



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
NORTH ATLANTIC DIVISION, US ARMY CORPS OF ENGINEERS
FORT HAMILTON MILITARY COMMUNITY
BROOKLYN, NEW YORK 11252-6700

CENAD-PD-PP

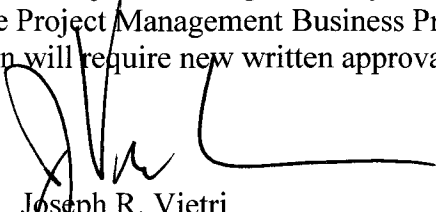
JAN 6 2012

MEMORANDUM FOR Commander, Baltimore District, ATTN: CENAB-PP-C

SUBJECT: Review Plan Approval for Chesapeake Bay Native Oyster Recovery Master Plan

1. The attached Review Plan for the subject study has been prepared in accordance with EC 1165-2-209, Civil Works Review Policy.
2. The Review Plan has been coordinated with the Ecosystem Restoration Planning Center of Expertise of the Mississippi Valley Division, which is the lead office to execute this plan. For further information, contact Ms. Jodi Creswell at 309-794-5448. As no specific projects for construction will be evaluated during this study, the Review Plan does not include independent external peer review.
3. I hereby approve this Review Plan, which is subject to change as study circumstances require, consistent with study development under the Project Management Business Process. Subsequent revisions to this Review Plan or its execution will require new written approval from this office.

Encl


Joseph R. Vietri
Chief, Planning & Policy Division
Programs Directorate

REVIEW PLAN

Chesapeake Bay Native Oyster Recovery Master Plan

Baltimore and Norfolk Districts

MSC Approval Date: January 6, 2012

Last Revision Date: January 6, 2012



**US Army Corps
of Engineers®**

REVIEW PLAN

Chesapeake Bay Native Oyster Recovery Master Plan

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1. PURPOSE AND REQUIREMENTS

a. **Purpose.** This Review Plan defines the scope and level of peer review for the Chesapeake Bay Native Oyster Recovery Master Plan (NORMP).

b. References

- (1) Engineering Circular (EC) 1165-2-209, Civil Works Review Policy, 31 Jan 2010
- (2) EC 1105-2-412, Assuring Quality of Planning Models, 31 Mar 2010
- (3) Engineering Regulation (ER) 1110-1-12, Quality Management, 30 Sep 2006
- (4) ER 1105-2-100, Planning Guidance Notebook, Appendix H, Policy Compliance Review and Approval of Decision Documents, Amendment #1, 20 Nov 2007
- (5) NORMP Project Management Plan (PMP)
- (6) CENAD Quality Management Plan
- (7) CENAD-PSD-P Memo dated 28 February 2011, Subject: Chesapeake Bay Oyster Recovery, MD and VA, Master Plan
- (8) Conceptual Model for Oyster Restoration in the Chesapeake Bay (attached)
- (9) Plan Formulation Strategy Conceptual Model for the NORMP (attached)
- (10) Carnegie, R.B. and E.M. Burreson. 2011. Declining impact of an introduced pathogen: Haplosporidium nelson in the oyster Crassostrea virginica in Chesapeake Bay. Marine Ecology Progress Series 432: 1-15.
- (11) Grabowski, J.H. and C.H.Peterson. (2007) Restoring oyster bars to recover ecosystem services. In: Cuddington K, Byers JE, Wilson WG, Hastings A (eds) Ecosystem engineers: concepts, theory and applications. Elsevier-Academic Press, Amsterdam, p 281-298.
- (12) National Research Council. 2004. Nonnative Oysters in the Chesapeake Bay. Washington DC: The National Academies Press.
- (13) USACE. 2009. Final Programmatic Environmental Impact Statement for Oyster Restoration in Chesapeake Bay Including the Use of a Native and/or Nonnative Oyster.
- (14) Santopietro, G.D. 2008. An Economic Analysis of Proposed Management Plans for the Public Oyster Grounds of the Rappahannock River. Virginia Coastal Zone Management Program Report.

c. **Requirements.** This review plan was developed in accordance with EC 1165-2-209, which establishes an accountable, comprehensive, life-cycle review strategy for Civil Works products by providing a seamless process for review of all Civil Works projects from initial planning through design, construction, and operation, maintenance, repair, replacement and rehabilitation (OMRR&R). The EC outlines four general levels of review: District Quality Control/Quality Assurance (DQC), Agency Technical Review (ATR), Independent External Peer Review (IEPR), and Policy and Legal Compliance Review. In addition to these levels of review, decision documents are subject to cost engineering review and certification (per EC 1165-2-209) and planning model certification/approval (per EC 1105-2-412).

2. REVIEW MANAGEMENT ORGANIZATION (RMO) COORDINATION

The RMO is responsible for managing the overall peer review effort described in this Review Plan. The RMO for decision documents is typically either a Planning Center of Expertise (PCX) or the Risk Management Center (RMC), depending on the primary purpose of the decision document. The RMO for

the peer review effort described in this Review Plan is National Ecosystem Planning Center of Expertise (ECO-PCX).

Since this is not a decision document, the RMO will not need to coordinate with the Cost Engineering Directory of Expertise (DX) to ensure the appropriate expertise is included on the review teams to assess the adequacy of cost estimates, construction schedules and contingencies.

3. STUDY INFORMATION

- a. **Decision Document.** The Chesapeake Bay Native Oyster Recovery Master Plan (NORMP) will serve as a programmatic tool that will identify the tributaries within the Chesapeake Bay that are appropriate for assessment at the feasibility-level for potential restoration of native oyster populations. In 2009, the Norfolk District, in cooperation with the Maryland Department of Natural Resources (MDNR) and the Virginia Marine Resource Commission (VMRC), as well as the Potomac River Fisheries Commission (PRFC), the Environmental Protection Agency (EPA), the National Oceanographic and Atmospheric Administration (NOAA), the U.S. Fish and Wildlife Service (USFWS), and the Atlantic States Marine Fisheries Commission (ASMFC), prepared the 2009 Programmatic Environmental Impact Statement EIS (PEIS) to Evaluate Oyster Restoration Alternatives, including the Proposed Action of Introducing the Oyster Species *Crassostrea ariakensis* (USACE 2009). This document underwent a significant level of external peer review. The EIS recommends pursuing only native oyster restoration in the Chesapeake Bay and serves as an umbrella document to this master plan.

