations:* A tidal Wetlands License for the proposed work is required from the Maryland Department of the Environment (MDE), however the license has not been issued, to date. There are no previous Corps authorizations for alternate material placement bay wide, but there was a permit issued for a 5 acre site in the Upper Bay for rubble and concrete structures (2002-61637).

VII. Date of Public Notice and Summary of Comments:

A. The alternate materials application was received on July 16, 2007. This application was initially reviewed on July 18, 2007, additional information was requested on July 18, 2007, and considered complete on December 14, 2007. A public notice was issued on December 26, 2007, and sent to all interested parties including appropriate State and Federal agencies. All comments received on this application have been reviewed and are summarized below:

(1) *U.S. Environmental Protection Agency (EPA)*: No written comments were received. Therefore, it is assumed they have no objections to the proposed work.

(2) *U.S. Fish and Wildlife Service (USFWS)*: No written comments were received. Therefore, it is assumed they have no objections to the proposed work.

(3) *National Marine Fisheries Service (NMFS):* NMFS concurs with measures discussed in the EFH Assessment for: 1) Requiring the applicant to survey planting areas for SAV prior to placing material; and, 2) and restricting planting within 300' of documented SAV.

(4) *State Historic Preservation Officer (SHPO)*: The Maryland Historic Trust *(MHT)* requested additional information and detailed mapping in a letter dated August 3, 2007. In a letter dated May 15, 2008, MHT stated, “Out of the 1105 distinct historic oyster bars (HOB) sent to the Trust, it is our opinion that 954 will have *no effect* on submerged historic properties”. Out of the 326 distinct natural oyster bars (NOB), 245 will have *no effect* on submerged historic properties. Activities cited under this permit *may impact* historic or archeological resources located on or in proximity to 151 HOBs, 81 NOBs, and an additional 15 NOBs that were supplied in AutoCadd by another division in DNR. Therefore, MHT has requested that the Corps restrict its permit to those activities which will have no effect on submerged historic properties, and should defer approval for the 246 bars listed until the agencies have successfully concluded the Section 106 consultation on the 246 oyster bars.

(5) *State and Local Agencies*: MDE has taken no formal action on this proposal.

(6) *Organizations*: This office received no comments on the proposed project from organizations.

(7) *Individuals*: This office received one comment on the proposed project from a private individual concerning potential ammonia nitrogen release during bottom disturbance associated with shell recovery.

(8) *United States Coast Guard (USCG*): The USCG will require a 250 ft buffer zone around all federal aids to navigation and 75 ft buffer of designated channels. All proposed reef coordinates including minimum depth information must be forwarded to USCG three weeks in advance of the proposed placement date.

(9) *Others, Including Internal Coordination*: A meeting was held on August 6, 2007 with the applicant and the Maryland Department of the Environment to discuss permitting issues.

B. *Response to the comments*: MHT sent comments before the application was advertised by public notice. MHT comments of August 3, 2007 and October 23, 2007 were coordinated with the applicant on August 7, 2007 and October 29, 2007, respectively. The applicant responded to the comments in March, 2008 by providing the additional information to MHT. MHT sent a letter to the Corps pursuant to Section 106 of the National Historic Preservation Act of 1966, which was received by this office on May 28, 2008. These comments were sent to the applicant, and after several discussions, the applicant agreed to eliminate the 246 oyster bars that MHT determined may be adversely affected by the project.

VIII. Alternatives:

A. *Avoidance (No action, uplands, availability of other sites)*: The "no action" alternative would avoid impacts to the aquatic environment, but would not meet the project purpose of restoring oyster habitat.

B. *Minimization (modified project designs, etc.)*: As a result of the permit review process, the applicants have eliminated oyster bars identified by MHT as potentially having adverse effects from the "area of review." This involved the elimination of 246 oyster bars.

C. *Project as Proposed (Outline impacts of project as proposed)*: The project as revised would impact less than 1600 acres of oyster bar over a ten-year period. The project impacts have been minimized to the most practicable extent possible (see minimization section above). This project has beneficial impacts to the aquatic environment.

D. *Conclusions of Alternatives Analysis*: The project as proposed is the least environmentally damaging practicable alternative that meets the project needs.

IX. Evaluation of the 404(b)(1) Guidelines:

A. Restrictions on discharges:

(1) Alternatives (See paragraph VIII):

(a) The activity is located in a special aquatic site (wetlands, sanctuaries and refuges, mudflats, vegetated shallows, coral reefs, riffle and pool complexes, etc.)

Yes ☒ No ☐

(b) The activity needs to be located in a special aquatic site to fulfill its basic purpose.

Yes ☒ No ☐

(c) All practicable alternatives have been reviewed in paragraph VIII above. It has been demonstrated that the alternative with the fewest impacts on the aquatic ecosystem (least damaging alternative), has been identified.

Yes ☒ No ☐

(d) The least damaging alternative has no other significant environmental effects.

Yes ☒ No ☐

(2) Other program requirements:

(a) The proposed activity violates applicable State water quality standards or Section 307 prohibitions or effluent standards.

Yes ☐ No ☒

(b) The proposed activity jeopardizes the continued existence of federally listed threatened or endangered species or affects their critical habitat.

Yes ☐ No ☒

(c) The proposed activity violates the requirements of a federally designated marine sanctuary.

Yes ☐ No ☒

(3) The activity will cause or contribute to significant degradation of water of the United States, including adverse effects on human health; life stages of aquatic organisms; ecosystem diversity, productivity and stability; and recreational, esthetic, and economic values.

Yes ☐ No ☒

(4) Minimization of adverse effects:

(a) Appropriate and practicable steps have been taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem.

Yes ☒ No ☐

(b) Compensatory Mitigation (wetland enhancement, creation, etc.): No mitigation is proposed or required for impacts to shallow water habitat.

X. Public Interest Review:

A. All public interest factors have been reviewed, including but not limited to the effects the work might have on conservation, economics, esthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, land use, navigation, shore erosion and accretion, recreation, water quality, safety, and consideration of property ownership. It has been determined that the proposed work will not adversely impact any of the public interest factors.

(1) *Conservation*. The proposed project is expected to have a positive impact on the conservation of aquatic resources, since the purpose of rehabilitating oyster bar habitat is to work towards the re-establishment of an abundant and self-sustaining oyster population in support of the Chesapeake Bay Program 2000 Agreement and 2005 Oyster Management Plan.

(2) *Economics* (33CFR320.4(q)). The proposed project is expected to have temporary adverse impacts on recreational and commercial fishing of finfish and shellfish, which will be temporarily disrupted by the work. Upon completion of the work, however, it is likely that shellfish and finfish will return to the project areas. As a result of previous oyster projects, oyster populations in the Chesapeake Bay have increased, benefiting watermen harvesting oysters. A minor beneficial impact by providing employment for a marine contractor and employees will occur.

(3) *Aesthetics*. No detrimental or beneficial impacts to aesthetics are expected to occur as a result of the proposed projects. During construction the dredging equipment would be visible. However, the extent and perception of the aesthetic alteration would vary depending upon the nature of the surrounding area and the values of the public using the waterway.

(4) *General environmental concerns* (33CFR320.4(p)). General environmental concerns are addressed in my evaluation of the following public interest factors.

(5) *Wetlands* (33CFR320.4(b)). No detrimental or beneficial impacts are anticipated to wetlands as a result of the proposed project.

(6) *Historic and cultural resources* (33CFR320.4(e)). Since the applicant has eliminated 246 oyster bars that MHT had identified may impact submerged historic properties, the proposed project will have no detrimental or beneficial impacts on historic or cultural resources.

(7) *Fish and wildlife values* (33CFR320.4(c)).

(a) *Endangered or threatened species.* No endangered or threatened species or their identified critical habitats occur within the project area, therefore, there will be no detrimental or beneficial impacts to this resource.

(b) *Anadromous fish.* The proposed project has the potential to indirectly benefit anadromous fish, as a result of rehabilitating oyster bar habitat, which provide valuable habitat for fish, blue crabs and other aquatic species and improve water quality.

(c) *Submerged aquatic vegetation (SAV).* SAV is an important component of the food chain, providing a food source for waterfowl, fish, and shellfish, as well as providing habitat and nursery areas for many species of fish and invertebrates. SAV also substantially contributes to maintaining water quality at the level necessary to support fisheries as it removes nitrogen, phosphorus, and suspended sediments from the water. The applicant is required to survey recovery/planting areas for SAV prior to dredging and planting. No alternate material placement will occur within 300 feet of SAV beds. Therefore, no adverse impacts to SAV are anticipated as a result of the proposed project.

(d) *Fish habitat and benthics.* The proposed project has the potential to indirectly benefit fish and wildlife values, as a result of rehabilitating oyster bar habitat, which provide valuable habitat for fish, blue crabs and other aquatic species. Benthics should colonize the alternate material shortly after placement.

(e) Essential Fish Habitat (EFH). The project site lies in or adjacent to EFH as described under Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) for *Scopthalmus aquosos* (windowpane flounder) juvenile and adult; *Pomatomus saltatrix* (blue fish) juvenile and adult; *Paralicthys dentatus (summer flounder)* juvenile and adult; *Peprilis triacanthos* (Atlantic butterfish) eggs, larvae, juvenile and adult ; *Centropristus striata* (black sea bass) juvenile and adult; eggs, larvae, juvenile, and adult stages of *Sciaenops ocellatus* (red drum), *Scomberomorus cavalla* (king mackerel), *Scomberomorus maculatus* (spanish mackerel), and *Rachycentron canadum* (cobia), all managed species under the MSFCMA. NMFS concurred with the measures discussed in our EFH Assessment, which include 1) Requiring the applicant to survey recovery/planting areas for SAV prior to placing material; and, 2) restricting planting within 300' of documented SAV. The project has the potential to beneficially impact forage and/or shelter habitat since rehabilitated oyster bar habitat will provide a more productive area for forage and shelter for smaller species.

(8) *Flood hazards*. No detrimental or beneficial impacts are predicted for flood heights and drift as a result of the proposed work.

(9) *Floodplain values* (33 CFR 320.4(l)). No detrimental or beneficial impacts are predicted for floodplain values as a result of the proposed work.

(10) *Land use*. No detrimental or beneficial impacts are predicted for land use in the area as a result of the proposed work as the project is compatible with current land use in the area and additional shoreline development is not anticipated as a result of the project.

(11) *Navigation* (33 CFR 320.4(o)). A temporary minor detrimental impact to navigation is anticipated to occur during the actual work as boat traffic may be temporarily impacted due to the presence of work boats/barges in the area. The Coast Guard requires a 250 foot buffer zone around all federal aid to navigation and a 75 foot buffer of designated channels.

(12) *Shore erosion and accretion*. No detrimental or beneficial impacts to shore erosion or accretion are anticipated as a result of the proposed project. Normal shoreline processes would influence erosion and accretion much more than the minimal depth changes proposed for this project; any minimal impacts the proposed project may have on shore erosion or accretion may not be discernable from normal waterway evolution.

(13) *Recreation*. No impact on recreation is anticipated to occur.

(14) *Water supply* (33 CFR 320.4(m)). No detrimental or beneficial impacts to water supply and conservation are expected as a result of the project as the project site is within a marine water system that is not a source of potable water.

(15) *Water quality* (33 CFR 320.4(d)). A temporary minor detrimental impact to water quality is anticipated as a result of the proposed project. A temporary increase in turbidity within the water column is expected during placement of alternate material. However, oysters have a positive impact of water quality due to their ability to filter water at a rate of about two gallons per hour per oyster. In abundance, oysters help clarify the water, which allows bay grasses to receive more sunlight. Then in turn, plentiful grasses increase oxygen levels, reduce wave energy and shoreline loss, and habitat for aquatic life.

(16) *Energy needs* (33 CFR 320.4(n)). No detrimental or beneficial impacts are anticipated on energy needs as a result of the proposed project.

(17) *Safety*. No detrimental or beneficial impacts are anticipated on safety as a result of the proposed project.

(18) *Food and fiber production*. Beneficial impacts are anticipated on food production, especially for oysters, as a result of the proposed project since the purpose is to increase oyster populations. The proposed project would not effect fiber production as the area is not used for fiber production.

(19) *Mineral needs*. No detrimental or beneficial impacts are anticipated on mineral needs as a result of the proposed project.

(20) *Considerations of property ownership*.

(a) *Public rights to navigation.* No impact is anticipated on public rights to navigation as a result of the proposed project.

(b) *Public interests in environmental protection.* The project is unlikely to be contrary to the public's interest in environmental protection as the purpose of the project is to rehabilitate oyster fisheries. Benthic organisms that are important to the aquatic food web will be temporarily impacted due to the project, but re-colonization will occur after placement is completed. Therefore, the impacts to living aquatic resources will be minimal.

(c) *Riparian rights.* This project will not affect riparian rights because the disturbance by the presence of work boats will be temporary.

(d) *Ownership rights.* Property owners along the waterway have an inherent right to reasonable private use of the waterway. This project will not affect private property owners because the disturbance by the presence of work boats will be temporary.

(e) *Public lands.* There are no public land issues associated with this project. The oyster seeding is proposed in natural or historic oyster bars in the Chesapeake Bay.

B. *Describe the relative extent of the public and private need for the proposed structure or work.* The project is proposed to benefit all citizens because oysters are economically and ecologically important.

C. *Describe the practicability of using reasonable alternative locations and methods to accomplish the objective of the purposed work where there are unresolved conflicts as to resource use*. There are no alternative locations for the proposed project that meet the purpose and need of the project. The projects will have minor to no permanent detrimental impacts on the aquatic environment, minor temporary detrimental impacts, and permanent beneficial impacts.

D. *Describe the extent and permanence of the beneficial and/or detrimental effects which the proposed work is likely to have on the public and private uses to which the area is suited*. The proposed project is unlikely to have permanent detrimental effects on public or private uses. The proposed project is expected to have permanent beneficial effects on public uses such as economics, fisheries and water quality of the Chesapeake Bay.

E. *Threatened or Endangered Species*. The proposed project will not jeopardize the continued existence or critical habitat of any threatened or endangered species.

F. *Corps wetland policy*. There are no wetland alterations associated with the proposed project. Therefore, the projects are in accordance with the Corps wetland policy.

G. *Cumulative and Secondary Impacts*: The proposed project is not likely to have more than minimal secondary, long-term impacts to the aquatic environment. The overall purpose of the proposed project is to enhance oyster propagation efforts in the Chesapeake Bay, Coastal Bays and its tributaries in Maryland. The placement of alternate material is an essential component in attempts to reestablish an abundant and self-sustaining oyster population within the Chesapeake Bay.

XI. Public Hearing Evaluation: There were no requests for a federal public hearing; therefore, a federal public hearing was not held for the projects.

XII. Essential Fisheries Habitat (EFH): The National Marine Fisheries Service (NMFS) did not request any EFH information in addition to that provided in the Pubic Notice. The Baltimore District's findings are that the proposed project will have negligible short or long-term detrimental impacts to EFH. NMFS concurs with measures discussed in the EFH Assessment for: 1) Requiring the applicant to survey recovery/planting areas for SAV prior to placing material; and, 2) restricting planting within 300' of documented SAV. Therefore, the proposed project is not expected to have substantial detrimental impacts to fish and wildlife resources or EFH.

XII. Determinations:

A. *Finding of No Significant Impact (FONSI)*. Having reviewed the information provided by the applicant and all interested parties and an assessment of the environmental impacts, I find that this permit action will not have a significant impact on the quality of the human environment. Therefore, an Environmental Impact Statement will not be required.

B. *Compliance with 404(b)(1) Guidelines*. Having completed the evaluation in paragraph VIII above, I have determined that the proposed discharge complies with the 404(b)(1) Guidelines.

C. *Section 176(c) of the Clean Air Act General Conformity Rule Review.* The proposed permit action has been analyzed for conformity applicability pursuant to regulations implementing Section 176(c) of the Clean Air Act. It has been determined that the activities proposed under this permit will not exceed *de minimus* levels of direct emissions of a criteria pollutant or its precursors and are exempted by 40 CFR Part 93.153. Any later indirect emissions are generally not within the Corps' continuing program responsibility and generally cannot be practicably controlled by the Corps. For these reasons a conformity determination is not required for this permit action.

D. *Environmental Justice*. In accordance with Title III of the Civil Rights Act of 1964 and Executive Order 12898, each Federal agency must ensure that all programs that affect human health or the environment do not directly or through contractual or other arrangements, use criteria, methods, or practices that discriminate on the basis of race, color, or national origin. Each Federal Agency must analyze the environmental effects, human health effects, economic effects, and social effects of Federal actions, including effects on minority communities and low-income communities. The undertaking of the proposed projects is not expected to discriminate on the basis of race, color, or national origin, nor will they have a disproportionate effect on minority or low-income communities.

E. *Public Hearing Request*. There were no requests for a public hearing on this project; therefore, one was not scheduled.

F. *Public Interest Determination.* I find that issuance of a Department of the Army permit is not contrary to the public interest.

PREPARED BY: Mary Frazier DATE: 12 Aug 08
Mary Frazier
Regulatory Project Manager, Maryland Section Northern

REVIEWED BY: Joseph P. DaVia DATE: 8/13/08
Joseph P. DaVia
Chief, Maryland Section Northern

APPENDIX F:

USACE Oyster Decision Documents

Chesapeake Bay Oyster Recovery Project Report January, 1996.

Environmental Assessment for the Construction of Seed Bars in Eastern Bay as Part of the Chesapeake Bay Oyster Recovery Project, July, 1999.

Decision Document Chesapeake Bay Oyster Recovery Project, Maryland; dated May 2002.

Programmatic Environmental Impact Statements for Oyster restoration in Chesapeake Bay Including the Use of a native and/or Nonnative dated October 2008.

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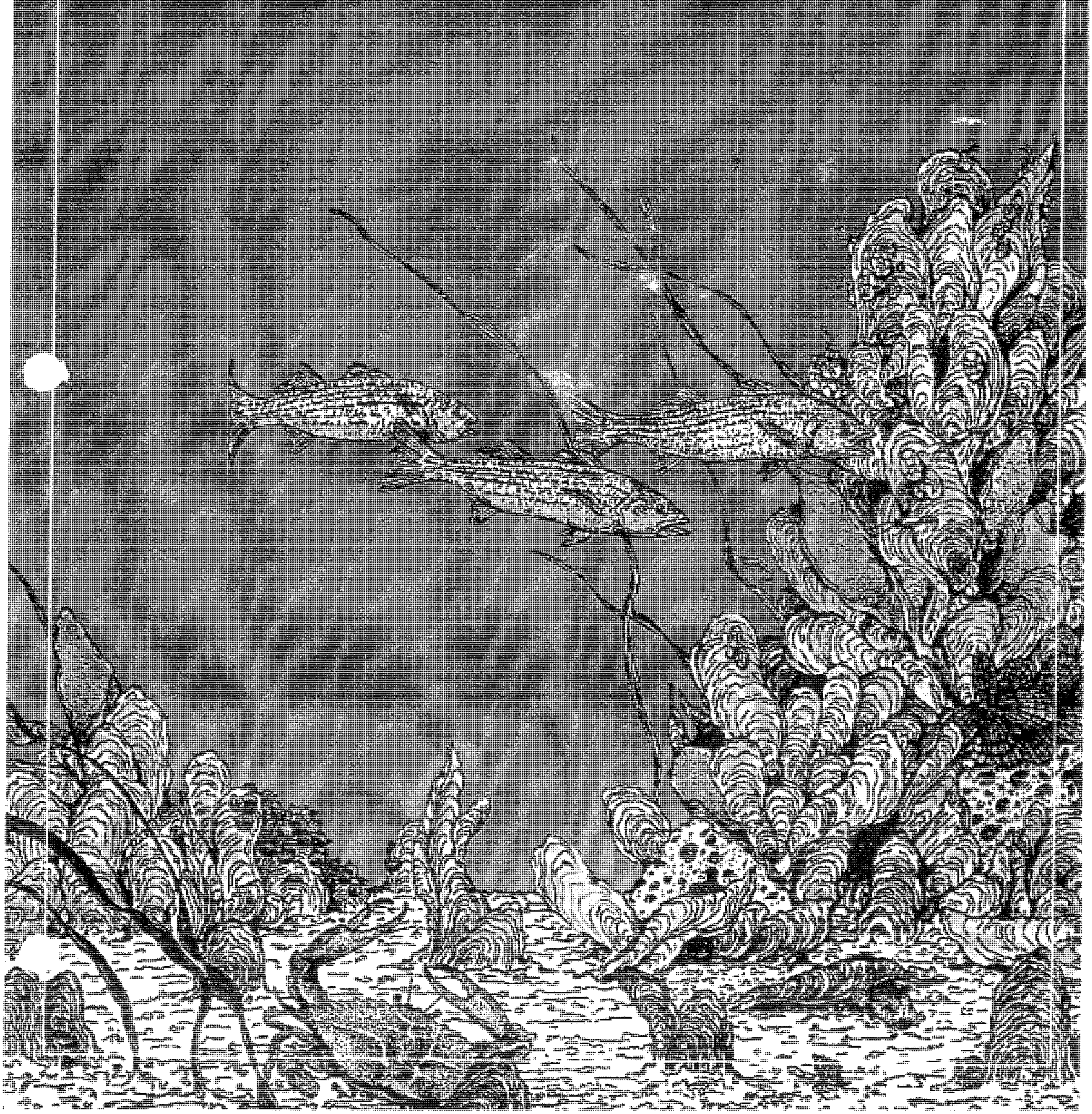
Chesapeake Bay Oyster Recovery Project

Maryland
1996



FINDING OF NO SIGNIFICANT IMPACT

CHESAPEAKE BAY OYSTER RECOVERY PROJECT

MARYLAND

The Baltimore District, U.S. Army Corps of Engineers, in cooperation with the Maryland Department of Natural Resources, is conducting the planning, engineering, and design of the Chesapeake Bay Oyster Recovery Project in Maryland. Project construction will be initiated in 1996 with upgrades to the Piney Point hatchery. Construction activities will occur over a five-year period and include the following: creation of new oyster bars and rehabilitation of existing non-productive bars; upgrading of state-owned hatcheries at Horn Point and Piney Point; construction of seed bars for production and collection of seed oysters or "spat"; and planting of spat produced at hatcheries and harvested from seed bars on new and rehabilitated bars. Monitoring of implemented projects will continue for three years after project implementation. Project activities will occur within Oyster Recovery Areas (ORAs) established by the Maryland Oyster Roundtable Action Plan in the Severn, Nanticoke, Chester, Choptank, Patuxent, and Magothy Rivers, and potentially in other Maryland waters of the Chesapeake Bay.

The purpose of the project is to restore oyster habitat and to increase oyster populations in the Maryland portion of the Chesapeake Bay. Oyster populations have declined dramatically since the turn of the century, largely due to parasitic diseases, overharvesting, and a loss of habitat. Oysters, which are filter feeders, improve water quality in the Chesapeake Bay, and oyster bars provide valuable habitat for fish, blue crabs, and other species.

An Environmental Assessment (EA) has been prepared which evaluates the potential environmental impacts associated with the proposed project. The EA was prepared in accordance with the provisions of the National Environmental Policy Act of 1969, as amended. Potential impacts were assessed with regard to the physical, chemical, and biological characteristics of the aquatic and terrestrial ecosystem, endangered and threatened species, hazardous and toxic materials, aesthetics and recreation, cultural resources, and the general needs and welfare of the public. In accordance with Section 404 of the Clean Water Act, a Section 404(b)(1) analysis was conducted for the proposed actions. The analysis determined that the project would result in beneficial impacts to the aquatic environment.

Upon reviewing the EA, I find that potential negative environmental impacts to benthic and open water habitat associated with implementation of the project will occur over a relatively small area and will be primarily short-term in nature. The project will produce a net beneficial impact to the environment through the creation of habitat for oysters and other species associated with oyster communities. Based upon this finding, preparation of an Environmental Impact Statement is not required.

Randall R. Inouye
Randall R. Inouye P.E.
Colonel, Corps of Engineers
District Engineer

January 29, 1996

US Army Corps of Engineers
Baltimore District

SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT

FOR THE CONSTRUCTION OF SEED BARS IN EASTERN BAY AS PART OF THE CHESAPEAKE BAY OYSTER RECOVERY PROJECT, MARYLAND

Prepared By:
Baltimore District
U.S. Army Corps of Engineers
Baltimore, Maryland 21203-1715

July 1999

FINDING OF NO SIGNIFICANT IMPACT

CONSTRUCTION OF SEED BARS IN EASTERN BAY AS PART OF THE CHESAPEAKE BAY OYSTER RECOVERY PROJECT PROJECT, MARYLAND

The Baltimore District, U.S. Army Corps of Engineers, in cooperation with the Maryland Department of Natural Resources, is constructing approximately 18 acres of seed bars in Eastern Bay in Queen Anne's County. This supplemental environmental assessment (EA) identifies and assesses the potential environmental impacts associated with the construction of these seed bars in Eastern Bay as part of the Chesapeake Bay Oyster Recovery Project in Maryland which was begun in 1997. Project activities were planned in Oyster Recovery Areas (ORAs) established by the Maryland Oyster Roundtable Action Plan in the Severn, Nanticoke, Chester, Choptank, Patuxent, and Magothy Rivers, and potentially in other Maryland waters of the Chesapeake Bay.

The Chesapeake Bay Oyster Recovery Project in Maryland is authorized under Section 704(b) of the Water Resources Development Act of 1986, which provides authority for the Corps to conduct projects for fish and wildlife, including but not limited to man-made reefs for fish. The purpose of the project is to restore oyster habitat and to increase oyster populations in the Maryland portion of the Chesapeake Bay. Oyster populations have declined dramatically since the turn of the century, largely due to parasitic diseases, overharvesting, and a loss of habitat. Oysters, which are filter feeders, improve water quality in the Chesapeake Bay, and oyster bars provide valuable habitat for fish, blue crabs, and other species.

An Environmental Assessment (EA) has been prepared which evaluates the potential environmental impacts associated with the proposed project. The EA was prepared in accordance with the provisions of the National Environmental Policy Act of 1969, as amended. Potential impacts were assessed with regard to the physical, chemical, and biological characteristics of the aquatic and terrestrial ecosystem, endangered and threatened species, hazardous and toxic materials, aesthetics and recreation, cultural resources, and the general needs and welfare of the public. In accordance with Section 404 of the Clean Water Act, a Section 404(b)(1) analysis was conducted for the proposed actions. The analysis determined that the project would result in beneficial impacts to the aquatic environment.

Upon reviewing the supplemental EA, I find that potential negative environmental impacts to benthic and open water habitat associated with implementation of the project will occur over a relatively small area and will be primarily short-term in nature. The project will produce a net beneficial impact to the environment through the creation of habitat for oysters and other species associated with oyster communities. Based upon this finding, preparation of an Environmental Impact Statement is not required.

Bruce A. Berwick P.E.
Colonel, Corps of Engineers
District Engineer

DECISION DOCUMENT

CHESAPEAKE BAY OYSTER RECOVERY PROJECT
MARYLAND

May 2002

Baltimore District
U.S. Army Corps of Engineers

XI. Recommendations

The proposed Phase II activities have been developed as part of a major goal of the EPA Chesapeake Bay Program's Chesapeake 2000 Agreement, of which the Corps is a partner, to increase oyster populations ten-fold by 2010. The Corps project was developed in conjunction with, and is supported by environmental interests such as the Chesapeake Bay Foundation, and the Oyster Recovery Partnership, and is a key part of EPA's oyster restoration goal. The project has been designed to complement activities undertaken by private citizens, environmental groups, and local, state and Federal agencies. Baltimore District has worked closely with these interests to efficiently allocate resources based upon the particular expertise and missions of the respective parties.

MdDNR, who has demonstrated expertise in the field of oyster habitat restoration, has proven to be a willing and able sponsor. Moreover, the inclusion of this cost-shared project will contribute in part to a much larger Virginia-Maryland Chesapeake Bay-wide effort to increase oyster populations ten-fold by 2010. The Phase II oyster recovery activities will demonstrate the Baltimore District's continued ability and dedication to preserve aquatic ecosystems and its commitment to the health of the Chesapeake Bay.

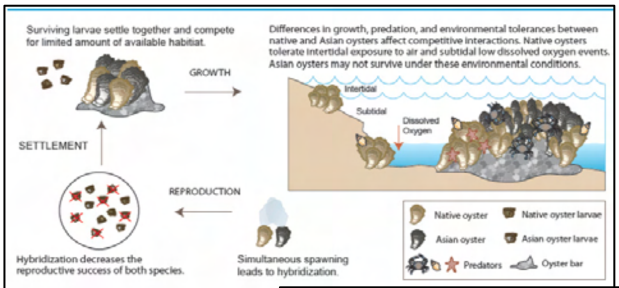
Therefore, I recommend that the oyster project be extended by two construction years with an associated cost increase of $3.4 million.

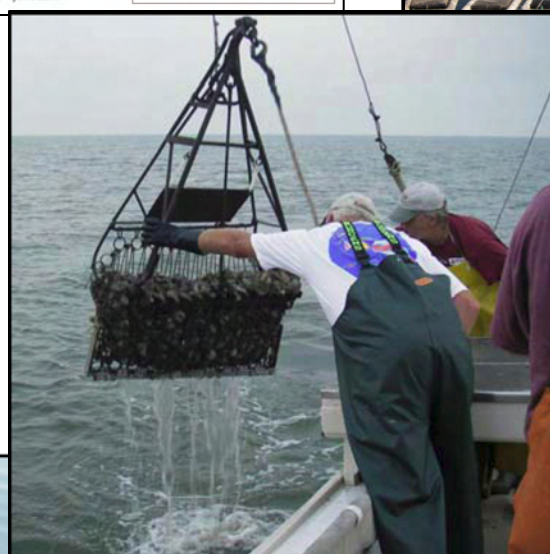
Date: 29 May 02

CHARLES J. FIALA, JR.
COL, Corps of Engineers
District Engineer

Draft Programmatic Environmental Impact Statement for Oyster Restoration in Chesapeake Bay Including the Use of a Native and/or Nonnative Oyster

Volume 1





US Army Corps of Engineers

Maryland Department of Natural Resources

Virginia Marine Resources Commission

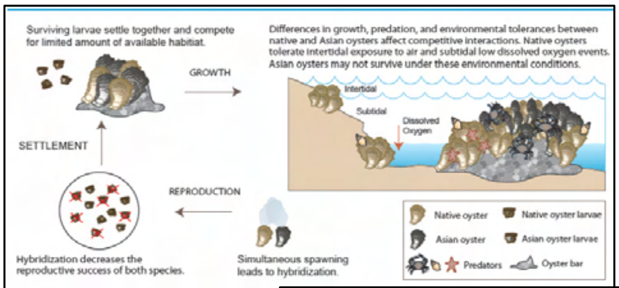
National Oceanic and Atmospheric Administration, U.S. Department of Commerce

United States Environmental Protection Agency

U.S. Fish & Wildlife Service, Department of the Interior

Draft Programmatic Environmental Impact Statement for Oyster Restoration in Chesapeake Bay Including the Use of a Native and/or Nonnative Oyster

Volume 2



US Army Corps of Engineers

MARYLAND DEPARTMENT OF NATURAL RESOURCES

VIRGINIA MARINE RESOURCES COMMISSION

NOAA — National Oceanic and Atmospheric Administration, U.S. Department of Commerce

United States Environmental Protection Agency

U.S. Fish & Wildlife Service, Department of the Interior

Appendix I – Public Coordination

November 7, 2013 – Public Meeting Materials

Meeting Announcement Flyer

Posters

Sign-in Sheet

Public Comments

2015 Public Notice

August 9, 2016 – Public Meeting Materials

Notice of Availability

Meeting Agenda

List of Participants/Sign-in Sheet

Posters

Presentation Slides

Pictures

Website

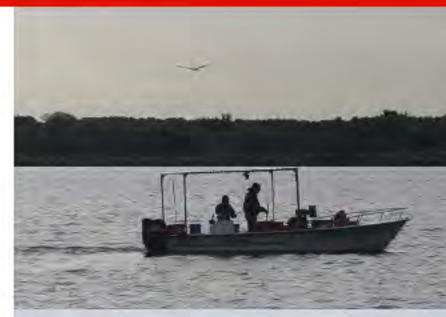
Public Review Comments

November 7, 2013 – Public Meeting Materials

Meeting Announcement Flyer

Tred Avon River Oyster Restoration Project

We Want Your Input!



Oysters are filter feeders that clean the water, and the reefs they build provide habitat for blue crabs, fish, and other Bay species. But our oysters are in trouble—because of disease, poor water quality, habitat loss, and other pressures, less than 1% of the historic oyster population remains.

The Maryland Department of Natural Resources, NOAA, and U.S. Army Corps of Engineers want to rebuild oyster populations and help the species that depend on oyster reefs by restoring up to 200 acres of oyster reefs in the Tred Avon River oyster sanctuary by:

- Developing a tributary oyster plan based on science to guide restoration
- Planting oysters on existing reefs and building and seeding new reefs on historic oyster bed footprint
- Using observation buoys and profilers to monitor water quality
- Researching how fish use oyster reefs as habitat

The group has developed a draft tributary oyster plan of when and where reefs will be constructed or enhanced. Because the Tred Avon is fairly small, potential restoration sites span the width of the river.

We invite you to learn about the plans—and we need your input to make the project a success!

Tred Avon Oyster Restoration Open House
Thursday, November 7, 3-8 p.m.
NOAA Environmental Science Training Center
Cooperative Oxford Lab
904 S. Morris St.
Oxford, MD 21654

Open house information, including the draft tributary oyster plan, will be available at www.chesapeakebay.noaa.gov/oysters/oyster-restoration-in-tred-avon.

Comments on the draft plan may be submitted by November 22 to chesapeake.oysters@noaa.gov. Feel free to email with questions, too!

NOAA

MARYLAND DEPARTMENT OF NATURAL RESOURCES

OYSTER RECOVERY PARTNERSHIP | ORP

Posters

Tred Avon River Oyster Restoration

Open House

Welcome!

We would like to hear your suggestions and comments on restoring the oyster population in the Tred Avon River oyster sanctuary.

Please look at the posters and feel free to ask questions and leave comments.

MARYLAND DEPARTMENT OF NATURAL RESOURCES

US Army Corps of Engineers.

NOAA
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE

DNR and Oysters

Historically it is has been the state's responsibility to conserve and manage fishery resources, including oysters.

1868	State Fishery Force (Oyster Police)
1882	Oyster Commission
1906	Shell Fish Commission
1916	Conservation Commission
1922	Conservation Department
1941	Board of Natural Resources
1943	**Authority for oyster management assigned to the Board (Tidewater Fisheries Commission) by the General Assembly**
1964	Dept. of Chesapeake Bay Affairs
1969	Dept. of Natural Resources
1972	Fisheries Administration created

NOAA and Oysters

In 2009, President Obama signed an executive order that called on the federal government to lead a renewed Chesapeake Bay restoration effort. The strategy developed by federal partners in response set a clear goal for oysters:

Restore oyster populations in 20 tributaries by 2025.*

Chesapeake Bay Program goal ; this goal is currently out for public comment and may be reduced to 10.

NOAA is one of the lead federal agencies involved in oyster restoration in the Chesapeake. We work with federal, state, and local partners to implement large-scale restoration, and provide science support to understand how to better manage the resource and habitat.

NOAA's Chesapeake oyster restoration program has grown from one small project of less than ¼ acre in 1995 to multiagency projects that have planted more than 300 million juvenile oysters and restored up to 200 acres per year.

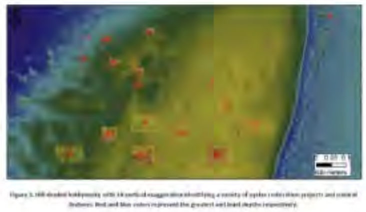
NOAA and its partners have implemented the mapping of tributaries with sonar technology to identify suitable bottom for shell and seed planting and reef construction. Preferable sites are:

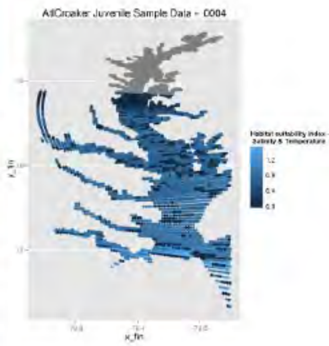
- hard and geologically stable with sand or oyster shell as the base,
- either contain or create moderate to high rugosity (a measure of surface irregularity/complexity), and
- informed by both water quality and hydrodynamics.

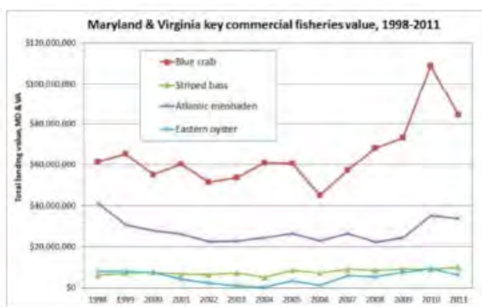
Sites are typically located on historic oyster bottom.

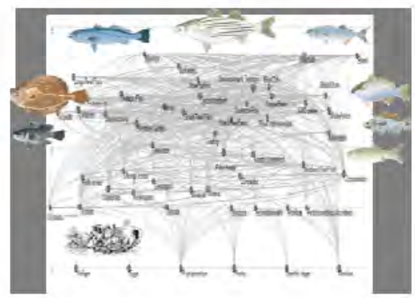
Oyster Reef Ecosystem Services Project

1. Habitat Complexity
2. Water Quality
3. Fish Sampling
4. Modeling
5. Economic Analyses



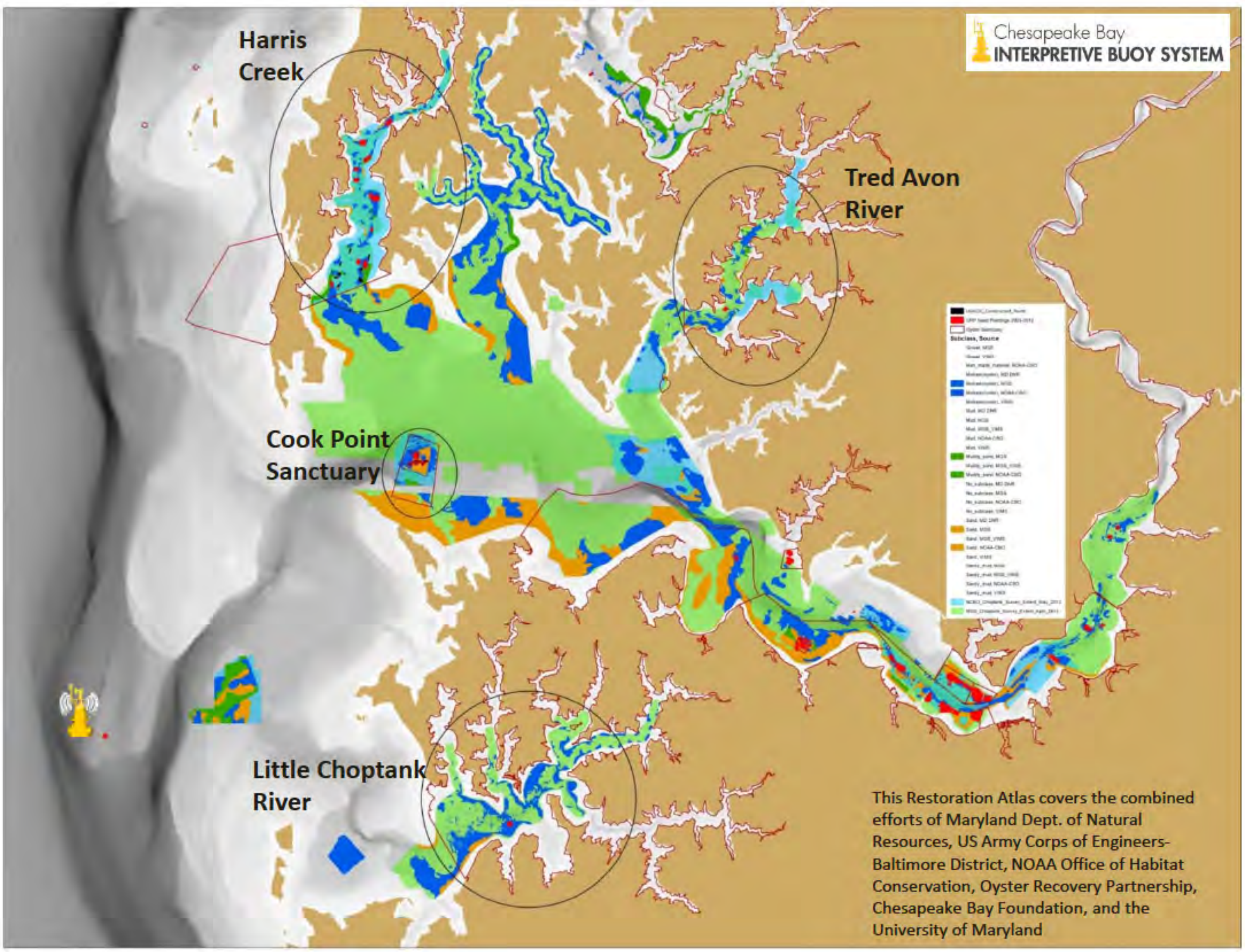






Ecological Studies	Ecological Production Function	Ecosystem Service	Economic Function	Ecosystem Service Value
Finfish Sampling; Habitat Monitoring	Oyster Reef Ecosystem and Habitat Models	Finfish Biomass	Economic Analysis	Commercial and Recreational Value of Finfish Biomass

Oyster Reef Ecosystem Services Project: Choptank Complex



Corps of Engineers and Oysters

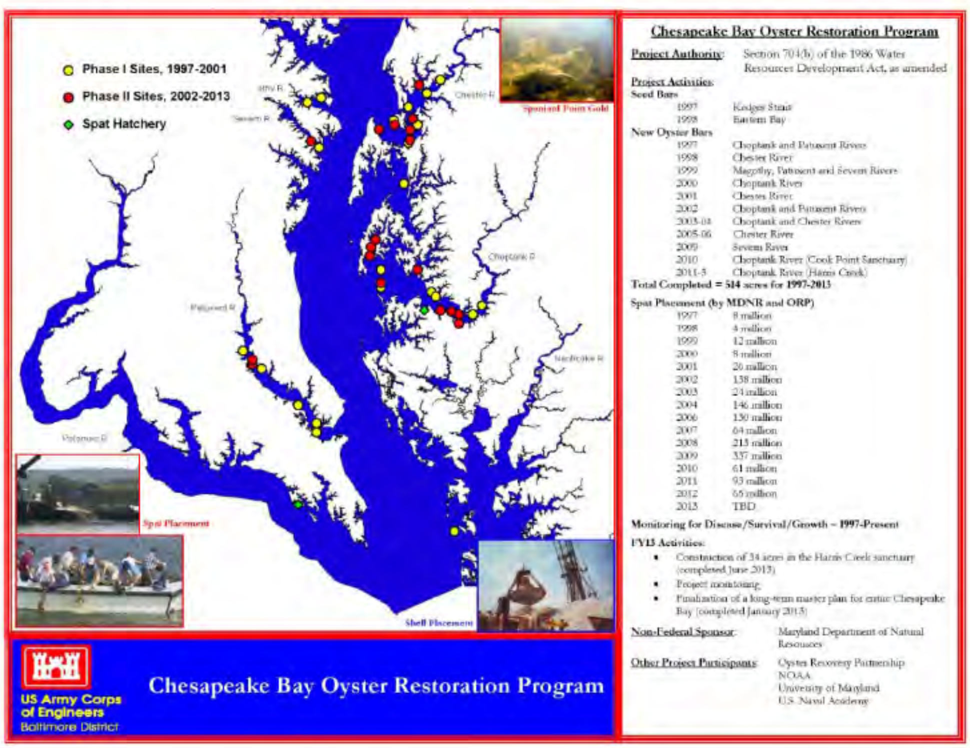
Congress authorized the Corps of Engineers to do oyster restoration in the Chesapeake Bay in Section 704(b) of the Water Resources Development Act of 1986.

The initial funding for the oyster restoration came in fiscal year 1995; since then, over the past 18 years, more than $21 million has been received for the Maryland effort [there is a similar effort ongoing in Virginia waters] .

The Corps has been partnering with Maryland DNR since 1997 to construct oyster bars in the Chesapeake Bay.

In the past 16 years, the Corps has placed substrate (both shell and alternative substrate) in the Severn, Magothy, Patuxent, Chester, and Choptank Rivers, as well as Eastern Bay and Kedges Strait.

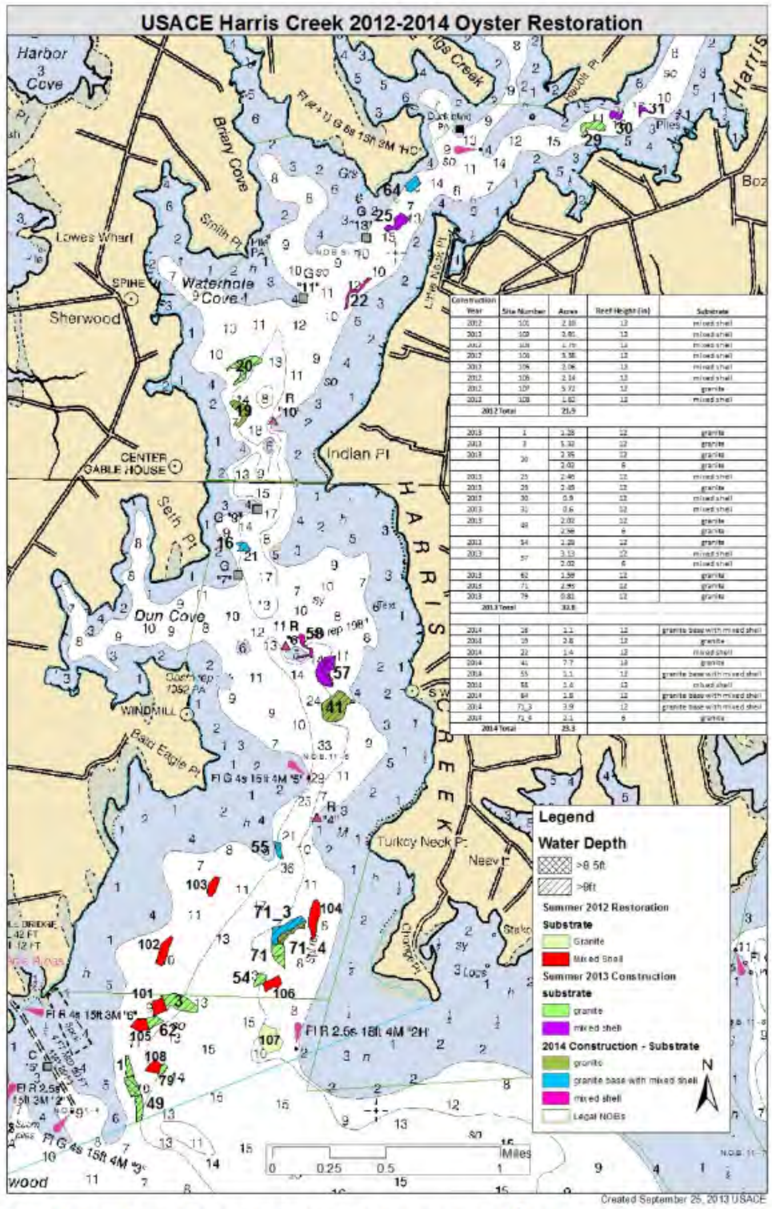
Currently, the Corps' mission is focused on ecosystem restoration to maximize aquatic habitat benefits.



Corps of Engineers and Oysters

Current Harris Creek Work

- In 2011-13, Congress gave the Corps of Engineers nearly $10 million for its efforts in Maryland waters.
- With those funds, we have placed substrate on 56 acres in Harris Creek at 21 sites.
- An additional 23 acres on 9 sites are scheduled for construction in winter 2013-14.
- Substrate has been a combination of stone and mixed shell (primarily clam) and granite.
- Bars have already been or will be seeded in spring 2014 with spat-on-shell from the Horn Point UMCES hatchery.



Native Oyster Restoration Master Plan

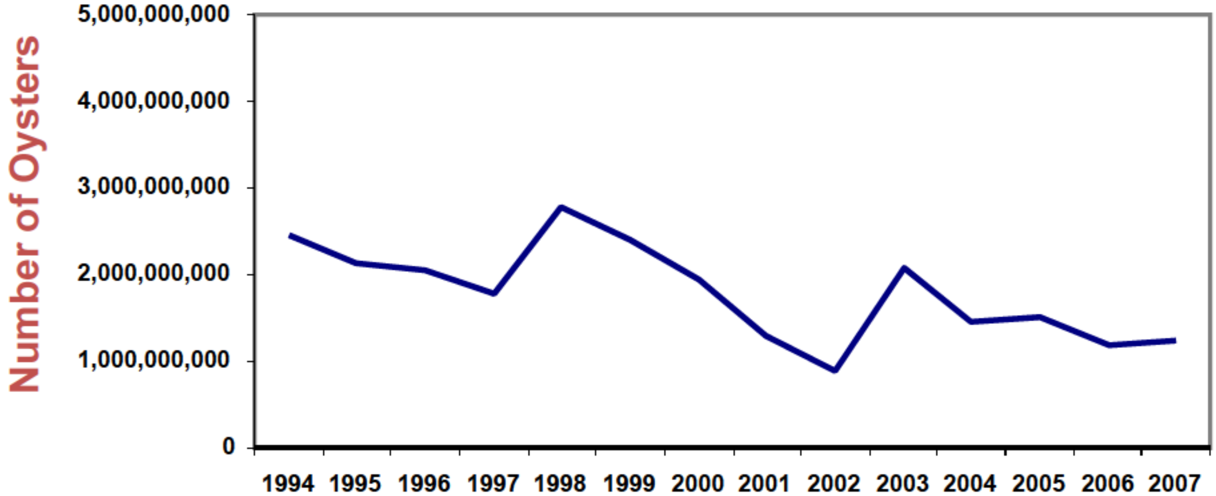
- In December 2012, we completed a Bay-wide master plan.
- You can find it at:

http://www.nab.usace.army.mil/Missions/Environmental/OysterRestoration/OysterMasterPlan.aspx

US Army Corps of Engineers.

Status of the Chesapeake Bay Oyster Resource

Population - Since 1994, the Chesapeake Bay's oyster population has languished at 1% of historic levels.



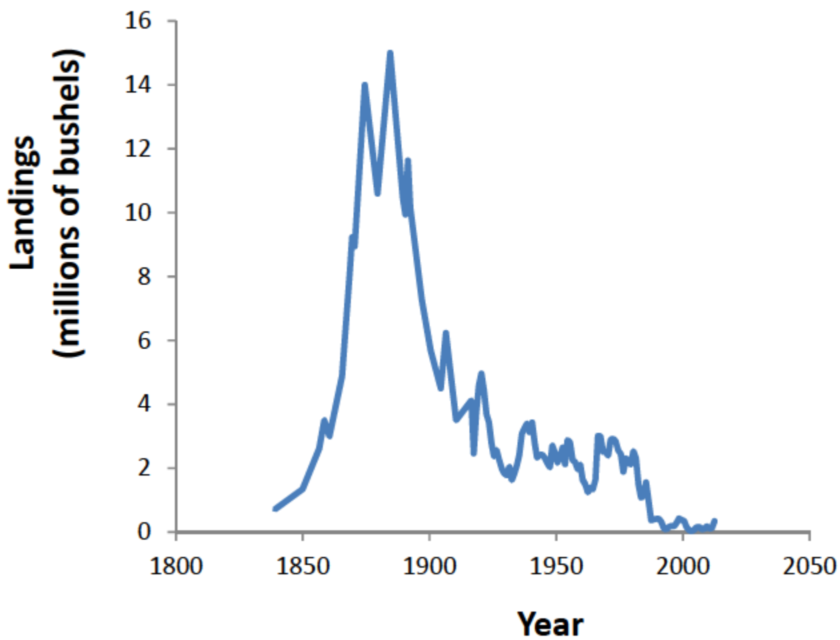
The graph above shows oyster population estimates for small and market oysters in the Maryland portion of Chesapeake Bay over the period 1994–2007 (estimated by applying MDNR Fall Survey density estimates to total habitat).

Habitat – Over the past 25 years, the amount of suitable oyster bar habitat has declined 80%, from 200,000 to 36,000 acres. Exposure to pollution, sedimentation, algal blooms due to excessive nutrient runoff, disease, and low dissolved oxygen levels in bottom water compound the problem and frustrate natural population recovery.

Status of Maryland's Oyster Industry

Harvest – Maryland's oyster harvest has been about 100,000 bushels annually since 2002. The annual harvest averaged 2. 5 million and 1. 3 million bushels during the 1920-69 and 1970-2002 periods, respectively.

Maryland Oyster Landings



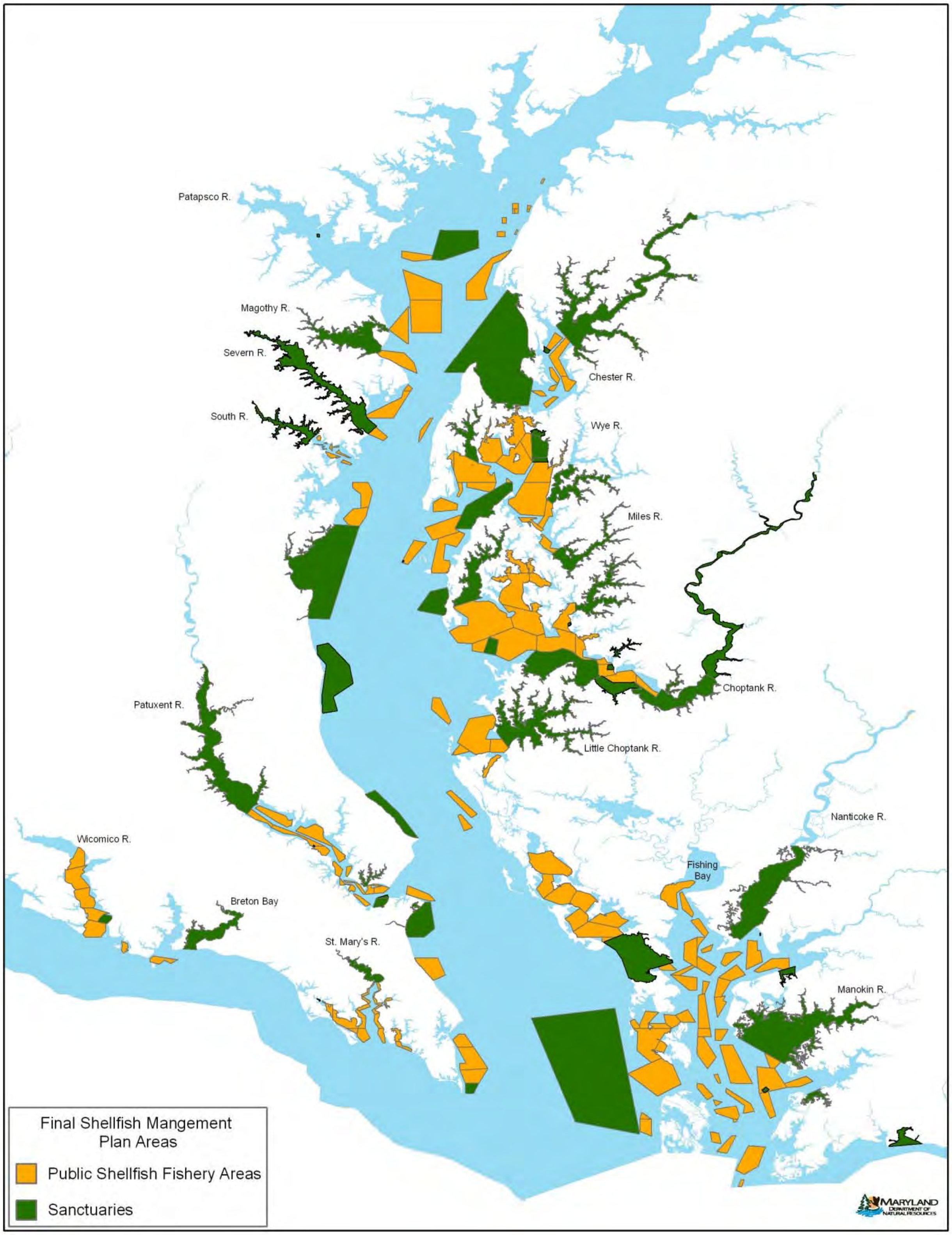
Harvesters - Prior to the disease epizootics (the rapid spread of disease among animals) of the mid-1980s, there were more than 2,000 oyster harvesters. The average number of annual license holders in MD from 2002 through 2010 was 550.

Processors - In 1974, there were 58 oyster processing companies in Maryland. Today, there are fewer than 18.

Maryland's 10-Point Oyster Restoration and Industry Revitalization Plan

1. Focus on target restoration strategies to achieve ecological and economic goals
2. Expand the sanctuary program
3. Support a more targeted, scientifically managed and sustainable wild oyster fishery
4. Shift commercial production to aquaculture
5. Rehabilitate oyster bar habitat
6. Manage against oyster disease and facilitate natural disease resistance
7. Increase hatchery production
8. Enhance law enforcement
9. Increase citizen involvement
10. Integrate inmate labor

Maryland Oyster Sanctuaries and Public Shellfish Areas



How Do We Define a "Restored Reef":

Per President Obama's 2009 Executive Order
on the Chesapeake Bay,
state and federal agencies have agreed to
a goal of restoring oysters in 20 Bay tributaries by 2025.

But what do we mean by a "restored reef"?

Six years after restoration activity, the reef should have at least 15 oysters* per square meter (preferably 50 oysters), covering at least 30% of the reef, and at least two year classes present. Reef structure should also persist, or preferably expand, over six years.

What do we mean by "restore a tributary"?

50-100% of currently-restorable bottom is covered with restored oyster reefs. Currently restorable bottom means hard seafloor, and water quality that will support living oysters. This restorable bottom must be a minimum of 8-16% of the historic oyster footprint. The Tred Avon River has 251 acres of restorable bottom, so the goal is to restore 125-251 acres.

Who determined that?

The Oyster Metrics Team, a Bay-wide group of scientists and fishery managers, defined what would be considered a "restored reef" and a "restored tributary" for the purpose of tracking progress toward the common goal of restoring 20 tributaries.

* Technically, the goal is at least 15 oysters *and* 15 grams of dry tissue weight. One 3-inch oyster has about one gram of dry tissue weight. So you can think of the minimum goal as a square meter of oyster reef with fifteen 3-inch oysters, or that same amount of oyster biomass spread among lots of smaller oysters.

Decline in Habitat

Reasons for Decline:

- **Overharvesting** – Oysters were removed by harvest over the past century, and shell was not replaced.

  Free-swimming larval oysters need to attach to hard material to survive.

  Oyster shell provides the predominant hard material in the Bay, so as the oyster population declined, so did the habitat for the next generation of oysters.

Warren Denton Company, Broome's Island 1940s
http://calvert.lib.md.us/history/oyster_pile.htm

- **Pollution and Poor Water Quality** – Sediment (soil) washing down from throughout the watershed lands in the Bay, smothering oyster beds. Excess nitrogen (from lawn and farm runoff, sewage treatment plants, and power plants) causes algae blooms, which robs the Bay's water of oxygen needed by oysters.

Hurricane Lee , September 2011,
NASA satellite photo

Restoration Techniques We Are Considering

Adding hard structure to seafloor

Free-swimming larval oysters need hard structure to attach to for survival. Oyster reefs historically provided this 3-dimensional structure, but today there is a lack of structure for settlement.

Possible material types:

- Shell
- Crushed concrete
- Granite or other rock
- Reef balls
- While alternative substrates are readily available and may deter poaching, they are generally expensive and may not have all of the physical characteristics of a natural oyster reef.

Planting juvenile oysters

Adding hatchery-produced juvenile oysters (called seed, or spat-on-shell) to new or existing reefs can help jump-start the population.

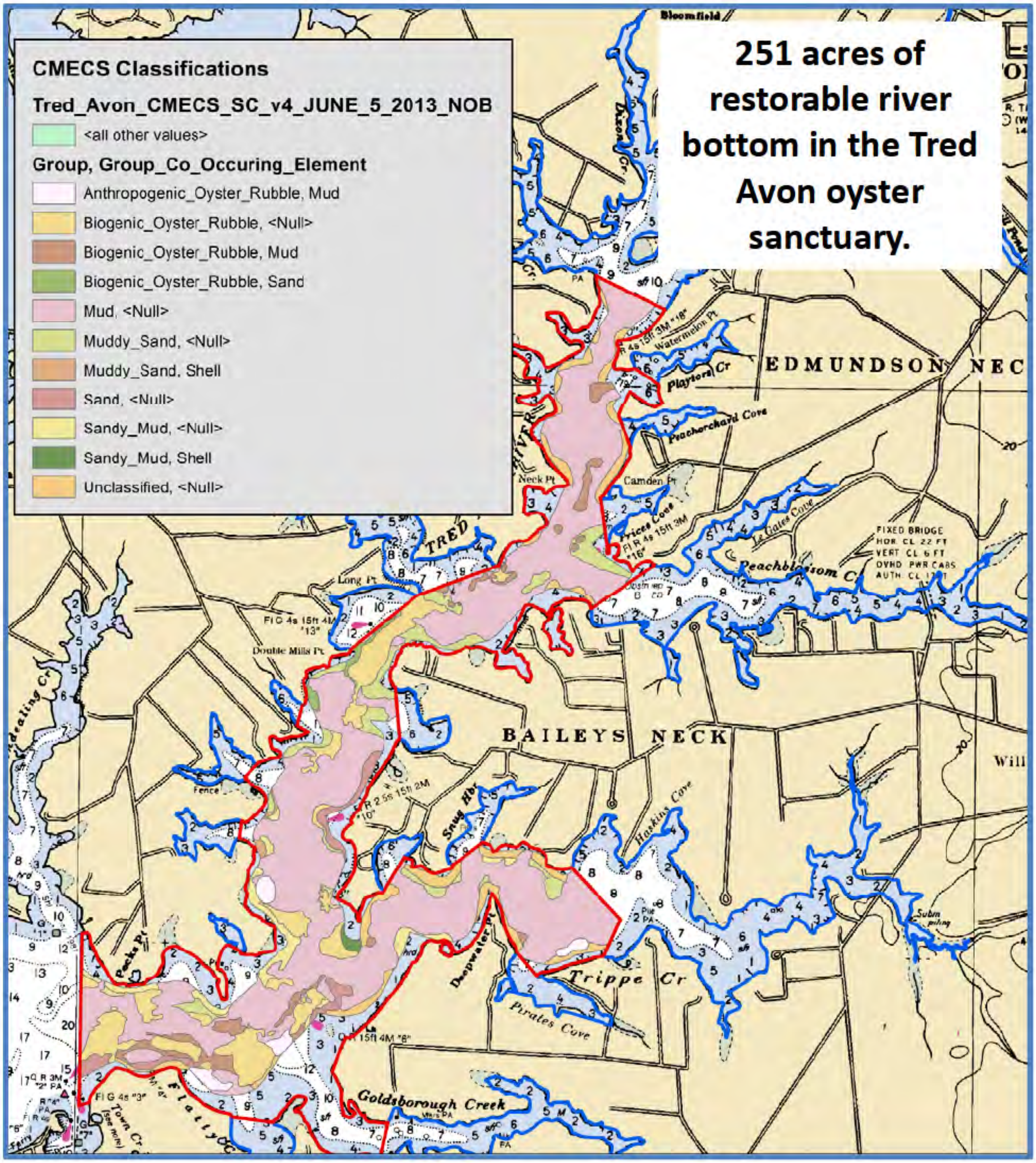
Why Was the Tred Avon River Chosen?

- ✓ Salinity (salt) level in the creek is moderate. This allows for good oyster reproduction (not found in less saline waters), yet still shows low disease levels (saltier waters tend to have higher disease levels). So the Tred Avon is somewhat of a "sweet spot," where moderate salinities favor both good reproduction and relatively low disease.
- ✓ Has some productive oyster reefs, which can produce oyster larvae to help seed existing and newly-built reefs.
- ✓ Has relatively good water quality.

- ✓ Achievable scale – Analysis of the Tred Avon River shows there are 251 acres of restorable bottom (hard bottom, with water quality that will support live oysters, in less than 20 feet of water). Our goal is to restore at least 125 acres in the Tred Avon.
- ✓ Is already an oyster sanctuary, meaning it is closed to oyster harvesting.

- ✓ The expectation is that larvae produced in the creek by existing or planted oysters will tend to stay within the Choptank River system, either in the Tred Avon River itself or in nearby creeks.

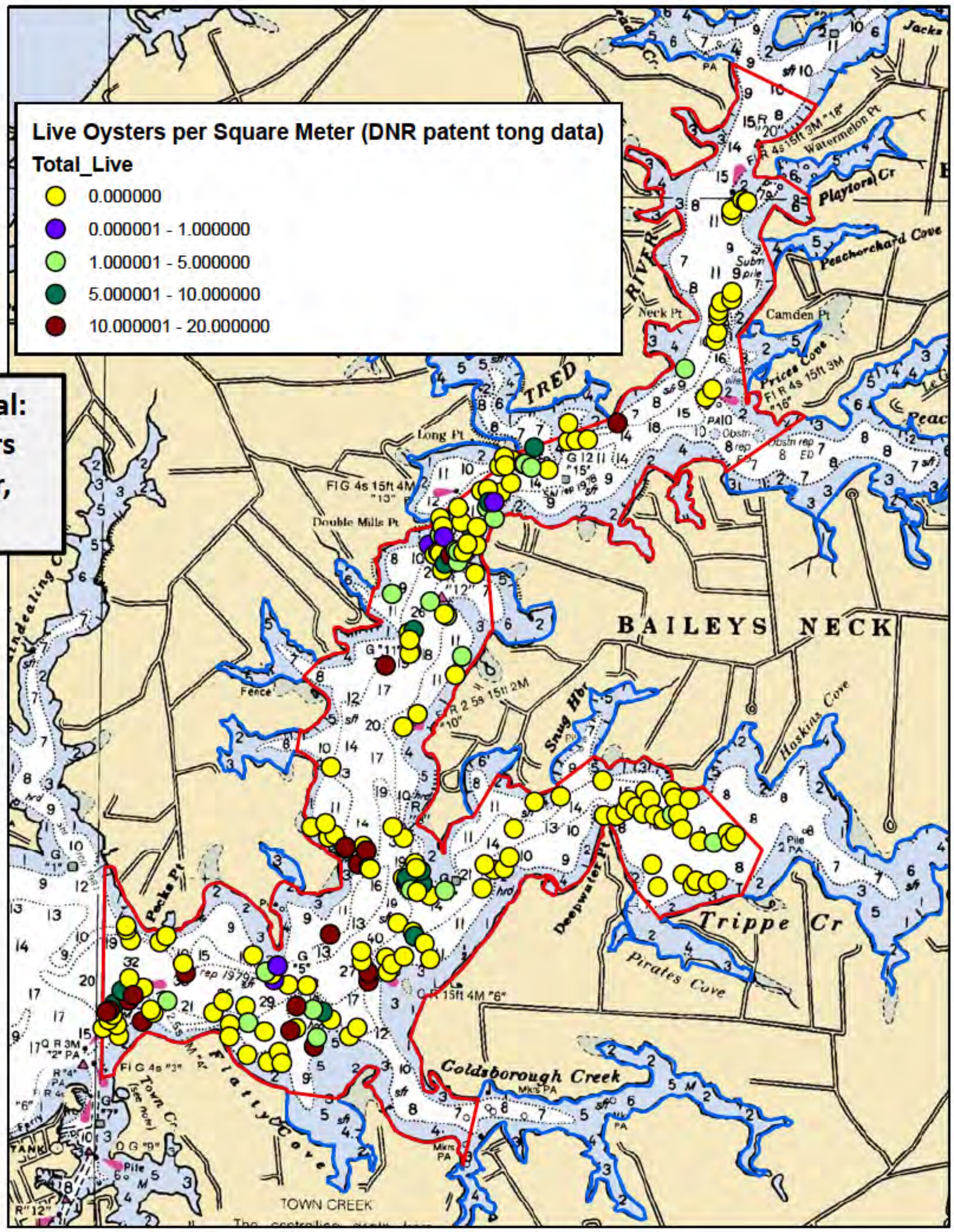
What Areas in the Tred Avon River Are Suitable for Oyster Restoration?



Where Are The Existing Oysters?

There are already functioning oyster reefs in the Tred Avon River. We want to do restoration work where it is needed, and not smother existing, healthy reefs with new seed or structure.

Restored reef goal: at least 15 oysters per square meter, preferably 50.



