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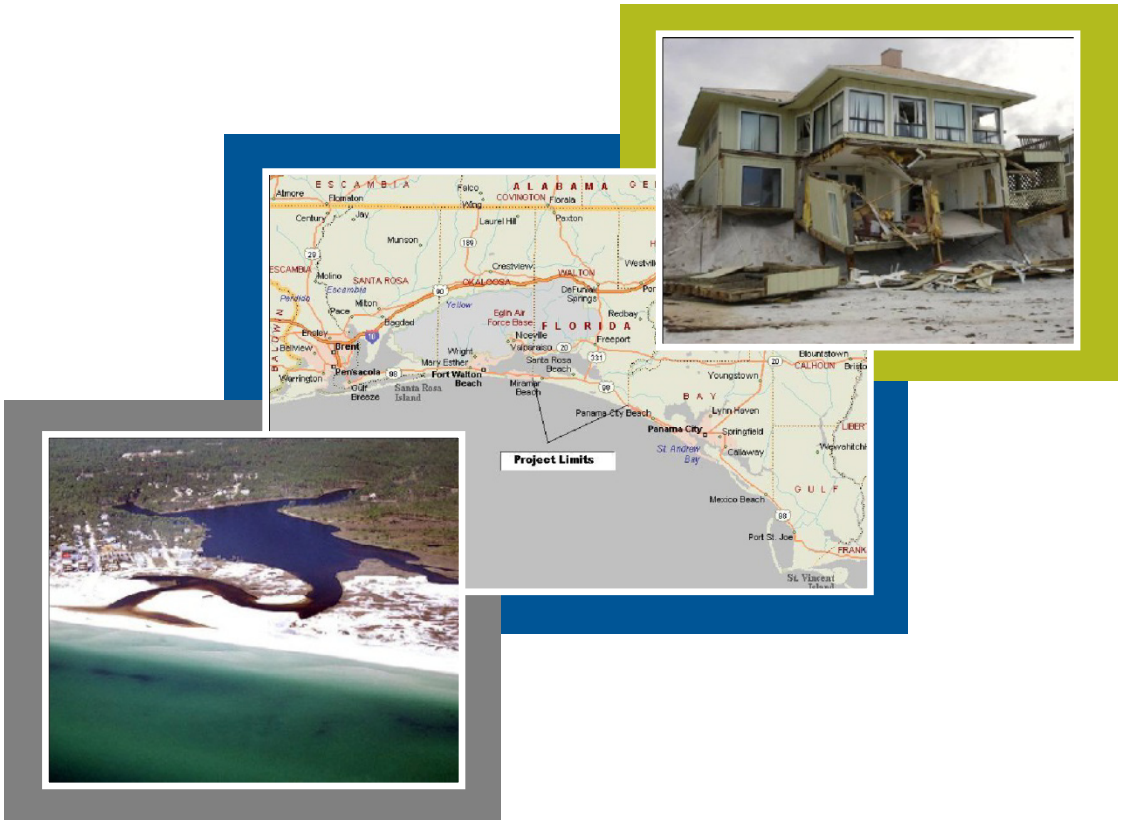
Final Independent External Peer Review Report Walton County, Florida, Hurricane and Storm Damage Reduction Project Draft Feasibility Report and Environmental Assessment

Prepared by
Battelle Memorial Institute

Prepared for
Department of the Army
U.S. Army Corps of Engineers
Coastal Storm Damage Reduction Planning Center of Expertise
Baltimore District

Contract No. W912HQ-10-D-0002
Task Order: 0012

July 9, 2012



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Draft Feasibility Report and Environmental Assessment

by

Battelle
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for

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FINAL
INDEPENDENT EXTERNAL PEER REVIEW REPORT
for the
Walton County, Florida, Hurricane and Storm Damage Reduction Project
Draft Feasibility Report and Environmental Assessment

EXECUTIVE SUMMARY

Project Background and Purpose

Walton County is located approximately 103 miles east of Pensacola, Florida and approximately 98 miles west of Tallahassee, Florida. The beaches of Walton County encompass approximately 26 miles of shoreline extending from the City of Destin in Okaloosa County, Florida. The western two-thirds of Walton County are comprised of coastal peninsula extending from the mainland, and the eastern third is comprised of mainland beaches. Choctawhatchee Bay lies to the north of the peninsula. Walton County includes approximately 11.9 miles of state-designated critically eroding areas and three State of Florida park areas that cover approximately 6 miles of the approximately 26-mile shoreline.