The NORMP uses physical data established as layers in GIS and layer analysis within GIS to identify tributaries within the Chesapeake Bay as either Tier I or Tier II tributaries. Tier I tributaries are those that are determined to have the most suitability and greatest potential to support large scale oyster restoration efforts. Tier II tributaries have a current physical limitation that is concluded to limit restoration potential under current conditions. The purpose of Tier classification is to focus follow-on feasibility study efforts within the Chesapeake Bay in areas with the highest likelihood of overall success. The NORMP includes construction cost estimates for Tier I tributaries that have planning-level designs based on potential acreages. There is no incremental cost analysis due to the level of detail involved in this effort. A CE/ICA will be done as part of the individual feasibility studies for independent tributaries.

The NORMP is not a decision document (this determination was made by CENAD and is documented in CENAD-PSD-P Memo dated 28 February 2011) and will not require action by Congress or approval of HQUSACE. CENAD has review and approval authority for the NORMP. There will be no NEPA documentation developed in conjunction with the NORMP. If needed, NEPA documentation will be developed during any follow-on feasibility studies.

- b. **Study/Project Description.** The Chesapeake Bay Native Oyster Recovery, MD and VA Native Oyster Restoration Master Plan(NORMP) is being developed jointly by the Baltimore and Norfolk Districts, under authority of Section 704(b) of the Water Resources Development Act (WRDA) of 1986, as amended by Section 505 of WRDA 1996, Section 342 of WRDA 2000, Section 113 of the FY02 Appropriations Act, Section 126 of the FY06 Appropriations Act, and Section 5021 of WRDA 2007. Although the project authorization was passed in 1986, funding for the project was not made available until 1995 through a Congressional add sponsored by Maryland Senator Paul Sarbanes and Congressman Steny Hoyer. The Baltimore District prepared decision documents in 1996, 2002, and

2009 supporting the construction of oyster bars in Maryland waters and has implemented projects with the Maryland Department of Natural Resources (MDNR) as the non-Federal sponsor. In addition, the Norfolk District prepared decision documents in 2001, 2003, and 2005 supporting construction of oyster reefs in Virginia waters (constructed or scheduled for construction) with the Virginia Marine Resources Commission (VMRC) as the non-Federal sponsor. Over 700 acres of oyster reefs have been either constructed or approved for construction in the Chesapeake Bay by USACE under the authority of Section 704(b).

The continued crucial need for conservation, restoration, enhancement, and the creation of oyster habitat in the Chesapeake Bay have raised interest in this work in both the oyster restoration community and Congress. This interest has led the oyster restoration teams from the Baltimore District and Norfolk District to undertake preparation of a native oyster restoration master plan (NORMP) for future work that considers the entire Chesapeake Bay and proposes a more comprehensive plan for oyster restoration in the Chesapeake Bay watershed. Initially, each district was addressing Maryland and Virginia waters separately. However, in December 2005, senior leadership within each district recommended that the master plan be developed, prepared and documented by a single integrated team. This position has been endorsed by both the District Support Team (DST) and the Regional Integration Team (RIT). The NORMP will address the Chesapeake Bay as a single watershed and will present a fully integrated strategy for restoring the native oyster consistent with USACE mission areas and authorities.

The NORMP will lay the long-term groundwork for future USACE oyster restoration in the Chesapeake Bay by evaluating the pattern, scale, and location of potential oyster restoration projects throughout the Bay. It will make recommendations for future restoration activities consistent with current and anticipated constraints. Oyster restoration is affected by different physical and biological constraints in different regions of the Bay. For instance, salinity varies widely between the upper and lower Bay. These variations in salinity regime may require different approaches to oyster restoration. The master plan will attempt to define the scale of restoration efforts and to provide for the recovery of sufficient biomass and population levels to sustain a continued population increase over time in any discrete body of water into which a project is directed. The master plan will outline salinity-based strategies for formulating restoration as well as strategies to address disease and reproduction with respect to restoration. The master plan is intended to be a living document that can be modified based on new information and lessons learned through project implementation, monitoring, and adaptive management.

Work defined and implemented under the NORMP is intended to build on and be consistent with the Chesapeake Bay Program's multi-agency 2004 Oyster Management Plan (OMP), Executive Order #13508, the Virginia Blue Ribbon Oyster Panel Report (2007), the Maryland Oyster Advisory Commission Report (2009), the Chesapeake Bay Action Plan (2008), and the Maryland Oyster Restoration and Aquaculture Development Plan (2009).

Detailed site-specific feasibility studies with appropriate National Environmental Policy Act (NEPA) documentation will follow the master plan and record the more detailed plans for oyster restoration in specific locations within the sub-estuaries.

- c. **Factors Affecting the Scope and Level of Review.** This document would differ from a typical USACE feasibility study/decision document in the following ways:

- The NORMP will be programmatic in that it will identify the scope of oyster restoration projects and recommend approaches for future USACE oyster restoration efforts in general locations throughout the Chesapeake Bay, without identifying specific details for implementation at specific sites.
- The NORMP will contain estimated costs for regional restoration efforts, but will not contain detailed cost estimates using the Corps' Tri-Service Automated Cost Engineering System (TRACES) for individual recommended sites.
- The NORMP will describe the sequence and general timing of oyster restoration projects and their scale and site characteristics, without a detailed description of site-specific recommended plans, LERRDs (lands, easements, rights-of-way, relocation, and disposal areas), and construction considerations.
- Oyster restoration does not involve life safety issues or have a relevant impact on life safety; therefore Type II IEPR will not be required.
- There is no request by the Governor of Maryland or Virginia for a peer review by independent experts.
- There are various perspectives about oyster restoration within the Bay. There are opinions ranging from "oyster restoration will never be successful" to opinions of "the more you put in, the greater your chance of success". Concerns about impacts to recreation, fisheries, other species, and private lands and the establishment of permanent oyster sanctuaries, as well as the overall cost of the program to recover species, are all issues at a broad scale related to oyster restoration in the Chesapeake Bay.
- The U.S. Environmental Protection Agency (EPA), the U. S. Fish and Wildlife Service (USFWS), and the National Oceanic and Atmospheric Administration (NOAA) are serving as advisors on the NORMP and are active participants in formal NORMP meetings. In addition, two state agencies are serving as local sponsors and PDT members for this initiative, the Maryland Department of Natural Resources and the Virginia Marine Resources Commission.
- Key factors in the current condition of oyster populations in the Chesapeake Bay include overharvesting, diseases, poor water quality, and lack of adequate substrate. These interrelated factors affect oyster survival and recruitment. A specific discussion on these key factors follows.

Overharvesting, associated habitat loss, disease, and water quality/sediment has reduced oyster numbers to their current extremely low population and biomass levels throughout the Chesapeake Bay. Oysters were abundant during pre-colonial times. Harvest pressure was relatively low until late in the 18th century, but began increasing as more people settled in the area and by the 1980's oyster populations were severely depleted from historic levels.

One of the greatest challenges, risks and uncertainties with any oyster restoration program in the Chesapeake Bay is linked to disease. 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 declines in the population have been attributed primarily to the introduction of two diseases. The diseases Dermo (*Perkinsus marinus*) and MSX (*Haplosporidium marinus*) are harmless to humans but usually are fatal to Eastern oysters. The diseases are caused by protozoan parasites that were first found in the Bay in 1949 (Dermo) and 1959 (MSX). These two diseases have been especially detrimental to the oyster fishery because they kill many oysters before they reach market size. In the absence of MSX and Dermo, the average lifespan of the eastern oyster is 6 to 8 years, and the maximum is probably 25 years (NRC 2004). Eastern oysters are marketed in the United States when they reach 3 inches or more, typically after 3 to 4 years in the Chesapeake Bay (NRC 2004). Oysters infected with Dermo, however, generally live only 2 or 3 years, and

oysters infected with MSX generally die within 1 year. The eastern oyster initially appeared to have no resistance, given the large increase in disease-related mortality that was observed. Recent investigations have identified that high salinity oyster populations that are regularly challenged by disease are developing resistance to MSX (Carnegie and Burreson 2011).

Dermo is caused by a parasitic, single-celled organism called *Perkinsus marinus*, which is found along the Atlantic and gulf coasts of the United States and is distributed throughout the water column. MSX is believed to have been introduced into the Bay through an illegal planting of the nonnative Pacific oyster, *C. gigas*. MSX is caused by a single-celled, infectious parasite called *Haplosporidium nelsoni*, which is now found along the entire Atlantic coast of the United States.

Salinity, and thus annual precipitation, as well as water temperature are major factors in determining whether oysters become infected with Dermo or MSX and the level of intensity of disease. Both diseases are more virulent at higher salinities. Dermo is active during the warmer months (at temperatures above 20°C) but can survive much colder temperatures. Cool water temperatures during winter and early spring suppress Dermo infections. A recent trend toward warmer winters has allowed Dermo to flourish in the Bay. Dermo is relatively inactive at salinities less than 8 parts per thousand (ppt), and infection rates decrease during wet rainfall years, when a larger-than-average volume of freshwater runoff reduces salinity in the Bay. The prevalence of MSX is controlled by water temperature and salinity, similarly to Dermo. Initial MSX infection generally occurs at water temperatures greater than 20°C and salinities greater than 10 ppt. Virginia's oyster fishery was affected disproportionately by MSX and Dermo because both diseases are more active in the salty water of the southern portion of the Bay (NRC 2004).

The likelihood that disease will kill an oyster is influenced by many factors besides disease intensity. An oyster living in ideal conditions (with adequate dissolved oxygen and abundant food) may be able to survive despite a substantial infection, whereas an oyster with a less intense infection might succumb quickly if exposed to an environmental stressor (such as prolonged hypoxia). Disease can also affect other biological characteristics of an oyster. For example, diseased oysters generally exhibit slower growth rates than healthy oysters. The high mortality rates of these diseases not only remove oysters potentially available for harvest, they 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 in addition to being negatively affected by harvest, degraded oyster habitat, poor water quality, and complex interactions among these factors.

Poor water quality in the form of high nutrients concentrations and excessive freshwater inflow and sedimentation contributes to the low oyster populations. Nutrients are added to the Chesapeake Bay and its tributaries through fertilizer runoff, sewage treatment plant outflows, groundwater discharge, and atmospheric deposition. Excess levels of nutrients lead to algal blooms. Bacterial decomposition of ungrazed algae contributes to anoxic water conditions. These anoxic events kill oyster larvae in the water column, and if they last longer than several days, can also kill adults. Considerable portions of the bay mainstem each summer are now classed as "dead zones" due to anoxic deep water conditions.

Two relatively modern phenomena, high sedimentation rates and the increased severity and frequency of freshet events, compound the problem of oyster habitat loss. Frequent freshets are another important water quality problem affecting oyster distribution. While adult oysters can survive brief periods of exposure to freshwater, more frequent and longer lasting freshets can have a profound negative impact on oyster populations in the upper reaches of the oysters' range. Increased intensity and frequency of freshets are rooted in watershed processes that have been significantly altered by human land use. As

increasing amounts of land are covered by impervious surfaces, more of the rainfall that previously would have entered the ground water is delivered directly to surface waters. The rapid delivery of freshwater runoff to tributaries temporarily reduces salinity, often to levels lethal to oysters. Because freshets are now caused by smaller rain events, they occur more frequently. Increasingly frequent and severe freshets have essentially eliminated oyster habitat from the upstream portions of many tidal tributaries.

Sediment poses a significant problem for oyster reefs. Fine-grained sediment produced within the Bay is the largest problem for oyster reefs, but coarse sediment delivered to the Chesapeake Bay by an increasingly developed watershed also contributes to burying reefs. In general, poor land management degrades water quality and contributes further stress to oyster restoration projects.

- d. In-Kind Contributions.** Products and analyses provided by non-Federal sponsors as in-kind services are subject to DQC, ATR, and IEPR. The in-kind products and analyses to be provided by the non-Federal sponsor include: There are no in-kind deliverables anticipated to be provided by the local sponsors other than review support and general technical input.

4. DISTRICT QUALITY CONTROL (DQC)

All decision documents (including supporting data, analyses, environmental compliance documents, etc.) shall undergo DQC. DQC is an internal review process of basic science and engineering work products focused on fulfilling the project quality requirements defined in the Project Management Plan (PMP). The home district shall manage DQC. Documentation of DQC activities is required and should be in accordance with the Quality Manual of the District and the home MSC.

- a. Documentation of DQC.** DQC will be documented via a memorandum signed by the Planning Division chiefs of Baltimore and Norfolk Districts, certifying DQC has been accomplished. This memorandum will be provided to the ATR Team as proof of conduct of DQC.
- b. Products to Undergo DQC.** The NORMP and its supporting documentation will undergo DQC.
- c. Required DQC Expertise.** DQC will be conducted by individuals on the PDT as well as peers not affiliated with the NORMP and supervisors.

5. AGENCY TECHNICAL REVIEW (ATR)

ATR is mandatory for all decision documents (including supporting data, analyses, environmental compliance documents, etc.). The objective of ATR is to ensure consistency with established criteria, guidance, procedures, and policy. The ATR will assess whether the analyses presented are technically correct and comply with published USACE guidance, and that the document explains the analyses and results in a reasonably clear manner for the public and decision makers. ATR is managed within USACE by the designated RMO and is conducted by a qualified team from outside the home district that is not involved in the day-to-day production of the project/product. ATR teams will be comprised of senior USACE personnel and may be supplemented by outside experts as appropriate. The ATR team lead will be from outside the home MSC.

- a. Products to Undergo ATR.** North Atlantic Division Memorandum (Reference 7) establishes that the NORMP is not a Decision Document. It also establishes that for the NORMP, ATR and IEPR are not

required. Although it has been determined by CENAD that the NORMP is not a decision document and that ATR is not required, the PDT feels strongly that the NORMP would benefit from ATR and therefore recommends that ATR be conducted. The work product involves significant input from stakeholders, resource agencies, the states and academia, at a cost of approximately \$2,000,000. Although it was fully Federally-funded up-front, cost-share will be recouped during any follow-on construction projects. ATR will be conducted on the draft NORMP and supporting documentation. There will not be an AFB or CWRB for the NORMP, so the ATR reviews will happen for the draft NORMP document and then for the final NORMP document after public comments have been addressed. As established in EC 1165-2-209, the ATR lead will be outside of CENAD. Reviewer roles can be within CENAD, but emphasis has been placed on obtaining reviewers external to the home MSC whenever possible. Disciplines for the ATR Team are described below, but proposed reviewers to serve in those disciplines are enclosed in Attachment 1.

b. Required ATR Team Expertise.

| ATR Team Members/Disciplines | Expertise Required |
|---|---|
| ATR Lead | <u>The ATR lead should be a senior professional with experience in conducting analyses and preparing Civil Works documents in support of ecosystem restoration. The lead should also have the necessary skills and experience to lead a virtual team through the ATR process. The ATR Lead MUST be from outside of CENAD.</u> |
| Planning | <u>The Planning reviewer should be a senior water resources planner with experience in environmental restoration in coastal estuarine environments.</u> |
| Economics | <u>The Economics reviewer should be familiar with average annual cost development and economic analyses in support of ecosystem restoration projects.</u> |
| Environmental Resources – Biology | <u>The Environmental Resources – Biology reviewer must be a senior biologist with experience in shellfish restoration, preferably an understanding of oyster biology, life cycle and survival requirements.</u> |
| Environmental Resources – Adaptive Management | <u>The Environmental Resources – Adaptive Management reviewer must be a senior biologist with experience in shellfish restoration and in developing adaptive management plans/strategies for environmental restoration projects.</u> |
| Hydraulics and Hydrology | <u>The Hydraulics and Hydrology reviewer must be a senior hydrologist/engineer with experience in coastal and estuarine processes and systems, with a full understanding of the dynamics of these systems.</u> |
| GIS | <u>The GIS reviewer must be familiar with GIS modeling applications, GIS layer manipulations, and GIS functionality. An understanding of coastal environments is preferred.</u> |

c. Documentation of ATR. DrChecks review software will be used to document all ATR comments, responses and associated resolutions accomplished throughout the review process. Comments

should be limited to those that are required to ensure adequacy of the product. The four key parts of a quality review comment will normally include:

- (1) The review concern – identify the product’s information deficiency or incorrect application of policy, guidance, or procedures;
- (2) The basis for the concern – cite the appropriate law, policy, guidance, or procedure that has not been properly followed;
- (3) The significance of the concern – indicate the importance of the concern with regard to its potential impact on the plan selection, recommended plan components, efficiency (cost), effectiveness (function/outputs), implementation responsibilities, safety, Federal interest, or public acceptability; and
- (4) The probable specific action needed to resolve the concern – identify the action(s) that the reporting officers must take to resolve the concern.

In some situations, especially addressing incomplete or unclear information, comments may seek clarification in order to then assess whether further specific concerns may exist.

The ATR documentation in DrChecks will include the text of each ATR concern, the PDT response, a brief summary of the pertinent points in any discussion, including any vertical team coordination (the vertical team includes the district, RMO, MSC, and HQUSACE), and the agreed upon resolution. If an ATR concern cannot be satisfactorily resolved between the ATR team and the PDT, it will be elevated to the vertical team for further resolution in accordance with the policy issue resolution process described in either ER 1110-1-12 or ER 1105-2-100, Appendix H, as appropriate. Unresolved concerns can be closed in DrChecks with a notation that the concern has been elevated to the vertical team for resolution.

At the conclusion of each ATR effort, the ATR team will prepare a Review Report summarizing the review. Review Reports will be considered an integral part of the ATR documentation and shall:

- Identify the document(s) reviewed and the purpose of the review;
- Disclose the names of the reviewers, their organizational affiliations, and include a short paragraph on both the credentials and relevant experiences of each reviewer;
- Include the charge to the reviewers;
- Describe the nature of their review and their findings and conclusions;
- Identify and summarize each unresolved issue (if any); and
- Include a verbatim copy of each reviewer’s comments (either with or without specific attributions), or represent the views of the group as a whole, including any disparate and dissenting views.

ATR may be certified when all ATR concerns are either resolved or referred to the vertical team for resolution and the ATR documentation is complete. The ATR Lead will prepare a Statement of Technical Review certifying that the issues raised by the ATR team have been resolved (or elevated to the vertical team). A Statement of Technical Review should be completed, based on work reviewed to date, for the AFB, draft report, and final report. A sample Statement of Technical Review is included in Attachment 2.

6. INDEPENDENT EXTERNAL PEER REVIEW (IEPR)

IEPR may be required for decision documents under certain circumstances. IEPR is the most independent level of review, and is applied in cases that meet certain criteria where the risk and magnitude of the proposed project are such that a critical examination by a qualified team outside of USACE is warranted. A risk-informed decision, as described in EC 1165-2-209, is made as to whether IEPR is appropriate. IEPR panels will consist of independent, recognized experts from outside of the USACE in the appropriate disciplines, representing a balance of areas of expertise suitable for the review being conducted. There are two types of IEPR:

- Type I IEPR. Type I IEPR reviews are managed outside the USACE and are conducted on project studies. Type I IEPR panels assess the adequacy and acceptability of the economic and environmental assumptions and projections, project evaluation data, economic analysis, environmental analyses, engineering analyses, formulation of alternative plans, methods for integrating risk and uncertainty, models used in the evaluation of environmental impacts of proposed projects, and biological opinions of the project study. Type I IEPR will cover the entire decision document or action and will address all underlying engineering, economics, and environmental work, not just one aspect of the study. For decision documents where a Type II IEPR (Safety Assurance Review) is anticipated during project implementation, safety assurance shall also be addressed during the Type I IEPR per EC 1165-2-209.
 - Type II IEPR. Type II IEPR, or Safety Assurance Review (SAR), are managed outside the USACE and are conducted on design and construction activities for hurricane, storm, and flood risk management projects or other projects where existing and potential hazards pose a significant threat to human life. Type II IEPR panels will conduct reviews of the design and construction activities prior to initiation of physical construction and, until construction activities are completed, periodically thereafter on a regular schedule. The reviews shall consider the adequacy, appropriateness, and acceptability of the design and construction activities in assuring public health safety and welfare.
- a. **Decision on IEPR.** Coordination was conducted with CENAD and the ECO-PCX to seek guidance on determination of EC 1165-2-209 requirements and a determination on whether the NORMP would be considered a decision document. In a memo from CENAD dated 28 February 2011, it was determined that the NORMP was not considered a decision document. In addition to this, the memorandum outlined that based on a risk-informed decision analysis conducted by CENAD, the NORMP is not subject to ATR or IEPR. Although the PDT has recommended that ATR be conducted for the NORMP, it concurs with CENAD findings that a Type I IEPR is not required for the NORMP and will not be pursued. In addition, since the NORMP is not a decision document that would be subject to Type I IEPR, an exclusion from Type I IEPR is not required and will not be pursued. The ECO-PCX also agreed with this decision via a telephone conversation held on August 25, 2011.

In the spring and summer of 2011 there has been substantial discussion amongst Virginia stakeholders regarding the possibility of using Federal funds to supplement rotational harvest grounds or harvest grounds in addition to oyster sanctuaries and whether the master plan should include these harvest-oriented management areas. The master plan is proposing a sanctuary approach to fulfill USACE's ecosystem restoration mission and the E.O. goals. In developing the master plan, USACE views oysters as 'an ecosystem engineer that should be managed as a provider of a multitude of goods and services' (Grabowski and Peterson 2007). There is not sufficient information available to perform a detailed investigation of this controversy for inclusion in the master plan. However, at this time, USACE does not have information that justifies federal

investment is warranted in other management approaches such as harvest grounds and reserves or replenishment of wild harvest areas to achieve ecosystem restoration goals. Although limited, current information supports that greater economic and ecological benefits are achieved through the use of sanctuaries (Grabowski and Peterson 2007, Santopietro 2008, past USACE harvest reserve efforts). Subsequent to the issue being raised, some studies have been funded to look at the environmental benefit as well as an economic analysis of rotational harvest areas in comparison to sanctuaries. It is expected that these studies will be used to help guide the plan formulation process in future oyster decision documents, particularly Virginia documents. Follow-on feasibility studies conducted as a result of the NORMP are the appropriate documents for evaluation of this existing controversy and these documents will undergo evaluation for the applicability of IEPR requirements as outlined in EC 1165-2-209.

b. **Products to Undergo Type I IEPR.** N/A

c. **Required Type I IEPR Panel Expertise.** N/A

d. **Documentation of Type I IEPR.** N/A

7. POLICY AND LEGAL COMPLIANCE REVIEW

All decision documents will be reviewed throughout the study process for their compliance with law and policy. Guidance for policy and legal compliance reviews is addressed in Appendix H, ER 1105-2-100. These reviews culminate in determinations that the recommendations in the reports and the supporting analyses and coordination comply with law and policy, and warrant approval or further recommendation to higher authority by the home MSC Commander. DQC and ATR augment and complement the policy review processes by addressing compliance with pertinent published Army policies, particularly policies on analytical methods and the presentation of findings in decision documents.

8. COST ENGINEERING DIRECTORY OF EXPERTISE (DX) REVIEW AND CERTIFICATION

All decision documents shall be coordinated with the Cost Engineering DX, located in the Walla Walla District. The DX will assist in determining the expertise needed on the ATR team and Type I IEPR team (if required) and in the development of the review charge(s). The DX will also provide the Cost Engineering DX certification. The RMO is responsible for coordination with the Cost Engineering DX. Since the NORMP is not a decision document and will not be used for budget justifications, a cost reviewer from the Cost Engineering DX will not be included in the ATR and a Cost Engineering DX certification will not be obtained.

9. MODEL CERTIFICATION AND APPROVAL

EC 1105-2-412 mandates the use of certified or approved models for all planning activities to ensure the models are technically and theoretically sound, compliant with USACE policy, computationally accurate, and based on reasonable assumptions. Planning models, for the purposes of the EC, are defined as any models and analytical tools that planners use to define water resources management problems and opportunities, to formulate potential alternatives to address the problems and take advantage of the opportunities, to evaluate potential effects of alternatives and to support decision making. The use of a certified/approved planning model does not constitute technical review of the planning product. The

selection and application of the model and the input and output data is still the responsibility of the users and is subject to DQC, ATR, and IEPR (if required).

EC 1105-2-412 does not cover engineering models used in planning. The responsible use of well-known and proven USACE developed and commercial engineering software will continue and the professional practice of documenting the application of the software and modeling results will be followed. As part of the USACE Scientific and Engineering Technology (SET) Initiative, many engineering models have been identified as preferred or acceptable for use on Corps studies and these models should be used whenever appropriate. The selection and application of the model and the input and output data is still the responsibility of the users and is subject to DQC, ATR, and IEPR (if required).

- a. **Planning Models.** The following planning models are anticipated to be used in the development of the decision document: No planning models will be used for the development of the NORMP, however, GIS layer and data manipulation tools are being used for analysis and comparison purposes. For this reason, a GIS reviewer has been included on the ATR team to review the GIS products developed in support of the NORMP.
- b. **Engineering Models.** The following engineering models are anticipated to be used in the development of the decision document: No engineering models will be used for the development of the NORMP, however, GIS layer and data manipulation tools are being used for analysis and comparison purposes. For this reason, a GIS reviewer has been included on the ATR team to review the GIS products developed in support of the NORMP.

10. REVIEW SCHEDULES AND COSTS

- a. **ATR Schedule and Cost.** The NORMP will undergo ATR at two review points – the draft NORMP report and the final NORMP report after public comments have been incorporated. The specific reviews are scheduled as follows:

Draft NORMP ATR:

Review Start: 6/27/11

Comments Due in DrChecks: 7/18/11

PDT Evaluations Due in DrChecks: 8/1/11

Backchecks Complete: 8/10/11

ATR Certification Provided: 8/12/11

Cost for Draft NORMP ATR: \$52,500

Final NORMP Post Public Comments ATR:

Review Start: 12/19/11

Comments Due in DrChecks: 1/9/12

PDT Evaluations Due in DrChecks: 1/13/12

Backchecks Complete: 1/19/12

ATR Certification Provided: 1/20/12

Cost for Final NORMP Post Public Comments ATR: \$12,000

- b. **Type I IEPR Schedule and Cost.** N/A.
- c. **Model Certification/Approval Schedule and Cost.** N/A.

11. PUBLIC PARTICIPATION

A formal public review period is expected to be held on the draft NORMP in winter of 2011-2012. Inclusive in this period is a series of public meetings. Comments made during this period will be consolidated and incorporated into a revised draft. Consolidated public comments and the revised draft will be provided to the ATR Team for the final NORMP post public comments ATR.

12. REVIEW PLAN APPROVAL AND UPDATES

The North Atlantic Division Commander is responsible for approving this Review Plan. The Commander's approval reflects vertical team input (involving district, MSC, RMO, and HQUSACE members) as to the appropriate scope and level of review for the decision document. Like the PMP, the Review Plan is a living document and may change as the study progresses. The home district is responsible for keeping the Review Plan up to date. Minor changes to the review plan since the last MSC Commander approval are documented in Attachment 3. Significant changes to the Review Plan (such as changes to the scope and/or level of review) should be re-approved by the MSC Commander following the process used for initially approving the plan. The latest version of the Review Plan, along with the Commanders' approval memorandum, should be posted on the Home District's webpage. The latest Review Plan should also be provided to the RMO and home MSC.

13. REVIEW PLAN POINTS OF CONTACT

Public questions and/or comments on this review plan can be directed to the following points of contact:

- QC Manager, Norfolk District, 757-201-7390
- DST Environmental Team Leader, North Atlantic Division, 347-370-4562
- Operational Director, ECO-PCX, 309-794-5448

ATTACHMENT 1: TEAM ROSTERS

Project Delivery Team Members

| First | Last | Discipline | Phone | Email |
|--------------|-------------|---|--------------|--|
| Claire | O'Neill | Project Manager – CENAB | 410-962-0876 | Claire.D.ONeill@usace.army.mil |
| Larry | Oliver | Study Manager, Plan Formulation – CENAE | 978-318-8347 | Lawrence.R.Oliver@usace.army.mil |
| Angie | Sowers | Study Manager, Plan Formulation/Biologist – CENAB | 410-962-7440 | Angela.Sowers@usace.army.mil |
| Anna | Compton | Biologist – CENAB | 410-962-4633 | Anna.M.Compton@usace.army.mil |
| Dave | Schulte | Biologist – CENAO | 757-201-7007 | David.M.Schulte@usace.army.mil |
| Jeff | Strahan | Economist – CENAO | 757-201-7195 | Jeffery.P.Strahan@usace.army.mil |
| Karin | Dridge | GIS Specialist – CENAO | 757-201-3860 | Karin.M.Dridge@usace.army.mil |
| Anthony | Clark | GIS Specialist – CENAB | 410-962-3413 | Anthony.A.Clark@usace.army.mil |
| Susan | Conner | Internal Quality Control – CENAO | 757-201-7390 | Susan.L.Conner@usace.army.mil |
| Mike | Naylor | MD Dept. of Natural Resources | | MNAYLOR@dnr.state.md.us |
| Jack | Travelstead | VA Marine Resources Commission | | Jack.Travelstead@mrc.virginia.gov |

Agency Technical Review Team Members

| First | Last | Discipline | Phone | Email |
|--------------|-------------|--------------------------------------|--------------|--|
| Brook | Herman | ATR Lead – CELRC | 312-846-5559 | Brook.D.Herman@usace.army.mil |
| Judy | Sheen | Plan Formulation - CESP | 415-503-6854 | Judy.P.Sheen@usace.army.mil |
| Charles | Wilson | Environmental -Biology – CESA | 910-251-4746 | Charles.R.Wilson@usace.army.mil |
| Tomma | Barnes | Environmental – Adaptive Mgmt - CESA | 910-251-4728 | Tomma.K.Barnes@usace.army.mil |
| Charles | Gerdes | GIS – CEMV | 309-794-5816 | Charles.A.Gerdes@usace.army.mil |
| Kevin | Conner | Hydraulics & Hydrology – CESA | 910-251-4867 | Kevin.B.Conner@usace.army.mil |
| Frank | Reynolds | Economics – CESA | 910-251-4773 | Frank.R.Reynolds@usace.army.mil |

Vertical Team Members

| First | Last | Discipline | Phone | Email |
|--------------|-------------|--|--------------|--|
| Roselle | Henn | Environmental Team Lead, CENAD | 347-370-4562 | Roselle.E.Henn@usace.army.mil |
| Jodi | Staebell | Operational Director, ECO-PCX, CEMVD | 309-794-5448 | Jodi.K.Staebell@usace.army.mil |
| Joseph | Vietri | Chief, Planning & Policy, CENAD | 347-370-4570 | Joseph.R.Vietri@usace.army.mil |
| Robert | Pace | Chief, Planning Division, CENAB | 410-962-4900 | Robert.S.Pace@usace.army.mil |
| Mark | Mansfield | Chief, Planning & Policy Branch, CENAO | 757-201-7764 | Mark.T.Mansfield@usace.army.mil |

ATTACHMENT 2: SAMPLE STATEMENT OF TECHNICAL REVIEW FOR DECISION DOCUMENTS

COMPLETION OF AGENCY TECHNICAL REVIEW

The Agency Technical Review (ATR) has been completed for the *Native Oyster Restoration Master Plan for Chesapeake Bay Oyster Recovery, MD and VA*. The ATR was conducted as defined in the project's Review Plan to comply with the requirements of EC 1165-2-209. During the ATR, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This included review of: assumptions, methods, procedures, and material used in analyses, alternatives evaluated, the appropriateness of data used and level obtained, and reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing US Army Corps of Engineers policy. The ATR also assessed the District Quality Control (DQC) documentation and made the determination that the DQC activities employed appear to be appropriate and effective. All comments resulting from the ATR have been resolved and the comments have been closed in DrCheckssm.

SIGNATURE

Name
ATR Team Leader
Office Symbol/Company

Date

SIGNATURE

Name
Project Manager
Office Symbol

Date

SIGNATURE

Name
Architect Engineer Project Manager¹
Company, location

Date

SIGNATURE

Name
Review Management Office Representative
Office Symbol

Date

CERTIFICATION OF AGENCY TECHNICAL REVIEW

Significant concerns and the explanation of the resolution are as follows: Describe the major technical concerns and their resolution.

As noted above, all concerns resulting from the ATR of the project have been fully resolved.

SIGNATURE

Name
Chief, Engineering Division
Office Symbol

Date

SIGNATURE

Name
Chief, Planning Division
Office Symbol

Date

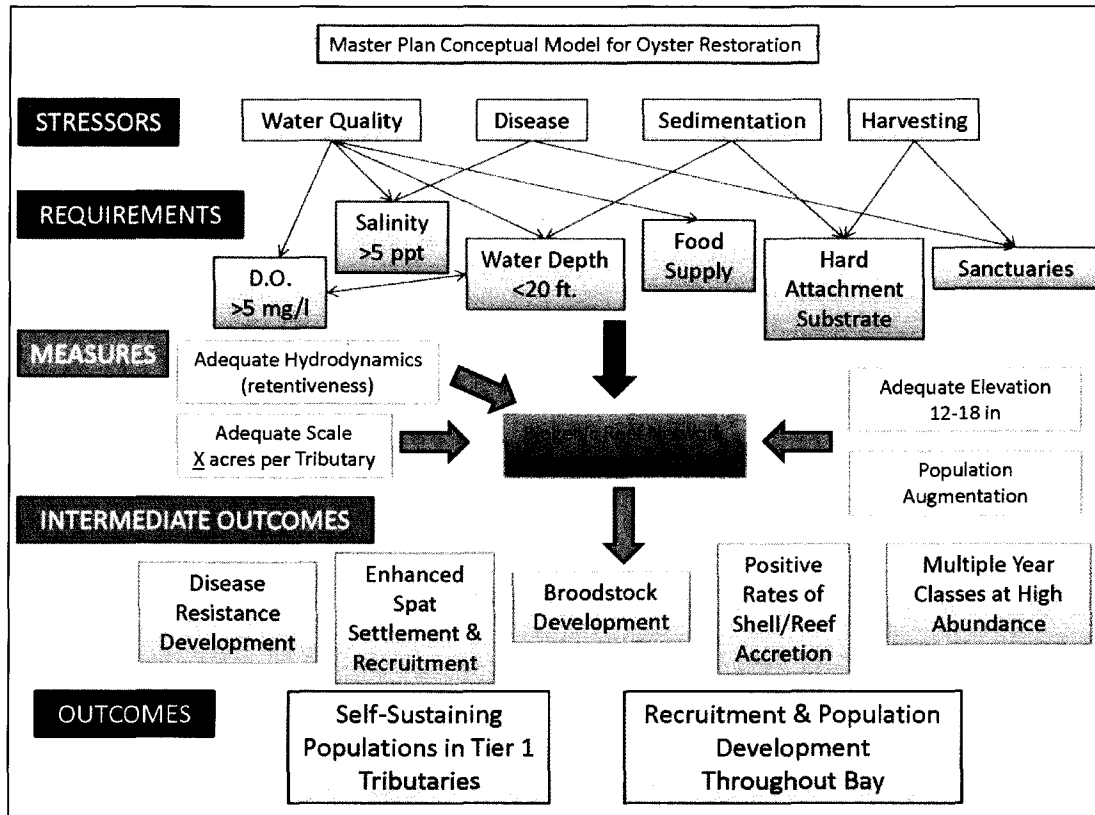
¹ Only needed if some portion of the ATR was contracted

ATTACHMENT 3: REVIEW PLAN REVISIONS

| Revision Date | Description of Change | Page / Paragraph Number |
|----------------------|------------------------------|--------------------------------|
| | | |
| | | |
| | | |
| | | |

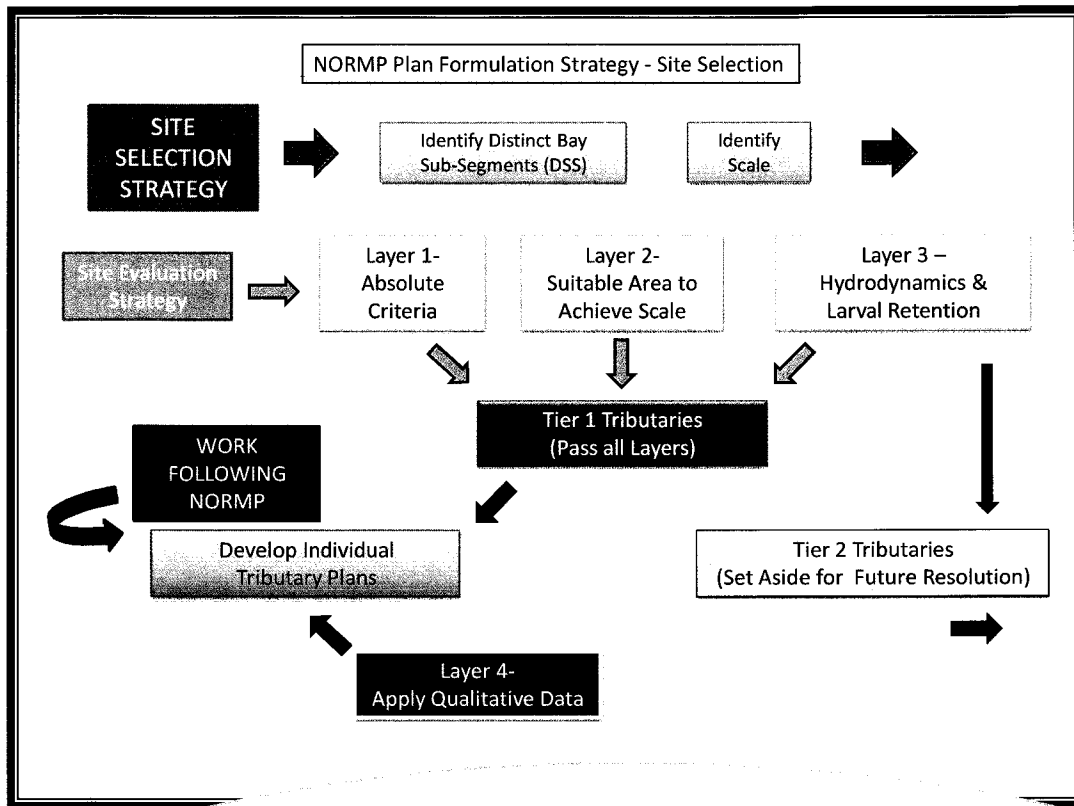
ATTACHMENT 4: ACRONYMS AND ABBREVIATIONS

| <u>Term</u> | <u>Definition</u> | <u>Term</u> | <u>Definition</u> |
|-------------------|--|-------------|--|
| AFB | Alternative Formulation Briefing | NED | National Economic Development |
| ASA(CW) | Assistant Secretary of the Army for Civil Works | NER | National Ecosystem Restoration |
| ATR | Agency Technical Review | NEPA | National Environmental Policy Act |
| CSDR | Coastal Storm Damage Reduction | O&M | Operation and maintenance |
| DPR | Detailed Project Report | OMB | Office and Management and Budget |
| DQC | District Quality Control/Quality Assurance | OMRR&R | Operation, Maintenance, Repair, Replacement and Rehabilitation |
| DX | Directory of Expertise | OEO | Outside Eligible Organization |
| EA | Environmental Assessment | OSE | Other Social Effects |
| EC | Engineer Circular | PCX | Planning Center of Expertise |
| EIS | Environmental Impact Statement | PDT | Project Delivery Team |
| EO | Executive Order | PAC | Post Authorization Change |
| ER | Ecosystem Restoration | PMP | Project Management Plan |
| FDR | Flood Damage Reduction | PL | Public Law |
| FEMA | Federal Emergency Management Agency | QMP | Quality Management Plan |
| FRM | Flood Risk Management | QA | Quality Assurance |
| FSM | Feasibility Scoping Meeting | QC | Quality Control |
| GRR | General Reevaluation Report | RED | Regional Economic Development |
| Home District/MSD | The District or MSD responsible for the preparation of the decision document | RMC | Risk Management Center |
| HQUSACE | Headquarters, U.S. Army Corps of Engineers | RMO | Review Management Organization |
| IEPR | Independent External Peer Review | RTS | Regional Technical Specialist |
| ITR | Independent Technical Review | SAR | Safety Assurance Review |
| LRR | Limited Reevaluation Report | USACE | U.S. Army Corps of Engineers |
| MSC | Major Subordinate Command | WRDA | Water Resources Development Act |
| | | | |



Conceptual Model for Oyster Restoration in the Chesapeake Bay.

This graphic shows the relationships among critical factors in oyster restoration considered in the master plan.



Layer 1 → Absolute Criteria → Determine the number of suitable acres available

Layer 2 → Scale → Determine if there is enough suitable acreage available to meet the scale required for sustainable restoration.

Plan Formulation Strategy