Potential
Oyster Restoration Sites

Oyster Sanctuary Boundary

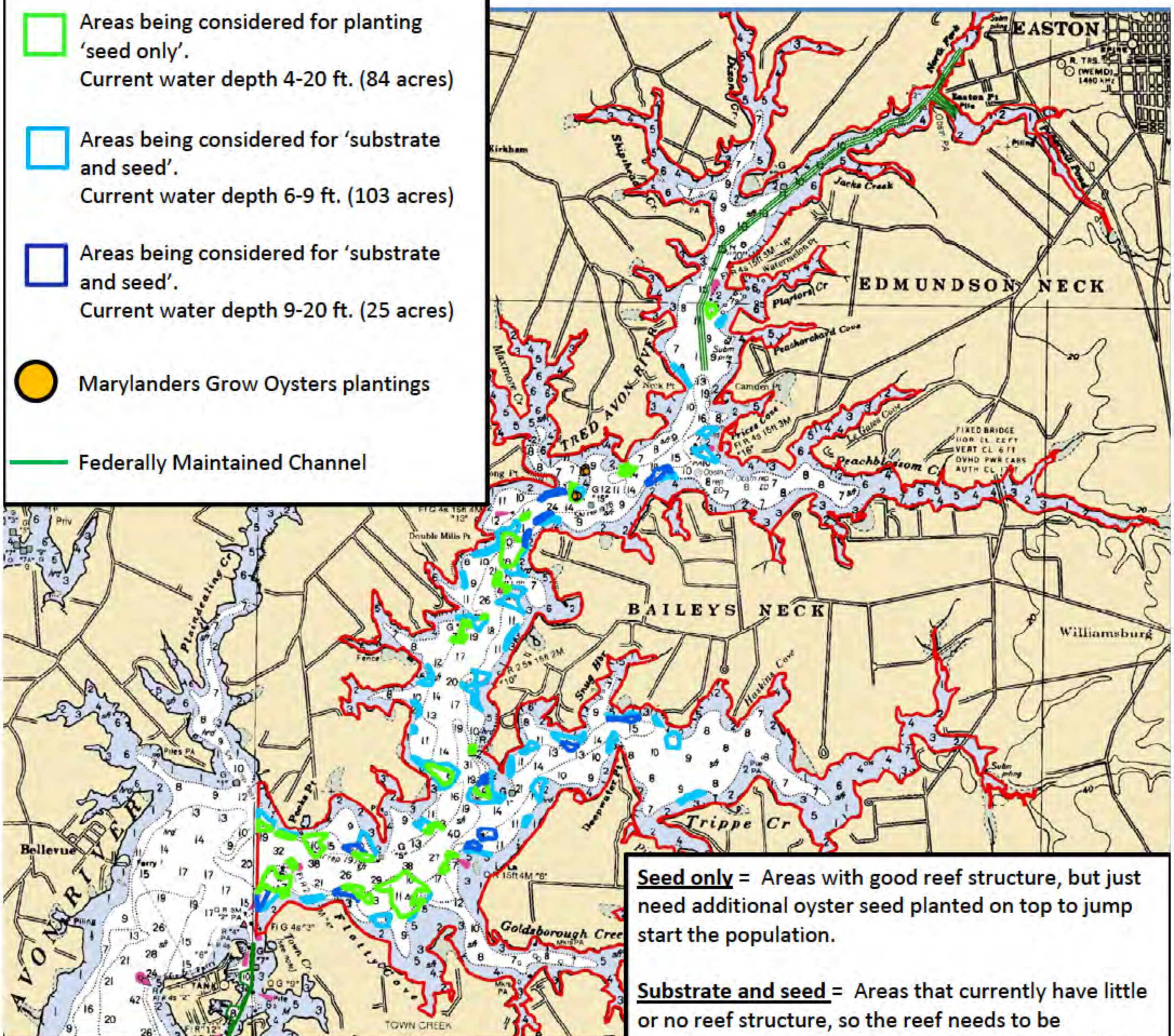
Areas being considered for planting 'seed only'.
Current water depth 4-20 ft. (84 acres)

Areas being considered for 'substrate and seed'.
Current water depth 6-9 ft. (103 acres)

Areas being considered for 'substrate and seed'.
Current water depth 9-20 ft. (25 acres)

Marylanders Grow Oysters plantings

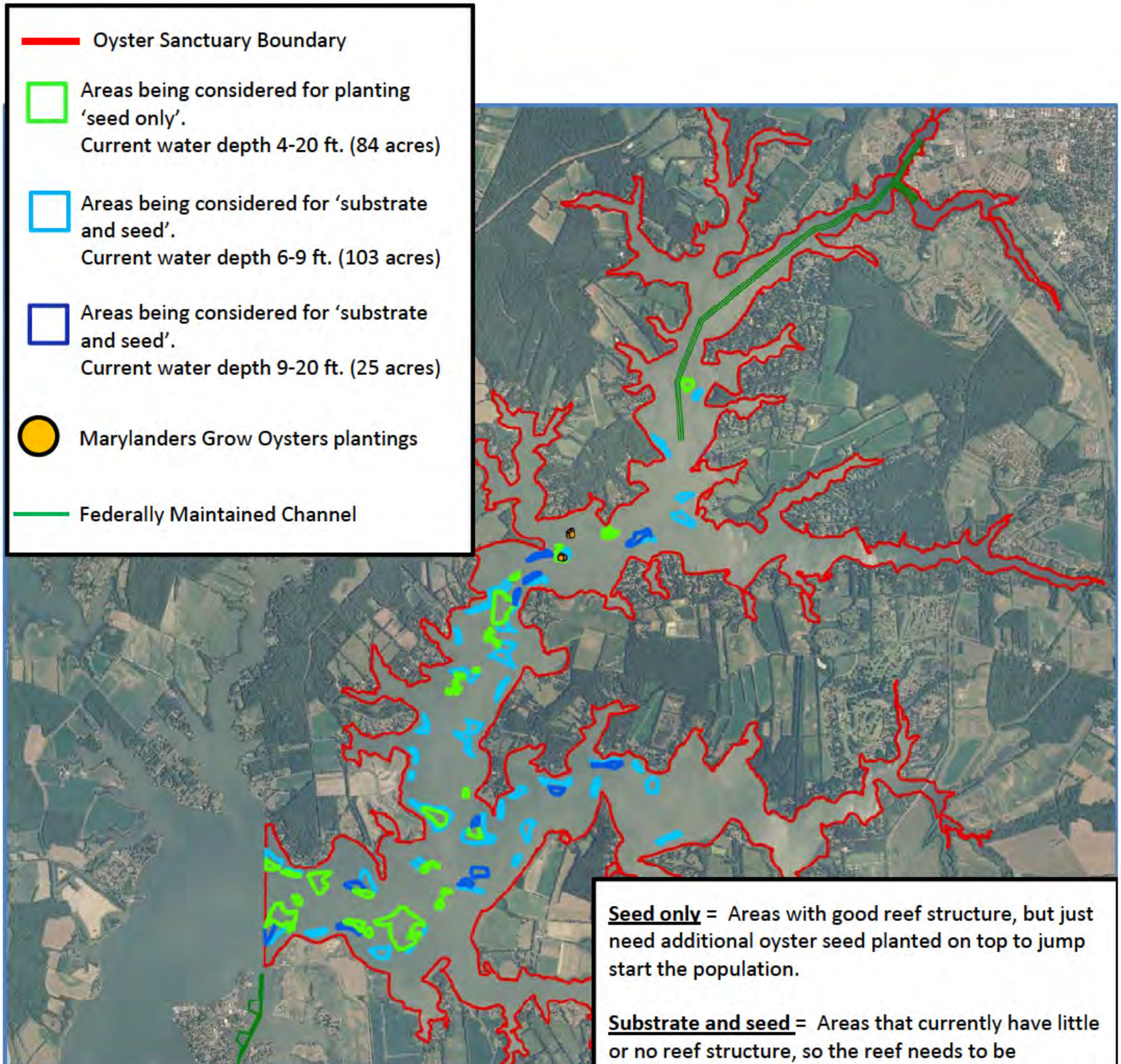
Federally Maintained Channel



Seed only = Areas with good reef structure, but just need additional oyster seed planted on top to jump start the population.

Substrate and seed = Areas that currently have little or no reef structure, so the reef needs to be physically constructed from substrate (usually shell or granite). Oyster seed will then be planted on top of the newly-constructed reef base.

Potential
Oyster Restoration Sites



Seed only = Areas with good reef structure, but just need additional oyster seed planted on top to jump start the population.

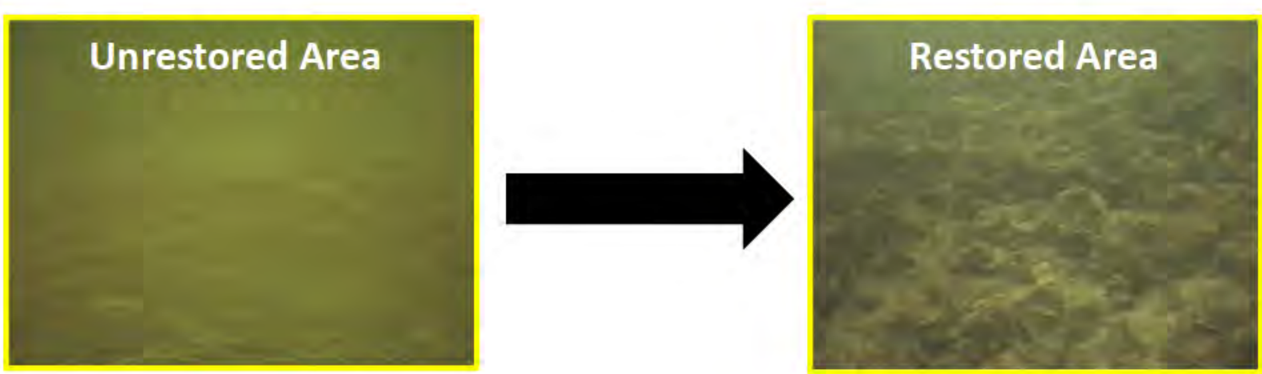
Substrate and seed = Areas that currently have little or no reef structure, so the reef needs to be physically constructed from substrate (usually shell or granite). Oyster seed will then be planted on top of the newly-constructed reef base.

Issues?
Here's What We Know and Don't Know

Question	Answer
Will I be able to use my boat?	Right now, we are limited to 8-foot clearance, but we would like to go shallower to increase the area of restoration.
Where are the channels to keep clear? What depth needs to be maintained for your boat?	***We need your input …***
Will I be able to fish/crab/anchor?	There is no reason why you couldn't fish/crab/anchor in these spots.
Can I trotline over the alternative substrate?	Legally you can, but we have heard that larger pieces of substrate physically interfere with gear.
How small does the substrate need to be avoid trotlining problems?	***We need your input …***
Are there any effects on leasing?	Restoration activities will not occur on currently leased bars.
Anything else?	***Please let us know …***

Timeline for Restoration

- Oyster goal = 125 to 251 acres; at this time, we are targeting 191 acres of restored reefs.
- Right now, we have 0 acres with the goal density.
- We need to seed/substrate 191 acres at a minimum.
- 214 acres are under consideration for substrate and/or seeding.
- We have funding to create substrate on 50 to 60 acres (Corps) this year and expect 25 acres/year in future years (Corps).
- We can seed 60 acres/year.
- We expect the restoration to take 2 to 5 years at current funding levels.
- **Restoration is contingent upon continued state and federal funding.**



Did You Forget to Tell Us Something?

If you think of issues we may have missed related to oyster restoration in Harris Creek, please contact us with your comments.

Thank you for your input.

Eric Weissberger
Maryland Department of Natural Resources,
Fisheries Service
580 Taylor Ave. B-2
Annapolis, MD 21401
(410) 260-8344
eweissberger@dnr.state.md.us

Claire D. O'Neill
U.S. Army Corps of Engineers,
Baltimore District
P.O. Box 1715
Baltimore MD 21203-1715
(410) 962-0876
claire.d.o'neill@usace.army.mil

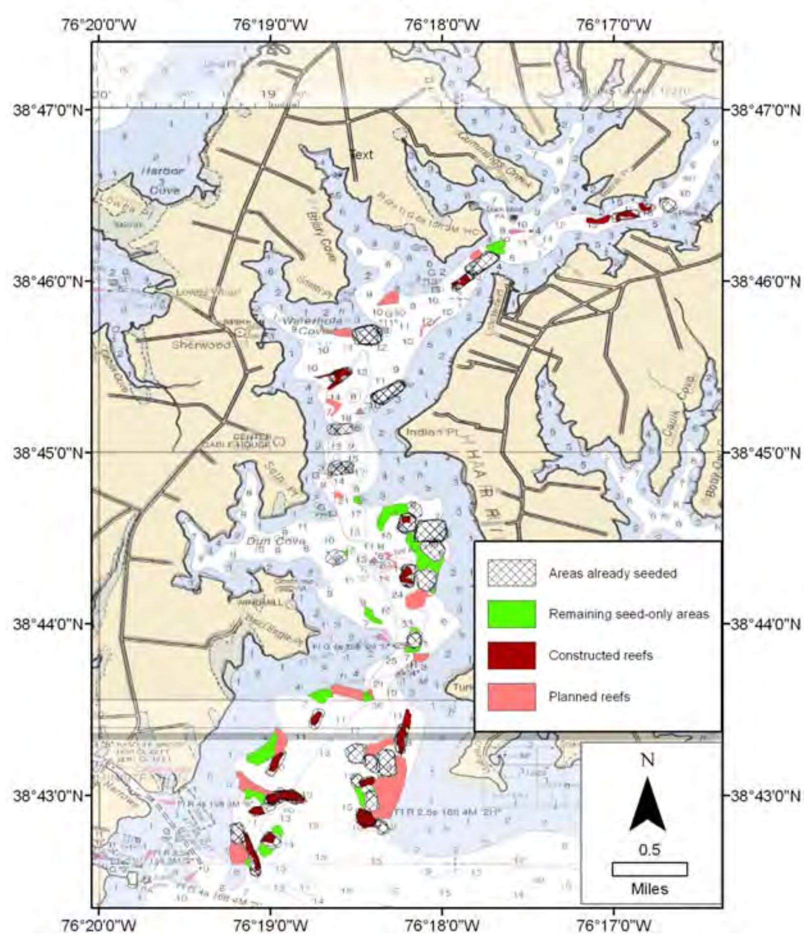
Stephanie Reynolds Westby
NOAA Restoration Center, Chesapeake Bay
410 Seven Ave, Suite 107A
Annapolis, MD 21403
(410)295-3153
stephanie.westby@noaa.gov

All open house materials can be found on the Internet at:
http://chesapeakebay.noaa.gov/oysters/oyster-restoration-in-tred-avon

Interagency Work in Harris Creek to Date

- In 2012, Harris Creek was selected as the first tributary for large-scale restoration.
- We followed a similar tributary plan process as we are doing in the Tred Avon.
- In the past 2+ years, MDNR, NOAA, and USACE have invested $16 million in restoration treatments with more to come in the next year.

Harris Creek Completed and Proposed Oyster Restoration

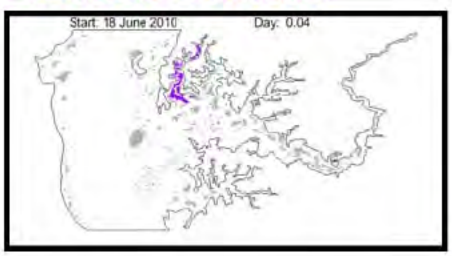


	Area (acres)
Tributary Goal	**377**
No treatment required (already met goal)	3
Constructed with substrate and seeded, 2012-13	56
Constructed with seed only, 2011-13	176
To be constructed with substrate and seed in winter-spring 2013-14	85
Area remaining to be done after spring 2014	57

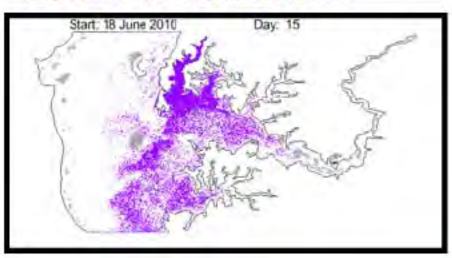
Larval Transport Modeling in Harris Creek

- To better understand the biology of Harris Creek and optimize future restoration actions, a three-dimensional model of Harris Creek and the nearby waterways was created.
- The model accounted for water flow and circulation patterns in Harris Creek, the lower Choptank River, and the mainstem Chesapeake Bay.
- The modeling work was led by Dr. Elizabeth North at the University of Maryland's Center for Environmental Studies at the Horn Point Laboratory.

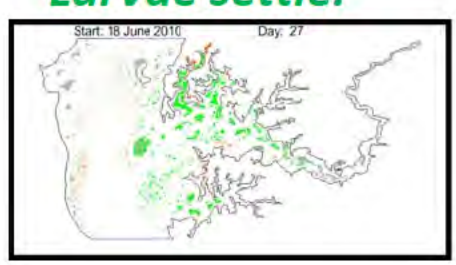
Larvae start…



Larvae move…



Larvae settle.



Watch the video to see how far larvae from Harris Creek might move!

Sign-in Sheet

Tred Avon River Oyster Restoration Tributary Plan
Open House – Oxford, MD – November 7, 2013
Please Sign In

Name	Address	Phone Number	Email Address
David Tomberlin	[redacted]		
Bill Wolinski	[redacted]		
Bill Goldsborough	[redacted]		
Meghan Hoffman	[redacted]		
Marguerite Jennings	[redacted]		
Larry Jennings	[redacted]		
Ed Frederick	[redacted]		
Tom Bixler	[redacted]		
Chris Judy	[redacted]		
Mitch Hager	[redacted]		
Nancy Hager	[redacted]		
PJ Klavon	[redacted]		
Katrina Greer	[redacted]		

Tred Avon River Oyster Restoration Tributary Plan
Open House – Oxford, MD – November 7, 2013
Please Sign In

Name	Address	Phone Number	Email Address
Steve Schneider	[redacted]	[redacted]	[redacted]
Bronwyn [illegible]	[redacted]	[redacted]	[redacted]
Drew Koslow	[redacted]	[redacted]	[redacted]
Jef + MARY Kinney	[redacted]	[redacted]	[redacted]
RICH HARRISON	[redacted]	[redacted]	[redacted]
Bobby [illegible]	[redacted]	[redacted]	[redacted]
[illegible]	[redacted]	[redacted]	[redacted]
Mike Basil	[redacted]	[redacted]	[redacted]
LeeAnn Hutchison	[redacted]	[redacted]	[redacted]
DAN WATSON	[redacted]	[redacted]	[redacted]
Carola Lewis	[redacted]	[redacted]	[redacted]
DICK RAWLINGS	[redacted]	[redacted]	[redacted]
JOE WEEKS	[redacted]	[redacted]	[redacted]

Easton

Tred Avon River Oyster Restoration Tributary Plan
Open House – Oxford, MD – November 7, 2013
Please Sign In

Name	Address	Phone Number	Email Address
Karl Willey	[redacted]	[redacted]	[redacted]
Craig West	[redacted]	[redacted]	[redacted]
Dan Johnson	[redacted]	[redacted]	[redacted]
ED THIEREN	[redacted]	[redacted]	[redacted]
Amy Bosserman	[redacted]	[redacted]	[redacted]
CHARLIE WEBB	[redacted]	[redacted]	[redacted]
Kenneth Lewis	[redacted]	[redacted]	[redacted]
Lisa Marie Ghezz	[redacted]	[redacted]	[redacted]
H. Jeff Harrison	[redacted]	[redacted]	[redacted]
Roy Meredith	[redacted]	[redacted]	[redacted]
Brandon Hack	[redacted]	[redacted]	[redacted]
MARK GROSS	[redacted]	[redacted]	[redacted]
John Rodenhausen	[redacted]	[redacted]	[redacted]

Tred Avon River Oyster Restoration Tributary Plan
Open House – Oxford, MD – November 7, 2013
Please Sign In

Name	Address	Phone Number	Email Address
Megan Rust	[redacted]	[redacted]	[redacted]
Sarah Rust	[redacted]	[redacted]	[redacted]
Cathy Rust	[redacted]	[redacted]	[redacted]
Bunky Chance	[redacted]	[redacted]	[redacted]

Public Comments

Tred Avon River Oyster Open House Comments

Please leave your comments in the space provided below. If you would like someone from NOAA or the Corps of Engineers to contact you regarding your comments, please leave your contact information below.

Name KEN LEWIS
Address [redacted]
Phone Num[redacted]
E-mail [redacted]

The GREAT WORK being done FOR oyster RESTORATION is NOT APPARENT TO THE GENERAL Public. CONSIDERATION might be given to ERECTING A classy SIGN ON A MAJOR highway AT the HEAD of HARRIS CREEK to INFORM the driving public of the EFFORT. The FEDS have done this FOR special projects in NATIONAL PARKS -

Tred Avon River Oyster Open House Comments

Please leave your comments in the space provided below. If you would like someone from NOAA or the Corps of Engineers to contact you regarding your comments, please leave your contact information below.

Name Mike Basil

Address [redacted]

Phone Number

E-mail

Will this river ever be open to public fishery again?

Tred Avon River Oyster Open House Comments

Please leave your comments in the space provided below. If you would like someone from NOAA or the Corps of Engineers to contact you regarding your comments, please leave your contact information below.

Name Mitch Hager
Address [redacted]
Phone Number [redacted]
E-mail [redacted]

Thank you for the excellent effort — hoping more people will realize the long term benefits. Please contact if I can be of any assistance as I am excited for the project.

Lots of cow nose Rays on

east fork of Maxmore Creek -

increased abundance recently;

Chris Judy has photos

of MGO ~~reef~~ damage.

~ Lisa from

Mid Shore Riverkeeper

From: Judy, Chris
Sent: Friday, January 17, 2014 8:12 AM
To: Weissberger, Eric
Cc: Tarnowski, Mitch
Subject: Tred Avon Project comments

Eric, below are comments from myself and also others who have spoken to me about the project.

Natural oysters are present on many bars and, on some, at levels higher than in the recent past. Surveys should be done before any plantings are made to prevent covering these oysters. It should be considered that these bars might not need a habitat planting, but only a planting of seed oysters, if that.

Will surveys be done to assess the natural populations?

Don't plant seed on all the bars. Leave some in their natural state (ie, bars with an increased natural population) as a comparison to the project, and for the value of having natural bottom. It seems like a sound responsibility of the Department of NATURAL Resources to leave some areas natural and not convert them all to rock, rubble, surf clam shells, and hatchery oysters.

Or, plant half of some bars to create a comparison with the unplanted half.

Numerous areas are used for trotlining. Plantings of rubble or rock can ruin a crab lay. Consult with watermen before making the final bar selections. Please include them in the project. Animosity exists and a lot of good can come from keeping them involved and informed.

Please include me in the development of the plan – being that MGO began in the Tred Avon, it is DNR's river in the MGO Program, and it has a long history with MGO (being the first river). We are off to a good start in that you asked where our plantings were located.

A few shelly locations exist that would make great leases. I can review the plans to see if these will be part of the project.

What is the status of the project since the November public meeting? Any new maps, decisions, plans, meetings?

Thanks

Chris

I cc'd Mitch since I mentioned the natural population status.

From:	Chris Judy -DNR-
To:	Gross, Kimberly NAB
Subject:	[EXTERNAL] Tred Avon Corps Project - comments
Date:	Monday, October 13, 2014 10:47:31 PM

Kimberly, thank you for the invitation to provide comments regarding the Tred Avon Corps Oyster Project. I'm familiar with the river's oyster bars through efforts under the Marylanders Grow Oysters Program and I hear from many growers in the program.

CAUTION
Basically, caution is needed to make sure existing good habitat and populations aren't covered up. There are good bars in the river, with oysters. Seed plantings are what most bars need. Planting material, particularly in a layer up to a foot thick, could cover existing habitat and oysters, killing the oysters and wasting the natural habitat. A person familiar with the river, beyond desk-top maps, should be involved before material is planted. Myself and others can work with you to review sites marked on the maps for the planting of habitat materials.

PRE-PLANTING CHECK
I suggest every proposed planting of material be double-checked through a site visit. Staff familiar with the sites and the populations should be consulted. With the investment about to be made, and with some good bars in existence, double checking is reasonable.

NATURAL BARS
Additionally, it is important to leave certain bars unplanted entirely to maintain some "natural" bars for comparison later on with planted bars. To restore each bar would remove natural bars from the project area. Preserving some natural bars, though they may have less than optimal habitat and less than abundant populations, is an important biological and ecological goal. ie: control sites.

PUBLIC COMMUNICATION
The river has over 100 oyster growers and numerous watermen who know the river. Questions have been directed to me, mostly from oyster growers in Marylanders Grow Oysters, asking about the Florida material. They have read the news articles regarding Harris Creek and the Little Choptank River. A public meeting would be helpful before any material is planted, to address questions and concerns. A few people have asked about water depth changes.

Please let me know how I can assist. One step I can take is to review the proposed planting maps. Also, I have already referred anyone with questions to your office.

Chris

Christopher Judy
MD DNR
Marylanders Grow Oysters

2015 Public Notice

US Army Corps of Engineers
Baltimore District

Planning Division

JUN 23 2015

PUBLIC NOTICE
CHESAPEAKE BAY OYSTER RECOVERY PROJECT, MARYLAND

ALL INTERESTED PARTIES:

The U.S. Army Corps of Engineers (Corps), Baltimore District, is expanding the scope of the supplemental environmental assessment (EA) for Tred Avon River oyster restoration initiated in 2013 to include planting of disease-free spat-on-shell, or oyster seed, from state-owned hatcheries, on new oyster reefs between 6 and 9 ft mean lower low water (MLLW), and on existing reefs/natural oyster bars between 4 and 20 ft MLLW. This is in addition to the assessment of reef construction on 60 acres in shallow water depths between 6 and 9 feet MLLW that was the initial focus of the supplemental EA. Planting of spat-on-shell will add minimal change to the existing height of the natural oyster reefs, approximately 3 inches, and will increase the proposed project area by an additional 71 acres for a total of 131 acres.

The Corps has authority to provide construction assistance for certain oyster restoration projects under Section 704(b) of the Water Resources Development Act (WRDA) of 1986, as amended (33 U.S.C § 2263). This authority provides for the restoration and rehabilitation of habitat for fish, including native oysters, in the Chesapeake Bay and its tributaries in Virginia and Maryland. Activities under the 704(b) program may include the construction of oyster bars and reefs; the rehabilitation of existing, marginal habitat; the use of appropriate alternative substrate material in oyster bar and reef construction; the construction and upgrading of oyster hatcheries; and activities relating to increasing the output of native oyster broodstock for seeding and monitoring of restored sites to ensure ecological success.

In compliance with the National Environmental Policy Act (NEPA) of 1969, as amended, the Corps is developing a supplemental EA for its proposed oyster restoration activities in the Tred Avon River, Talbot County, Maryland under Section 704(b). This EA will supplement several previous EAs, which analyzed oyster restoration more broadly, and are discussed below. Oyster restoration planning was initiated in 2013 for the Tred Avon River. Restoration proposed in the Tred Avon River includes construction to be implemented by the Corps under the 704(b) program, and activities to be implemented by the Maryland Department of Natural Resources (MD DNR) as credit for the 704(b) program. The draft Tributary Plan and blueprint map are available at http://chesapeakebay.noaa.gov/oysters/oyster-restoration-in-the-tred-avon-river.

The Corps has partnered with MD DNR as the 704(b) program's non-federal Sponsor in Maryland since 1997. The Corps also coordinates with the National Oceanic and Atmospheric Administration (NOAA) and the Oyster Recovery Partnership (ORP). These agencies comprise the Maryland Interagency Workgroup which facilitates oyster restoration and consults with the scientific community and public stakeholders to ensure environmentally-sound and cost-effective efforts. There are two important documents that guide how oyster restoration actions are conducted in Maryland. The Corps' long-term, large-scale Native Oyster Restoration Master Plan (2012) guides projects funded for Corps construction. The State of Maryland's restoration actions are conducted in accordance with Maryland's 10-Point Oyster Restoration Plan (2010). For more information on the Corps oyster restoration program see http://bit.ly/NABoysters.

In 1996, the Corps completed a report/EA, the Chesapeake Bay Oyster Recovery Project, which documents the plan formulation in conjunction with non-federal sponsor, MD DNR. Areas covered by the initial 1996 EA include: Patuxent, Severn, Magothy, Chester, Choptank and Nanticoke Rivers, and near Smith and James islands. Implementation of the recommendations made by this plan began in 1997 and is ongoing, but is restricted to maintaining 8 feet of navigational clearance above the reef. This limits restoration efforts to depths greater than 8.5 ft MLLW (6-inch reefs) or 9 ft MLLW (12-inch reefs). A supplemental report/EA was also prepared in 2002 that evaluated the cost effectiveness of Corps-led oyster restoration, as well as an EA in 2009 that evaluated the use of alternate substrates for reef construction.

In the Tred Avon River, a total of 155 acres of oyster habitat is proposed to be restored. The Blueprint (attached figure) identifies the locations for reef construction (84 acres) and spat-on-shell plantings (71 acres). The green areas on the enclosed figure indicate the areas where substrate and spat-on-shell will be placed on the river bottom to restore oyster reefs. Depending on current water depths, 6-inch and 12-inch reefs are planned to maintain a minimum navigational clearance of 6 feet. The red areas indicate the seed-only areas where spat-on-shell will be placed on existing natural oyster bottom. As proposed, the Corps will implement the 84 acres of alternate substrate reef restoration. MD DNR is the lead agency for planting spat-on-shell on these 84 acres, as well as planting spat-on-shell on the 71 acres of seed-only restoration as credit for the 704(b) program.

Corps construction of oyster reefs at depths greater than 9 ft MLLW was programmatically assessed in the 1996 Chesapeake Bay Oyster Recovery Project EA. As such, 24 acres of the 84 acres identified for reef restoration, will be constructed in April–May 2015 with seeding to follow. The remaining 60 acres (of the 84 acres) are between 6 and 9 ft MLLW and are assessed in this EA for USACE implementation. The 60 acres of shallow reef restoration is projected for winter 2016–2017 with seeding in summer 2017. Seed-only sites are planned for restoration in the summers of 2016 and 2017. All seeding would be carried out by MD DNR and ORP and would be subject to the Corps' regulatory jurisdiction pursuant to Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act.

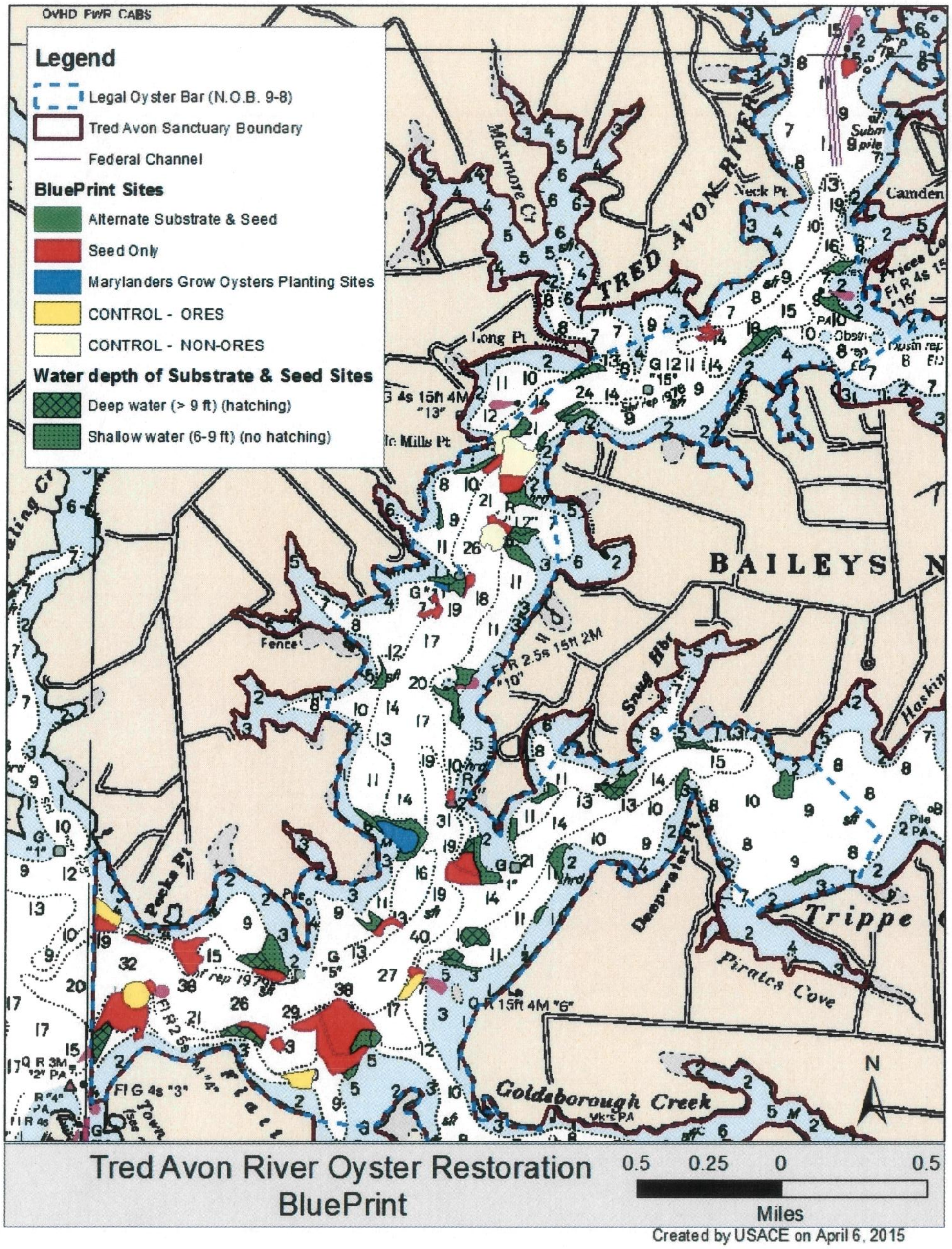
For shallow water restoration in the Tred Avon River, the Corps received public input through both a flyer distributed to approximately 500 residents that requested comments by October 15, 2014, and an interagency public open house held November 7, 2013, in Oxford, Maryland. Upon completion of the draft EA, a notice of availability will be advertised (anticipated fall 2015) to provide opportunity for the public to comment on the proposed action.

To assist in the development of the supplemental EA, we are requesting that you provide information concerning your interests or your organization's area of responsibility or expertise within 30 days from the date of this notice to the address below. Substantive public comments received via the NEPA process will be fully considered by the Corps.

U.S Army Corps of Engineers
Planning Division (Attn: Angie Sowers)
P. O. Box 1715
Baltimore, MD 21203

If you have questions or comments regarding this project, please contact Ms. Angie Sowers at (410) 962-7440 or by e-mail at angela.sowers@usace.army.mil.

Daniel Bierly
Chief, Civil Project Development Branch
Planning Division



Tred Avon River Oyster Restoration BluePrint
(developed by the Maryland Interagency Workgroup)

The Blueprint identifies the oyster restoration plan for the Tred Avon River. Green sites are hard bottom areas identified by bottom mapping as suitable for placement of substrate and seed. The figure distinguishes between substrate and seed sites that are in water depths greater than 9 ft MLLW and those between 6 – 9 ft MLLW. Reef construction at green sites is proposed for USACE implementation under the 704(b) program. Red sites are existing reef habitat that has oyster densities of less than 5 oysters/m^2. The red sites are identified as seed only sites for planting of spat-on-shell and are situated at water depths between 4 and 20 ft MLLW. MD DNR is the lead for planting of spat-on-shell on red sites for credit under the 704(b) program. Control sites are identified for NOAA's ORES (Oyster Reef Ecosystems Services) project as well as for other purposes (Non-ORES) such as MD DNR's Fall Survey. N.O.B. (Natural Oyster Bar) refers to the legally designated oyster bar in the Tred Avon River.

August 9, 2016 – Public Meeting Materials

Notice of Availability

US Army Corps of Engineers
Baltimore District

JUL 19 2016

NOTICE OF AVAILABILITY

Oyster Restoration in the Tred Avon River Oyster Sanctuary, Maryland Feasibility Report and Integrated Environmental Assessment

All Interested Parties: The U.S. Army Corps of Engineers, Baltimore District (USACE), in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended, has prepared a supplemental environmental assessment (EA) for the potential expansion of alternate substrate oyster reef restoration efforts into water depths between 6.5 and 9 feet mean lower low water (MLLW) within the Tred Avon River Oyster Sanctuary, Talbot County, MD. The plan is being conducted in partnership with the Maryland Department of Natural Resources (MD DNR). In addition to having an approved supplemental EA, construction of this project is contingent upon MD DNR concurrence with the restoration plans.

Purpose of Work: The purpose of the project is to restore oyster reef habitat in the Tred Avon River.

Recommended Plan Description: The recommended plan is for restoration of approximately 128 acres within the Tred Avon River. This includes placement of 6 to 12 inches of alternate substrate material (such as stone or non-oyster shell) and placement of 1 to 3 inches of spat-on-shell on a maximum of 57 acres to restore reef habitat. The plan will ensure at least 6 feet of navigational clearance above each reef. Additionally, the EA includes MD DNR's planting of spat-on-shell on constructed reefs and on existing oyster reef on 63 to 71 acres within the sanctuary. The 128 acres being evaluated would be in addition to the 26 acres of reef habitat that is partially implemented in waters deeper than 9 ft MLLW and is covered by previous NEPA documentation.

The proposed actions evaluated in this supplemental EA are a central part of a multi-agency restoration effort outlined in the *Tred Avon River Oyster Restoration Tributary Plan: A blueprint for sanctuary restoration* (http://chesapeakebay.noaa.gov/oysters/oyster-restoration-in-the-tred-avon-river), which targets restoration of 146 acres of reef habitat. Further, these large-scale, native oyster restoration plans directly follow upon the recommendations of the *Final Programmatic Environmental Impact Statement for Oyster Restoration in Chesapeake Bay Including the Use of a Native and/or Nonnative Oyster* (2009) and USACE's *Chesapeake Bay Oyster Recovery: Native Oyster Restoration Master Plan, Maryland and Virginia* (2012).

A supplemental EA has been prepared for the actions relating to the construction of this project. Potential impacts were assessed with regard to aquatic ecosystem impacts; temporary construction impacts to water, endangered and threatened species; commercial and recreational fishing, boating, and navigation, other waterway uses; cultural resources; and the general needs and welfare of the public.

USACE and MD DNR will be holding a public meeting on Tuesday, August 9, 2016. The meeting will be held from 6 to 8 p.m. at the Talbot County Community Center: 10028 Ocean Gateway, Easton, MD 21601. Written comments will be accepted within 30 days of the date of publication of this notice and can be sent via email to MD.OysterRestoration@usace.army.mil or by mail to: U.S. Army Corps of Engineers, Baltimore District, Attn: Angie Sowers, 10 South Howard Street, Ste. 11600, Baltimore, Maryland 21201. The draft supplemental EA is available for viewing electronically at http://go.usa.gov/cswPh, and hard copies can be found at the St. Michaels Public Library, Talbot County Free Library, Oxford Library, Tilghman Branch Library, Federalsburg Branch Library, Dorchester County Public Library, Somerset County Library, and Caroline County Public Library. We anticipate the EA to result in a finding of no significant impacts. If you have any questions, please contact Angie Sowers by telephone at (410) 962-7440 or by email to Angela.Sowers@usace.army.mil.

Daniel Bierly
Chief, Civil Project Development Branch
Planning Division

The U.S. Army Corps of Engineers (Corps), in cooperation with the Maryland Department of Natural Resources (MD DNR), is seeking comments on a draft supplemental environmental assessment (EA) focused on oyster restoration in the Tred Avon River Oyster Sanctuary. The plan is being conducted in partnership with the Maryland Department of Natural Resources (MD DNR). In addition to having an approved supplemental EA, construction of this project is contingent upon MD DNR concurrence with the restoration plans. The Corps and MD DNR are holding a public meeting on Tuesday, August 9, 2016, as part of a public environmental assessment review to evaluate extending oyster restoration into shallower water depths, between 6.5 to 9 feet mean low lower water, in the Tred Avon River in Talbot County, MD. Oyster reef restoration activities evaluated include alternate substrate reef restoration, and planting spat-on-shell (baby oysters) on substrate and existing oyster reefs to meet the restoration target of 146 acres. The meeting will be held from 6 - 8 p.m. at the Talbot County Community Center: 10028 Ocean Gateway, Easton, MD, 21601.

The meeting will include a short presentation followed by a question and answer panel.

The meeting will be held rain or shine.

Written comments will also be accepted until the comment period closes August 19, 2016. Written comments can be sent via email to MD.OysterRestoration@usace.army.mil or mail to:

U.S. Army Corps of Engineers, Baltimore District
Attn: Angie Sowers
10 South Howard St., Ste. 11000
Baltimore, Md. 21201
* Please have mail postmarked by August 19, 2016.

More information on oyster restoration can be found on the study website: http://go.usa.gov/cswPh. If you have other questions, please call 410-962-7440.

Meeting Agenda

Tred Avon River Oyster Restoration Environmental Assessment Meeting Agenda

Aug. 9, 2016 – Talbot County Community Center, Wye Oak Room

6:00 PM Welcome/ Open Time to View Posters

6:20 PM Review of Public Meeting/Groundrules

6:30 PM Environmental Assessment Overview and Findings Presentation

6:40 PM Panel Question and Answer Period Begins – Index cards will be provided to all meeting attendees to write down their questions for the panel. The panel will answer all the questions, as appropriate. Given the time constraints, any submitted questions not answered will be addressed in an appendix to the final report.

Presenter:

Angie Sowers, U.S. Army Corps of Engineers

Panel:
Angie Sowers
David Bruce, National Oceanic Atmospheric Administration
Eric Weissberger, Maryland Department of Natural Resources

8:00 PM Panel Question and Answer Period Ends. Meeting concludes.

In addition to submitting comments/questions at this public meeting, comments may be submitted via e-mail at MD.OysterRestoration@usace.army.mil, or mail at the following address:

U.S. Army Corps of Engineers, Baltimore District
Attn: Angie Sowers
10 South Howard Street, Ste. 1600
Baltimore, MD 21201
*Please have comments in or postmarked by August 19, 2016

Thank you for attending and providing your input! Please visit http://go.usa.gov/cswPh to view the Tred Avon River Oyster Restoration draft report and keep current on the study.

List of Participants/Sign-in Sheet

Tred Avon Oyster Restoration Public Meeting
Sign-In Sheet

Agency	Name	Email Address	Phone	Would you like to be added to our email distribution list?
	Rachael Lemberg	[redacted]	[redacted]	✓
	Jennifer Herzog	[redacted]	[redacted]	✓
	Hilary Gibson	[redacted]	[redacted]	✓
talbot Seafood Herritage	Jason Schmidt	[redacted]	[redacted]	✓
TAlbot seafood Heritage	Greg Kemp	[redacted]	[redacted]	✓
Dor County Council	Tom Bradshaw	[redacted]	[redacted]	✓
QHLWA	Jeff Anthony	[redacted]	[redacted]	✓
TWA	Bill Skipper	[redacted]	[redacted]	
ChesapeakeBay Foundation	Doug Myers	[redacted]	[redacted]	✓
QAC-Waterman	Troy Wilkins	[redacted]	[redacted]	
—	Jake Hawkey	[redacted]	[redacted]	
—	ED THIERER	[redacted]	[redacted]	—

Tred Avon Oyster Restoration Public Meeting
Sign-In Sheet

Agency	Name	Email Address	Phone	Would you like to be added to our email distribution list?
SELF	LANI HUMMEL	[redacted]	[redacted]	YES
Midshore Riverkeeper Conservancy	Matt Pluta	[redacted]	[redacted]	
Self	LES BOWMAN	[redacted]	[redacted]	yes
Self	Ben Marshall	[redacted]	[redacted]	
DNR Fisheries	George O'Donnell	[redacted]	[redacted]	yes
Delmarva Fisheries	Capt. Rob Newbe	[redacted]	[redacted]	yes
Talbot Co. Waterme	Bunky Chance	[redacted]	[redacted]	
Tilghman ISLAND	Thomas HADAWAY	[redacted]	[redacted]	
SELF	MIKE HAGER	[redacted]	[redacted]	YES
	Chip MacLeod	[redacted]	[redacted]	Yes
	Cody Paul	[redacted]	[redacted]	
CBCFA	Bob WHAPLES	[redacted]	[redacted]	Yes

Tred Avon Oyster Restoration Public Meeting
Sign-In Sheet

Agency	Name	Email Address	Phone	Would you like to be added to our email distribution list?
N/A	BAKER, LYNN	[redacted]	[redacted]	
Dorchester waterman	Dwane Paul	[redacted]	[redacted]	
waterman	Thomas L. Powley	[redacted]	[redacted]	
Citizen	Sam Brita	[redacted]	[redacted]	
	Wm N KIRBY	[redacted]	[redacted]	
Lex Loci Fnd.	Russell Dashiell Jr	[redacted]	[redacted]	
MWA	Robert T Brown	[redacted]	[redacted]	Yes
MWA	Victoria M. Brown	[redacted]	[redacted]	yes
Midshore Riverkeeper	Elizabeth Broun	[redacted]	[redacted]	
citizen	D Wm Chapman	[redacted]	[redacted]	
Waterman	Christopher A. Kaylor	[redacted]	[redacted]	
QA County	Lenell Jones	[redacted]	[redacted]	

- William N. Kirby - Email: [illegible]

Tred Avon Oyster Restoration Public Meeting
Sign-In Sheet

Agency	Name	Email Address	Phone	Would you like to be added to our email distribution list?
Rep. Andy Harris	Denise Lovelady	[redacted]	[redacted]	[redacted]
~~Charles Den~~ None	Charles Denton	[redacted]	[redacted]	[redacted]
Talbot Waterman	Robin Harrison	[redacted]	[redacted]	[redacted]
Talbot Waterman	Jeff Harrison	[redacted]	[redacted]	[redacted]
~~Marjorie Robfogel~~	Marjorie Robfogel	[redacted]	[redacted]	[redacted]
	Reevie Rice	[redacted]	[redacted]	[redacted]
	Jennifer Starks	[redacted]	[redacted]	[redacted]
	Clint Smith	[redacted]	[redacted]	[redacted]
	Dan Watson	[redacted]	[redacted]	[redacted]
	Leon Washington	[redacted]	[redacted]	[redacted]
	William Ko	[redacted]	[redacted]	[redacted]
	Carole Ratcliffe	[redacted]	[redacted]	[redacted]

Tred Avon Oyster Restoration Public Meeting
Sign-In Sheet

Agency	Name	Email Address	Phone	Would you like to be added to our email distribution list?
CBF	ALAN GIRARD	[redacted]	[redacted]	YES.
State Delegate	Johnny Mautz	[redacted]	[redacted]	
Bay Journal	Tim Wheeler	[redacted]	[redacted]	
QAC Commissioner	Jim Moran	[redacted]	[redacted]	Yes
TCWA.	RAY GRODECKI	[redacted]	[redacted]	
	Lurcaine Claggett	[redacted]	[redacted]	Yes
QA-co	Moochie Gilmer	[redacted]	[redacted]	

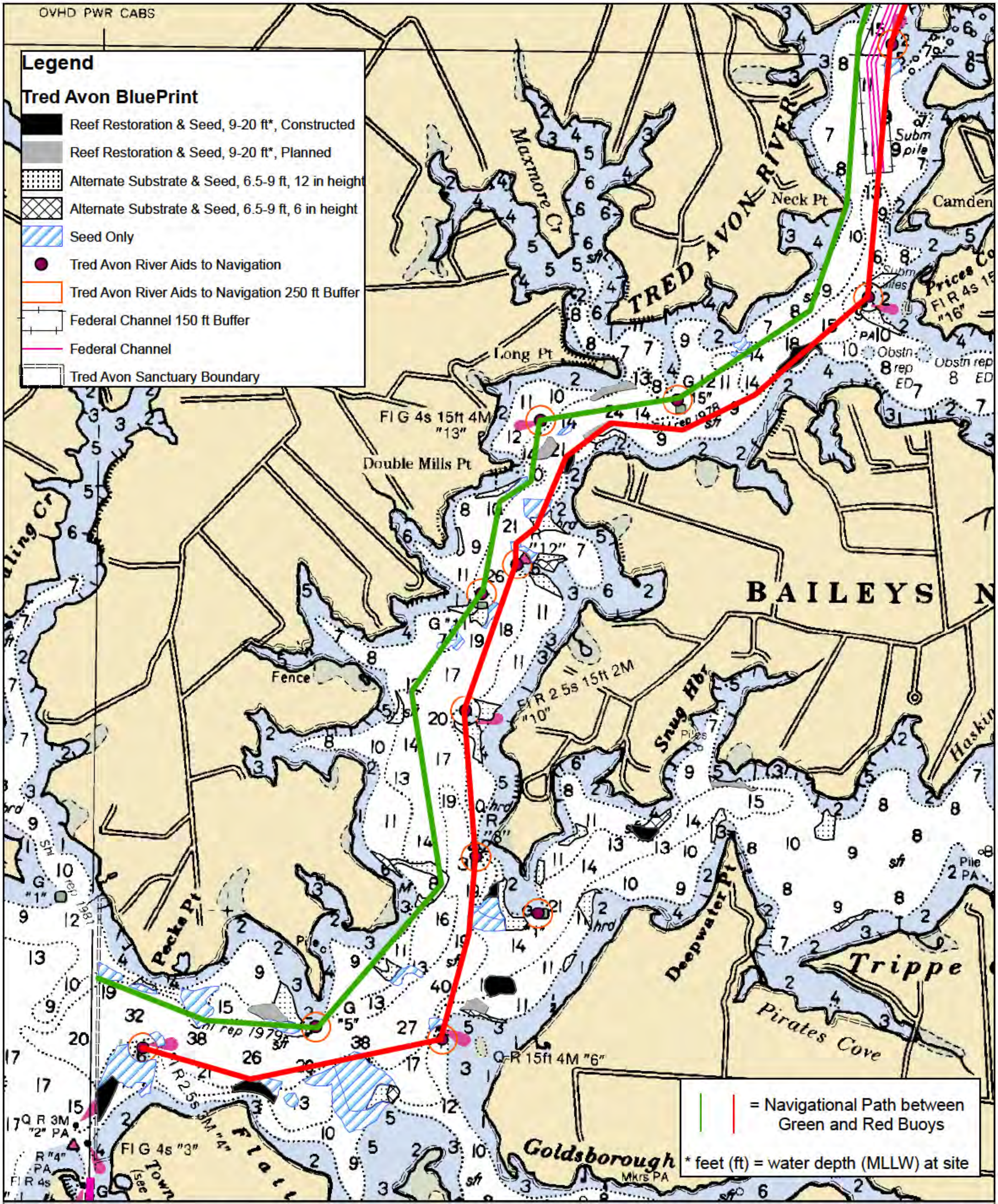
Tred Avon Oyster Restoration Public Meeting
Sign-In Sheet

Agency	Name	Email Address	Phone	Would you like to be added to our email distribution list?
MD HOD	Michael Kik	[redacted]	[redacted]	Y
Maginnes Productions	David Maginnes	[redacted]	[redacted]	yes
Ann Swanson	Ches. Bay Commission	[redacted]	[redacted]	Yes
Jeannie Riccio	Gov. Office	[redacted]	[redacted]	yes
Waterman	Tony Young	[redacted]	[redacted]	

	Name	Agency
1	Alan Girard	CBF
2	Johnny Mautz	State Delegate
3	Tim Wheeler	Bay Journal
4	Jim Moran	QAC Commission
5	Ray Grodeck	TGWA
6	Lurrane Claggett	
7	Moochie Gilmer	QA Co
8	Michael Kiko	MD HOD
9	David Maginnes	Maginnes Productions
10	Ann Swanson	Ches. Bay Commission
11	Jeannie Riccio	Gov. Office
12	Tony Yocca	waterman
13	Racheal Lemberg	
14	Jennifer Herzog	
15	Hilary Gibson	
16	Jason Schmidt	Talbot Seafood Herritage
17	Greg Kemp	Talbot Seafood Herritage
18	Tom Bradshaw	Dor. County Council
19	Jeff Anthony	QALWA
20	Bill Skipper	TWA
21	Doug Myers	Ches. Bay Foundation
22	Troy Wilkins	QAC Commission
23	Jane Hawkey	
24	Ed Thieleor	
25	Lani Hummel	
26	Matt Pluta	Midshore Riverkeeper Conservancy
27	Les Bowman	
28	Ben Marshall	
29	George O'Donnell	DNR
30	Capt Rob Newberry	Delmarva Fisheries
31	Bunky Chance	Talbot Co. Waterman
32	Thomas Hadway	Tilghman Island
33	Mike Hager	
34	Chip Macleod	
35	Cody Paul	
36	Rob Whaples	CBCFA

37	Lynn Baker	
38	Dwayne Paul	Dorchester Waterman
39	Thomas Powley	waterman
40	Sam Brinta	citizen
41	Will Kirby	
42	Russell Dashiell Jr.	Lex Loci Foundation
43	Robert T. Brown	MWA
44	Victoria M. Brown	MWA
45	Elizabeth Brown	Midshore Riverkeeper Conservancy
46	Chapmen	citizen
47	Christopher Kayloe	waterman
48	Lennell Jones	QA Co
49	Denise Lovelady	Rep. Andy Harris
50	Charles Denton	
51	Robin Harrison	Talbot Co. Waterman
52	Jeff Harrison	Talbot Co. Waterman
53	Marjorie Robfogel	
54	Reevie Rice	
55	Jennifer Stanley	
56	Clint Smith	
57	Dan Watson	
58	Leon Washington	
59	William Roe	
60	Carole Ratchle	

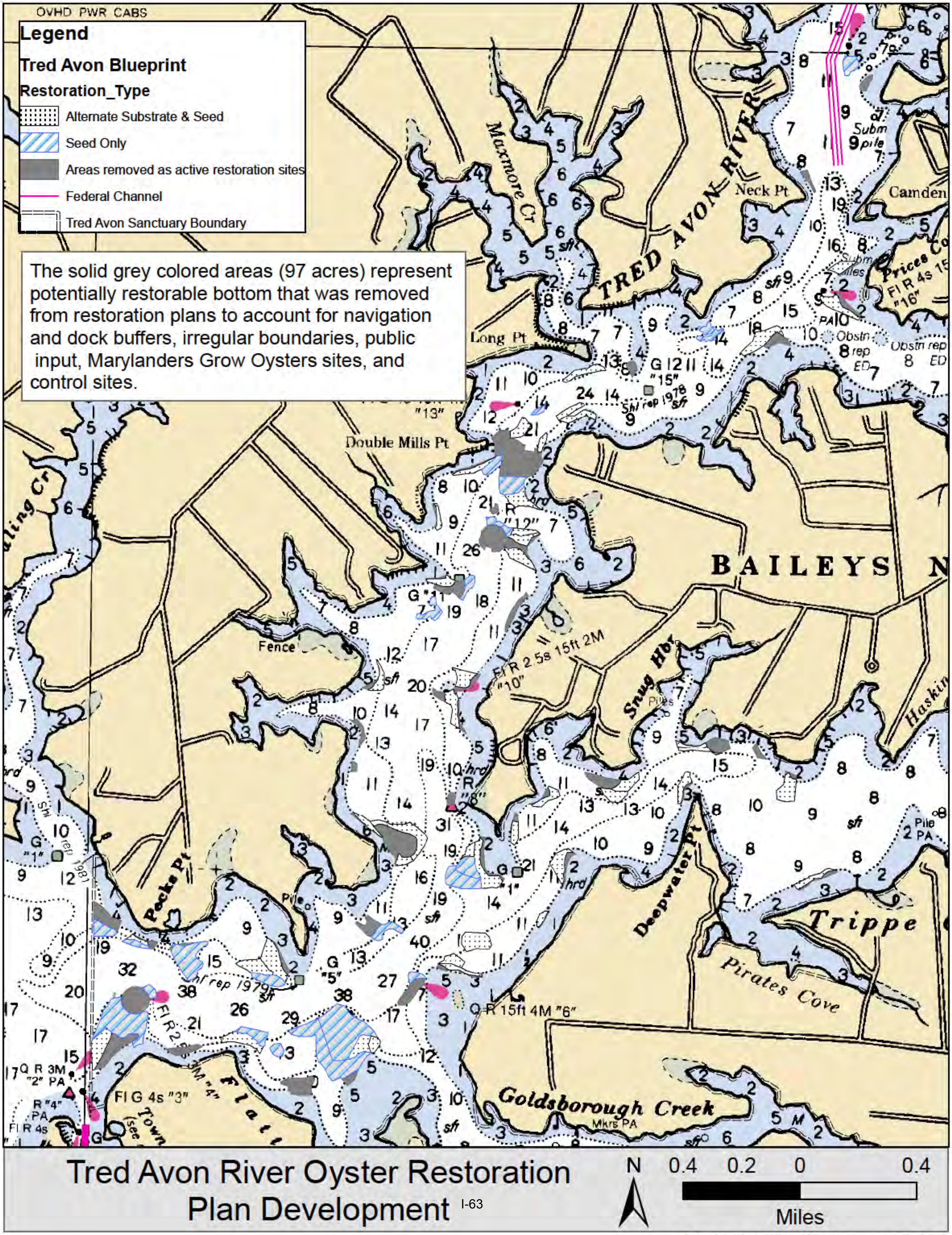
Posters



Tred Avon River Oyster Restoration Navigation Pathway and Buffers

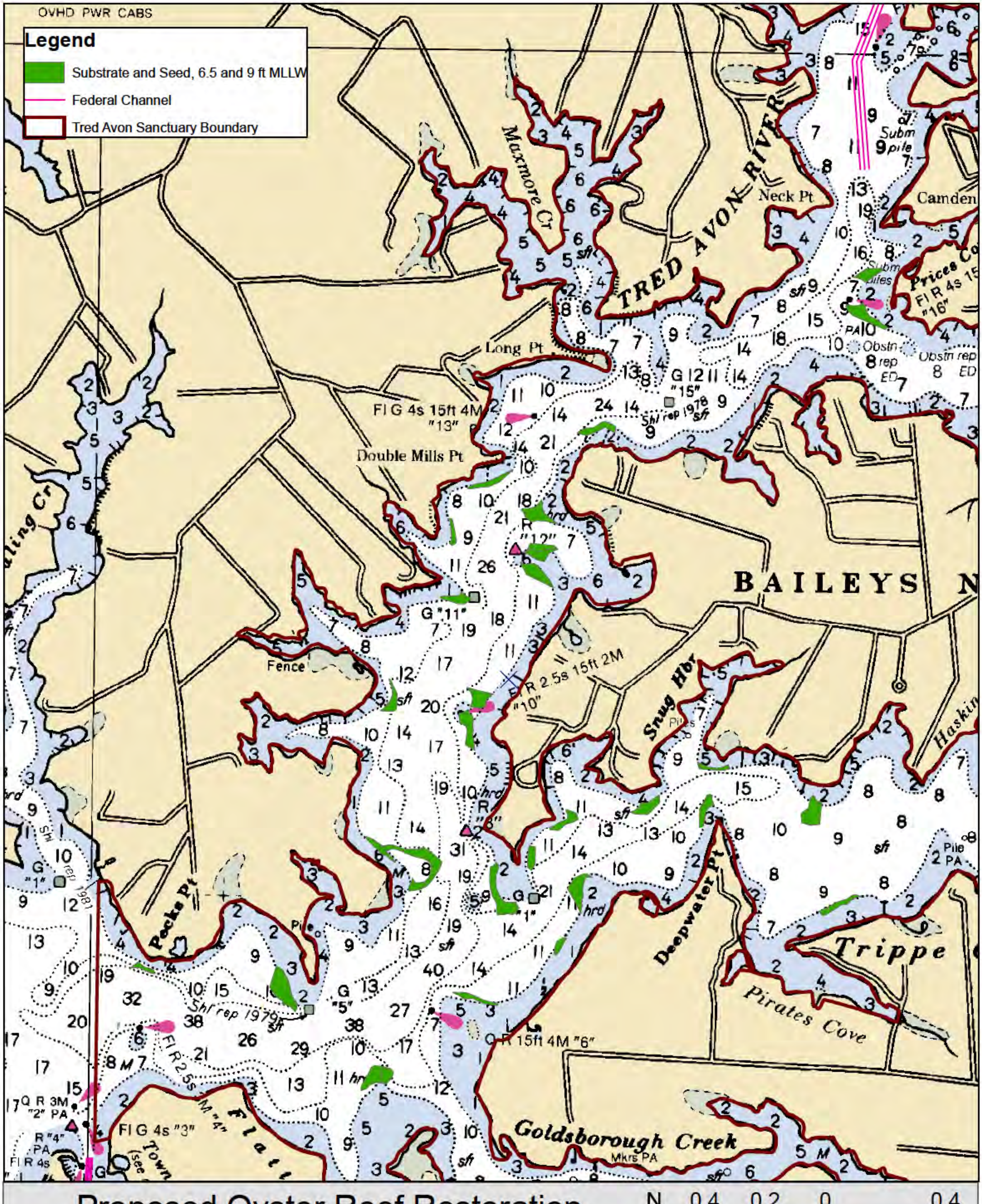
N 0.5 0.25 0 0.5 Miles

Created by USACE on April 14, 2016



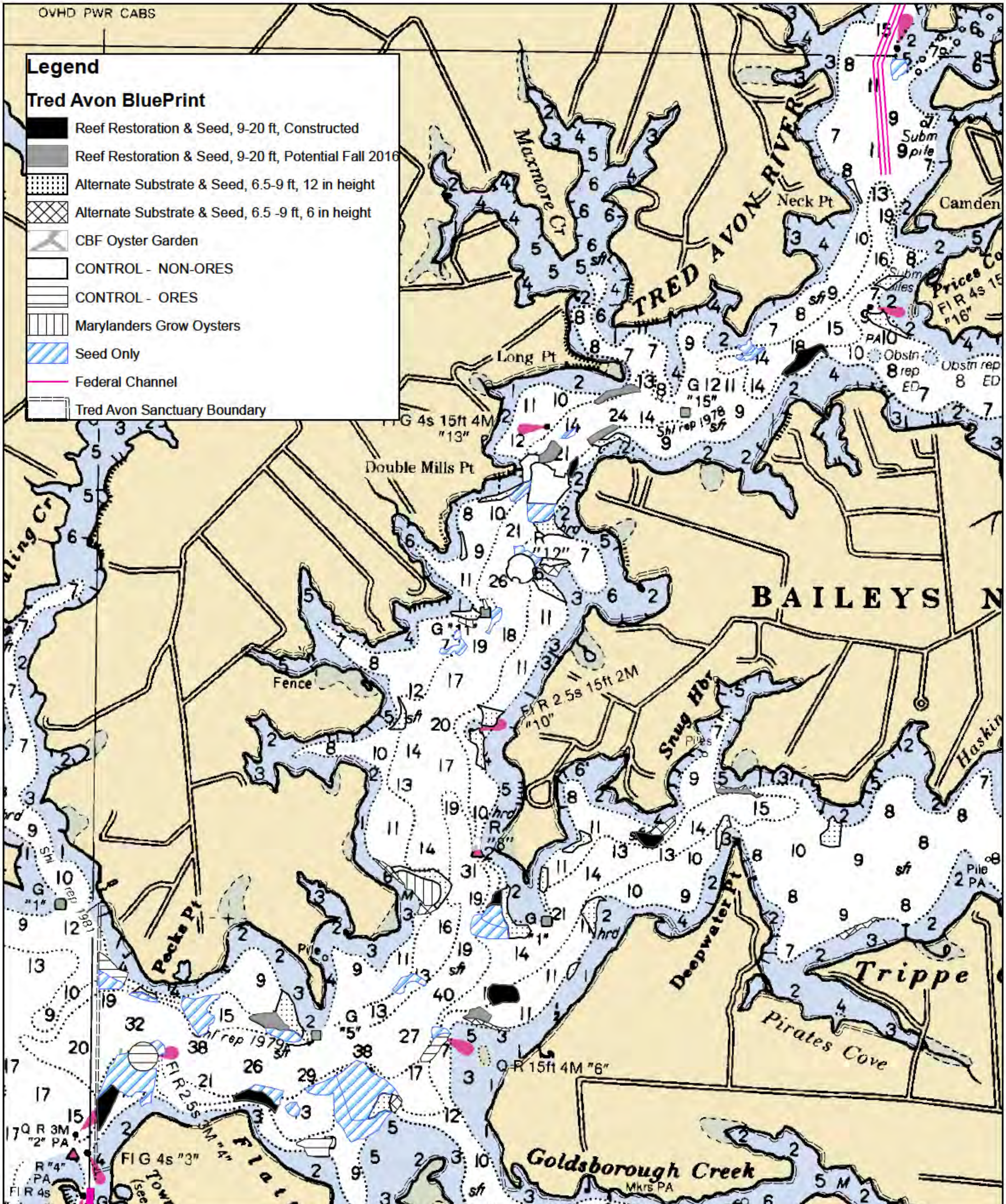
Tred Avon River Oyster Restoration Plan Development

Created by USACE on August 4, 2016



Proposed Oyster Reef Restoration
Between 6.5 and 9 ft MLLW

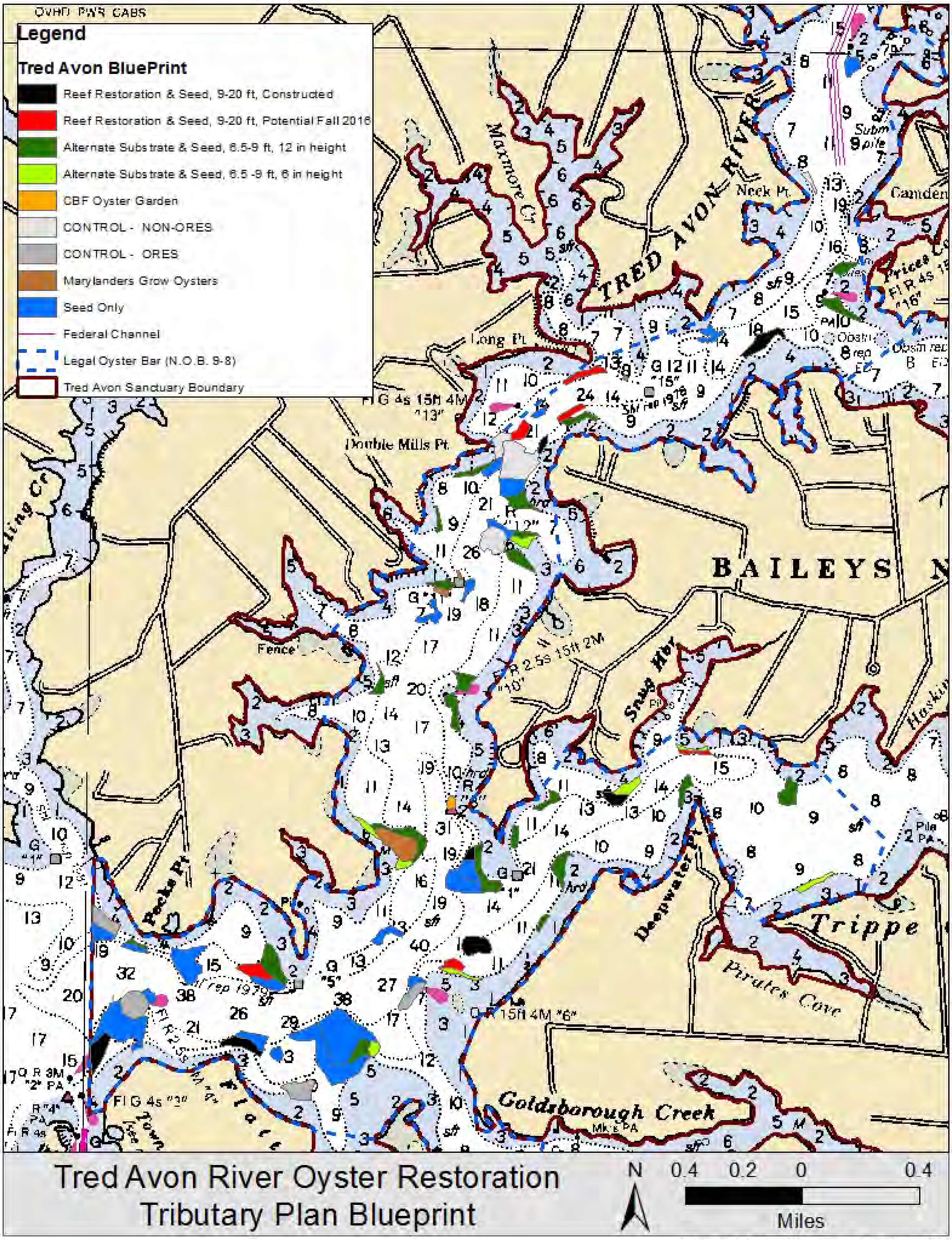
Created by USACE on August 4, 2016



Tred Avon River Oyster Restoration Tributary Plan Blueprint

Created by USACE on August 4, 2016

Tred Avon River Oyster Restoration Tributary Plan Blueprint



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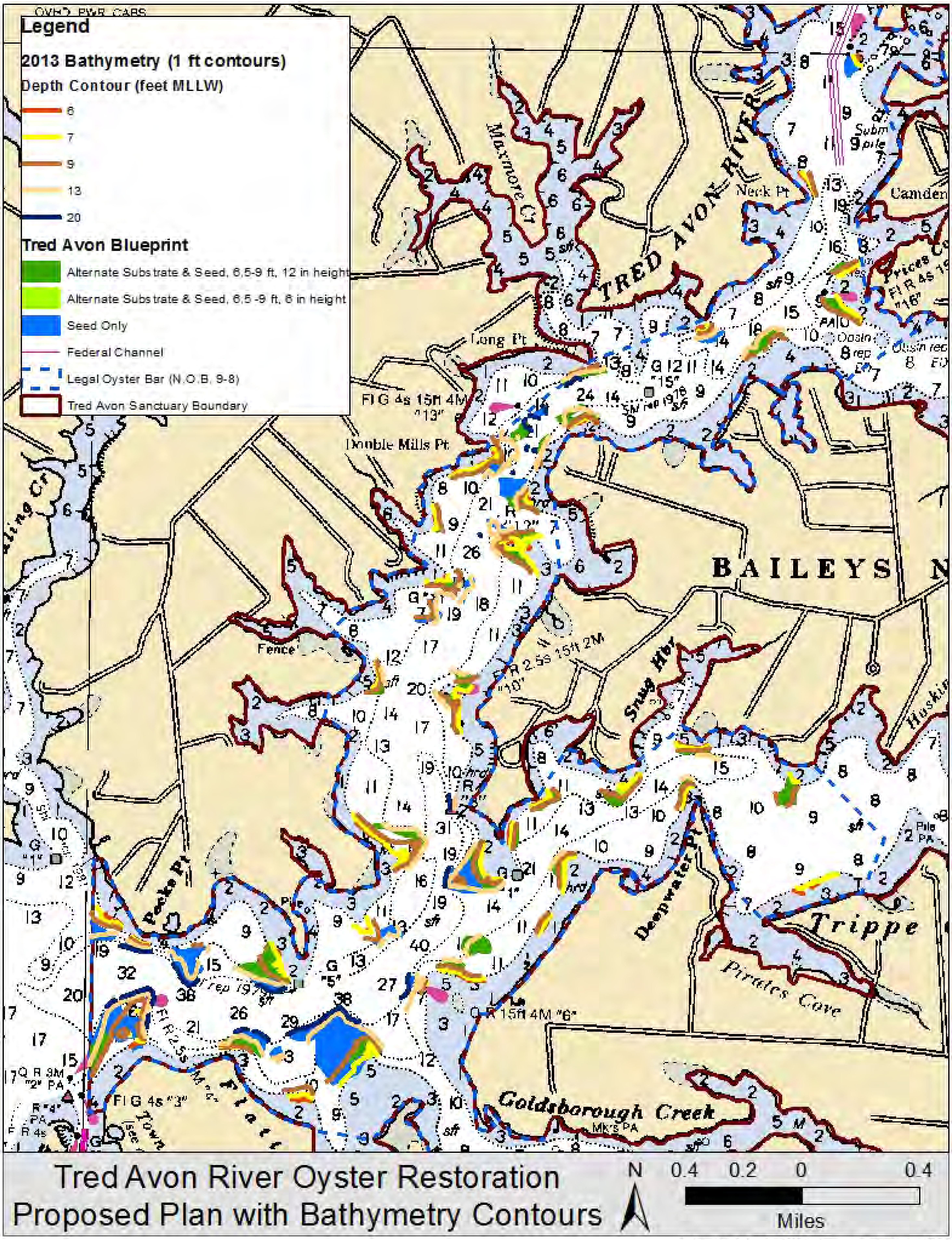
Tred Avon River Oyster Restoration Proposed Plan with Bathymetry Contours



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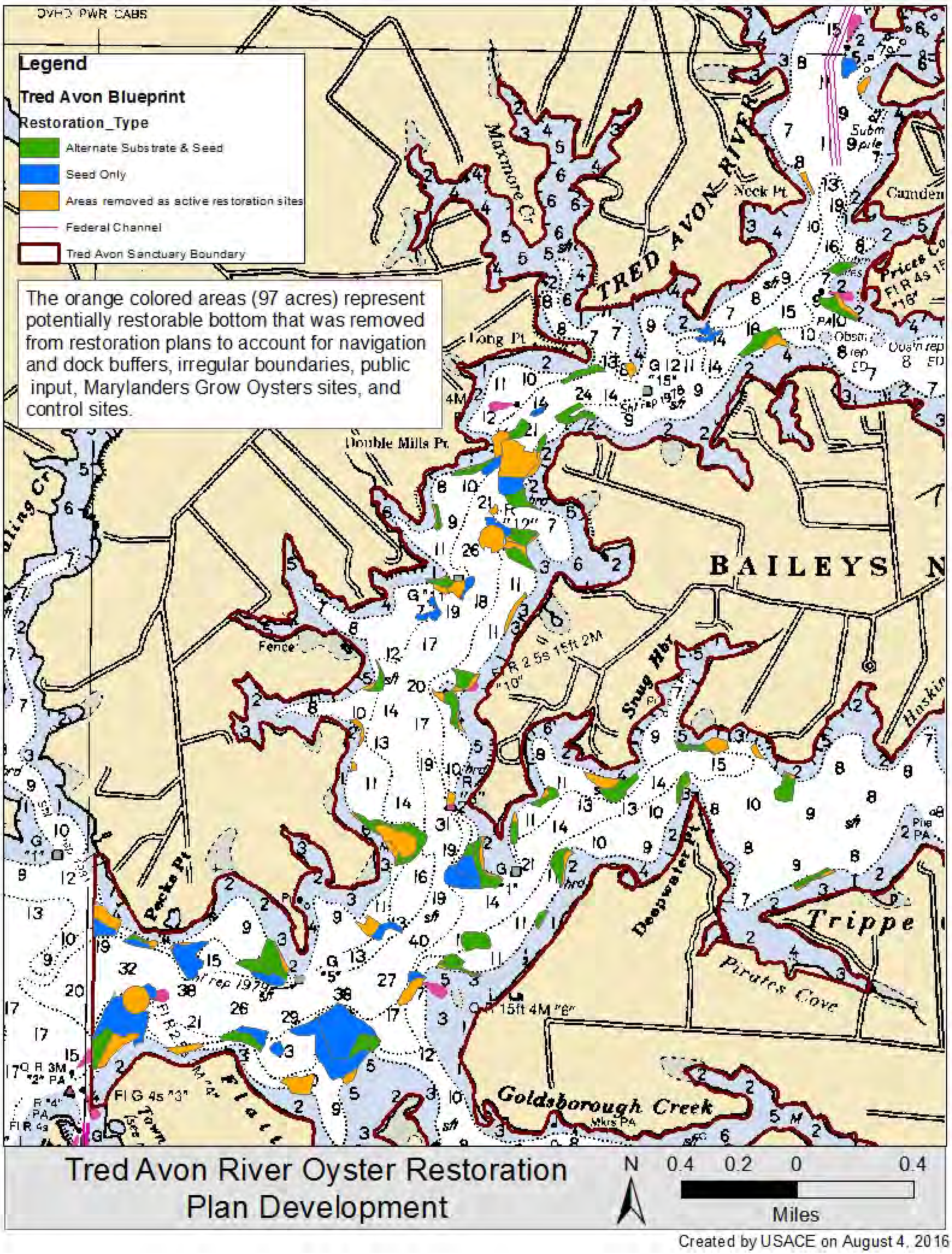
MARYLAND DEPARTMENT OF NATURAL RESOURCES

Tred Avon River Oyster Restoration Plan Development



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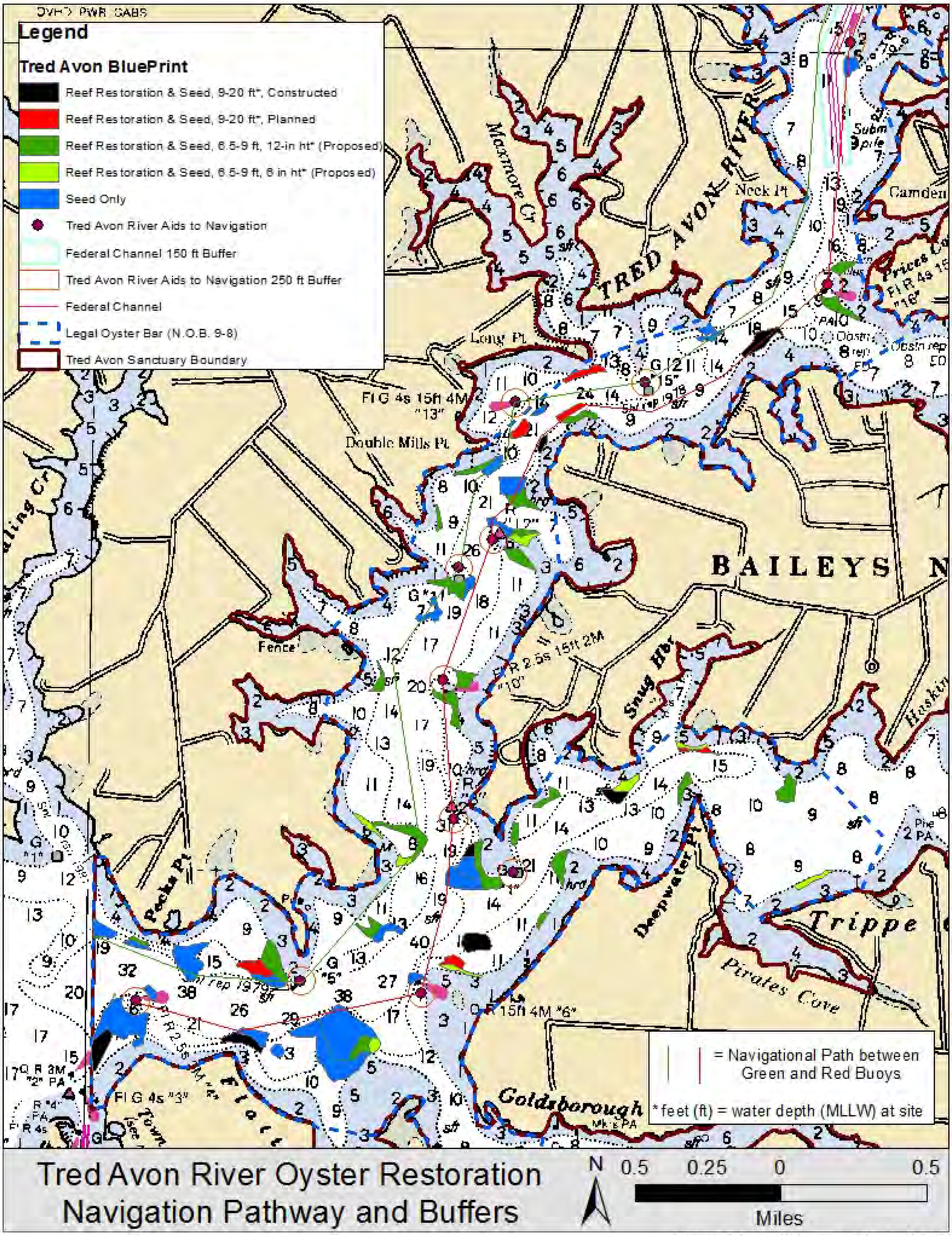
Tred Avon River Oyster Restoration Navigation Pathways and Buffers



Created by USACE on April 14, 2016

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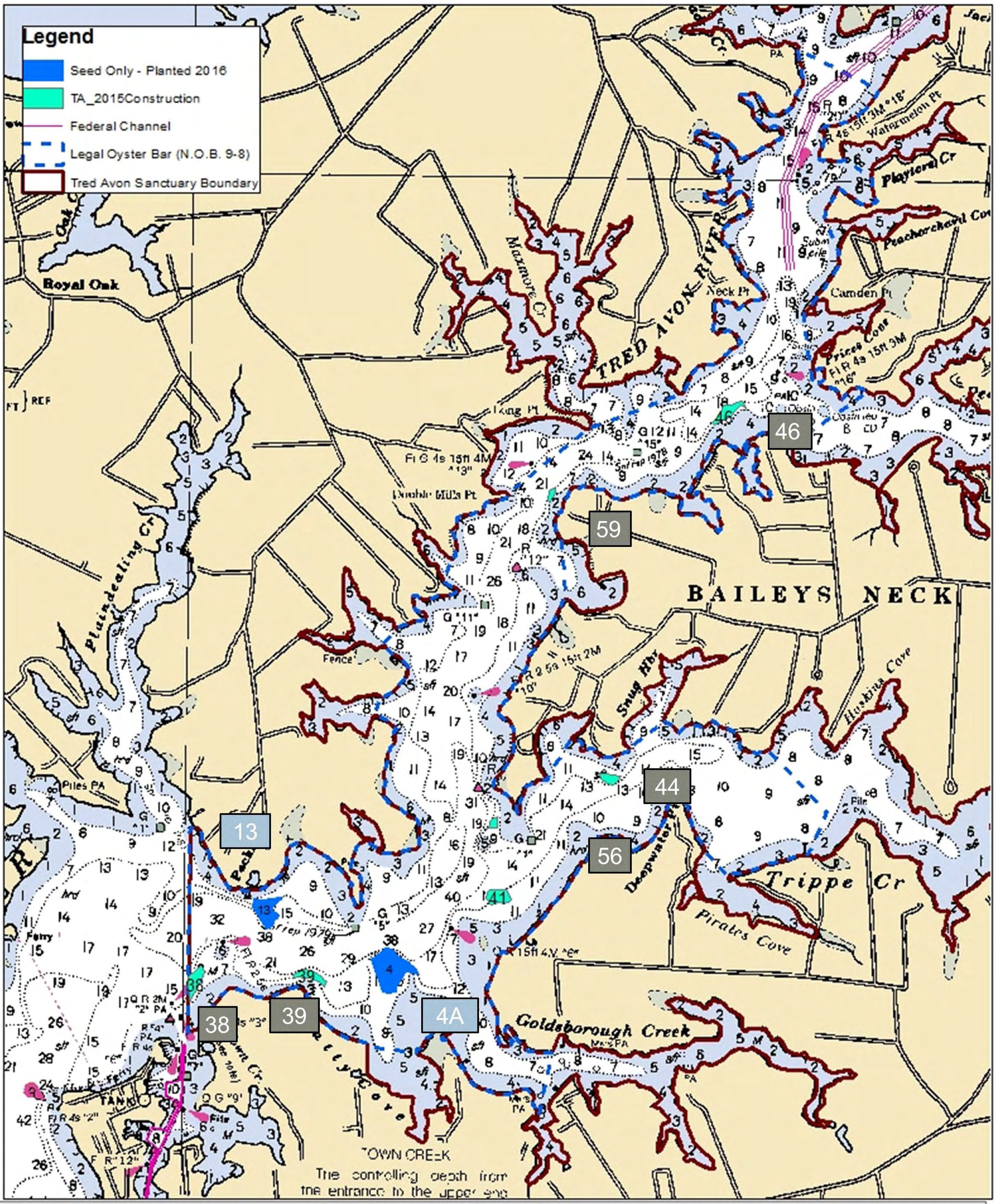
MARYLAND DEPARTMENT OF NATURAL RESOURCES

Tred Avon River Oyster Restoration Completed Work



Tred Avon River Oyster Restoration
Completed Work

N 0.5 0.25 0 0.5
Miles

Created by USACE on July 19, 2016

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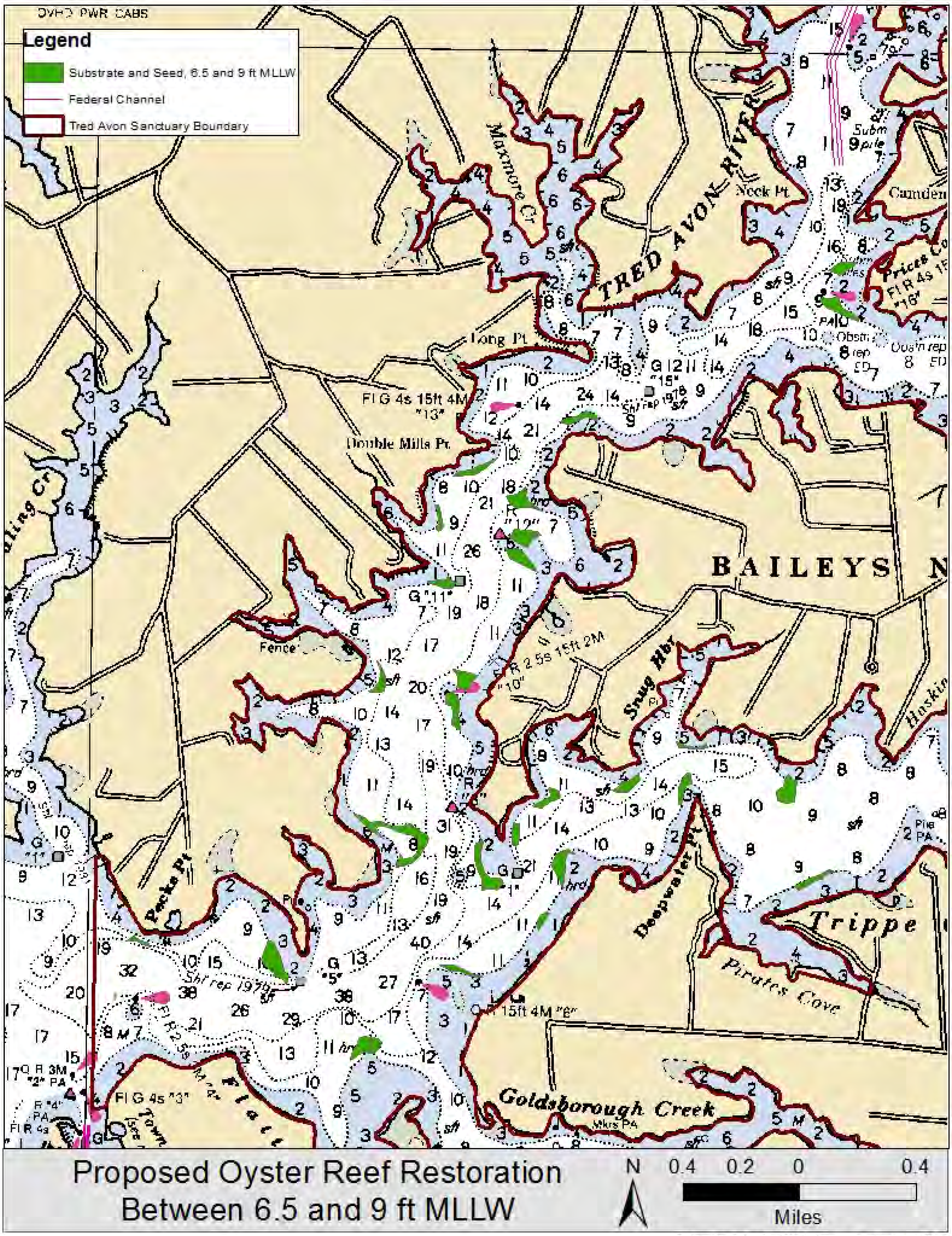
MARYLAND DEPARTMENT OF NATURAL RESOURCES

Tred Avon River Oyster Restoration Proposed Between 6.5 and 9 ft MLLW



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MARYLAND DEPARTMENT OF NATURAL RESOURCES

Welcome!

Tred Avon Oyster Restoration Draft Supplemental Environmental Assessment Public Meeting

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MARYLAND DEPARTMENT OF NATURAL RESOURCES

Welcome!

Tred Avon Oyster Restoration
Draft Supplemental
Environmental Assessment
Public Meeting

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MARYLAND DEPARTMENT OF NATURAL RESOURCES

Tred Avon Oyster Restoration
Draft Supplemental Environmental Assessment

- Draft Report Available NOW.
    - Available: http://go.usa.gov/cswPh
- Submit Comments:
    - Email: MD.OysterRestoration@usace.army.mil
    - Mail : U.S. Army Corps of Engineers, Baltimore District
      Attn: Angie Sowers
      P.O. Box 1715
      Baltimore, MD 21203
- Comment Period: July 19, 2014 – August 19, 2016
- Final Report: Anticipated for September 2016

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MARYLAND DEPARTMENT OF NATURAL RESOURCES

Tred Avon Oyster Restoration
Draft Supplemental Environmental Assessment

- 6:00 PM - Welcome and Review of the Public Meeting
- 6:10 PM - Study Overview Presentation
- 6:40 PM - Panel Question and Answer Period Begins
- 8:00 PM - Panel Question and Answer Period Ends -

  Meeting Adjourned

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MARYLAND DEPARTMENT OF NATURAL RESOURCES

Presentation Slides

Chesapeake Bay Native Oyster Restoration Program

Tred Avon River Environmental Assessment

August 9, 2016

US Army Corps of Engineers
BUILDING STRONG®

Public Meeting Agenda

- **6:00 PM - Welcome and Review of the Public Meeting**
  - ***Facilitator, Agency***
- **6:10 PM - Study Overview Presentation**
- **6:40 - Panel Question and Answer Period Begins**
- **8:00 – Panel Question and Answer Period Ends -**

  Meeting Adjourned

Public Review

- **Draft Report Available <u>NOW</u>.**
  - **Available: http://go.usa.gov/cswPh**
- **Submit Comments:**
  - **<u>Email</u>: <u>MD.OysterRestoration@usace.army.mil</u>**
  - **<u>Mail</u> : U.S. Army Corps of Engineers, Baltimore District**

    Attn: Angie Sowers

    P.O. Box 1715

    Baltimore, MD 21203
- **Comment Period: July 19, 2014 – August 19, 2016**
- **Final Report: Anticipated for September 2016**

STUDY OVERVIEW

- **Dr. Angie Sowers, USACE....**

Policy Authorization

Executive Order 13508 (2009):

- Federal Government shall lead a renewed effort to restore the Chesapeake Bay and its watershed.

2014 New Chesapeake Bay Agreement:

- Established goal by EPA, MD, VA, PA, NY, DE, WV, & DC) to restore native oyster populations in 10 tributaries in Virginia and Maryland by 2025.

Section 704(b) Of The Water Resources Development Act (WRDA) Of 1986, as amended

- Established Authority to implement projects to provide alternative or beneficial habitats for native fish and wildlife.

Overarching Goal

Restoring abundant self-sustaining oyster populations in priority tributaries of the Chesapeake Bay in an environmentally, technically, and economically sound manner.

Sustainable Reef → Self-sustaining Population → Restored Tributary → Restored Chesapeake Bay

Restoration - The Big Shift

Past (1997-2009)

- Small- unable to impact oyster populations
- Poor results
- Scattered
- Conflicting goals
- Avoid disease
- Illegally harvested
- Poor records keeping
- Little monitoring

Present (since 2010)

- Large
- Concentrated in select tributaries
- Clear goals
- Coordinated agency efforts including monitoring
- Confront/manage disease
- Adaptive Management of sites for success

Interagency Workgroup Process (USACE, DNR, NOAA, ORP)

Goal Setting ("Chesapeake Bay Oyster Metrics")

↓

Select Tributaries

↓

Develop Tributary Plans/NEPA

↓

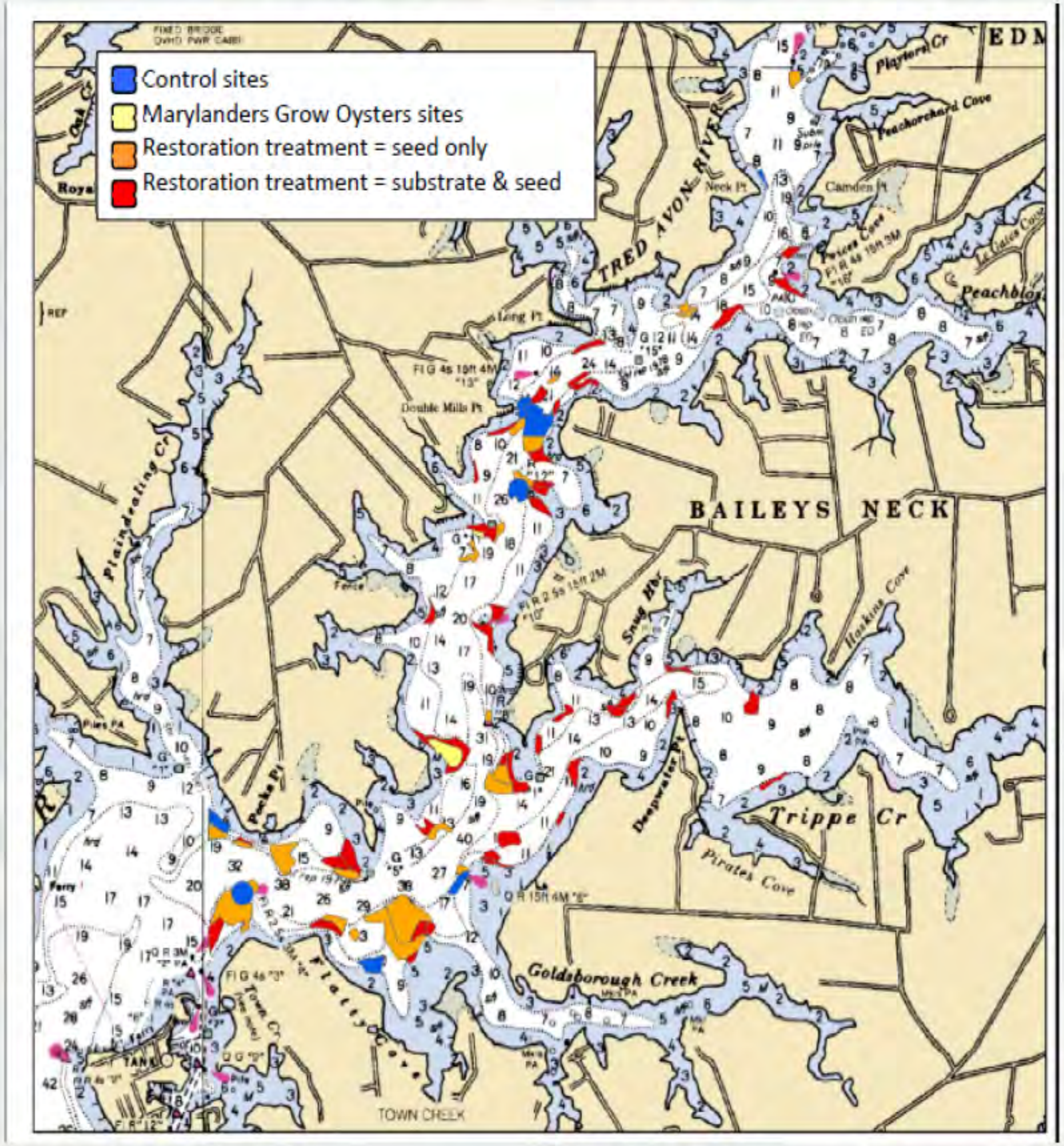
Implement Restoration

↓

Monitor

↓

Adaptive Management



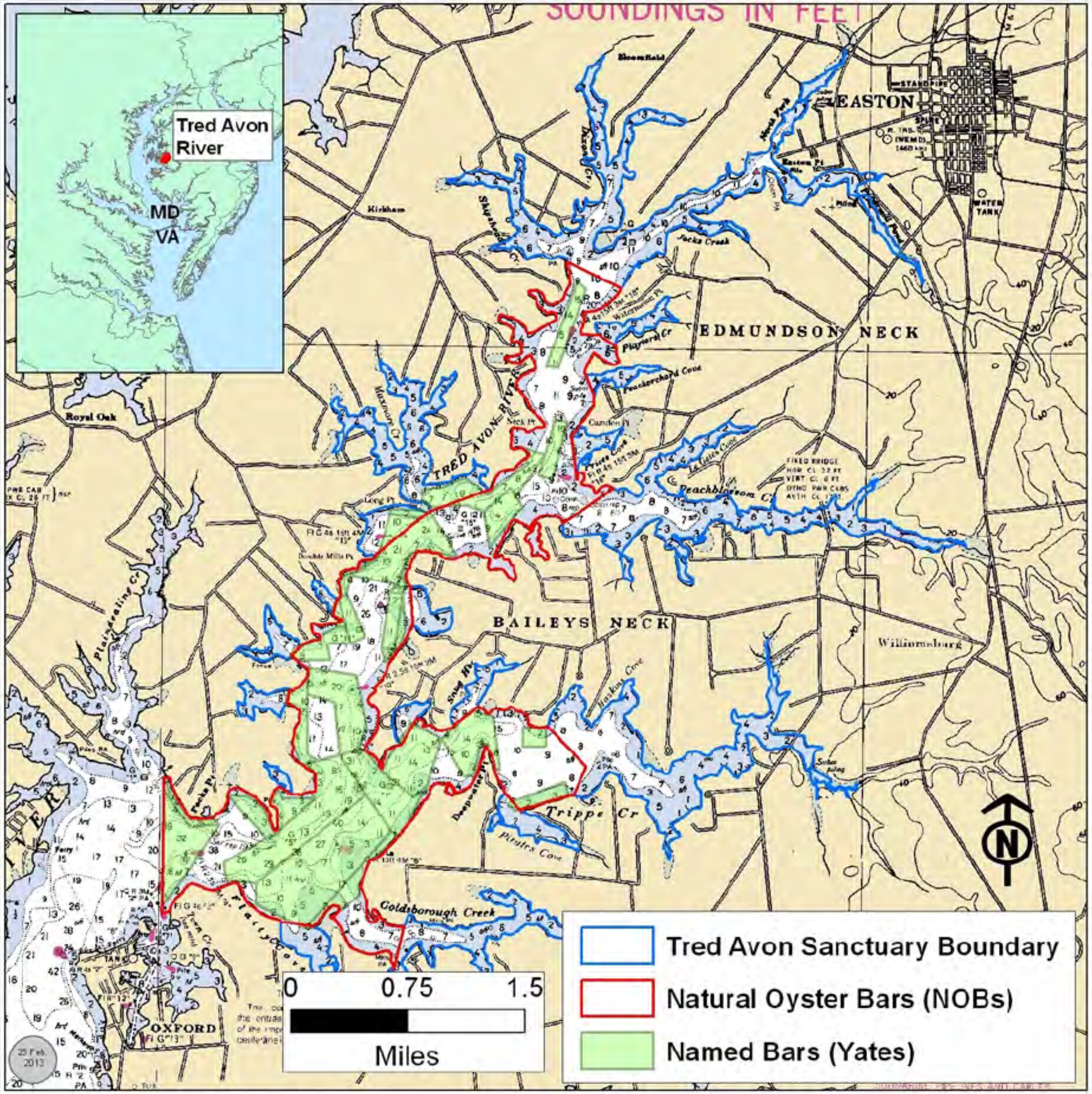
Purpose of NEPA Effort

- Evaluate the expansion of oyster reef restoration efforts into water depths between 6.5 and 9 ft mean lower low water
- Replace the 8-foot minimum navigational depth clearance for previously authorized activities under the 704(b) Program with a 6-foot minimum navigational depth clearance
- Currently, NEPA clearance to restore reefs in water depths greater than 9 ft mean lower low water
- Work also includes placing spat-on-shell on existing degraded reefs

Problem/Need for the Proposed Action

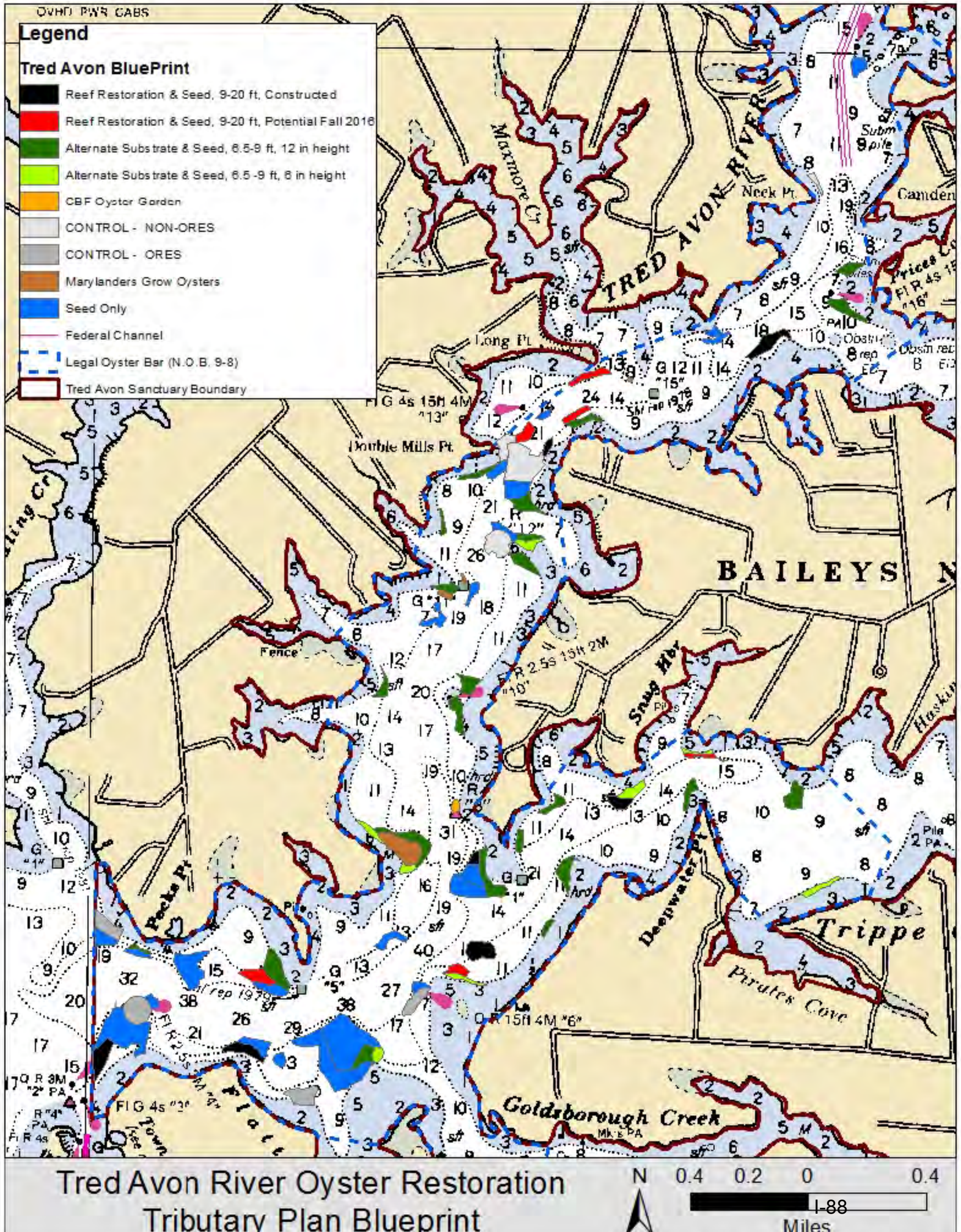
- 90 to 99 % habitat loss
- Degraded water quality
- Disease
- Overharvesting

- The goal is large-scale restoration at diverse depths throughout the tributary to capture the full expanse of historical habitat coverage and to provide a diversity of reef habitat



Tred Avon River

Sanctuary: 3,937 acres
Historical Oyster Bottom: 851 acres
Projected Restorable Bottom: 251 acres
Planned Restoration: 146 acres
Constructed: 16
Completed Restoration: 35 acres



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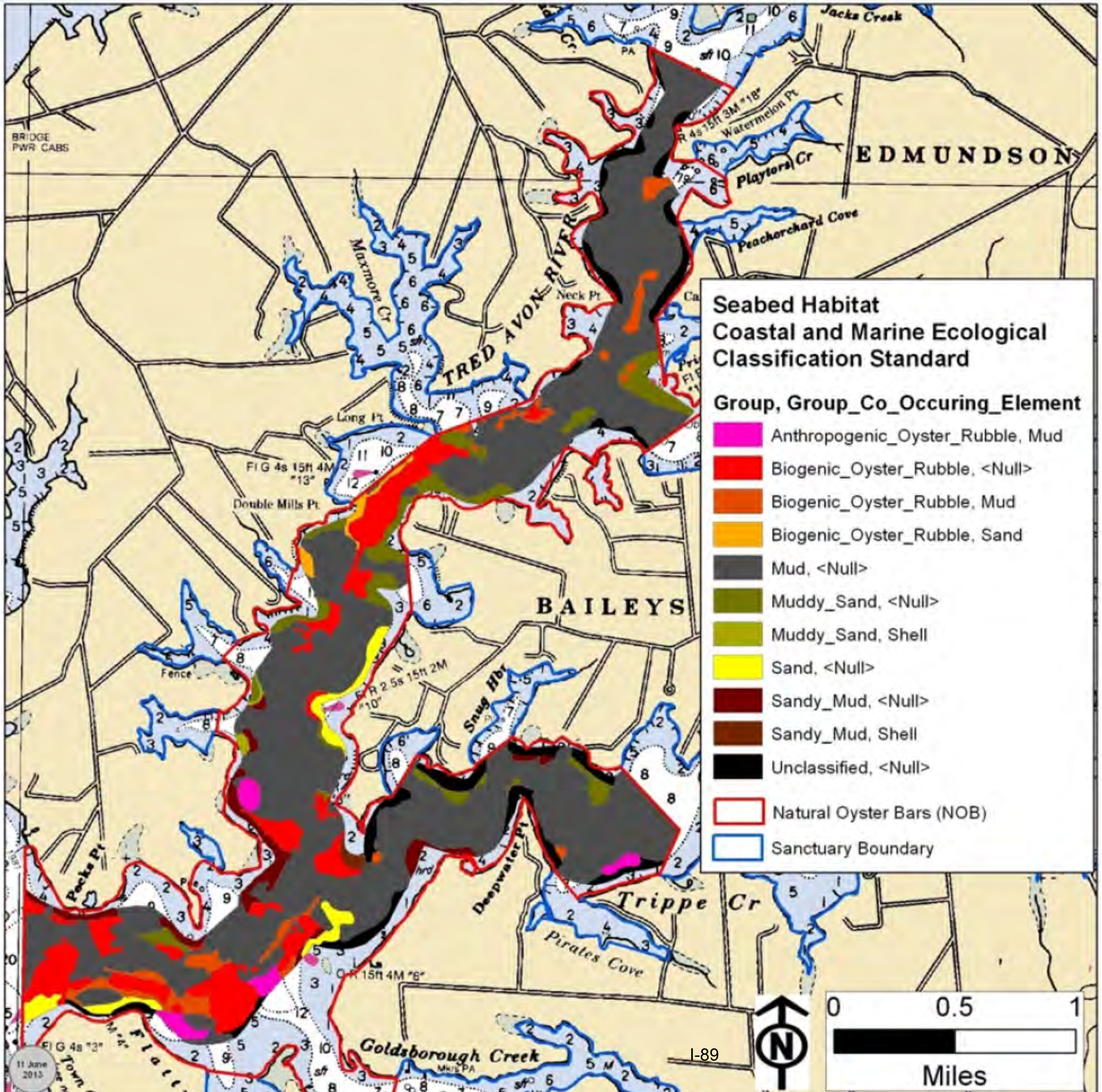
Proposed Alternative

- Oyster reef restoration in water depths between 6.5 and 9 ft mean lower low water = 57 acres
- Placing spat-on-shell (seed only sites) on existing degraded reefs = 71 acres
- Currently, NEPA clearance to restore reefs in water depths greater than 9 ft mean lower low water = 26 acres

How did we develop this plan and select this alternative?

Bottom Habitat Classification



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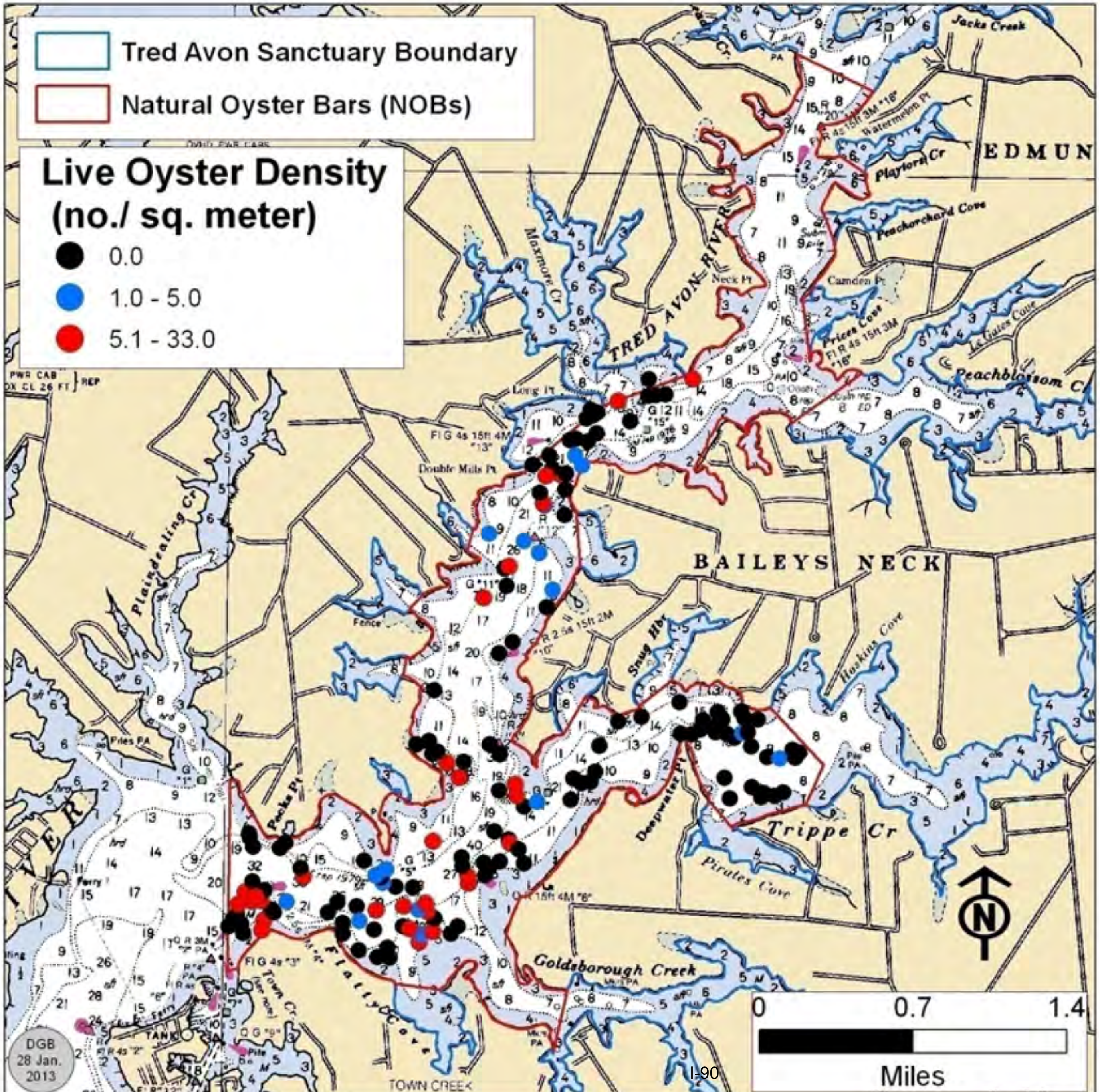
Existing Oyster Densities



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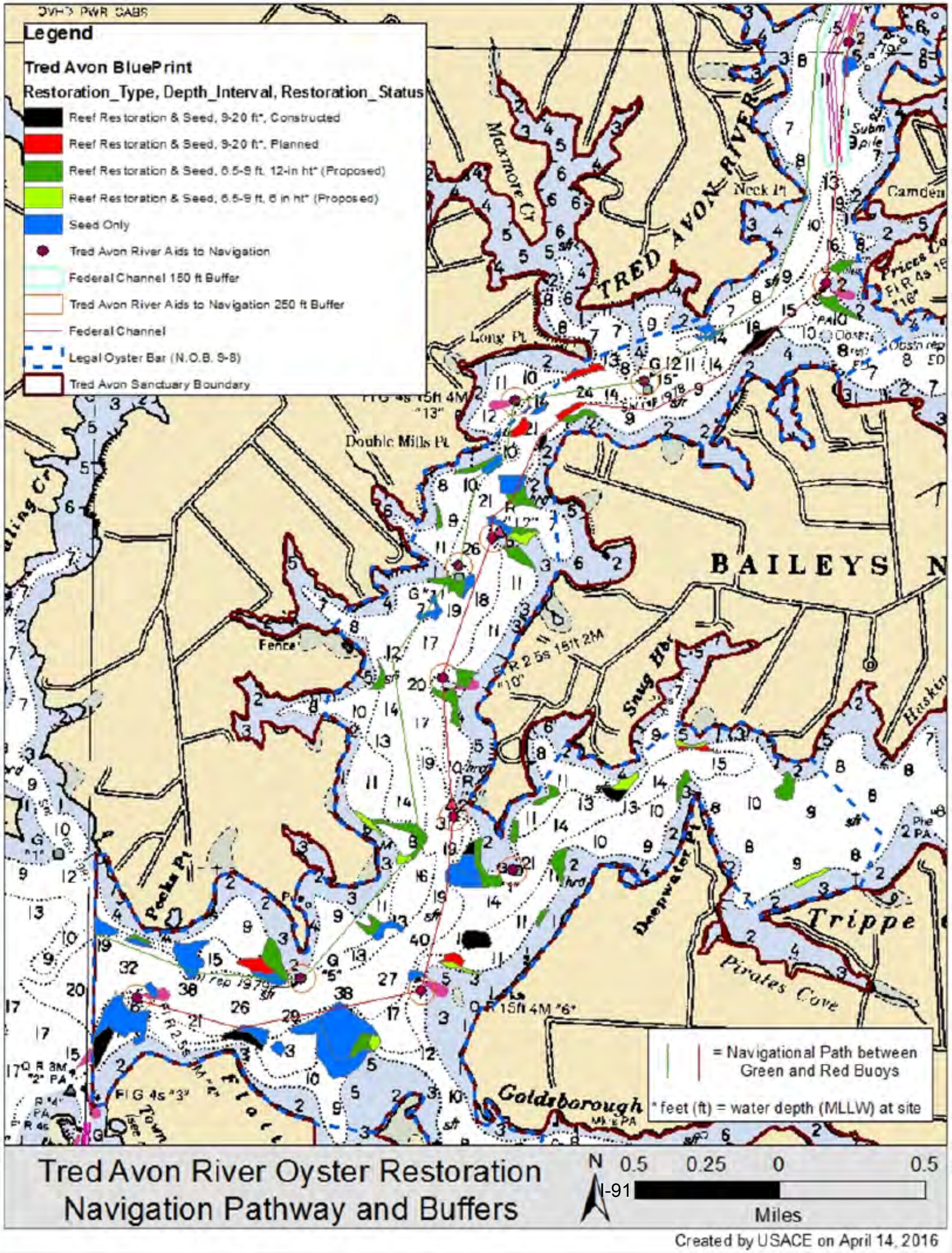
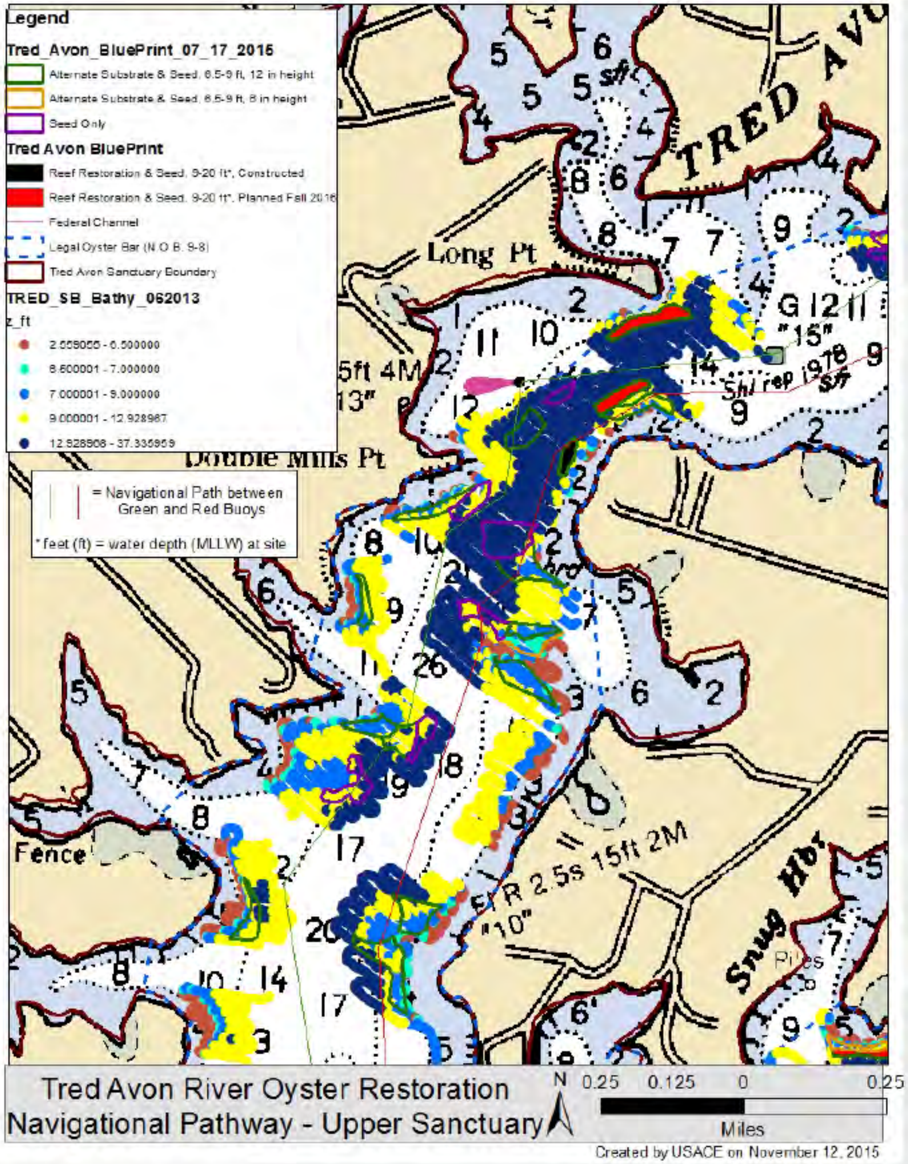
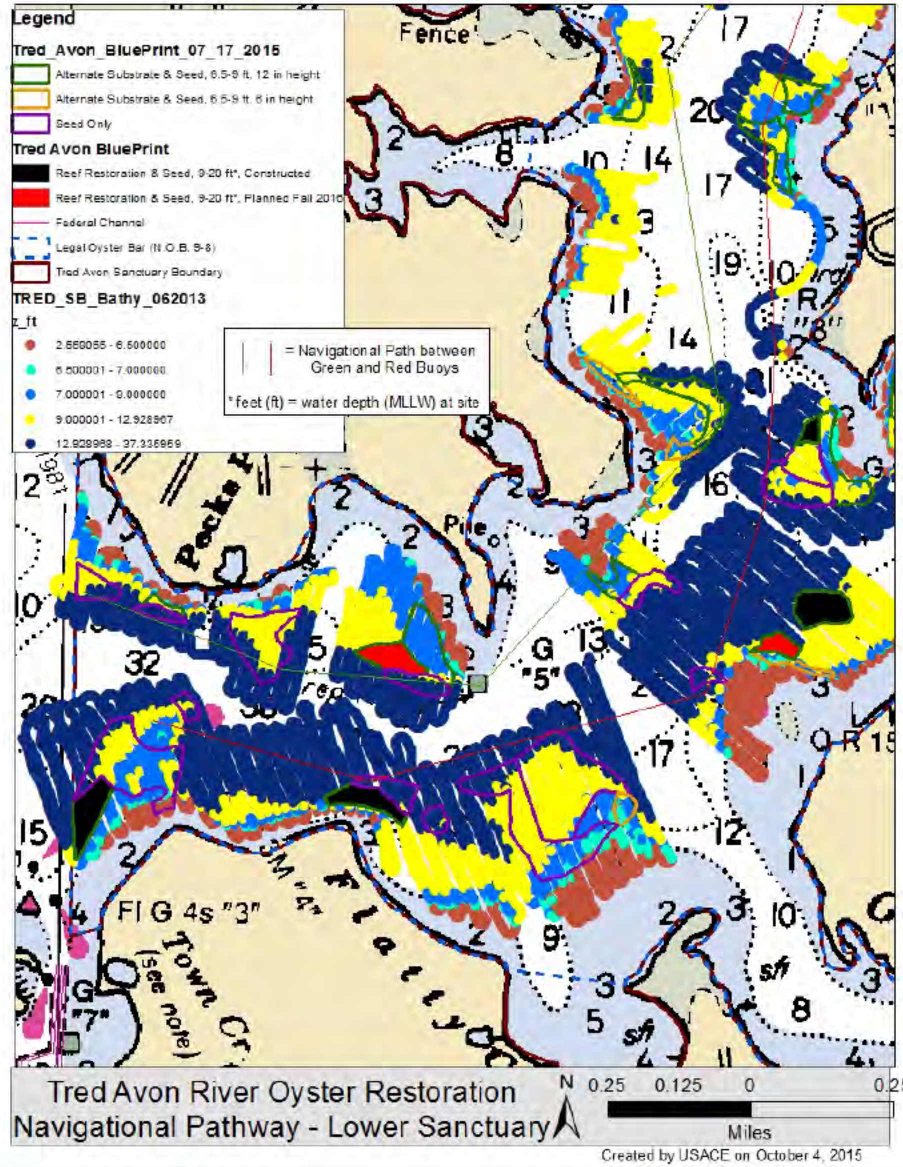
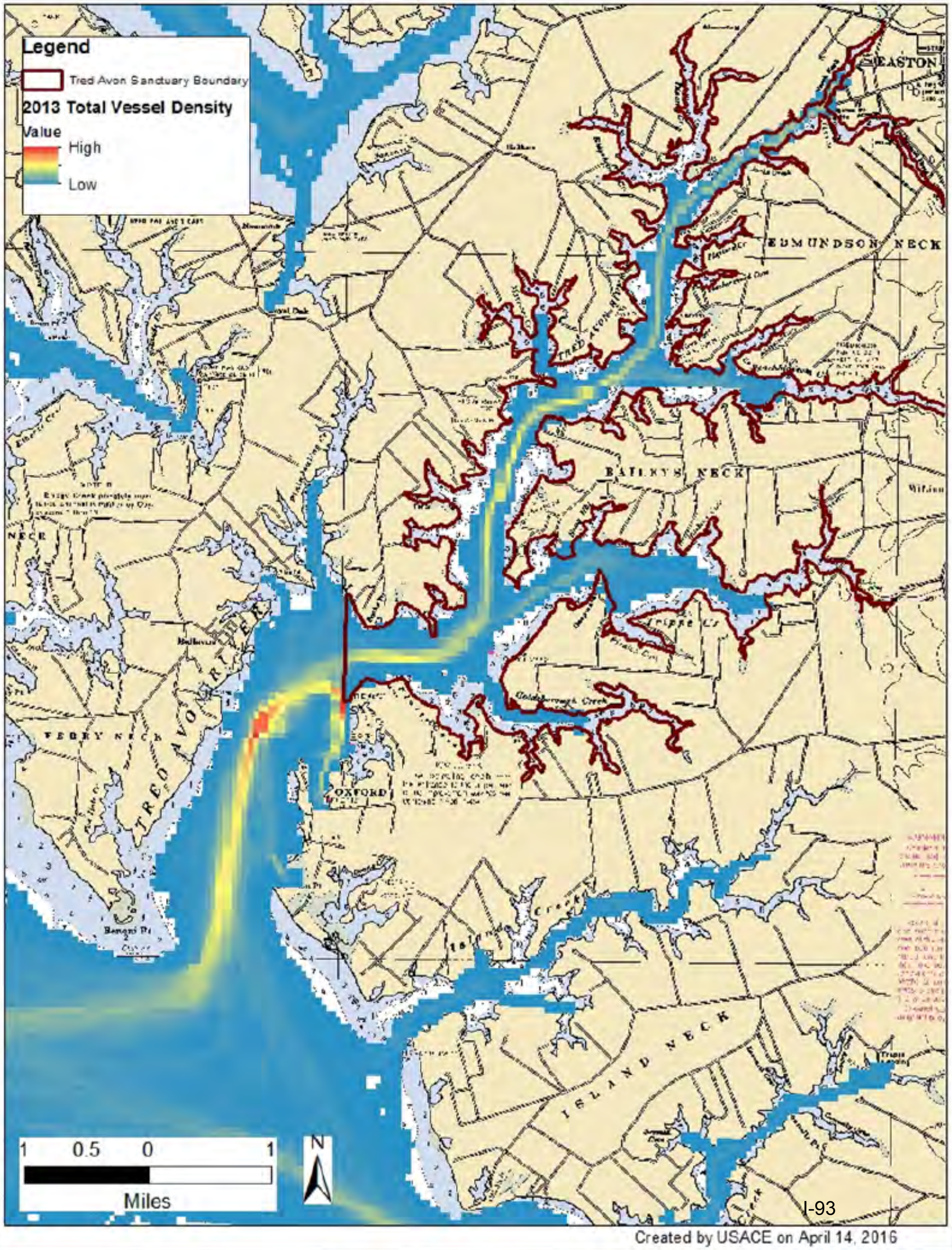
Navigational Pathway



Water Depths

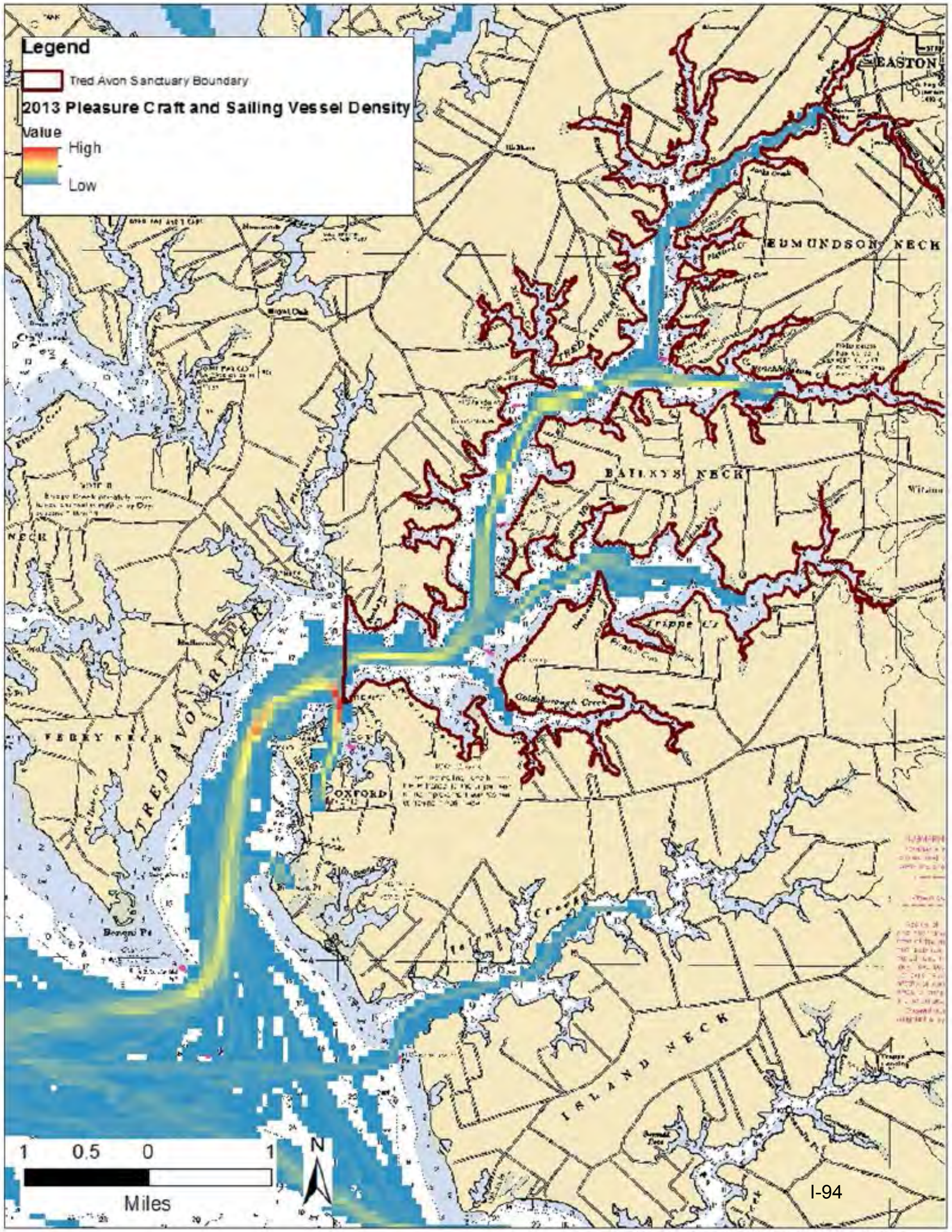






Total Vessel Density in the Tred Avon (2013)

(from USCG – Automatic Identification System data)



Created by USACE on April 14, 2016

Pleasure Craft and Sailing Vessel Density in the Tred Avon River (2013)

(from USCG – Automatic Identification System data)

Created by USACE on April 14, 2016

Tug and Towing Vessel Density in the Tred Avon (2013)

(from USCG – Automatic Identification System data)

Summary of Tred Avon River Oyster Restoration

	Acres
Tred Avon Sanctuary	**3,937**
Restorable Bottom	**251**
Metrics Goal #1 - 50-100% of Restorable Bottom	125-251
Yates Bars	**851**
Metrics Goal #2 - 8-16% of Yates Bars	68-136
Accounting for navigation and dock buffers, irregularity of boundaries, public input (68.6 ac)	182.4
Removal of Control Sites (28 ac)	154.4
ACREAGE AVAILABLE FOR RESTORATION	**154**
Reduce seed-onlys sites by 10% to account for groundtruthing loss (8 acres)	63-71
RESTORATION TARGET	**146**
Substrate and seed sites, > 9 ft MLLW	***26***
Substrate and seed sites, 6.5-9 ft MLLW	***57***
Seed-only sites	***71***

Panelist Question and Answer Period

- **Moderator: Ellen Kandell**
- **Panelists:**
  - **Angie Sowers – U.S. Army Corps**
  - **Eric Weissberger – Maryland DNR**
  - **David Bruce - NOAA**

Public Review

- **Draft Report Available <u>NOW</u>.**
  - **Available: http://go.usa.gov/cswPh**
- **Submit Comments:**
  - **<u>Email</u>: <u>MD.OysterRestoration@usace.army.mil</u>**
  - **<u>Mail</u> : U.S. Army Corps of Engineers, Baltimore District**

    Attn: Angie Sowers

    P.O. Box 1715

    Baltimore, MD 21203
- **Comment Period: July 19, 2014 – August 19, 2016**
- **Final Report: Anticipated for September 2016**

Pictures


EXIT
DYING

Proposed Alternative


River Oyster Restoration
ompleted Work
Tred Avon River Oyster Restoration
roposed Between 6.5 and 9 ft MLLW
BAILEYS NECK
Proposed Oyster Reef Restoration
Between 6.5 and 9 ft MLLW
MARYLAND
DEPARTMENT OF
NATURAL RESOURCES
MARYLAND
DEPARTMENT OF
NATURAL RESOURCES

Website

Maryland Oyster Restoration

*Click to enlarge/download

Tred Avon River and Harris Creek Oyster Reef Restoration Updates

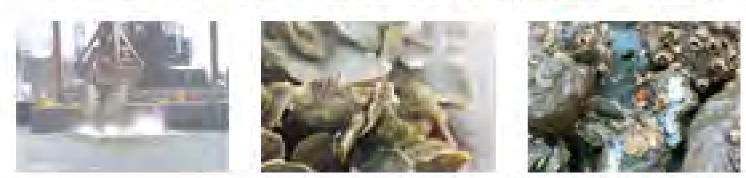
July 2016 Update - Supplemental Environmental Assessment Available for Review and Comment: The U.S. Army Corps of Engineers (Corps), in cooperation with the Maryland Department of Natural Resources (MD DNR), is seeking comments on a draft supplemental environmental assessment (EA) focused on oyster restoration in the Tred Avon River Oyster Sanctuary to evaluate extending oyster restoration into shallower water depths, between 6.5 to 9 feet mean low lower water, in the Tred Avon River in Talbot County, MD.

Click here to download the draft supplemental EA for review.

Click the following link to access the full presentation from the Aug. 9 Tred Avon public meeting.

Maps with non-color coded figures for color blind readers: Map 1; Map 2; Map 3; Map 4


Caption



◀PREV NEXT▶

Oyster Restoration Resources

Public Review Comments

	Topic	Comment (as provided by individual)	Response	Changes to report
COMMENTS PROVIDED AT PUBLIC MEETING ON AUGUST 9, 2016				
1	General comment in support of project	I am Charles Denton, I live [redacted] in Wicomico County Maryland. I do not speak for any special interest group. I only speak as an individual citizen of the state and stakeholder in these proceedings. I want to express my thanks to all the Maryland Interagency Oyster Restoration Workgroup participants for their hard work on the Tred Avon River Oyster Restoration Plan and related work. Thanks you for your continuing work. As a citizen observer, I have attended the last two Oyster Advisory Commission meetings in Annapolis this past month. The presentations were detailed and discussions long as many of you know. It was great for me to learn more about oysters and sanctuaries. It plainly does not make sense to make major changes to the oyster sanctuary plans for the Tred Avon or the rest of the Bay. The scientific monitoring data and the successful progress are clear. Please move forward with extension of the oyster restoration into shallow areas of the Tred Avon River. Thanks you for allowing me to speak.	Comment Noted.	None.
2	Vibrio concerns	Letter from Tommy Haddaway, To whom it may concern, my name is Tommy Haddaway. I was born and raised on Tilghman Island. Up until this year I have made my living on the water for the past 60 years. I am now 75 years old. In 2014 I contracted the disease known as Vibrio in my arm that lasted 6 months. The following year 2015 it contracted the disease in my leg. Since that time, the doctors have said no more working in the water. What concerns me the most is that vibrio has only really seen in the past few years. Several other cases have been diagnosed in this area, especially on Tilghman. Vibrio is a southern base bacteria from Florida. It's funny that this deadly bacteria has become more noticeable since this so-called oyster shell from Fla was dumped in the Tilghman Area. My question to you is, could this bacteria be coming from the Florida material? After all, it wasn't what we told it was going to be. In living on Tilghman for 75 years of my life, I and many others have never seen this deadly bacteria until the dumping of this Florida muck in the Choptank. As I said, I've been working on and in the water of this area since I was a child. You don't need to be putting anything in the Bay that doesn't come from the Bay. Bottom Line!!! Peoples lives and lively hoods are more important than the money you are chasing. Sincerely, Tommy Haddaway	Vibrio occurs naturally in Chesapeake Bay. Outbreaks of this bacterium are related to temperature, salinity, and chlorophyll.	None.
3	Stone size/Reef Substrate	There should have been another public meeting before deciding stone size in previous project	Comment noted. All USACE projects have used 3"-6" stone. Going forward, based on the recommendations of the Oyster Advisory Commission, projects proposed with stone will be presented to the OAC for review. OAC meetings are open to the public and will provide the public an opportunity to comment.	None.
4	Success of sanctuary	Talbot Waterman Association says Harris Creek is an experiment. The OAC was given 2 days to review the 900 page report and decide if we needed to move forward in Tred. The Harris Creek hasn't been determined a success, why are we using this as a blue print? Biomass needs to increase, by this standard the program is failing (preliminary reports show its successful). Huge economic impact due to this project.	All ecosystem restoration projects contain some experimental component, due to not fully understanding our natural world and the variability of the natural world. Thus far, the 3 year monitoring results from the first 100 acres, has determined that those reefs are meeting success criteria for oyster density and biomass. Bay Agreement goals are to restore five tributaries in Maryland by 2015. The blueprint is just the term for the road map and restoration plan developed to achieve restoration in a given tributary. There are no indicators in the early stages of the project that large-scale restoration in not progressing within expected bounds.	None.

	Topic	Comment (as provided by individual)	Response	Changes to report
5	Substrate/navigational clearance concerns.	20 years ago Dorchester Co report status? Why do we need rock if you are putting shell on areas that aren't mud? Waterman Association is opposed to permitting anymore work until Harris Creek is corrected. Shallow acreage work is going to cause problems. USACE is in violation by not providing 5ft of clearance in water.	We are not familar with the mentioned report. One USACE site remains to be corrected, but all other constructed reefs have been corrected to provide at least 5 ft of navigational clearance. DNR is working to correct the reefs constructed with their funding. Rock is utilized because there is insufficient shell available to meet restoration, aquaculture, and commercial fishery needs.	None.
6	Review extension request	I hereby request an extension of the 8/19 public comment deadline until after the promised recommendations of the Oyster Advisory Commission	The recommendations of the OAC are separate issues, not directly related to this NEPA process.	None.
7	General comment in support of project	I support the extension of the restoration efforts to waters between 6' and 9' depth of MLW I also support the idea of any available substrate that is effective for the purpose of oyster attachment, growth and development.	Comment Noted.	None.
8	Transcript of meeting request.	Will a transcript of this hearing be placed in the record and available for judicial review.	This is a meeting, not a hearing. There is not a stenographer at this public meeting. All written comments will be transcribed and responded to and be a part of the Final EA which will be distributed and posted online.	None.
9	General comment against the project.	It seems like all these projects are good for is taking the old and new bottom from the working watermen taking are future away from us. What good is this doing for Harris creek and now Tred Avon. What will you take from us next?	Restoration efforts are not aimed at taking from the watermen, but rather being a part of a comprehensive effort to provide a long-term sustainably managed oyster population in the Bay that provides ecosystem and fishery benefits. We have engaged the watermen to a greater extent in the Tred Avon project since 2015 and will continue to do so going forward.	None.
10	Use of shell.	There's plenty of shell on man'o'war why don't we get that shell?	DNR has applied for a permit to dredge shell from Man O' War Shoal, and replied to a series of issues and questions from the Corps in order to move the permit process ahead. The application is being reviewed by the Corps of Engineers.	None.
11	Use of shell.	Capt. Robert Newberry – Are all materials that are placed on oyster bars that are non-indigenous to Maryland being tested as to MD law to be free of pathogens?	Fossil shell from Florida was not tested as there was no tissue on it that could be tested. Contractors using non-Maryland shell are responsible for all necessary permits and disease-free certifications.	None.

	Topic	Comment (as provided by individual)	Response	Changes to report
12	Harris Creek navigation concerns.	What would be done differently in the Tred Avon to avoid mistakes like shallow water in Harris creek? Was Harris creek considered shallow water work?	In the Tred Avon, the following will be implemented to avoid the problems that occurred in Harris Creek: 1) a 6 ft rather than a 5 ft navigational clearance is committed to, 2) use of one bucket size during placement of substrate to avoid confusion in the volume of material being placed, 3) placing a 6 ft mark on the bucket to enable a course check of water depths immediately following placement, 4) use of USCG Notice to Mariners to communicate reef presence in the time lag between construction and revision of navigational charts, 5) more comprehensive public outreach was completed to identify and eliminate from proposed plans sites that are likely to cause navigational problems, and 6) more timely post-construction surveys following completion of substrate placement to provide for correction of any depth problems before spat-on-shell are planted.	None.
13	Paying waterman not to oyster.	Have you considered the alternative of paying the watermen not to the oyster, like the USDA pays farmers not to farm? It might be a better use of public funds.	No. This is not a management option supported by the MD DNR. Watermen and the seafood industry are important components of Maryland's culture and industry.	None.
14	Rotational harvests on sanctuaries.	Why can't these sanctuaries be opened on rotation basis for oyster harvesters? Proven cultivation is good for growing?	Harvesting practices inherently damage the reef structure and remove adult oysters and shell, reducing benefits, and eliminating some of the sought after benefits such as enhancement of shell resources, efforts to develop disease resistance, and developing three dimensional reef structure and habitat. Also, harvest by individual citizens of ecosystem resources that were funded with public dollars is not in the federal interest of the project.	None.
15	Crab Impacts	Has there been any consideration to impacts of crabbing both recreation and commercial.	Yes. Unfortunately, data is not available to evaluate those potential impacts. Also, it has been identified that three dimensional oyster reefs are just as much a disruption as alternate substrate reefs. This is really an issue of adding structure to the bottom of the water column that hasn't existed in the Bay for decades.	None.
16	Mortality Rates	Is it true the spat from Horn Point has an 80% to 90% mortality rate?	Yes, that is correct. In general juvenile oysters have high mortality rates. The majority of natural spat also die.	None.
17	Disease resistance	Why aren't disease resistant oysters from VA planted in the Tred Avon instead of waiting for years for disease resistance to come overtime?	Maryland broodstock is used because of the potential for adaptation to local conditions, including a lower salinity than that of Virginia. Additionally, there aren't enough oysters available from Virginia for the scale of the projects being conducted.	None.

	Topic	Comment (as provided by individual)	Response	Changes to report
18	General comment on navigation	It should not be the obligation of a restoration project to avoid all potential negative interactions. Boaters should be responsible for navigation relative to charts and other local aids and fisherman should be responsible for avoiding gear conflicts by not setting nets or trotlines over known bottom structure.	Comment Noted.	None.
19	Reef Substrate	If substrate is used to support new reefs, why are the reefs not approved for any area? Seems like, if rock is placed on mud they could so anywhere.	Substrates like rock or non-oyster shell to restore reef habitat are only placed on hard bottom that supports their weight. These materials are not placed on mud.	None.
20	Reef Substrate	Why use such big stone? What is the benefits. There is no way to ever think about working the bottom if you have to big of stone.	The specifications for stone have been 3 -6 ". This is the size of rip-rap typically used for bank stabilization. The benefits of stone is that each stone is different and therefore there is a great deal of surface area and structural heterogeneity provided by stone reefs. An additional benefit is that stone provides a poaching deterrent.	None.
21	Sanctuary or open to harvest	Are these 54 acres going to be commercially harvested? When? Limitations?	No, these reefs are being restored to meet ecosystem restoration goals. See response to comment #14.	None.
22	Will the reefs succeed	According to the VMRC vertical reef construction projects such as these failed in VA in the recent past because bay conditions have significantly changed since the distant past. Has it been considered the potential negative consequences of such major tributary alterations when there is no historical record of success in such projects? Are these projects considered entirely experimental due to the lack of any such project succeeding in the past? Have considerations been made for a negative result?	It is likely that the reference about failed vertical reef projects is to 1-acre reefs that consisted of 6' high mounds of shell, looking rather like an eggshell crate upside down. The design trapped a lot of sediment and these reefs tended to fail over time. The proposed design now is for a raised high plateau. This design was first deployed in the Great Wicomico and was a major change in design. This design has been successful. The reefs are still well in exceedance of GIT metrics 12 years post construction. Also, recruitment in the river was enhanced by the reefs. There has been past success, but since each tributary is unique, there is always an aspect of experimentation. We have discussed negative results, adaptive management, how to determine what factors contributed to the negative results, and what actions could be taken.	None.
23	Harris creek Quantity	How many oysters planted in the Harris creek? What is spat count in Harris creek?	2.3 billion oysters were planted in Harris Creek from 2011-2015. 2015 Fall Survey spat count was 45 spat per bushel on Tilghman Wharf outside the sanctuary and 34 on Eagle Pt/Mill Pt (within sanctuary). The 31-year average at Eagle Pt/Mill Pt is 39 while that at Tilghman Wharf is 69.2 spat/bushel.	This information added to Section 1.3.2.1.

	Topic	Comment (as provided by individual)	Response	Changes to report
24	Success of sanctuary	Since becoming a sanctuary what has happened to the existing oyster bio mass? Has there been any spat set in these areas?	According to the findings of DNR's 5-year review, generally, biomass and the number of market-sized oysters has increased in the sanctuaries. Biomass has increased in the Tred Avon and Little Choptank. A trend is not available in Harris Creek. Number of oysters (including markets) has increased in all 3 sanctuaries. The number of total oysters has increased in Harris Creek sanctuary. Spat sets in Harris Creek have increased in the sanctuary portion and harvest area compared to the 2000-2009 period, but are not as high as levels prior to 2000. There is no change in spatset discerned in Tred Avon or Little Choptank.	Sections 1.3.2.1 was revised to summarize the first round of 3-year monitoring in Harris Creek. Section 1.3.3 was added to summarize DNR's Oyster Management Review. Section 2.3.2 was updated with new information on the status of oysters in the Tred Avon.
25	Harvest moratorium	Have you considered the alternative of a total moratorium on harvesting, as DNR did to restore striped bass population in the 1980s?	DNR recognizes the economic and cultural value of a commercial oyster industry and wishes to maintain a sustainable oyster fishery.	None.
26	Substrate	If oyster shell is superior to stone as a substrate material are you saying that the DNR cannot find or buy enough native shell to build up 35 to 50 acres.	DNR does purchase native shell. But there isn't enough to meet all project needs, so given the shortage of fresh shell, DNR has prioritized using it in the hatchery for spat production. This provides spat for both sanctuary and industry projects. We have applied for a permit to obtain dredged shell from Man O' War Shoal in order to re-shell (restore) the bottom habitat.	None.
27	SAV	What effects on SAV will the restoration project have?	All potential restoration areas are reviewed to ensure that no SAV is present. SAV are typically found in waters up to 6 ft in depth. Oyster reefs are in waters deeper than 6 ft. Therefore, there is low chance of overlapping habitat and conflicts. There is the potential for oyster restoration efforts to improve water quality and bottom conditions and lead to an enhancement in SAV habitat/extent.	None.
28	MD grow oyster program.	When Chris Judy was doing Marylanders Grow Oysters the state needed and collected growers oyster cages. The new group wants us to come to them in the fall and deliver our oysters to them in the spring, we have an option to pay. With the high number of non-resident and older property owners on the Tred Avon, oysters growing will decline dramatically. So then another way to do this?	The DNR employee assigned to the MGO program was transferred. The group that took over the program does not have dedicated funding or staff. DNR is still interested in the program and will hold a meeting to discuss options.	None.

	Topic	Comment (as provided by individual)	Response	Changes to report
29	Shallow waters, Fully restored tributary	How do you define shallow water restoration? How will it be determined that a tributary is fully restored.	Shallower water restoration refers to the placement of substrate for reef restoration between 6.5 and 9 ft MLLW. A tributary will be determined to be fully restored if the reefs meet success metrics for biomass, density, reef footprint and height, and shell budget at 6 years following restoration. (The six year timeframe varies for individual reefs based on when the reef was planted.) The report is available at http://www.oyster-restoration.org/wp-content/uploads/2012/06/OysterRestorationMetrics-Final-w-adopt-statmnt-1-3-12.pdf.	None.
30	SAV	Section 4.3.1 SAV: EA reports that SAV data from 2008- 2013 was assessed to understand if documented SAV was shown to be occurring where reef construction and seeding areas would be undertaken. I suggest reviewing VIMS 2015 preliminary SAV data to ensure that no SAV exist in project sites even after the resurgence of the SAV in 2015.	All potential restoration areas are reviewed to ensure that no SAV is present. SAV are typically found in waters up to 6 ft in depth. Oyster reefs are in waters deeper than 6 ft. Therefore, there is low chance of overlapping habitat and conflicts. There is the potential for oyster restoration efforts to improve water quality and bottom conditions and lead to an enhancement in SAV habitat/extent. VIMS 2014 GIS data and preliminary 2015 data was reviewed following the meeting. SAV exists along shorelines, but not in oyster restoration areas.	Revised Section 4.3.1 to state that SAV data from 2008-2015 was assessed and no impacts.
31	Harris creek	Harris Creek was not successful. - Sustainability: leaving reef alone and they should be successful. - Manipulated #'s - seed and shell program - synthesize sustainability - we want shell from oyster Man O' War for the Seafood industry	A NOAA report shows that Harris Creek reefs restored three years ago are performing well and meet minimum oyster density goals. Sustainability is the long-term goal, but the interagency workgroup recognized that initial restoration efforts would possibly require re-seeding and other adaptive management measures. DNR has applied for a permit to dredge shell from Man O' War Shoal and replied to a series of issues and questions from the Corps in order to move the permit process ahead. The application is being reviewed by the Corps of Engineers, Regulatory.	None.
32	General comment in support of project	I am a Talbot county resident and am benefitting immensely from the cleaner water and improved fishing in my river. Thank you for your investment in my community. I do not feel that the economic value of oysters is greater than their ecological value. Please proceed with this project as planned.	While it isn't certain that the benefits you mention are the result of the oyster projects, oyster restoration is a key piece of Bay restoration efforts and your support of the projects is noted.	None.
33	Concerns for waterman	Wouldn't it be simpler for you to say you wanted the waterman gone and give all the bottom to private groups and aquaculture? That is what you're saying in not so many words.	Comment Noted. The intent of the restoration work is not to eliminate watermen.	None.
34	Cleaning process of bars.	Before the placement of seed on any natural oyster bar is there action taken to clean the bars of sediment, such as bagless dredging? Was this done in Harris Creek?	Bars are not cleaned of sediment before placing spat. Before each planting on natural bottom, divers check the site to ensure it is suitable for planting including an evaluation of sedimentation.	None.

	Topic	Comment (as provided by individual)	Response	Changes to report
35	Harris creek Benefit Tred?	Will any of the oysters from the Harris creek project benefit recruitment in Tred Avon.	Potentially, but larval transport connections are not well understood.	None.
36	# of oysters Acres	How many millions of oyster do you plan to plant? How many acres do you plan to plant these oysters on?	Oyster plantings are planned for 146 acres, of which 35 have been completed. Each acre is targeted to receive 4-5 million spat-on-shell. This will provide for a total planting of 584-730 million spat-on-shell. 2.3 billion spat-on-shell were planted in Harris Creek.	None.
37	General comment in support of project	Please follow the science and the data that support completion of the planned Tred Avon restoration. Having spent already millions of tax payer dollars, do not open the sanctuary areas to plunder by watermen until and unless they reimburse all the public agencies and private partners for the restoration costs to date	Comment Noted.	None.
38	Bay agreement; benefits to waterman	If this project does not move forward, how will the executive order and bay agreement obligations be met? Where will the 75% fed money go? What is the benefit to working non sanctuary bars? How will the project benefit watermen?	Executive Order and Bay Agreement obligations would likely not be met. Federal money that the project has received would be utilized to monitor existing restoration projects. Potentially, some funding would be utilized for restoration efforts in Virginia to meet Executive Order and Bay Agreement goals. One aim of the restoration projects is to establish reproductive engines that benefit not only sanctuary reefs but also harvest areas for the benefit of watermen. This would provide a long-term enhancement to oyster populations.	None.
39	GMO oysters	Are there any GMO oysters in the Choptank river complex planted by the ORP or any group you say this is a sustainable fishery. Why are more oysters being added after the original planting if it's sustainable?	No GMO oysters are planted in restoration projects. More oysters are added to ensure that both males and females are present.	
40	Better Maps	Please provide diagrams for those with color perception deficiencies i.e., color blind people. The Americans with disabilities act requires no less. Without non-colored maps showing the habitat distinctions you have not satisfied public notice and participation agreements.	Thank you for bringing this to our attention. USACE has prepared a set of maps that can be distinguished by color-blind persons. They have been posted to our website.	Added to Appendix I.
41	Alternative plans.	Because the preferred alternative doesn't maximize diversity and resiliency in design, doesn't maximize reproductive connectivity of ecosystem benefits, are you able to quantify or qualitatively describe what we are losing between alternative 6 and alternative 7? What are we giving up?	By selecting alternative 7 rather than 6, 3.7 acres (at three sites) will not be restored. While it is correct that we won't maximize the various benefits, we will come close to reaching maximum levels. Project goals can still be met with respect to acreage (scale of the project), and therefore, the trade-off of reducing the project by 3.7 acres to accommodate navigation has been determined to be reasonable.	None.
42	General comment in support of project	Oysters are the key to any and all restoration and harvesting efforts for the bay. We must provide habitat.	Comment Noted.	None.

	Topic	Comment (as provided by individual)	Response	Changes to report
43	Sediment	How does the USACE propose to deal with the sediment that is resuspended in Tred Avon from prop dredging tugs + gravel barges (oversized + overloaded for this river)?	We are working to engage with the county and the barge operators to better understand where this occurs and the frequency, as well as to determine if there are any operational changes that could be made to minimize the resuspension. Providing 1 ft high reefs is expected to provide the oysters increased ability to handle any sedimentation. Also, monitoring to understand the resuspension and the potential problem it poses may be undertaken.	None.
44	Disease	What about oyster disease in sanctuaries? Are older oysters more susceptible to MSX and DERMO? How will the impact population?	Yes, disease typically becomes more intense in oysters as they age which makes them more susceptible to mortality from disease. However, not all older oysters succumb to disease. One of the goals of the sanctuaries is to foster disease resistance. Large oysters found in the sanctuaries may be disease resistant (but this is unknown at this time), and leaving them in place allows them to reproduce and theoretically pass on any genes for disease resistance.	None.
45	Budget	How much is this costing the tax payers? Why can't you just use shells instead of stones that cost a lot of money?	Oyster shell has not been found to be available in quantities needed to restore reefs to the scale of the project needed to have a system-wide impact. Total projected project costs are $11.4 million.	None.
46	Harris Creek	Please include in the budget money to 1. Survey, the exact location and depth after work is done 2. Publish exact lat/long data on the areas after they are planted	Surveys will be completed and lat/long data will be made available.	None.
47	Comment against project until Harris Creek is corrected.	Totally against any additional work being done until Harris Creek stone is corrected. Too many boats not repaired.	Work has been completed to correct those sites that were constructed with USACE funding. DNR is working to correct the sites constructed with State funding.	None.
48	Oyster aquaculture/ growers	Can property owners grow oysters for consumption under their piers?	Property owners can apply for a lease to raise oysters for consumption. Oyster grown as part of an oyster gardening program, usually based at piers, are not for human consumption. The Maryland State Programmatic General Permit 4 (MDSPGP-4) authorizes private landowner oyster gardening, and the MDSPGP-5 will continue to do so, with a few changes to the conditions.	None.
49	Budget	If you achieve 50 oysters per m2, how much will the entire restoration project have paid for each oyster?	Based on initial projections of total project costs of $11.4 million for restoring 146 acres, each oyster at a density of 50 oyster per m2 would cost $0.39.	None.
50	Public vs. Sanctuary success?	What comparison is there to natural spat set on public oyster bars vs. sanctuary bars?	Spat sets in Harris Creek have increased in the sanctuary portion and harvest area compared to 2000-2009 period, but are not as high as levels prior to 2000. There is no change in spatset discerned in Tred Avon or Little Choptank.	None.
51	Dredging shell	Why would you not wait until the watermen have dredged what shells are available in the Tred Avon? Let the watermen clean up what shells are there, and plant them on the reefs?	We are examining the feasibility of retrieving shell previously planted in the Tred Avon River.	None.

	Topic	Comment (as provided by individual)	Response	Changes to report
52	Navigational clearance	Why not leave 8 feet of clearance which was the NEPA required depth before this started?	Limiting restoration in the Tred Avon to only waters > 9 ft MLLW would not provide enough habitat to meet restoration targets. Also, restoration is attempting to restore to the extent possible and feasible historic habitat which existed across a variety of water depths.	None.
53	Man O' War shell	In your original plan it called for the possible use of shell from Man O' War shoals. Will this area be pursued as a shell supply?	DNR has applied for a permit to get shell from Man O' War Shoal. The application is being reviewed by the Corps of Engineers.	None.
54	Monitoring	Are you self-monitoring this project? If not who?	USACE, NOAA, and DNR funding is used for monitoring, but, we do not perform the monitoring. Various contractors have completed monitoring in the past - University of Maryland, ORP, and Versar.	None.
55	Shell	The gentlemen from DNR stated only indigenous materials will be used in the Tred Avon. The USACE public notice for this meeting says “shell from processing plants in the mid-Atlantic region.” Which is accurate? Can the processing plants be identified?	Shell from the mid-Atlantic region will be used in the project. Contractors buy shell directly from the shucking houses.	None.
56	Man O War shell	By all metrics native oyster shell is the best substrate for oyster propagation. The state of Maryland has an application pending to USACE to dredge natural shell from Man O' War shoal. Will USACE expedite its review in order for the natural shell to be used in the future Tred Avon work and work in other Chesapeake Bay projects?	The permit application goes through USACE Regulatory Branch. That is a separate process than the restoration work. The restoration work cannot interfere with the regulatory process.	None.
57	Poaching concerns	Are the reefs going to have markers to identify locations to alert boaters to stay away or do you feel this would aid poachers?	Upon completion of the project, NOAA charts will be updated to show the location of the restoration sites, but at this time, buoys or other markers are not planned.	None.
58	Placement on existing oysters	Is there any plan to move living oysters before material is dumped into the river.	Surveys have identified that sites selected have few if any oysters. The sites proposed for substrate placement are hard bottom where surveys have shown there to be little shell and less than 5 oyster per m2. Some sites have been verified. We are open to making site visits to other locations to verify. The agencies can consult with the local oystermen to discuss this issue and develop a plan to move oysters as needed from areas of concern.	None.
59	Sanctuary laws	DNR secretary Mark Belton recently stated that any tributary in which federal oyster restoration projects occur will be closed to all public harvest throughout the entire tributary not just on the restoration area. However, all areas including sanctuaries are available for private lease. 1) What law or laws is this based on 2) Have economic impact statements been conducted in regard to this change? 3) With legislation in the current 2016 water resources development act, private companies and groups can partner in restoration construction + claim a full stake in reconstructed areas. Has it been considered that all given these changes could lead to the massive redistribution of tributaries to private interests?	1. Closure of areas where USACE restores oysters is a stipulation of the Water Resources Development Act and the 2012 Master Plan. 2. Economic analyses were done as part of the Programmatic Environmental Impact Statement. 3. Leasing in sanctuaries is limited to 10% of the restorable bottom, so there won't be a massive redistribution to private interests.	None.
60	Poaching concern	How do you plan to monitor, prevent and if needed, prosecute against poaching.	DNR monitors the sanctuary with the Maritime Law Enforcement Information Network and with regular patrols. Anyone caught removing oysters illegally will be prosecuted.	None.

	Topic	Comment (as provided by individual)	Response	Changes to report
61	Poaching Concern	You stated the amount of the taxpayer money being invested in this project/ how will these oysters be protected from poaching? I'm tired of people stealing resources that belong to all of us.	DNR monitors the sanctuary with the Maritime Law Enforcement Information Network and with regular patrols. Anyone caught removing oysters illegally will be prosecuted.	None.
62	Budget Question	If your planting density is 5 million per acre and spat on shell to oyster committee is approx. $35,000 per 10 million that comes out to approx. $1.7 million/ where is the rest of the funds being used?	A large portion of the budget goes toward purchasing substrate for reef restoration. A small portion of the budget is set aside for monitoring. Of the $11.4 million estimated for restoration in the Tred Avon, $3.3 million was projected for seed, $7.4 million for substrate, and $693,000 for monitoring.	None.
63	Use of shell.	During oyster season, the oysters caught on public oyster bottom after they are shucked, the shells should be placed back to public bottom and not bought for lease oyster bottom.	DNR does not own the shell from shucked oysters. DNR is authorized to buy shell from shucking houses, but the shucking house is not required to sell the shell to the state if someone else will pay more.	None.
64	Reef depths.	The 1988 study that is mentioned in the EA explains that 6' of water in the Tred Avon was highly supportive of oyster habitat historically. Please explain how the contours in the Tred Avon and planting at 6' of depth is a benefit for circulation and local disbursement.	In Seliger and Boggs, the authors identified a threshold of dz/dr x 10^3 > 20 for the gradient where they saw a relationship with the presence of oyster rock. This paper suggests that this gradient occurred at the 6 ft contour and is supportive of maintaining a sediment free reef. We are proposing to place a 12 inch elevated reef in the vicinity of that gradient which will artificially provide a steep gradient along the edges of the reef. While this was not a specific criteria used to site restoration locations, an analysis of the restoration plans identifies that gradients of this magnitude are present at 9 of 14 proposed sites. Restorable bottom is too limited to use this as a selection criteria given that restoration actions will provide an elevated reef.	None.
65	Budget	Is the fact that 90% of the seeded oyster perish play any point that 90 cents of every dollar spent on oysters is wasted.	Oysters, by nature, produce large quantities of gametes and larvae. There is naturally high mortality between every stage of the oyster's life cycle. This high mortality of hatchery spat on shell occurs whether the material is placed on a restoration sites or an area for commercial harvest.	None.
66	Sanctuary laws	Once federal funds have been used on this project can the bottom ever be open to the public again for harvest?	Federal funds toward this project are committed with the expectation that the site will remain a sanctuary.	None.
67	General comment against the project.	This project is a gov't boondoggle built in the backs of watermen with taxpayer $. What a waste of money and exploitation of a hard working group of citizens.	Comment Noted.	None.
68	Shell	With all the boat traffic in the Tred Avon what will be done to keep the reef from silting over again? Why wouldn't the authorities want to dredge existing shell from the river?	Restoration areas are located away from the main channel for the most part, avoiding the worst sedimentation from boat traffic. We are examining the feasibility of retrieving shell previously planted in the Tred Avon River.	None.

	Topic	Comment (as provided by individual)	Response	Changes to report
69	Sanctuary laws	Once we accept federal funding is it true we will never be able to harvest in the Tred Avon?	Federal funds toward this project are committed with the expectation that the site will remain a sanctuary.	None.
70	GMO vs Triploid Oysters	What is the difference between a genetically modified (GMO) and a Genetically Altered Organism such as triploid oysters.	A genetically modified organism has changes made to the DNA sequence. A triploid organism is rendered sterile by a third set of chromosomes, but no changes are made to the DNA sequence.	None.
71	Returning oyster bottom	Why don't you ever give back some bottom that you've already taken?	The Oyster Management Plans in Maryland have set aside 24% of historic oyster habitat as sanctuaries and 76% remains in the public fishery. Following the Five-year Review, the OAC is evaluating if there should be any equivalent areas switched between the sanctuary network and the public fishery, with a goal to maintain 20-30% in the sanctuary network.	None.
72	Hydrology impacts	The bay is a delta. Has there been any analysis of the impacts that man-made oyster bars made of large stone and rubble have on the ebb and flow of the tributaries? i.e. impacts on natural flushing?	There has not been a specific targeted investigation. It is expected that the addition of the reef structure to the currently flat Bay bottom will have an impact on local circulation (in the vicinity adjacent/above the reef), but that on a broader tributary or Bay-wide level, the addition of the reef will not alter circulation. The reefs are restoring the bottom structure that used to be in the areas, so that the change to be concerned about is less what the project will do, but what the loss of oysters has already done. The project is trying to restore what was there prior to widespread oyster population and habitat loss.	None.
73	General comment against the project.	Kent, Queen Anne's, Talbot, and Dorchester County Waterman's Associations do not support moving forward with the Tred Avon until the 900 page survey is fully reviewed by the Oyster Advisory Committee.	Comment Noted.	None.
74	Crab Impacts	What happened to the crabs that we covered up on the initial planting of the substrate in the bottom in the winter?	Crabs winter in soft bottoms (mud). Reefs are only restored on hard bottom so there should be no conflict/impact to wintering crabs.	None.
75	Shell	When the material from Florida was found to "out of spec" why was the material not found out of spec and the plan modified instead and by army corps.	All Florida fossil shell placed in Harris Creek and Little Choptank River was tested and found to comply with the contract specifications.	None.
76	Oysters and water quality	Instead of relying on oyster to clean up the bay, wouldn't it make sense to clean up the bay so the oysters had the same water quality as when oysters thrived in the bay with little silt and pollution.	That also makes sense. States/Commonwealths throughout the Chesapeake Bay watershed are working to address water quality through the Chesapeake Bay TMDL and Watershed Implementation Plans. However, the oyster is a keystone species in the Chesapeake and is a significant component of restoring function and health to the Chesapeake.	None.

	Topic	Comment (as provided by individual)	Response	Changes to report
77	Scale	If the project is reduced to 97 acres how many millions of seed will be planted and why is that not enough to restore oysters.	Oysters are seeded at 5 million spat per acre and would yield 485 million spat on 97 acres. Given natural mortality we hope to end up with 15-50 oysters per square meter. It is not known exactly at what scale the restoration projects need to be implemented to have an impact on the system and become sustainable. The 2012 Master Plan and the Oyster Metrics Success Criteria outline that 50-100% of restorable bottom that constitutes 8-16% of historic Yates bars should be restored to provide for a system-wide impact from the restoration efforts. In the Tred Avon, 50% of restorable bottom is 125 acres. Therefore, restoring only 97 acres is not anticipated to be a large-enough project to impact the system and achieve sustainability. Restoration efforts work to maximize restoration efforts given that there is no clear answer to scale.	None.
78	Pier access	Proposed reef due east of the Tred Avon buoy #10 will shut off my pier access; That area is shallower than chart shows.	This site was reviewed for possible removal or reduction. Email and proposed change sent to Mr. Chapman. Mr. Chapman concurred that removing the southern half from this site will alleviate any potential problems he foresaw with access to his dock.	Section 3.3 updated to include the reduction of SS_13 by 1.5 acres. Acreages throughout report updated to reflect reduction of 1.5 acres. Cost estimate revised in Section 3.5 Figures were inserted (now Figure 6) to depict the recommended plan and portray the changes made to SS_13 (now Figure 18). Text added to Sections 5.4.2.2 and 8.7 to include this change as a result of public comment.
79	Shell from VA	Why has the DNR refused to purchase native shell from Virginia packers – much of which is Maryland shell? While at the same time the Dept. purchased – mud/fossil shell at 2x the price from Florida as in the Little Choptank.	DNR does purchase shell from Virginia shucking houses.	None.

	Topic	Comment (as provided by individual)	Response	Changes to report
80	VA comparison oyster reefs	The only previous such vertical reef project to be completed and reviewed was undertaken by Virginia between 2003 and 2007. It was deemed that such vertical projects could not succeed in current bay conditions due to this projects failure. As this was the only prior vertical oyster reef project in world history, was it considered in implementing this massive program? Considering such poor history for vertical reef construction possible risk have the negative consequences of such a wide scaled risky project been fully considered.	See response to Comment #22.	None.
81	Public fishery impacts	Why hasn't the DNR opened any new harvest areas to the public fishery since the recovery of the oyster? Watermen have funded seed planting in the oyster sanctuaries for future harvests. When can they clean oysters bare and get shells planted? One of the goals is to have a sustainable public fishery so what does the DNR have planned to increase the public fishery? These watermen and their families have waited decades for the oysters to overcome disease. It does not seem fair that no more bottom has been allocated.	New harvest areas have not been opened because of the existing commitment to the sanctuary program under the Chesapeake Bay Agreement and the Executive Order for oyster restoration. However, the Oyster Advisory Commission recently began, at DNR's request, discussing this issue of access to closed areas. This process only just began and will take time to complete. There is still the requirement to maintain 20-30% within sanctuaries, but there may be some opportunities to exchange some equivalent areas between sanctuaries and public fishery grounds. The final result is unknown at this time. Note that while oyster biomass and harvest have trended upward recently, the population is still well below historic levels. DNR has applied for a permit to dredge shell from Man O' War Shoal to enhance both sanctuary and public fishery bottom.	None.
82	Navigational clearance	The target criteria for restoration mentions acreage and minimum oyster density. The long term navigational target is a minimum of 6 feet. If successful, would you not expect oysters to continue to grow vertically into the water column over time requiring a shallower long term navigational minimum depth?	Yes, if the project is successful, oysters will grow into the water column. Sites will be surveyed in years 3 and 6 following restoration. If there are areas on a reef that are growing to become a navigational problem, the oysters could be removed by divers or some other way that would minimize reef impact and placed on the reef in deeper areas.	None.

COMMENTS PROVIDED ORALLY AT PUBLIC MEETING

1	Robert T. Brown - not supportive	Maryland Watermen's Association is opposed to any further work until Harris Creek low spots have been corrected. This project causes impacts to navigation and crab trot lining. There is no place for it in shallower water.	Opposition noted. USACE has corrected areas in Harris Creek that were built too high using federal funding. DNR is working to correct those areas that were built too high with state funding.	None
2	Bunky Chance - not supportive	President of Talbot Watermen's Association. Acknowledged experimental nature of work. Stated that the OAC was asked to move forward within one day of receiving the DNR five-year report. Holds the view that Harris Creek is not successful. Questions why we would use an unsuccessful project as a way of doing future projects. Further work should wait until Harris Creek is deemed successful.	Opposition noted. The work that the OAC was asked to move forward upon is not part of the restoration in shallower water that is being considered by this EA. Initial monitoring data is showing that Harris Creek restoration efforts are reaching initial success metrics.	None
3	Robert Newberry - not supportive	DelMarVa Fisheries Association. Questions sustainability of these projects if there will be a need to continually add spat-on-shell. Believes restoration numbers are being manipulated. Given high mortality of spat-on-shell, thinks that 90 cents of each dollar is lost. Wants more honesty.	Opposition noted. See response to written comment #16 and 65.	None

	Topic	Comment (as provided by individual)	Response	Changes to report
COMMENTS PROVIDED VIA EMAIL				
1	Sediment concerns from barge traffic	Supportive of project, but barge traffic generates a sediment plume that could threaten success of project. Consider this for future work.	We are working to engage with the county and the barge operators to better understand where this occurs and the frequency, as well as to determine if there are any operational changes that could be made to minimize the resuspension. Providing 1 ft high reefs is expected to provide the oysters increased ability to handle any sedimentation. Also, monitoring to understand the resuspension and the potential problem it poses may be undertaken.	None.
2	Support for the project	Supports completing the full 146 acre project.	Comment noted.	None.
3	Support for the project	Supports oyster restoration and not making changes to restoration plans.	Comment noted.	None.
4	Support for the project	Supports continuing oyster restoration based on review of existing monitoring data. Does not support harvesting restoration projects funded with public dollars.	Comment noted.	None.
5	Support for the project	Supports restoration and questions push to open existing sanctuaries to harvest.	Comment noted.	None.
6	Support for the project	Supports moving forward with restoration.	Comment noted.	None.
7	Support for the project	Supports oyster restoration. Requests that report is updated to reflect increased harvests occurring since sanctuary network expanded.	Overall, the commercial harvest has more than doubled since the expansion of the sanctuary network, reaching 400,000 bushels in 2014. In the Tred Avon, harvests are about 3000 bushels compared to nearly non-existent harvests in the 8 years prior to sanctuary establishment.	Sections 1.3.3 and 4.4.9.2 were updated with recent harvest numbers.
8	Support for the project	Supports continuing restoration and cites long-term benefits to environment and commercial industry.	Comment noted.	None.
9	Support for the project	Supports completing the project.	Comment noted.	None.
10	Support for the project	Supports continuing and expanding oyster restoration. Notes that many in Maryland support restoration.	Comment noted.	None.
11	Support for the project	Supports restoration. Identifies a need to focus on long-term rather than short-term gains.	Comment noted.	None.
12	Support for the project	Supports continuing restoration. Supports continuing to include the watermen in the planning and restoration efforts.	Comment noted.	None.
13	Support for the project	Supports implementation of Alternative 7 and expansion into water depths between 6.5 and 9 ft MLLW.	Comment noted.	None.

	Topic	Comment (as provided by individual)	Response	Changes to report
14	Support for the project	Supports implementation of Alternative 7 and expansion into water depths between 6.5 and 9 ft MLLW. Recommends 1) describing recent information on positive impacts of current and past restoration activities, and 2) consider most recent (2015) VIMS SAV data. Recognizes that oyster shell is the preferred reef material, but if unavailable, the project should be continued using stone.	Information will be added to capture the results of the first three-year monitoring review in Harris Creek and DNR's five-year review of Maryland oyster management. VIMS 2014 GIS data and preliminary 2015 data has been reviewed. SAV exists along shorelines, but not in oyster restoration areas.	Section 4.3.1 was revised to identify that SAV information reviewed includes 2014 and 2015 data. Sections 1.3.2.1 was revised to summarize the first round of 3-year monitoring in Harris Creek. Section 1.3.3 was added to summarize DNR's Oyster Management Review. Section 2.3.2 was updated with new information on the status of oysters in the Tred Avon.
15	Support for the project	Supports implementation of Alternative 7 and expansion into water depths between 6.5 and 9 ft MLLW. Recommends incorporating recent information on positive impacts of ongoing oyster restoration activities. Agrees that native oyster shell is the ideal substrate, but if unavailable the project should move forward using stone. Requests public meeting to continue to evaluate the barging activities in the waterway.	Information will be added to capture the results of the first three-year monitoring review in Harris Creek and DNR's five-year review of Maryland oyster management. USACE and the interagency workgroup will continue to work through the barge issue and will determine if a follow-on meeting is appropriate for addressing the potential issues. At this time, we will continue to try to identify scientific information relevant to this issue and we will focus on monitoring the project for any ties to the sediment plumes. We will use our website to provide important updates.	Sections 1.3.2.1 was revised to summarize the first round of 3-year monitoring in Harris Creek. Section 1.3.3 was added to summarize DNR's Oyster Management Review. Section 2.3.2 was updated with new information on the status of oysters in the Tred Avon.

	Topic	Comment (as provided by individual)	Response	Changes to report
16	Does not support the project	Identifies the following concerns: 1) Only shell should be used. There is an abundance of buried shell throughout Maryland waters that could be used. USACE should approve Man O' War Shoals permit. 2) Identifies that restoration efforts in Harris Creek have caused economic impact to boaters and crabbers. 3) Raises the idea that three-dimensional reefs become sediment traps and degrade water quality. 4) Questions whether there is evidence of spat setting on stone and mixed shell. 5) States that Florida shell used in Harris Creek and Little Choptank projects has increased vibrio in Bay waters. 6) Questions whether USACE and DNR can be trusted to maintain quality control. 7) Believes that these projects are a waste of taxpayer money. and 8) The project is being undertaken in violation of NEPA.	DNR has applied for a permit to dredge shell from Man O' War Shoal, and replied to a series of issues and questions from the Corps in order to move the permit process ahead. The application is being reviewed by the Corps of Engineers, Regulatory Branch. A process has been established for claims to be made to the contractor for damage to boats from running aground on oyster reefs in shallow water in Harris Creek. USACE has gone to extensive efforts to notify the public that the reefs have been placed and water depths are not as shown on current NOAA charts. There is no evidence to support the input provided that three-dimensional reefs become sediment traps and degrade water quality. Rather, science supports that the loss of three-dimensionsal reefs had increased sediment and reduced water quality, further impairing oyster habitat. There is monitoring available from Cook Point and other applications to show that spat will set on stone and mixed shell. Vibrio is native to Bay waters. See response to comment #2. In compliance with NEPA and its implementing regulations, USACE prepared a programmatic Environmental Impact Statement (PEIS) for oyster restoration in 2009 which provided ample opportunities for public input. Additionally, there were specific public outreach opportunities in 2013, 2015, and 2016 associated with the preparation of this EA. 33 U.S.C. § 2263 authorizes the Secretary of the Army to construct, restore, and rehabilitate habitat for native oysters in the Chesapeake Bay and its tributaries in Maryland, including the construction of oyster bars and reefs, and the use of appropriate alternative substrate material in oyster bar and reef construction. No changes made to the report.	
17	Request for bathymetry	A request was made for a map showing high resolution bathymetry for the Morgan's Point area.	Map provided directly to individual.	None.

COMMENTS PROVIDED VIA MAIL

1	Support for the project	Supports implementation of Alternative 7 and expansion into water depths between 6.5 and 9 ft MLLW.	Comment noted.	None.

COMMENTS PROVIDED VIA PHONE

1	George Segers- Support for the project but concerns	Resident of Waverly Island since 1960s. Supports restoration, but concerned with out of state shell and sediment plume from barges.	We discussed that fossil shell from Florida is not a part of this project and that we are continuing to work with the barging company to discuss perception and concerns associated with sediment plume.	None.

John H. Murray
[redacted]
Easton, Maryland 21601

August 2, 2016

U.S. Army Corps of Engineers
Baltimore District
Attn: Angie Sowers
10 South Howard Street
Ste. 11600
Baltimore, MD 21201

Re: Oyster Restoration in the Tred Avon River Oyster Sanctuary/Supplemental Environmental Assessment (EA)

Dear Ms. Sowers:

I live on LeGates Cove off of Peachblossom Creek, which is a tributary of the Tred Avon River. I frequently navigate the Tred Avon River in my boat.

I have reviewed the EA and support the modified plan for oyster restoration in the Tred Avon River.

Thank you for including my comments in the public record. Please contact me if you have any questions.

Sincerely,

John H. Murray

4817-2327-4549v1|000001-002706|8/2/2016

Email #1

To	MD Oyster Restoration
Cc	Sowers, Angela NAB
Sent	Tuesday, July 19, 2016 9:57 AM

As the dock director for a community located on Legates Cove off of the Tred Avon river and owner of two boats I spend a lot of time on the Tred Avon. I support the restoration of oysters and our community participates in Marylanders Grow Oysters. I used my boat a couple months ago to volunteer to plant spat that we collected from property owners. In doing this I observed a few things that I think go hand in hand in regards to the email I received today regarding expanding the reef restoration to include 6.5-9 foot areas. When collecting oysters from properties that were directly on the Tred Avon river we noticed that many of the cages were covered in mud and the oyster growth was not nearly as good as the clean cages that we found in Maxmore Creek and other areas off the main river. I thought about what may have caused this and it is my opinion that the tug/barge that carries stone to Easton point and the amount of mud it churns off of the bottom of the river covers these cages. I think this is important to oyster restoration on the Tred Avon river as one the only real vessels I feel may be restricted in navigation with the construction of these reefs is that tug/barge and two I feel the tug/barge will contribute to silting and thus killing the reefs that are constructed the same as it did the cages. I have followed this tug/barge up river on low tide before and though he is in the channel he leaves a mud plum from Oxford to Easton. For the two reasons stated above I feel the tug/barge operation and business it is delivering to are the main factors in the restoration of oysters in the Tred Avon river and I think before too much money is vested into this new phase there needs to be some research regarding transportation using barge and tug on the river. The substrate that has already been set needs to be seeded but the new areas may need some additional consideration in my opinion.

On a side note I was on the beach at Pecks Point and have done so for many years and for the first time I saw many oysters growing on the rip rap around the shoreline.

Chris Schindler
Dock Director Oaklands Assoc

Email #2

Subject	[EXTERNAL] Shallow Water Oyster Project
From	Buck Waller
To	MD Oyster Restoration; Sowers, Angela NAB
Sent	Tuesday, August 09, 2016 9:47 AM

Please consider my request for your help in restoring the scope of this project from 8 acres to the original 146 acre goal. It is extremely important to carefully consider important long-term goals of water clarity and fishery health.

Thank you.

Email #3

Subject	[EXTERNAL] Tred Avon Public Comment
From	Charles Denton
To	MD Oyster Restoration
Sent	Wednesday, August 10, 2016 9:44 AM

August 9, 2016

To: Maryland Department of Natural Resources

Army Corps of Engineers

Subject: Public Comments At Hearing 8-9-16

On the Tred Avon Oyster Sanctuary

I am Charles Denton, I live at [redacted] in Wicomico County Maryland. I do not speak for any special interest group. I only speak as an individual citizen of the state and stakeholder in these proceeding.

I want to express my thanks to all the Maryland Interagency Oyster Restoration Workgroup participants for their hard work on the Tred Avon River Oyster Restoration Plan and related work. Thank you for your continuing work.

As a citizen observer, I have attended the last two Oyster Advisory Commission meetings in Annapolis this past month. The presentations were detailed and the discussions long as many of you know. It was great for me to learn more about oysters and sanctuaries.

It plainly does not make any sense to make major changes to the oyster sanctuary plans for the Tred Avon or the rest of the Bay. The scientific monitoring data and the successful progress are clear.

Please move forward with extension of the oyster restoration into the shallow areas of the Tred Avon River.

Thank You, for allowing me to speak.

Charles Denton

Email #4

Subject	**[EXTERNAL] Huge Support for Oyster Restoration/Sanctuaries**
From	Tim Zink
To	MD Oyster Restoration
Sent	Thursday, August 11, 2016 1:38 PM

August 8, 2016

To Whom It May Concern:

As a recreational angler with a deep appreciation for Maryland's natural resources, I write to convey my unwavering support for the ongoing oyster restoration projects in Harris Creek, the Little Choptank and Tred Avon rivers, and especially support the continued use of oyster sanctuaries in these - and additional - locations. I urge all decision-makers involved in oyster management to spend time digesting the findings of the scientific monitoring of these projects, as I have done, and am convinced that the only picture one can take from these reports is of successful recovery that is worth every dollar invested in the projects. I ask that under no circumstances are any existing or future sanctuaries to be harvested by private interests. Those restoration efforts were done with public monies for the benefit of future generations, and are not to be used for the enrichment of private interests or as political favors. I believe such actions would be unethical at best and illegal at worst, and should be unthinkable to anyone who truly cares about the health of the Chesapeake Bay. The only changes I would make to the ongoing oyster recovery effort is to expand its scope and expedite its pace.

Thank you for your determination to elevate protections for a resource about which we both obviously care deeply.

Sincerely,

Timothy A. Zink

Email #5

Subject	[EXTERNAL] Oyster reef construction
To	MD Oyster Restoration
Sent	Friday, August 12, 2016 7:50 AM

The surface area of the lower Choptank River and Tred Avon River is about 65,000 acres. To construct and protect reefs that amount to less than about 150 acres in the two rivers represents less than 0.25% of the surface area. This seems to be a very small amount dedicated to oyster reef restoration and protection and should be supported. With GPS systems routinely used by fisherman, there should be no excuse for them to get their gear/boats damaged on the reef if they aren't intentionally fishing in the area. This illustrates the logical fallacy of their claims: on the one hand, they claim the reefs are not meeting their production targets as a reason not to construct more reefs, yet on the other, they want to open reefs to more fishing and are fishing nearby (this the reason their gear gets damaged) which would mean these areas are indeed productive. If they insist on this line of reasoning, ask them to voluntarily

reduce the number of licenses available as a quid pro quo to stopping further reef construction and protected areas.
Sincerely,
P Swanson

Email #6

Subject	[EXTERNAL] Tred Avon Oyster Sanctuary
To	MD Oyster Restoration
Sent	Friday, August 12, 2016 3:21 PM

(Below is text of word file provided in email.)

Maryland Oyster Restoration

Tred Avon Oyster Sanctuary

Army Corps of Engineers

ATTN: Angie Sowers

Good afternoon,

It is truly a beautiful Friday afternoon here as I look out onto the waters of the Tred Avon River.

I appreciate this opportunity to communicate my strong support for moving forward with these plans for oyster restoration on the Tred Avon. I was unable to attend the August 9th meeting but have spoken with those in attendance as well as read several news reports.

My purpose in writing this letter is to communicate my awareness of the critical nature of the passion this project creates in our community as well as represent those who are not motivated by profit but committed by personal investment I acknowledge the role careers play in all of our lives. However, the overall economy of the region is at risk with the health of the Bay.

I have no answers or even suggestions as to how to deal with these conflicting perspectives except to commend the professional engagement with which these officials conducted themselves.

Thank you for your leadership and commitment,

Donna Hager

Email #7

Subject	[EXTERNAL] Proceed with your oyster restoration plan as presented!
To	MD Oyster Restoration
Sent	Saturday, August 13, 2016 11:13 AM

I am a Talbot County resident and own 5 acres of waterfront property. I am an avid consumer of local oysters. I also enjoy many water-based activities and believe the long term need for clean rivers is paramount.

I listened attentively to Dr. Sowers explanation of the current restoration plans at the Talbot County hearing on August 9, 2016. I found the information clear, logical, and indicative of a well-thought out program. I was also impressed with the open-mindedness expressed for making modifications when there were thoughtful, fact based comments or objections (for example, specific locations where maps were believed to show erroneous water depth).

Many watermen present took strong objection to the program. I appreciate the watermen's perspective and viewpoint, but believe it is unduly self-interested and short sighted (literally, as in a short time horizon). I am confident and pleased that the results of the planned oyster restoration program will not only provide ecological benefits to the state (benefitting all citizens), but will provide a permanent, sustainable basis for a prosperous oyster industry, which is a shared objective.

II would add that at the meeting where many oystermen were implying that restoration work is challenging them financially and threatening their welfare, the facts concerning annual wild oyster catch in the Maryland portion of Chesapeake should have been cited. I believe the data (which should be updated thru 2015-16) shows the following (bushels landed); and if these figures are not correct, I urge the Corps to obtain and consider the correct data.

YOY Gain Cumulative
2010-11 123,613
2011-12 137,317 11% 11%
2012-13 343,000 150% 177%
2013-14 450,000 31% 264%

All of the gains shown above (which I believe continued in subsequent years) occurred in the presence of the State's oyster sanctuary, oyster reserve, and oyster restoration efforts. I believe the data demonstrates that oyster restoration is completely compatible with a contemporaneously thriving wild oyster fishery.

Please proceed with oyster restoration on the Tred Avon as planned.

Dan Watson

Email #8

Subject	[EXTERNAL] Maryland Oyster Restoration Project
To	MD Oyster Restoration
Sent	Saturday, August 13, 2016 1:04 PM

Greetings: Please add my name to those coming forward to support the proposal to continue to improve oyster restoration in the Chesapeake Bay and contributory rivers! If the current levels of adult oysters is + or - 1% of levels decades ago, we need to make sure this valuable asset continues to be available for our children and grandchildren. (NOTE: Watermen please note — your children and grandchildren will also want this valuable asset to be available for their enjoyment — and profit — as well!)

Below are two quotes from the proposed project which has been developed in cooperation with representatives of the watermen community. I urge the adoption of the proposal!

"Less than one percent of historic oyster populations remains. Oyster restoration is important because oysters provide a number of environmental benefits, including reef habitat that is significant to the Bay ecosystem for animals like blue crabs and fish. Additionally, oysters are filter feeders that improved water quality."

"….noysters within sanctuaries are expected to increase the abundance of adult oysters whose larvae are expected to settle not only within the sanctuary, but also on public shellfish fishery areas in the vicinity of the sanctuaries."

Sincerely yours,

David W. Lloyd

Email #9

Subject	[EXTERNAL] I support Tred Avon reef restoration
To	MD Oyster Restoration
Sent	Saturday, August 13, 2016 1:38 PM

As a resident of Baltimore, MD, a father of two kids whom I want to experience a restored Chesapeake Bay, and an environmentalist, I urge the Corps to complete the Tred Avon oyster restoration.

Sincerely,

-Joshua Ratner

Email #10

Subject	[EXTERNAL] Oyster Restoration in MD
To	MD Oyster Restoration
Sent	Sunday, August 14, 2016 2:26 PM

I am sending this email in strong support of the Corps oyster restoration program in Maryland and particularly on Maryland's Eastern Shore. I did not attend the recent public session in Easton, but have attended similar sessions in the past where waterman association reps and members dominate the feedback. Please do not take that as a valid representation of public sentiment which I find is widely in support of current restoration efforts. The watermen in general, and particularly through their associations, have a common objective - making money from oyster harvest. History has clearly shown that if permitted, they will take all and go on to the next species.

Any casual review of history on oyster harvesting in the Bay shows that this is a fishery that has been horribly abused so as to reduce population by 99 percent. Not only has this been catastrophic for oysters (and watermen), but also for underwater habitat that oyster reefs provide. (Yes, disease has been a factor, but the fishery had been reduced beyond resiliency.) The truth of the matter is that oysters are worth far more living in the water than in someones belly, at least until numbers can be restored to a sustainable level.

As a private citizen and volunteer. I have devoted a good chunk of the last fifteen years to Bay restoration efforts. Most of that time has been spent working as part of a community and State effort at comprehensive restoration of the Corsica River. For the past eight years I have personally labored each spring and fall to grow oysters at host locations all along our River and then planting them at an historic oyster bar here.

I, like many many others in our State, have done this because we have come to fully appreciate the science of the Bay and the role of oysters as its keystone species. I expressed to Governor Hogan that I was very disappointed when in January, his Administration halted the multi-million dollar, multi-agency partnership oyster restoration work in the Tred Avon. I appreciate caution where appropriate, but as the 2015 study of Harris Creek spat has shown again, the science behind these restoration methods is solid. The continuation and acceleration of this program, along with aggressive support of Maryland's oyster aquaculture industry, needs to be sustained, not undermined,

Continued protection of existing oyster sanctuaries is a complementary piece of the oyster restoration strategy and of efforts like ours in the Corsica to reestablish underwater habitat crucial to a healthy Bay and tributaries.

Please continue and expand oyster restoration efforts and protection of our sanctuaries.

Respectfully,

Frank DiGialleonardo

Email #11

Subject	**[EXTERNAL] oyster restoration -- or not**
To	MD Oyster Restoration
Sent	Monday, August 15, 2016 10:57 AM

Dear Friends,

I am taking the time to write you because the strident voices of those who value short-term gain over long-term environmental consequences are increasingly dangerous. I applaud the efforts to establish sanctuaries for oyster restoration. Over-harvesting and nutrient poisoning of the crab and oyster populations is not a legacy to leave our children. It's past time to get serious about regulation and education.

Thank you, Ann Hymes

a grandmother from St. Michaels, MD

Email #12

Subject	**[EXTERNAL] Tred Avon Oyster Restoration**
To	MD Oyster Restoration
Sent	Wednesday, August 17, 2016 4:36 PM
Attachments	<<Tred Avon Oyster Restoration.pdf>>

The public hearing held in the Talbot County Community Center August 9 was interesting and informative.

I am a fan of oysters, oysters for everyone, everything, everywhere, thus I have an ongoing interest in oyster restoration/protection projects. My husband loves to eat oysters, so I also have an ongoing interest in oysters for market.

For the record, I am fully behind the Tred Avon oyster restoration project. Godspeed and good luck.

It was obvious, hearing the commentary, that there have been issues with a prior habitat creation project. This is sad, but problems attend virtually all pilot projects, and I am certain the engineers will learn from the past and the next attempt will be much closer to perfection.

It was also obvious that the watermen present are angry with the whole idea of such projects. They can’t seem to find anything “right” with it and consider it a huge waste of taxpayer money.

I don't. I think oyster "reclamation" projects are probably the best thing for the bay, and the watermen. In fact, I think at least one of the arguments purportedly against the pilot project actually seems to support the benefit of this project for the watermen themselves.

One angry voice shouted about how catches of oysters really were up, quoting state reports available to any of us.

If this is true, and watermen are likely to be well aware of the size of their catches, then this is an argument FOR oyster habitat creation and protection.

This is because of the oyster's quirky reproductive strategy, which depends upon tides and heaps and heaps of good luck. Since watermen are scraping the bottom for oysters, and finding that the catches are up, it has to mean that seeding the oyster beds is working, even though many larvae "escaped" and struck elsewhere. Likely it also means that oysters that live above the mucky bottom, on, perhaps, a concrete block or pile of gravel, are doing a better job with their reproductive attempts than others mired in the muck. My best guess on that one is that higher in the water means the reproductive cells are also higher in the water, where it's easier to move around because there's less obstruction.

Whether the catches are up due to "escaping" larvae and spat or the improved chances of reproductive success from oysters living above the bottom, or both, it appears that seeding oyster beds is good for watermen.

Some might call this a handout or government subsidy, and I am absolutely fine with that idea, too. Watermen have families to support, and if they benefit from seeded oysters I'm delighted. I consider that an excellent use of taxpayer dollars, helping a struggling industry to keep people working and off the welfare rolls! Watermen rightly take pride in their independence, but in this case, I think the expense of oyster restoration projects is money well spent and if it helps them out, I think we should all just be grateful.

While the watermen seem to gripe about virtually every element of the pilot project it appears that the real "rub" is that they feel they've been left out of the whole planning process and have no voice in a matter which so seriously affects their livelihood. I am hopeful that in the future a greater effort to involve the watermen in the planning process – perhaps reminders that these things help them out, too, will help – so that they can get behind the projects which are of such obvious benefit to all of us.

Thank you for taking the time to hold a "town meeting" for us, and thank you for all your hard work helping to save this lovely bay for all future generations.

Maureen Rice

*this letter also submitted in PDF for your records.

Email #13

Subject	**[EXTERNAL] comment/support on DRAFT EA &FONSI: Oyster Restoration in the Tred Avon River Oyster Sanctuary, Maryland**

To	MD Oyster Restoration
Cc	Matt Pluta
Sent	Wednesday, August 17, 2016 5:29 PM

To Whom It May Concern:

I find that the above-referenced EA and FONSI is a satisfactory document to justify deciding to expand oyster restoration efforts from only waters deeper than 8 feet MLLW to waters between 6.5 and 9 feet MLLW in the Tred Avon River oyster sanctuary.

Rationales advanced in Sections 2.3,(Problem Identification), 2.31 (Brief Description of Project), 2.32 (Tred Avon Oyster Populations [especially the reference p. 17, from Boicourt {1982, expanded/supplemented by the discussion in Section 4.1.3: Water depths and circulation, p. 31 }]) are persuasive.

Section 3.3 (Evaluation of Alternatives p.20, et seq.) provides a fair, balanced consideration of the possible strategies. Section 3.3, subsection Alternative 7 (ABC_ nav), “Full restoration with limits…navigational pathway”, pp. 25-26, and Section 3.4 (Preferred Alternative) make an adequate case to justify selecting the preferred alternative.

I support implementation of Alternative 7.
W. R. (“Nick”) Carter, III

Email #14

Subject	**[EXTERNAL] Comments on Supplemental EA for Tred Avon Oyster Restoration**
To	MD Oyster Restoration
Sent	Friday, August 19, 2016 9:56 AM
Attachments	<<Comments on USACE Supplemental EA for Tred Avon Restoration.pdf>>

To whom it may concern,

Please see the attached comment letter in regards to the terms and decisions identified in the Supplemental EA for Tred Avon oyster restoration. These comments are provided in support by the undersigned organizations and individuals.

Thank you,
Matthew J. Pluta
Choptank Riverkeeper

Midshore Riverkeeper Conservancy

MIDSHORE RIVERKEEPER® CONSERVANCY

TIMOTHY D. JUNKIN, ESQ.
FOUNDER

JEFFREY H. HORSTMAN
EXECUTIVE DIRECTOR
MILES-WYE RIVERKEEPER

MATTHEW J. PLUTA
CHOPTANK RIVERKEEPER

midshoreriverkeeper.org info@midshoreriverkeeper.org

August 19, 2016

Via EMAIL

U.S. Army Corps of Engineers, Baltimore District
Attn: Angie Sowers
10 South Howard St., Ste. 11000
Baltimore, MD 21201

Re: **Supplemental Environmental Assessment and Finding of No Significant Impact; Oyster Restoration in the Tred Avon River Oyster Sanctuary, Maryland**

Dear Sir or Madam,

This letter provides comments of the undersigned organizations on the U.S. Army Corps of Engineers' (USACE) July 2016 *Supplemental Environmental Assessment and Finding of No Significant Impact; Oyster Restoration in the Tred Avon River Oyster Sanctuary, Maryland* ("Supplemental EA"). We support the expansion of restoration efforts into waters as shallow as 6.5' to meet oyster restoration goals and ultimately improve the function and water quality in the Tred Avon River. Oyster restoration is a benefit to the river and all of the natural resources it supports, and is a key component of the wider Chesapeake Bay recovery effort. Significant federal and state resources already have been invested in the strategic plan and activities to return oysters to their historical role in the Bay. As recognized in the federal Strategy for Protecting and Restoring the Chesapeake Bay Watershed:

> "Oysters are a keystone species in Chesapeake Bay. They grow naturally in reefs that create and provide habitat not just for themselves and additional generations of oysters, but for many species of commercially and recreationally important finfish and shellfish. Oyster reefs were once the dominant hard-bottom habitat in the Chesapeake Bay, and it is thought that the ability to restore the overall water quality, habitat and fisheries in the Bay is likely closely linked to our ability to restore oyster populations."[1]

We consider the Supplemental EA to represent a scientifically supportable and fair analysis of the impacts of the proposed oyster restoration project in the Tred Avon River. We support the alternative selected by USACE, which protects the navigability of the river while maximizing ecological restoration to a great extent. It is impossible to eliminate adverse impacts on all parties

[1] Executive Order No. 13,508, *Chesapeake Bay Protection and Restoration*, signed May 12, 2009, p. C-7, 74 Fed. Reg. 23099 (May 15, 2009), http://www.gpo.gov/fdsys/pkg/FR-2009-05-15/pdf/E9-11547.pdf.

given the magnitude of this project, but the long-term ecological, economic, and cultural benefits that will result from oyster restoration in the Tred Avon River support these further activities. We provide comments on certain aspects of the Supplemental EA below.

1. The Positive Effects of Oyster Restoration Should Be Described Using the Most Currently Available Information and Data

This supplemental EA represents the transition into the next phase of the on-going oyster restoration activities, expanding restoration into shallower water depths that more fully represent the extent of historic reef habitat. Although the impacts of the larger restoration effort may not be known for some time, we consider it very important to acknowledge the positive impacts that already have been identified from current and past activities, as identified in recent reports. Large-scale in-water oyster restoration activities have been taking place in Maryland's Harris Creek since 2011. The first 12 reefs (102 acres) were treated in 2012, resulting in the first three-year monitoring review in fall 2015.[2] The monitoring data revealed that all 12 reefs in the first cohort meet the Oyster Metrics success criterion for presence of multiple year classes of oysters, and also meet the minimum threshold success criteria for oyster density (15 oysters/m^2 over 30% of the reef area) and oyster biomass (15 g/m^2 over 30% of the reef area), with half of those reefs also meeting the higher target criteria for oyster density (50 oysters/m^2 over 30% of the reef area) and oyster biomass (50 g/m^2 over 30% of the reef area).[3] These are early, but very promising data, and support the expansion of large scale restoration activities.

Also in July 2016, the Maryland Department of Natural Resources issued its first required five-year review of Maryland's oyster sanctuaries, Public Shellfish Fishery Areas (PSFAs), and aquaculture industry under the state's Oyster Management Plan.[4] Although the report is reluctant to reach any conclusions, it acknowledges that "the proxy indicators for ecological services (survival, abundance, biomass, and size structure) have generally shown stable or increasing trends in sanctuaries. Increasing biomass, which is more common in sanctuaries than in PSFAs, in many cases reflects the survival of older, larger oysters that have a greater reproductive capacity. Changes in mortality, abundance, biomass and typical oyster size after an area is placed in sanctuary can indicate increased ecological services. Research is beginning to show how a complex, three-dimensional structure benefits the oyster reef and the whole ecosystem."[5] While we agree that more time is needed to fully evaluate the impacts of the sanctuaries, particularly in light of the on-going restoration activities, these preliminary data are very promising.

Considering the positive trend of the information and data presented in these reports, we urge USACE to ensure that it is appropriately evaluating and incorporating the positive impacts of oyster restoration activities in the Supplemental EA.[6]

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[2] National Oceanic and Atmospheric Administration, *Analysis of Monitoring Data from Harris Creek Sanctuary Oyster Reefs, Data on the First 102 Acres/12 Reefs Restored*, July 2016, p. 3, http://www.chesapeakebay.noaa.gov/images/stories/habitats/hc3ydcheckinjuly2016.pdf ("NOAA Harris Creek Analysis").

[3] *Id.*, p. 4.

[4] Maryland Department of Natural Resources, *Oyster Management Review: 2010-2015, Draft Report*, July 2016, http://dnr.maryland.gov/fisheries/Documents/FiveYearOysterReport.pdf.

[5] *Id.*, p. v.

[6] We acknowledge that these reports were released too recently to address in the Supplemental EA.

2. USACE's Restoration Goals Are Reasonable and Supportable

The Supplemental EA establishes a restoration goal for the Tred Avon of 146 acres, based on the oyster metrics report criteria for a successfully-restored tributary[7] and considering waterway use conflicts, buffers around navigational channels, aids to navigation, and private docks.[8] The 146 acres does not include an additional 28 acres that will be used for project controls and accounts for a 10% reduction in suitable restoration area of the area targeted for seed (only 71 acres) when work begins (i.e., a reduction from 154 acres to 146). USACE notes that "it is unknown which acreages will be determined to be unsuitable with future investigations such as diver ground truthing."[9] We support USACE's rationale for establishing the ~146 acre restoration goal, but note that this goal does not provide a large buffer against the minimum objective to restore at least 125 acres (i.e., at least 50% of currently-restorable bottom); if diver ground truthing reveals less suitable ground than anticipated, the current plan may need to be reassessed to ensure the project meets the definition of a successfully-restored tributary.

The purpose of the supplemental EA is to: (1) evaluate the environmental impacts of the expansion of oyster reef restoration between the depths of 6.5 to 9 feet mean lower low water (MLLW) within the Tred Avon River oyster sanctuary; and (2) evaluate the planting of spat-on-shell on constructed reefs and on existing oyster reef (4-20 feet MLLW, depending on natural location of the reef) within the sanctuary on 71 acres.[10] Previously, activities had been limited to locations where it was possible to retain a minimum 8 ft navigational depth clearance. USACE has now determined that it is necessary to expand the water depths where oyster reef habitat restoration can occur in order to reach the restoration target of the tributary plan and provide the greatest likelihood that restored oyster resources will have a system-wide response and become self-sustaining.[11] We fully support USACE's determination to move forward with restoration activities in shallower waters. As discussed in the Supplemental EA, expanding restoration to shallower areas provides a number of biological benefits to support increased oyster reproductive success. As the goal of the overarching project is to establish a self-sustaining oyster population, these shallow water activities are critical to that goal.

While we fully support the expansion of the oyster restoration activities to shallower depths, we encourage USACE to consider the impact of restoration efforts on submerged aquatic vegetation (SAV). The Supplemental EA indicates that data from 2008-2013 showed no documentation of SAV at proposed restoration sites, and concludes that SAV is unlikely to be adversely impacted because restoration activities will be taking place in waters deeper than those in which SAV typically grows and during a time of the year when SAV is dormant.[12] While we generally agree with the rationale why SAV will not be impacted, more recent data is available from the Virginia Institute of Marine Sciences (VIMS), which mapped the 2015 distribution of SAV in the Chesapeake Bay and its tributaries.[13] These data indicate a significant increase (58%) in SAV in

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[7] Supplemental EA, p. 7. A successfully-restored tributary is defined as a tributary where 50-100%t of currently restorable bottom is restored and the amount of restorable bottom that is restored must be at least 8-16% of historic oyster habitat. Id.

[8] *Id*.

[9] *Id*., p. 10.

[10] *Id*., p. 11.

[11] *Id*., p. 13.

[12] *Id*., p. 60.

[13] Virginia Institute of Marine Science, *Preliminary 2015 Distribution of Submerged Aquatic Vegetation in the Chesapeake Bay and Tributaries and the Coastal Bays*, Preliminary Executive Summary, http://web.vims.edu/bio/sav/sav15/exec_summary html ("VIMS SAV Report").

the mouth of the Choptank River (1535 ha (2014) vs. 2428 ha (2015)). USACE should consider this newer data in its assessment and confirm that areas within close proximity to restoration sites would not negatively impact any newly established SAV habitat.

3. USACE Selected the Most Appropriate Alternative for the Project

The Supplemental EA includes a list of feasible and reasonable alternatives to the planned restoration activities. The Supplemental EA does not evaluate restoration of all available bottom (251 acres) as that was considered to be an infeasible option (due to navigational uses, setting area aside as controls, and public input).[14] Of the "feasible and reasonable" alternatives, USACE selects the last described alternative, Alternative 7, identified as "ABC_nav."[15] Alternatives 6 and 7 are very similar, but based on feedback from the U.S. Coast Guard (USCG) Alternative 7 reduces the acreage for restoration to avoid navigational impacts. USACE concludes that restoration efforts completed under Alternative 7 could achieve restoration of the full 146 acres, and satisfy the goals set to restore a minimum of 8-16% of historic habitat (68 acres) and >125 acres of restorable bottom. Unlike Alternative 6, this alternative would not maximize ecological benefits. While Alternative 6 would be the most desirable alternative, we support USACE's reasonable decision to ensure that the navigational channel be kept clear. Indeed, it is important to keep the navigational channel clear of oyster restoration activities to prevent the potential destruction of oyster reefs and to protect investments in oyster restoration.

As part of the reef restoration, USACE has indicated that although native oyster shell is the preferred substrate and will be used if it becomes available, alternate substrates such as stone and non-oyster shell are the more likely substrates.[16] We agree that native oyster shell would be the ideal substrate for reef restoration, but strongly support USACE moving forward with reef restoration using stone as the alternative. Stone is a readily available, cost-effective alternative, and data from the NOAA report on Harris Creek indicates that it is a biologically suitable substrate: "Beyond the first cohort of reefs, one reef (#18), constructed of stone substrate and planted in 2013 (a year later than the first cohort), was also monitored. Data show oyster density here in fall 2015 was more than three times as high as at any other site monitored in Harris Creek. As this reef was planted a year later than the first cohort, densities between it and the first cohort may not be completely comparable. However, the high density and the complex reef structure evident in the sonar image show promising early results from the use of stone substrate for restoration."[17] We also understand that the Chesapeake Bay bottom historically would have been comprised of stone and rock, but that over time this bottom has been covered with sediment. Use of stone for reef restoration is therefore authentic to the Bay.

One issue that has arisen with the use of stone substrate is impediments to navigability due to overbuilt reefs. In 2015, USACE constructed 55 acres across 24 sites of oyster reef in Harris Creek. Ten of these 24 sites had locations in which the contractor overbuilt some of the reefs, which lowered the navigable clearance for vessels.[18] Corrections to these reefs were completed in March, 2016, and to prevent a reoccurrence with new work, USACE has developed a process to more efficiently conduct post-construction surveys before the spat-on-shell is placed, and is

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[14] Supplemental EA, p. 30.

[15] *Id*., p. 27.

[16] Supplemental EA, p. ES-2.

[17] NOAA Harris Creek Analysis, p. 4.

[18] USACE, *Tred Avon River and Harris Creek Oyster Reef Restoration Updates*, http://www nab.usace.army.mil/Missions/Environmental/Oyster-Restoration/.

tightening quality control methods for future work.[19] We recognize that more such incidents are possible, but believe that the control measures that USACE is implementing should significantly minimize that risk, and considering the broad, long-term ecological, economic, and cultural benefits that should accrue from this project, that risk is acceptable.

We appreciate your time and consideration. If you should have any questions regarding these comments, please contact Matthew Pluta, Choptank Riverkeeper of the Midshore Riverkeeper Conservancy, at 443-385-0511 or matt@midshoreriverkeeper.org.

Sincerely yours,

Matthew Pluta,
Choptank Riverkeeper
Midshore Riverkeeper Conservancy

Jesse Iliff
South River Riverkeeper
South River Federation Inc.

Chester River Association

Chesapeake Bay Foundation

Robert Mason,
Homeowner, Harris Creek

Suellen Keiner
Homeowner, St. Mary's River
Member, Save Our Sanctuary

John Paradis
Homeowner, St. Mary's River
Member, Save Our Sanctuary

Kevin Sullivan
Homeowner, Miles River
Volunteer, Midshore Riverkeeper Conservancy
Volunteer, Oyster Recovery Partnership

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[19] *Id.*

Email #15

Subject	**[EXTERNAL] CCA Maryland Input to Draft EA on Tred Avon Restoration**
To	MD Oyster Restoration
Sent	Friday, August 19, 2016 12:55 PM
Attachments	<<USACE - Tred Avon 081616-signed.pdf>>

Attached please find CCA Maryland's input on the Draft EA for the Tred Avon Restoration.

Thank You.

-David Sikorski
Coastal Conservation Association- Maryland
Chairman-Government Relations Committee

COASTAL CONSERVATION ASSOCIATION MARYLAND

U.S. Army Corps of Engineers, Baltimore District
Attn: Angie Sowers
10 Howard St. Ste. 11000
Baltimore MD. 21201

RE: Supplemental Environmental Assessment and Funding Of No Significant Impact: Oyster Restoration in the Tred Avon River Oyster Sanctuary, Maryland

Dear Ms. Sowers,

The Coastal Conservation Association of Maryland supports the expansion of restoration efforts, in order to meet oyster restoration goals and improve the water quality of the Tred Avon River, into waters as shallow as 6.5 feet.

We believe the Supplemental EA represents a scientifically supportable and fair analysis of the impacts of the restoration project in the Tred Avon River. We support the alternative selected by USACE to protect the navigability of the river while maximizing the ecological restoration. Although ideal it is impossible to eliminate adverse impacts on all stakeholders when the magnitude of the project is considered. We believe the long-term ecological, economic and cultural benefits that will result from oyster restoration in the river supports these further activities.

The impacts of the larger restoration effort may not be known for some time, the positive data from current and past activities is well illustrated. The supplemental EA represents the transition into the next phase of the on-going restoration into shallower water depths that more fully represent the extent of historic reef habitat. A goal of the project is to establish a self-sustaining oyster population and these shallow water activities are a key element to that goal. We urge USACE to evaluate and incorporate the positive impacts of oyster restoration activities in the Supplemental EA.

We agree that native oyster shell would be the ideal substrate for reef restoration, but strongly support USACE moving forward with reef restoration using stone as the alternative. Stone is very available and cost-effective. The data from the NOAA report on Harris Creek indicates that it is a biologically suitable substrate. We believe that that the control measures USACE is implementing to minimize navigational risks associated with overbuilt reefs will be a great asset to the project. Although future incidents are possible we believe USACE's post-construction surveys before spat-on-shell is placed and the tightening of quality control methods will have a positive effect on the project.

Finally, although USACE has already modified its restoration plan to account for barging activities by Vulcan that could unintentionally damage restored reefs; we would request that a public meeting be held so that the potential of these impacts can be addressed.

Thank you for your time and consideration.

Sincerely,

Frank Bonanno

Frank Bonanno
Coastal Conservation Association of Maryland
Chairman of the Board

Email #16

Subject	**[EXTERNAL] DFA - Tred Avon USACE/NOAA oyster project**
To	MD Oyster Restoration
Cc	'Robert Newberry (rnewberry56@yahoo.com)'; 'Floyd "Bunky" Chance'; Charles D. MacLeod
Sent	Friday, August 19, 2016 6:26 PM
Attachments	<<SKM_C654e16081917210.pdf>>

Attached please find public comments relative to the Tred Avon project.

Jefferson L. Blomquist, Esquire

200 Duke of Gloucester Street
Annapolis, Maryland 21401
PHONE: (410) 810-1381
FAX: (410) 810-8964

August 19, 2016

VIA Email
U.S. Army Corps of Engineers, Baltimore District
Attn: Angie Sowers
10 South Howard Street, Ste. 11600
Baltimore, MD 21201
MD.OysterRestoration@usace.army.mil

Re: DFA Comments on Oyster Restoration in Shallower Waters in Tred Avon River

Dear Ms. Sowers:

DelMarVa Fisheries Association, Inc. ("DFA") appreciates the opportunity to comment on the oyster restoration into shallower water depths than are currently allowed in what USACE has labeled the Tred Avon River Oyster Sanctuary in Talbot, County.

DFA does not support this project.

The only material that should be placed on the historic natural oyster bars (*i.e.*, the Yates bars) is shell. There is an abundance of oyster shell in the Maryland portion of the Chesapeake Bay that has been buried in sediments and could be mined and seeded for that purpose.

The Man O'War Shoal, which is located at the mouth of the Potapsco River and the Bay, is an excellent example of a natural oyster bar that should be mined for shell. A shell mining permit is pending before USACE and has been pending for over five years which would permit indigenous shell to be mined from under the smothering sediments that cover that oyster bar. That oyster bar has not produced a sustainable oyster population because it is regularly inundated with the polluted/toxic, poorly oxygenated waters of the Potapsco River. Millions of gallons of raw sewage with industrial waste from the Baltimore City and the Baltimore County WWTPs and from failing sewer lines and pumping stations that in some cases are over a century old, have not been properly maintained and have been subject to EPA corrective action consent orders that have been extended for multiple decades make the restoration of a sustainable oyster population on Man O'War Shoals impracticable and unable of accomplishment at this time. USACE should approve that permit and mine that shell for use in Tread Avon River oyster restoration projects.

The non-indigenous substrate placed in Harris Creek has:

(i) caused damage to boats navigating in the creek;

(ii) have prevented crabbers from harvesting crabs in Harris Creek because their lines and pots get caught in such substrate.

No one has compensated boat owners for the damage caused by such substrate. No one has compensated Maryland harvesters for the lost profits caused by such substrate.

The State of Maryland holds the tidal waters of the State in trust for the citizens of the State to use as navigable highways and as fisheries. The State has a fiduciary duty to maintain the navigability and the harvestable qualities of those tidal waterways, which include the Tred Avon River, for its citizens. Representatives of USACE have asserted that the oyster restoration work undertaken in the Tred Avon will preclude the harvest of oysters from the historic natural oyster bars in the river. USACE has no legal right to do anything in the waters of the Tred Avon River that interferes with the right of Marylanders to navigate that river and harvest from the fisheries supported by that river, including the crab fishery and the oyster fishery.

Creating three-dimensional oyster reefs in the Bay is a recipe for the death of natural oyster bars, not the restoration of natural oyster bars. Three-dimensional barriers placed in the Bay, a largely flat and shallow estuarine, retard tidal flushing and cleansing and serve as underwater fences that trap sediments, vegetative debris and decaying algae blooms and prevent them from being flushed in the deep channels and out into the Ocean. Such items anaerobically decompose to sapropel, deplete the supply of oxygen in the shallows and release toxic sulfides, all of which kill oysters, shellfish, and other indigenous flora and fauna.

Centuries ago, when bulkheads, riprap lined banks and other man-engineered practices were not employed to preserve property lines and maintain tidal water access, as dimensional structures in the Bay grew taller and in conjunction with natural periodic storm events and hurricanes, the natural courses of inlets and tributaries regularly changed, moved, filled and relocated. I could take you to a farm field in in the middle of Queen Anne's County that surrounds Interstate Route 301 and show you a historic tributary channel through such farm field that long ago filled in and now serves as fertile farmland. When one excavates to depth of 18"-30" in the field, one encounters a healthy layer of buried shell (primarily oyster shell). When one studies the history of major river delta regions, such filing and alteration of tributary courses in the delta region was typical and a naturally occurring cycle prior to the introduction of man-made engineering practices that altered such natural cycles.

In the longer term, three-dimensional "reefs" will become traps for sediments and other pollutants that will remove oxygen during the initial aerobic decomposition of such pollutants, will generate sulfides during the anaerobic decomposition of such pollutants, and will destroy shellfish habitat.

There is no evidence that natural oyster spat will adhere to the substrate being dumped in the Tred Avon or that was dumped into Harris Creek or the little Choptank River.

Non-indigenous and unwashed shell and substrate was dumped into Harris Creek and the Little Choptank and the slurry from Florida transported by railcar to the Bay came from a vibrio-rich environment. The incidence of debilitating vibrio in the regions were USACE work was performed is on the rise, and at the public hearing, testimony to that effect was prohibited.

Much of the substrate dumped into Harris Creek and the Little Choptank River, was laden with sediments and further polluted the Bay and those tributaries. When members of the public established that such substrate did not meet the USACE permit specifications, USACE modified the permit apparently because Governor O'Malley made a deal with CSX to bring polluted substrate mined in Florida to Maryland (perhaps as part of a political pay-off) and such polluted substrate that did not meet original specifications was loaded on barges in the Inner Harbor waiting to be dumped in those tributaries. USACE and MDNR/MES cannot be trusted to maintain quality control.

Such projects are a waste of taxpayer money. They have not increased the biomass of oysters as effectively as the oyster cultivation through power dredging and the seeded shell relocation program have.

Such project is being undertaken in violation of NEPA and the CEQ implementing regulations of NEPA. At the public hearing last week, NOAA/USACE refused to allow the public in attendance to offer comments. The public had to submit questions on 3"x5" cards that were taken to another room and screened, with only selected and approved questions being answered and addressed. No EIS was prepared for this project and the EIS process was not implemented. Local government and industry input was not requested or allowed.

What scientific evidence does USACE/NOAA have to suggest that this project is an effective use of taxpayer money to restore oyster habitat?

Removing the Tred Avon River from the public fishery will devastate the human environment (including the economic, cultural and social environments) of Maryland's Eastern Shore jurisdictions.

What economic impact analysis have NOAA/USACE performed?

Thank you for the opportunity to submit comments on behalf of DFA.

Who will be responding to such comments and when can a response be expected? Please advise.

Sincerely,

Capt. Robert Newberry
Chairman

189533v1

Email #17

From:	Gmail
To:	Sowers, Angela NAB
Subject:	Re: [EXTERNAL] Re: Corps of Engineers, MD DNR request comments on oyster restoration in Tred Avon River
Date:	Tuesday, July 19, 2016 11:44:17 AM

Thanks so much!

Sent from my iPhone

> On Jul 19, 2016, at 11:38 AM, Sowers, Angela NAB <Angela.Sowers@usace.army mil> wrote:
>
> Hello,
> We do have bathymetry data. I will work to get you the information requested.
>
> Thank you,
> Angie Sowers
>
> -----Original Message-----
> From: Gmail [redacted]
> Sent: Tuesday, July 19, 2016 11:26 AM
> To: Sowers, Angela NAB <Angela.Sowers@usace.army mil>
> Subject: [EXTERNAL] Re: Corps of Engineers, MD DNR request comments on oyster restoration in Tred Avon River
>
> Do you have high resolution bathymetry for the Morgan's Point areas you intend to seed? Can we get a detailed side scan map of the areas you plan to seed with an overlay of the seeding areas?
>
> Sent from my iPhone
>
>> On Jul 19, 2016, at 8:06 AM, Sowers, Angela NAB <Angela.Sowers@usace.army mil> wrote:
>>
>> Dear interested stakeholder,
>> The U.S. Army Corps of Engineers, Baltimore District, in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended, has prepared a supplemental environmental assessment (EA) evaluating oyster restoration activities in the Tred Avon River. The actions evaluated by the EA include the potential expansion of alternate substrate oyster reef restoration into water depths between 6.5 and 9 feet mean lower low water (MLLW) as well as seeding those reefs and existing reefs with spat-on-shell. The plan is being conducted in partnership with the Maryland Department of Natural Resource (MD DNR). In addition to having an approved supplemental EA, construction of this project is contingent upon MD DNR concurrence with restoration plans. Further information including how to obtain the EA for review, the public meeting, and how to submit comments is included in the attached Notice of Availability. Please contact me with any questions.
>>
>> Thank you,
>> Angie Sowers
>>
>> Angie Sowers, Ph.D.
>> U.S. Army Corps of Engineers
>> Baltimore District- Planning Division
>> Civil Project Development Branch
>> Integrated Water Resources Management Specialist
>> 10 S. Howard St.
>> Rm 11700-E
>> Baltimore, MD 21201
>> angela.sowers@usace.army mil
>> (410)962-7440