Walton County's shoreline is receding, and the protective dunes and high bluffs are being destroyed by hurricane and storm forces that are occurring more frequently. Storm events have damaged properties and environmental resources along the coast.

The selected plan recommended (Tentatively Selected Plan; TSP) for construction is the Locally Preferred Plan (LPP). The project would be composed of a 50-foot berm width, a 25-foot berm, and an additional 25 feet of nourishment in all construction reaches. The project will also feature added dune width in all construction reaches of either 10 or 30 feet. The modeling efforts have predicted fill requirements of 2,400,000 cubic yards. This plan extends the coverage area to the westernmost limits of Walton County where the National Economic Development (NED) plan could not justify the coverage. Approved borrow sources lie offshore within the State of Florida waters. The dune construction would be planted with at least three species of dune vegetation.

Independent External Peer Review Process

Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific analyses. The U.S. Army Corps of Engineers (USACE) is conducting an Independent External Peer Review (IEPR) of the Walton County, Florida, Hurricane and Storm Damage Reduction Project Draft Feasibility Report and Environmental Assessment (hereinafter Walton County DFR & EA). Battelle, a 501(c)(3) non-profit science and technology organization with experience in establishing and administering more than 100 peer review panels for USACE since 2005, was engaged to coordinate the IEPR of the Walton County DFR & EA. Battelle is independent, free from conflicts of interest (COIs), and meets the requirements for an Outside Eligible Organization (OEO) per guidance described in USACE (2010). The IEPR was external to the agency and conducted following USACE and Office of Management and Budget (OMB)

guidance described in USACE (2010), USACE (2007), and OMB (2004). Battelle received award notification from USACE on April 21, 2011, held the first teleconference, and selected a panel. However, USACE needed to make revisions to the project, so the IEPR was delayed until May 2012. This final report describes the IEPR process, describes the panel members and their selection, and summarizes the Final Panel Comments of the IEPR Panel (the Panel).

Based on the technical content of the Walton County DFR & EA and the overall scope of the project, Battelle identified candidates for the Panel in the following key technical areas: coastal engineering, plan formulation, environment/biology, and economics. Four panel members were selected for the IEPR from more than 20 candidates identified. USACE was given the list of candidate panel members, but Battelle made the final selection of the Panel.

The Panel received electronic versions of the Walton County DFR & EA documents, totaling more than 1,400 pages, along with a charge that solicited comments on specific sections of the documents to be reviewed. The charge was prepared by USACE according to guidance provided in USACE (2010) and OMB (2004). Charge questions were provided by USACE and included in the draft and final Work Plans.

The USACE Project Delivery Team (PDT) briefed the Panel and Battelle during a kick-off meeting held via teleconference prior to the start of the review. In addition to this teleconference, a teleconference with USACE, the Panel, and Battelle was held halfway through the review period to provide the Panel an opportunity to ask questions of USACE and clarify uncertainties. The Panel produced approximately 400 individual comments in response to the 89 charge questions.

IEPR panel members reviewed the Walton County DFR & EA documents individually. The panel members then met via teleconference with Battelle to review key technical comments, discuss charge questions for which there were conflicting responses, and reach agreement on the Final Panel Comments to be provided to USACE. Each Final Panel Comment was documented using a four-part format consisting of: (1) a comment statement; (2) the basis for the comment; (3) the significance of the comment (high, medium, or low); and (4) recommendations on how to resolve the comment. Overall, 18 Final Panel Comments were identified and documented. Of these, nine (9) were identified as having high significance, eight (8) had medium significance, and one (1) had low significance.

Results of the Independent External Peer Review

The panel members agreed among one another on their "assessment of the adequacy and acceptability of the economic, engineering, and environmental methods, models, and analyses used" (USACE, 2010; p. D-4) in the Walton County DFR & EA document. Table ES-1 lists the Final Panel Comments statements by level of significance. The full text of the Final Panel Comments is presented in Appendix A of this report. The following statements summarize the Panel's findings.

The Panel found that the Walton County project generally follows USACE planning guidelines and describes the methods and analyses used to develop the Tentatively Selected Plan (TSP).

The Panel also recognizes the pioneering effort to use Beach-fx in the planning process. The Main Report and appendices provide a great deal of information about the project. However, in many instances a summary of key information is not provided and the reader is referred to the appendices or to a separate report that has not been included in the project documents provided to the Panel for this IEPR. In addition, the current organization of the project documents affects the readability and impedes the understanding of the project. The Main Report should contain the key information necessary to understand the methods and analyses as well as how the conclusions are supported without referencing the appendices. Integrating the Main Report with the Environmental Assessment may greatly improve readability and allow the reader to clearly understand the problem, alternatives, and how the recommended plan was developed and justified.

The Panel identified several deficiencies in the methods and analyses, which raises questions about the technical support for the project recommendations. The engineering and economic analyses are based on limited data, and these data are typically for time periods prior to 2006. In some instances the analyses do not appear to follow more recent USACE guidance, most notably as related to use and reporting of risk and uncertainty. In addition, significant information, such as baseline environmental conditions, was not included for the Panel's review in the project documents.

Plan Formulation – The Panel found that the Main Report adheres well to the USACE planning process, with some exceptions. The project justification depends on the project costs and benefits (Benefit Cost Ratio or BCR). Additional information is needed to specifically demonstrate that the TSP provides the greatest net benefits, particularly as related to quantifying risk and uncertainty. The selection of the TSP relies on the economic analysis, which in turn relies on the engineering analysis. The engineering analysis is critical to establish replenishment rates, erosion, and costs for the project alternatives.

Engineering – The Panel concluded that the engineering information appears to be well done, but not well explained or well justified. The Panel believes that the outstanding issues can be addressed and explained. Some items appear to have been calculated, for example, shoreline recovery rates and local inundation for damage calculation, but these calculations are not presented in the project documents. The storm set selection was of concern because the justification appeared to have been based on older multiple storm events and no consideration was given to more contemporary methods that consider alternate plausible storm scenarios. The beach profiles appear to be dated, and are about seven years old (2005). While it appears that uncertainty was quantified for some engineering calculations, such as erosion volumes and long-term shoreline change rates, it is unclear how these uncertainties were incorporated into the economic evaluation. A more rigorous discussion of risk and uncertainty should be used throughout the entire study for the engineering estimates as well as the economic analysis. For example, the risk and uncertainty concerning the volume of available sand at the borrow area was not addressed.

Economics – The Panel found that the project documents do not provide sufficient economic analyses to justify the recommendations for the project. The economic analyses rely on a limited use of available data, partial analysis of project alternatives, and reporting of single values rather

than a probabilistic description of expected outcomes. The Panel acknowledges the Monte Carlo simulations within the Beach-fx model analyses, but very little information about the distribution of expected outcomes is included in the economic analyses provided in the report. Further analyses are needed that integrate risk and uncertainty in both the engineering and economic parameters.

Environmental – The Panel could not compare the project alternatives since baseline and future without project conditions were not established in the Main Report. This information may be contained in a plan previously developed by the non-Federal sponsor, and could help in describing and justifying the TSP. The environmental impacts and benefits of the project are not quantified. For example, the Panel did not find a thorough description or evaluation of the borrow area, a major project feature. The description of the existing beach conditions relies on data from 2005 and may not reflect the current conditions. The Panel is aware of several published reports from 2007-2010 that contain data that appear to be relevant to this project, and a review of more current data may increase the potential for project success. In addition, critical information and data from the 2003 Taylor Engineering report are not included in the Main Report or Environmental Assessment for review; this information is required to provide support for certain statements and conclusions. Finally, the Panel did not find a thorough discussion of public coordination efforts commensurate with a project of this scale.

Table ES-1. Overview of 18 Final Panel Comments Identified by the Walton County DFR & EA IEPR Panel

No.	Final Panel Comment
	Significance – High
1	The results of the economic analysis are reported as point estimates and do not include a thorough assessment of risk and uncertainty as required by ER 1105-2-101.
2	The methods used to calculate structure and content values, as well as sensitivity tests related to these values, are not consistent with USACE guidelines; in addition, technical details regarding the economic analysis are not provided.
3	Risks associated with wind and flood damage from previous storm events are not provided and the relative magnitudes of these risks are not addressed in the report.
4	The decision criteria for selecting the NED plan and TSP are not provided and it could not be determined how incremental analysis was used in the evaluation of alternatives.
5	Conflicting with and without project benefit information is presented throughout the project documents and raises concerns about the alternatives selected using the benefit-cost analysis.
6	The uncertainties associated with many of the engineering calculations are not presented and do not appear to be carried through the analyses.
7	The borrow area is a major project feature, but its physical and environmental aspects have not been thoroughly described or quantified to understand how this feature will function.
8	The implications of the 2010 Deepwater Horizon oil spill, and the potential impacts to the project, if contaminants are found, are not fully discussed.
9	The engineering and environmental data presented may not be representative of more recent conditions within the project area.
	Significance – Medium
10	The statistical analyses are not consistent with contemporary methods, and the details of the extreme value statistical analysis are not provided.
11	The Panel could not determine how inundation was included within the Beach-fx analysis, or if full inundation occurred for any of the SBEACH-simulated storm conditions.
12	Technical details of the engineering analysis are not provided in the project documents, making it difficult to understand the process of conducting the analysis.
13	Technical details regarding the Beach-fx model and implementation are not provided in the project documents, making it difficult to understand the process for conducting the modeling.
14	The potential impacts of sea-level rise and climate change on flooding damages and environmental conditions do not appear to have been considered or accounted for in the uncertainty analysis.
15	Data quantifying the potential environmental impacts and ecosystem benefits of the project are not summarized in the Main Report or Environmental Assessment (EA).
16	The Environmental Assessment contains unsupported statements and numerous readability issues that impair the Panel's ability to determine if the analysis of the environment and natural resources are sufficient to support selection of the TSP.
17	Public input and stakeholder engagement in the planning process are not discussed, and the level and resources of local sponsor support is unknown.
	Significance – Low
18	Technical details of the engineering computational modeling are not provided in the project documents, making it difficult to understand the process of conducting the analysis.

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LIST OF ACRONYMS

ADCIRC	A coastal circulation and storm surge model
ASCE	American Society of Civil Engineers
ATR	Agency Technical Review
BA	Borrow Area
BCR	Benefit Cost Ratio
Beach-fx	A shore protection engineering-economic model
COI	Conflict of Interest
COPRI	Coasts, Oceans, Ports, and Rivers Institute
DFR	Draft Feasibility Report
DrChecks	Design Review and Checking System
EA	Environmental Assessment
FEMA	Federal Emergency Management Agency
GENESIS	Generalized Model for Simulating Shoreline Change
HEC-FDA	Hydrologic Engineering Center Flood Damage Reduction Analysis
IEPR	Independent External Peer Review
LPP	Locally Preferred Plan
NEPA	National Environmental Policy Act
NED	National Economic Development
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NTP	Notice to Proceed
OEO	Outside Eligible Organization
OMB	Office of Management and Budget
PDT	Project Delivery Team
SBEACH	Storm-induced Beach Change Model
TSP	Tentatively Selected Plan
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

1. INTRODUCTION

Walton County is located approximately 103 miles east of Pensacola, Florida and approximately 98 miles west of Tallahassee, Florida. The beaches of Walton County encompass approximately 26 miles of shoreline extending from the City of Destin in Okaloosa County, Florida. The western two-thirds of Walton County are comprised of coastal peninsula extending from the mainland, and the eastern third is comprised of mainland beaches. Choctawhatchee Bay lies to the north of the peninsula. Walton County includes approximately 11.9 miles of state-designated critically eroding areas and three State of Florida park areas that cover approximately 6 miles of the approximately 26-mile shoreline.

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The selected plan recommended (Tentatively Selected Plan; TSP) for construction is the Locally Preferred Plan (LPP). The project would be composed of a 50-foot berm width, a 25-foot berm, and an additional 25 feet of nourishment in all construction reaches. The project will also feature added dune width in all construction reaches of either 10 or 30 feet. The modeling efforts have predicted fill requirements of 2,400,000 cubic yards. This plan extends the coverage area to the westernmost limits of Walton County where the National Economic Development (NED) plan could not justify the coverage. Approved borrow sources lie offshore within the State of Florida waters. The dune construction would be planted with at least three species of dune vegetation.

The objective of the work described here was to conduct an Independent External Peer Review (IEPR) of the Walton County, Florida, Hurricane and Storm Damage Reduction Project Draft Feasibility Report and Environmental Assessment (hereinafter Walton County DFR & EA) in accordance with procedures described in the Department of the Army, U.S. Army Corps of Engineers (USACE) Engineer Circular *Civil Works Review Policy* (EC No. 1165-2-209) (USACE 2010), USACE CECW-CP memorandum *Peer Review Process* (USACE 2007), and Office of Management and Budget (OMB) bulletin *Final Information Quality Bulletin for Peer Review* (OMB 2004). Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific analyses.

This final report details the IEPR process, describes the IEPR panel members and their selection, and summarizes the Final Panel Comments of the IEPR Panel on the existing environmental, economic, and engineering analyses contained in the Walton County DFR & EA. The full text of the Final Panel Comments is presented in Appendix A.

2. PURPOSE OF THE IEPR

To ensure that USACE documents are supported by the best scientific and technical information, USACE has implemented a peer review process that uses IEPR to complement the Agency Technical Review (ATR), as described in USACE (2010) and USACE (2007).

In general, the purpose of peer review is to strengthen the quality and credibility of USACE's decision documents in support of its Civil Works program. IEPR provides an independent assessment of the economic, engineering, and environmental analysis of the project study. In particular, the IEPR addresses the technical soundness of the project study's assumptions, methods, analyses, and calculations and identifies the need for additional data or analyses to make a good decision regarding implementation of alternatives and recommendations.

In this case, the IEPR of the Walton County DFR & EA was conducted and managed using contract support from Battelle, which is an Outside Eligible Organization (OEO) (as defined by EC 1165-2-209) under Section 501(c)(3) of the U.S. Internal Revenue Code with experience conducting IEPRs for USACE.

3. METHODS

This section describes the method followed in selecting the members for the IEPR Panel (the Panel) and in planning and conducting the IEPR. The IEPR was conducted following procedures described by USACE (2010) and in accordance with USACE (2007) and OMB (2004) guidance. Supplemental guidance on evaluation for conflicts of interest (COIs) was obtained from the *Policy on Committee Composition and Balance and Conflicts of Interest for Committees Used in the Development of Reports* (The National Academies, 2003).

3.1 Planning and Schedule

After receiving the award notice on April 21, 2011, Battelle held a kick-off meeting with USACE to review the preliminary/suggested schedule, discuss the IEPR process, and address any questions regarding the scope (e.g., clarify expertise areas needed for panel members). Battelle also completed the process of selecting the four members of the Panel. Prior to the start of the review process, however, the IEPR was delayed until May 2012 to allow USACE to make revisions to the project. Any revisions to the schedule were submitted as part of the final Work Plan.

Table 1 presents the schedule followed in executing the IEPR. Due dates for milestones and deliverables are based on the Award/Effective date of April 21, 2011. Note that the work items listed in Task 7 occur after the submission of this report. Battelle will enter the 18 Final Panel Comments developed by the Panel into USACE's Design Review and Checking System (DrChecks), a Web-based software system for documenting and sharing comments on reports and design documents, so that USACE can review and respond to them. USACE will provide responses (Evaluator Responses) to the Final Panel Comments, and the Panel will respond (BackCheck Responses) to the Evaluator Responses. All USACE and Panel responses will be documented by Battelle.

Table 1. Walton County DFR & EA IEPR Schedule

Task	Action	Due Date
1	Award/Effective Date (NTP)	April 21, 2011
	Review documents available	May 2, 2012
	Battelle submits draft Work Plan[a]	May 27, 2011
	USACE provides comments on draft Work Plan	June 6, 2011
	Battelle submits final Work Plan[a]	May 11, 2012
2	Battelle requests input from USACE on the conflict of interest (COI) questionnaire	April 28, 2011
	USACE provides comments on COI questionnaire	May 2, 2011
	Battelle submits list of selected panel members[a]	May 12, 2011
	USACE confirms the Panel has no COI	May 17, 2011
	Battelle completes subcontracts for panel members	August 3, 2011
3	USACE provides Charge to be included in Work Plan	May 4, 2012
4	Battelle convenes kick-off meeting with USACE	May 3, 2011
	Battelle convenes kick-off meeting with USACE to Re-Start IEPR	May 9, 2012
	Battelle sends review documents to Panel	May 14, 2012
	USACE/Battelle convenes kickoff meeting with Panel	May 18, 2012
4.1	Civil Works Review Board Attendance[b]	TBD
5	Battelle convenes mid-review teleconference for Panel to ask clarifying questions of USACE	May 29, 2012
	Panel members complete their individual reviews	June 6, 2012
	Battelle provides Panel merged individual comments and talking points for Panel Review Teleconference	June11, 2012
	Battelle convenes Panel Review Teleconference	June 14, 2012
	Panel members provide draft Final Panel Comments to Battelle	June 22, 2012
	Battelle provides feedback to Panel on draft Final Panel Comments; Panel provides revised draft Final Panel Comments per Battelle feedback (iterative process)	June 23, 2012 – June 29, 2012
	Final Panel Comments finalized	July 3, 2012
6	Battelle provides Final IEPR Report to Panel for review	July 5, 2012
	Panel provides comments on Final IEPR Report	July 6, 2012
	Battelle submits Final IEPR Report to USACE[a]	July 9, 2012
7[b]	Battelle convenes teleconference with USACE to review the Post-Final Panel Comment Response Process	July12, 2012
	USACE provides draft PDT Evaluator Responses to Battelle	July 17, 2012
	Panel members provide Battelle with draft comments on draft PDT Evaluator Responses (i.e., draft BackCheck Responses)	July 20, 2012

Task	Action	Due Date
7[b]	Battelle convenes teleconference with Panel and USACE to discuss Final Panel Comments and draft responses	July 25, 2012
	USACE inputs final PDT Evaluator Responses in DrChecks	July 31, 2012
	Panel members provide Battelle with final BackCheck Responses	August 2, 2012
	Battelle inputs the Panel's BackCheck Responses in DrChecks	August 8, 2012
	Battelle submits pdf printout of DrChecks project file[a]	August 8, 2012
	Project Closeout	October 12, 2012

[a] Deliverable.

[b]Occurs after the submission of this report.

3.2 Identification and Selection of IEPR Panel Members

The candidates for the Panel were evaluated based on their technical expertise in the following key areas: coastal engineering, plan formulation, environment/biology and economics. These areas correspond to the technical content of the Walton County DFR & EA and overall scope of the Walton County, Florida, Hurricane and Storm Damage Reduction Project Draft Feasibility Report and Environmental Assessment project.

To identify candidate panel members, Battelle reviewed the credentials of the experts in Battelle's Peer Reviewer Database, sought recommendations from colleagues, contacted former panel members, and conducted targeted Internet searches. Battelle initially identified more than 20 candidates for the Panel, evaluated their technical expertise, and inquired about potential COIs. Of these, Battelle chose seven of the most qualified candidates and confirmed their interest and availability. Of the seven candidates, four were proposed for the final Panel and three were proposed as backup reviewers. Information about the candidate panel members, including brief biographical information, highest level of education attained, and years of experience, was provided to USACE for feedback. