DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS
SOUTH ATLANTIC DIVISION
60 FORSYTH ST, SW, ROOM 10M15
ATLANTA, GEORGIA 30303-3490

REPLY TO
ATTENTION OF:

CESAD-PDP

31 MAY 2012

MEMORANDUM FOR Commander, Wilmington District (CESAW-TS-P/Elden Gatwood)

SUBJECT: Review Plan Approval for Neuse River Basin, North Carolina, Integrated Feasibility Report and Environmental Assessment

1. References:

a. Memorandum, 28 November 2011, CESAW-TS-P

b. Memorandum, 1 September 2011, CEMVD-PD-N

c. EC 1165-2-209, 31 January 2010, Civil Works Review Policy

2. The attached Review Plan for Neuse River Basin, North Carolina, Integrated Feasibility Report and Environmental Assessment (enclosure) has been prepared in accordance with EC 1165-2-209.

3. The Review Plan has been coordinated with the National Ecosystem Planning Center of Expertise (ECO-PCX) of the Mississippi Valley Division (MVD), which is the lead office to execute this plan. For further information, please contact the ECO-PCX at (309) 794-5448. The Review Plan does not include independent external peer review.

4. I hereby approve this Review Plan, which is subject to change as 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.

5. The District should take steps to post the approved Review Plan and a copy of this approval memorandum to the SAW District public internet website and provide a link to the ECO-PCX for their use. Before posting to the website, the names of Corps/Army employees should be removed.

6. The SAD point of contact for this action is Ms. Karen Dove-Jackson, CESAD-PDP, (404) 562-5225.

FOR THE COMMANDER:

Encl

WILBERT V. PAYNES
Chief, Planning and Policy
Community of Practice

DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
69 DARLINGTON AVENUE
WILMINGTON, NORTH CAROLINA 28403-1343

REPLY TO
ATTENTION OF:

CESAW-TS-P

28 November 2011

MEMORANDUM FOR Commander, South Atlantic Division (CESAD-PDS-P ATTN: Wilbert Paynes)

SUBJECT: Revised of Review Plan for Neuse River Basin, North Carolina, Integrated Feasibility Report and Environmental Assessment

1. References.

a. EC 1165-2-209, Civil Works Review Policy, 31 Jan 2010
b. Decision Document Review Plan Template 15 June 2011

2. I hereby request approval of the enclosed Review Plan for Neuse River Basin, North Carolina, Integrated Feasibility Report and Environmental Assessment. The Review Plan complies with applicable policy and includes our DQC, and ATR plans for this project.

3. A risk informed decision was made by CESAW to request an exclusion from IEPR as the project does not meet the conditions that warrant IEPR. A waiver request will be submitted upon approval of the Review Plan.

4. The National Planning Center of Expertise for Ecosystem Restoration (ECO-PCX) has reviewed the review plan and has no objections. A memo from the ECO-PCX, endorsing the Review Plan, was sent to CESAD on 9/1/2011. A copy of that memo is enclosed.

5. The District has responded to SAD comments and modified the Review Plan accordingly.

6. The District will post the CESAD approved Review Plan to its website and provide a link to the CESAD for its use. Names of Corps/Army employees are withheld from the posted version, in accordance with guidance.

FOR THE COMMANDER:

Elden Gatwood

Encl

Elden Gatwood
Chief, Planning and Environmental Branch

DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
69 DARLINGTON AVENUE
WILMINGTON, NORTH CAROLINA 28403-1343

REPLY TO
ATTENTION OF:

CESAW-TS-P

12 September 2011

MEMORANDUM FOR Commander, South Atlantic Division (CESAD-PDS-P ATTN: Wilbert Paynes)

SUBJECT: Approval of Review Plan for Neuse River Basin, North Carolina, Integrated Feasibility Report and Environmental Assessment

1. References.

a. EC 1165-2-209, Civil Works Review Policy, 31 Jan 2010

2. I hereby request approval of the enclosed Review Plan for Neuse River Basin, North Carolina, Integrated Feasibility Report and Environmental Assessment. The Review Plan complies with applicable policy and includes our DQC, and ATR plans for this project.

3. A risk informed decision was made by CESAW to request an exclusion from IEPR as the project does not meet the conditions that warrant IEPR.

4. The National Planning Center of Expertise for Ecosystem Restoration (ECO-PCX) has reviewed the review plan and has no objections. A memo from the ECO-PCX, endorsing the Review Plan, was sent to CESAD on 9/1/2011. A copy of that memo is enclosed.

5. The district will post the CESAD approved Review Plan to its website and provide a link to the CESAD for its use. Names of Corps/Army employees are withheld from the posted version, in accordance with guidance.

FOR THE COMMANDER:

Elden Gatwood

Encl

Elden Gatwood
Chief, Planning and Environmental Branch

**DEPARTMENT OF THE ARMY**
MISSISSIPPI VALLEY DIVISION, CORPS OF ENGINEERS
P.O. BOX 80
VICKSBURG, MISSISSIPPI 39181-0080

REPLY TO
ATTENTION OF:

CEMVD-PD-N

01 September 2011

MEMORANDUM FOR Commander, South Atlantic Division
ATTN: (Wilbert Paynes, SAD-PDS-P)

SUBJECT: Neuse River Basin, North Carolina Feasibility Report and Environmental Impact Statement, Wilmington District, Ecosystem Planning Center of Expertise Recommendation for Review Plan Approval

1. References:
   a. Engineering Circular (EC) 1165-2-209, Water Resources Policies and Authorities, CIVIL WORKS REVIEW POLICY, 31 Jan 2010
   b. EC 1105-2-412, Assuring Quality of Planning Models, 31 March 2011
   c. Engineering Regulation (ER) 1110-2-12, Quality Management, 30 Sep 2006

2. The enclosed Review Plan (RP) complies with all applicable policy and provides an adequate agency technical review of the plan formulation, engineering, and environmental analyses, and other aspects of plan development. The Ecosystem Restoration Planning Center of Expertise (ECO-PCX) has reviewed the RP.

3. The RP includes a risk informed decision for exclusion from Type I Independent External Peer Review (IEPR) for this study. The exclusion request has not been made yet. The ECO-PCX should be included on the coordination of this request. Final approval for exclusion must be obtained from the Director of Civil Works (DCW).

4. The Habitat Evaluation Procedures for Oyster Reef Habitat and the Habitat Suitability Index for the American Oyster used in this study were approved for use by HQ Memorandum Policy Guidance on Certification of Ecosystem Output Models (Aug 2008). The North Carolina Stream Habitat Evaluation Method (NC SHEM) and the North Carolina Wetland Assessment Method (NC WAM) used in this study were approved for use by the Headquarters' Model Certification Team on 09 August 2011.

5. The ECO-PCX concurs with the attached RP. Upon approval by the MSC Commander, please provide the approved RP, the MSC Commander's approval memorandum, and the link to the District posting of the RP to Jodi Staebell. When substantive revisions are made to the RP, such as approval of the IEPR exclusion request, changes in project scope, or Corps policy, a revised RP should be provided to the ECO-PCX for review. Non-substantive changes do not require further PCX review.

6. Thank you for the opportunity to assist in the preparation of the Review Plan. We look forward to reviewing the IEPR exclusion request when available.

Enclosures (1)

Jodi Staebell
Operational Director,
National Ecosystem Planning
Center of Expertise

CF:
CEMVD-PD-N (Wilbanks, Smith, Staebell)
CESAD-PDS (Stratton)
CESAW-TSD-PL (Barnes)
CESAW-PM-C (Castens)
CEMVR-PD-F (Knollenberg)

# REVIEW PLAN

## Neuse River Basin, North Carolina

## Integrated Interim Feasibility Report and Environmental Assessment

## Wilmington District

**SAD Approval Date: May 2012**

US Army Corps of Engineers ®

**REVIEW PLAN**

**Neuse River Basin, North Carolina**

**Integrated Feasibility Report and Environmental Assessment**

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## 1. PURPOSE AND REQUIREMENTS

**A. Purpose.** This Review Plan defines the scope and level of review for the Neuse River Basin, North Carolina Integrated Interim Feasibility Report and Environmental Assessment.

**B. References**

1) Engineering Circular (EC) 1165-2-209, Civil Works Review Policy, 31 Jan 2010

2) EC 1105-2-410, Assuring Quality of Planning Models, 31 Mar 2011

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) CESAD Civil Works Planning and Policy Division Quality Management Sub-plan. CESAD R 110-1-8, App C. 28 Feb 2003.

**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 by the Cost Planning Center of Expertise (PCX) (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 review effort described in this Review Plan is the Ecosystem Planning Center of Expertise (ECOPCX).

RMO will 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 Integrated Feasibility Report and Environmental Assessment for the Neuse River Basin, NC shall be the decision document. The Neuse River Basin Study is being pursued under the Corps of Engineers' General Investigation (GI) Program. The integrated Feasibility Report and Environmental Assessment (EA) are being conducted in response to a resolution adopted July 23, 1997:

*"Resolved by the Committee on Transportation and Infrastructure of the United States House of Representatives, That the Secretary of the Army is requested to review the report of the Chief of Engineers on the Neuse River Basin, North Carolina, published as House Document 175, 89th Congress, 1st Session, and other pertinent reports to determine whether modifications of the recommendations contained therein are advisable at the present time in the interest of flood control, environmental protection and restoration, and related purposes."*

**b. Study/Project Description**. The Neuse River Basin is the third largest basin in North Carolina, encompassing a total area of 6,235 square miles. The river basin is one of only four basins located entirely within the state and incorporates parts or all of 18 counties. The Neuse River originates in north central North Carolina in Person and Orange Counties and flows southeasterly until it reaches tidal waters near Streets Ferry upstream of New Bern. The river broadens dramatically at New Bern and changes from a free-flowing river to a tidal estuary known as the Neuse River Estuary, which eventually flows into Pamlico Sound. The upper one-third of the basin lies in the Piedmont physiographic province while the lower two-thirds of the basin lie in the Coastal Plain physiographic province.

The Neuse River Feasibility Study is investigating stream restoration (reestablishing stream sinuosity, restoring wetlands and riparian buffers, preservation, etc.), anadromous fish habitat restoration (removal of dams and culverts), and estuarine restoration (reestablishing oyster reef habitat).The Neuse River, once thriving with abundant species in diverse habitats, has experienced detrimental impacts in water quality. Approximately 555 miles and 3,569 acres within the Neuse River are listed on the 2004 North Carolina 303(d) Impaired Waters List.

In addition to considerable water quality degradation, alteration and destruction of the estuary's habitats, alteration of river flow, and declines in aquatic populations has occurred. The study will address basin-wide improvements to water quality, environmental restoration, and related purposes. The State of North Carolina, Division of Water Resources is the non-federal sponsor for this study. (In-kind contributions are currently not provided by the non-federal sponsor.)

Recommended plans will be formulated to address the needs of the Neuse River Basin at the basin-wide scale. Plan components will be developed by the workgroups to address needs (study objectives) identified above for the individual focus areas. All Alternative Ecosystem Restoration Plans will be evaluated using a variety of habitat or functional assessment models, which are described in section 9 of this review plan. Cost will estimated for each plan and IWR Plan will be used evaluate alternatives for inclusion in the recommended plan.

**c. Factors Affecting the Scope and Level of Review.**

Study Challenges: The complexity of the possible problems in the watershed and the appearance that there is no single problem is a challenge.

Technical Challenges: Availability of suitable and acceptable models for use in analysis and the ability to compare outputs in a meaningful way because of the diversity of habitat types in the study area poses challenges for Environmental Benefits Analysis. Additionally, making a connection between possible measures across the very large watershed may also be a challenge.

Social Challenges: No Social Challenges are anticipated.

Institutional Challenges: Time and cost requirements for implementation of the Study, including the level of necessary review poses a challenge with the local sponsor. The sponsor suggests a more focused study approach but USACE policy and process requires a watershed approach.

Risk: The PDT worked to manage risk in developing measures. It developed measures by expanding on and referencing successful similar work completed by the USACE Wilmington District and others, including the State of North Carolina, on adjacent/nearby stream or shoreline segments or oyster reefs. The team used the experience from previous projects to identify possible risks and decrease uncertainty in plan formulation. No measures in the Tentatively Selected Plan are believed to be burdened by significant risk or uncertainty regarding the eventual success of the proposed habitats. Significant risk would be avoided by proper design, appropriate site selection, and correct seasonal timing of biotic applications. Unforeseen temporary perturbations during habitat establishment would be addressed by making allowances for replanting during the biotic establishment period. The dynamic and complex nature of coastal environmental processes is a principal source of uncertainty. Post-construction monitoring and adaptive management plans would be used to address 20 unplanned outcomes in all Tentatively Selected Plan components.

Threat to human life/safety: There are no anticipated threats to human life or safety.

Governor request for review: The Governor of North Carolina has not requested a peer review by independent experts.

Public Dispute: The project is not expected to involve significant public dispute as to the size, nature, or effects of the project, or to the economic or environmental cost or benefit of the project.

Project Design: The information in the decision document or anticipated project design is not based on novel methods, involve the use of innovative materials or techniques, present complex challenges for interpretation, contain precedent-setting methods or models, or present conclusions that are likely to change prevailing practices. The project design does not require redundancy, resiliency, and/or robustness, unique construction sequencing, or a reduced or overlapping design construction schedule.

**d. In-Kind Contributions.**

Products and analyses provided by non-Federal sponsors as in-kind services are subject to DQC, ATR, and IEPR. For the Neuse River Basin, The local sponsor has provided $78,000 in in-kind contributions.

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 DQC Team will be comprised of management or staff that has not been directly involved in the day to day conduct of the study effort. 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.

The Wilmington District is responsible for controlling quality for all work that they accomplish. The SAW Quality Management Plan establishes district roles, responsibilities and processes consistent with the South Atlantic Division's Quality Management Plan (28 Feb 2003).The PDT is responsible for a complete reading of the report to assure the overall integrity of the report, technical appendices, and the recommendations before approval by the District Commander.

In general, the USACE Civil Works regulations, policy letters, technical manuals, and pertinent federal laws will serve as the basis of the technical review. Checklists developed by each functional area organization on the PDT may be used during the review process.

**a. Documentation of DQC.** Documentation of the technical and policy review of a specific product will be sufficient to allow both planning management and QC reviewers to feel confident that a comprehensive review was conducted in accordance with principles and guidelines established. All in-progress review actions, review team meetings, and other significant technical review related actions will be documented in the form of a written memorandum prepared by the review leader

**b. Products to Undergo DQC.** All documents will be submitted for DQC prior to Agency Technical Review.

## 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 (ECOPCX) 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.

ATR was performed for the Feasibility Scoping Meeting (FSM) documentation, August 2007. ATR was performed on the Alternative Formulation Briefing (AFB) package in accordance with EC 1105-2-410 (8/2008), June 2009, and again April 2010 with EC 1165-2-209. During this ATR, compliance with established policy, principles, and procedures utilizing justified and valid assumptions were verified. This included review of:

- Assumptions
- Methods, procedures, and material used in analyses
- Alternatives evaluated
- The appropriateness of data used and the level of data obtained

- Reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing USACE policy.

ATR was performed on the Environment Benefit Models April 2010. This review was performed by the USACE Environmental Research and Development Center (ERDC).

ATR will also be performed on the Final Report (including NEPA and supporting documentation).

b) **Required ATR Team Expertise.** The following table provides list of ATR Team disciplines and expertise required for the Neuse River Basin ATR team. The expertise represented on the ATR team reflects the significant expertise involved in the work effort, and in general, mirrors the expertise on the PDT. ATR Team members were determined by the RMO, in cooperation with the PDT, vertical team, and other centers of expertise, The names, organizations, contact information, credentials, and years of experience of the ATR members are included in Attachment 1.

| **ATR Team Members/Disciplines** | **Expertise Required** |
|---|---|
| ATR Lead | The ATR lead should be a senior professional with extensive experience in preparing Civil Works decision documents and conducting ATR. The lead should also have the necessary skills and experience to lead a virtual team through the ATR process. The ATR lead may also serve as a reviewer for a specific discipline (such as planning, economics, environmental resources, etc). |
| Planning | The Planning reviewer should be a senior water resources planner with experience in Ecosystem Restoration Planning and familiar with applicable USACE plan formulation standards and procedures. Additionally, the team member will be experienced in Environmental Benefits Analysis modeling as it relates to the proposed measures for this study. |
| Cost Engineering | Team member will be an expert in Cost Engineering analyses for Ecosystem Restoration studies and have a thorough understanding of requirements based on study objectives and proposed measures. |
| Environmental Resources | Team member will be experienced in the field of estuarine, freshwater, and barrier island ecosystems as they relate to the proposed study measures. Specifically, the team member should be knowledgeable of salt marsh and submerged aquatic vegetation communities, as well as be familiar with all National Environmental Policy Act (NEPA) requirements. |

| | |
|---|---|
| Real Estate | The RE team member must be able to review the real estate plan and the real estate aspects of the planning documents, being familiar with and having expertise in the real estate planning process for cost shared and federal civil works projects, relocations, navigational servitude issues, report preparation and the reviewing and acquisition of real estate interests. |
| Hydrology & Hydraulics | Team member will be an expert in the field of hydrology & hydraulics and have a thorough understanding of specific requirements based on study objectives and proposed measures – for example, knowledge of watershed hydrology, channel dynamics, enclosed sound systems, and application of measures for fetch reduction within the Sound, etc. Additionally, the team member will be experienced in computer modeling techniques that will be used such as ADCIRC, CH3D, CE-QUAL-ICM, etc. |

**c) Documentation of ATR.** DrChecks review software has been 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 be 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 includes 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, 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.** A final risk informed decision analysis has been performed and a decision has been made by the District that performance of IEPR is not necessary based on criteria in EC 1165-2-209 and the information provided in section 3 (above). No significant threat to human life is anticipated, and current expectations are that Type II IEPR will not be required. A final determination concerning the requirement/need for a Type II IEPR will be made and documented in the Review Plan that addresses the project design/construction phase. An exclusion from Type I IEPR has been granted for this study for reasons documented below:

1. Implementation Guidance: The implementation guidance states that activities shall include preparation of a decision document which will contain at a minimum: Plan Formulation Analysis, an Incremental Analysis/Cost Effectiveness Analysis, the Appropriate National Environmental Policy Act Documentation, and the Results of Agency Technical Review and Independent External Peer Review to justify proceeding with the Selected Plan. All of these elements have been addressed except the Independent External Peer Review which is discussed below.

2. Draft Engineer Circular 1165-2-209 Requirements: Prior to issuance of this Engineering Circular this study was given a waiver from external peer review (Neuse River Basin Restoration Feasibility Study Peer Review Plan 11 October 2007). At the time it was determined that (1) no influential scientific information will be produced by the study and (2) the risk was assessed as low. Since that time, these factors are still relevant. Factors that trigger an Independent External Peer Review described in the Engineer Circular and their relevance to this project are discussed below.

3. According to Engineer Circular 1165-2-209, Appendix D, any of the following factors trigger the requirement for a Type I Independent External Peer Review:

    a) <u>Significant threat to human life.</u> None of the various components recommended for restoration in the Neuse River Basin present a risk to human life. Modification to an existing weir on Little River, stabilization of shoreline in the Neuse River Estuary, and construction of oyster reef habitat in the Neuse River Estuary do not present a risk to human life.

    b) <u>Total project cost greater than $45 million.</u> The current cost estimate is less than $45 million. Final cost estimates will be reviewed by the Cost Estimating Center of Expertise at Walla Walla District.

    c) <u>Request by the State Governor.</u> There has been no request for Independent External Peer by the Governor of North Carolina.

    d) <u>Request by a State or Federal Agency.</u> There has been no request for Independent External Peer Review by any State or Federal Agency.

e) Significant public dispute. There is no significant public dispute. Based on public scoping, the U.S. Army Corps of Engineers (Corps) determined that an Environmental Impact Statement is not necessary and are preparing a draft Environmental Assessment.

f) Methods are novel or complex. Modifying the existing weir to improve fish passage is not novel. Shoreline stabilization in the estuary is not novel. Finally, construction of oyster reef habitat is also not novel. Similar projects have been implemented by the Corps and other agencies.

g) Chief of Engineers determines Independent External Peer Review is necessary. To date, the Chief of Engineers has not determined that Independent External Peer Review is necessary.

The proposed project does not meet the criteria for conducting Type I IEPR as described in Paragraph 2 of Appendix D of EC 1165-2-209.

## 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 South Atlantic Division 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 Cost Engineering 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 ECO PCX is responsible for coordination with the Cost Engineering DX.

## 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).

**Planning Models.** The following planning models are anticipated to be used in the development of the decision document: A series of planning and biological models were used in this study. In accordance with EC 1105-2-412, IWR Plan was used to establish cost effective alternatives and compare the incremental cost benefits of alternatives. The planning and biological models used to quantify environmental benefits have completed ATR as recommended by the Ecosystem (ECO) PCX. The District is coordinating with the ECO PCX to determine what needs to be done to complete model approval. The information presented in this section will be presented at the Alternative Formulation Briefing for discussion and support in granting approval of these models for use in this study.

A description of each of the models and the results of technical review follow. Application of these models in the field and in the office was done by a team of qualified biologists in the USACE Wilmington District with more than 70 years of combined experience.

**North Carolina Wetland Assessment Method (NC WAM).** Environmental benefits resulting from wetlands restoration opportunities were assessed using NC WAM Version 2.0 (NCDENR 2009), which is a rapid, reference-based functional assessment method. NC WAM was developed by a state and federal interagency team consisting of NCDOT, NCDENR, USEPA, USFWS, and the USACE. The method provides functional ratings for up to 3 major functions and 10 subfunctions, depending on the wetland type being assessed. Functions are evaluated using up to 22 field and GIS-based metrics, which include the soil, hydrologic, vegetative, and landscape characteristics of the assessment area. Functional ratings are then determined based on an iterative, Boolean logic process.

Three types of wetland are being assessed in this study—bottomland hardwood forest, estuarine woody wetland, and salt/brackish marsh. As per the assessment methodology, for bottomland hardwood forest sites, all functions and subfunctions (with the exception of the subfunction “pollution change”) are measured by the assessment. For estuarine woody wetland, the hydrology main function and the habitat function and subfunctions are measured. For the salt/brackish marsh, only the hydrology and habitat main functions (no subfunctions) are measured.

The PDT made some modifications to the standard NC WAM outputs so that they could be useable in this study. This analysis requires that quality be measured numerically. NC WAM, however, does not provide numerical outputs; instead it gives each function and subfunction a rating of Low, Medium, or High. Therefore, the PDT assigned each function or subfunction rating an index score of 0.1 (Low), 0.5 (Medium), or 1.0 (High). For wetland classes that measure subfunctions, the subfunction scores are averaged to

determine a score for the primary function. Because there was no clear scientific basis for differentially weighting subfunctions, each subfunction was given equal weight in determining the primary function score. For instance, the hydrology function consists of two subfunctions—surface storage and retention, and subsurface storage and retention. If, for instance, the scores for these subfunctions are 0.1 and 0.5, the score for the hydrology primary function will be 0.3. The primary functions scores are then averaged together to give a wetland functional index score for the site.

In an April 2010 ATR, [redacted] of the Engineer Research Development Center (ERDC) reviewed the model to determine if it was appropriate for use in this study. The reviewer determined that it was inappropriate to use the qualitative model in a quantitative way. Unfortunately, other models of wetland function and habitat developed specifically for North Carolina are currently not available. This model is currently being used by various Federal, State and local agencies (including the US Fish and Wildlife Service and USACE Regulatory Division) on decisions regarding wetland activities. The District would like to maintain use of this model for this application and will provide further documentation regarding the potential range of environmental outcomes that exist based on the way the model was applied. A sensitivity of the results is discussed in the Feasibility Report to support use of this model application. At the Alternative Formulation Briefing, the District will present the results of the sensitivity analysis and describe the pros- and cons- of using this tool versus other regional models. In the interim, further discussions will be coordinated with ERDC and the ECO PCX to present the sensitivity analysis.

**North Carolina Stream Habitat Evaluation Method (NC SHEM).** Stream restoration opportunities were assessed using the stream habitat evaluation procedure as outlined in the Internal Technical Guide for Stream Work in North Carolina (NCDENR 2001), which was developed by the NCDWQ, the North Carolina Division of Land Resources, and the USACE. The method evaluates streams based on seven or eight variables (depending on ecoregion location). The variables measure aspects of riparian condition, channel modification, and instream habitat. Each variable is assigned a numerical score based on field observations and measurements, and some variables have higher maximum scores than others. A total functional score for the stream segment is calculated by adding together the individual variable scores, with the highest possible total score equaling 100. For the purpose of the EBA, the total score was divided by 100 to generate a stream functional index score.

[redacted] of ERDC conducted ATR of this model to determine if it was appropriate for use in this study in April 2010. The review determined that this model was generally appropriate for use in this study. The description of this model application was updated in the report to discuss risk and uncertainty in the environmental benefits analysis. The model shortcomings and areas of uncertainty in the model and analysis were described and a sensitivity analysis was conducted to show a potential range of environmental outputs. This information will be described during the Alternative Formulation Briefing.

**Habitat Evaluation Procedure for Oyster Reef Habitat.** Estuarine reef restoration opportunities were evaluated using a USFWS HEP in which the quality of habitat is multiplied by the quantity of habitat to establish environmental benefit. The quality of

habitat is defined by a Habitat Suitability Index (HSI) for a target species. The American oyster was the target species because a healthy oyster population is considered a keystone indicator of the ecological health of the estuary (NCDMF 2001). Ecological health is dependent on oysters because they are the ecosystem's "engineers" that build reefs (Jones et al. 1994). For the purpose of this assessment, HSI and Habitat Units (HUs) as described in the HEP model will be referred to as the "Functional Index" and "Functional Units," respectively. The HSI model Gulf of Mexico American Oyster, developed by the USFWS (Cake 1983), was applied. Although this model was developed for the Gulf of Mexico, it can be applied in specific Atlantic coast habitats. The Neuse Estuary OGA is similar to the Gulf of Mexico; it supports subtidal American oysters Crassostrea virginica in waters that are less than 33 ft deep and experiences a small mean diurnal tidal variation. All oyster life requisites were confirmed as appropriate through a review of literature regarding Atlantic coast oyster populations (Kennedy et. al 1996).

This HSI model has a larval and adult component and assesses six variables. The variables measure reef structure, water column conditions, and oyster abundance to determine site suitability for both adult oysters and larvae. Killing events (V5) were defined to address issues in the Basin—low salinity and low dissolved oxygen events (Burkholder et al. 2004, Lenihan et al. 1998).

[redacted] of the Norfolk District conducted an ATR on the Habitat Evaluation Procedure for Oyster Reef Habitat. He concluded that the application of this certified model was appropriate for use and conservative in its definition of killing events caused by low dissolved oxygen. This application errs on the conservative, thus increasing the likelihood for oyster recruitment.

**Total Benefits Output.** For each alternative at each site, a total Average Annual Functional Unit (AAFU) was calculated. The total AAFU was calculated as the sum of the AAFUs for the wetland, stream, and oyster components at each site. The different ecosystem components are given equal weight in this calculation, so as to not give "preference" for one type over another. AAFUs are calculated by determining the functional units at each project year, adding these together, and dividing by the project life (50 years). For alternatives or sites where benefits are not expected to change over the project life, the AAFU is the same as the benefits measured for year 0 (immediately following construction). The total AAFU benefit for an alternative is the difference between the AAFU calculated for that alternative (with project) and the AAFU calculated for the no-action plan (without project).

| **Model Name and Version** | **Brief Description of the Model and How It Will Be Applied in the Study** | **Certification / Approval Status** |
|---|---|---|
| NC WAM<br>Version 2.0 | Environmental benefits resulting from wetlands restoration opportunities were assessed using NC WAM Version 2.0 (NCDENR 2009), which is a rapid, reference-based functional assessment method. NC WAM was developed by a state and federal interagency team. The method provides functional ratings for up to 3 major functions and 10 | Approved *for Single Use* by HQ Model Certification Team on 8/9/11 |

| | | |
|---|---|---|
| | subfunctions, depending on the wetland type being assessed. Functions are evaluated using up to 22 field and GIS-based metrics, which include the soil, hydrologic, vegetative, and landscape characteristics of the assessment area. Functional ratings are then determined based on an iterative, Boolean logic process. | |
| NC SHEM | Stream restoration opportunities were assessed using the stream habitat evaluation procedure as outlined in the Internal Technical Guide for Stream Work in North Carolina (NCDENR 2001). The method evaluates streams based on seven or eight variables (depending on ecoregion location). The variables measure aspects of riparian condition, channel modification, and instream habitat. A total functional score for the stream segment is calculated by adding together the individual variable scores. | Approved *for Single Use* by HQ Model Certification Team on 8/9/11 |
| HEP Procedure for Oyster HSI | Estuarine reef restoration opportunities were evaluated using a USFWS HEP in which the quality of habitat is multiplied by the quantity of habitat to establish environmental benefit. The quality of habitat was defined by a Habitat Suitability Index (HSI) for the eastern oyster. | Certified |

**Engineering Models.** No Engineering models were used for this study.

## 10. REVIEW SCHEDULES AND COSTS

### I. ATR Schedule and Cost.

| REVIEW PHASE | COMPLETION DATE | COST |
|---|---|---|
| ATR of FSM Documentation | 8/22/07 | $18,200 |
| ATR of Models Package (w/ AFB ATR) | 3/24/09 | $20,000 |
| ATR of AFB Documentation (w/ model ATR) | 3/24/09 | $20,000 |
| ATR of Draft Feasibility Report | 9/27/11 | $25,000* |
| ATR of Final Report | 6/18/12 | $15,000* |
| | | |

* Estimated costs are based on the actual cost of the ATR for the FSM and AFB Documentation, as well as communication with the PCX Guild.

**II. Type I IEPR Schedule and Cost.** Not Applicable

**III. Model Certification/Approval Schedule and Cost.**

The NC WAM and NC SHEM models were approved *for Single Use* by HQ Model Certification Team on 8/9/11 for the Neuse Study. These models are considered "Class 1" models and are not expected to be used in future studies and therefore certification of the models was not requested. At the request of the ECO-PCX, these models underwent review as part of the normal Agency Technical Review of the Alternative Formulation Briefing Report in April 2010. ATR costs for the model review were approximately $20,000.

The USFWS Eastern Oyster Habitat Suitability Index (HSI) Model being utilized for the Habitat Evaluation Procedures (HEP) was approved for use August 13, 2008 (Policy Guidance on Certification of Ecosystem Output Models).

## 11. PUBLIC PARTICIPATION

Public comments are solicited for the duration of the Study through initiatives such as the initial public scoping meeting, interagency coordination meetings, and the posting of study products and documents on the District website for public access and review. Once completed, the Neuse River Basin feasibility report will be disseminated to resource agencies, interest groups, and the public as part of the National Environmental Policy Act (NEPA) environmental compliance review. The report will include an Environmental Assessment (EA). Public entities and private individuals may also review and comment on draft documents as members of the PDT. All significant and relevant public comments will be provided as part of the review package to Peer Reviewers as they are available and may include but not be limited to: scoping letters, meeting minutes, other received letters, and emails.

## 12. REVIEW PLAN APPROVAL AND UPDATES

The South Atlantic Division that oversees the home district is responsible for approving the review plan. Approval is provided by the South Atlantic Division Commander. The commander's approval should reflect vertical team input (involving district, MSC, PCX, and HQUSACE members) as to the appropriate scope and level of review for the decision document. Like the Project Management Plan, the Review Plan is a living document and may change as the study progresses. Changes to the review plan should be approved by following the process used for initially approving the plan. In all cases the MSCs will review the decision on the level of review and any changes made in updates to the project.

## 13. REVIEW PLAN POINTS OF CONTACT

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

[redacted]

## ATTACHMENT 3: REVIEW PLAN REVISIONS

| Revision Date | Description of Change | Page / Paragraph Number |
|---|---|---|
| 1/25/2011 | Review Plan revised based on updated guidance; EC 1105-2-410, EC 1165-2-209, and EC 1105-2-412. | Entire report |
| | | |
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## ATTACHMENT 4. MEMORANDUM FOR REVIEW PLAN APPROVAL, 11 OCT 2007

**DEPARTMENT OF THE ARMY**
SOUTH ATLANTIC DIVISION, CORPS OF ENGINEERS
60 FORSYTH STREET
RM: 9M15
ATLANTA, GEORGIA 30303

REPLY TO
ATTENTION OF:

CESAD-PDS-P

11 October 2007

MEMORANDUM FOR Wilmington District Commander (CESAW-TS-PF)

SUBJECT: Neuse River Basin Restoration Feasibility Study Peer Review Plan (PRP)

1. References:

a. Memorandum, 5 October 2007, subject: Neuse River Basin Restoration Feasibility Study, National Ecosystem Restoration Center of Expertise (ECO-PCX) Recommendation for Approval of PRP and US Army Corps of Engineers, Wilmington District, Technical Services and Plan Formulation.

b. EC 1105-2-408, "Peer Review of Decision Documents," 31 May 2005.

c. CECW-CP memorandum, 30 March 2007, subject: Peer Review Process.

d. Supplemental information for the "Peer Review Process" memorandum, March 2007 from CECW-P.

2. In accordance with EC 1105-2-408, "Peer Review of Decision Documents," the PRP for the Neuse River Basin Restoration Feasibility Study has been coordinated and developed with the ECO-PCX. The plan as prepared has been reviewed by this office and is approved.

3. We concur with the conclusion that external peer review of this project is not necessary for the following reasons: (1) no influential scientific information will be produced by the study and (2) the risk was assessed as low. The PRP complies with all applicable policy and provides an adequate independent technical review of the plan formulation, engineering, and environmental analyses, and other aspects of the plan development. Non-substantive changes to this PRP do not require further approval.

4. The district should take steps to post the PRP to its web site and to provide a link to the ECO-PCX for their use. Before posting to the web site the names of Corps/Army employees should be removed in accordance with reference 1.d. above.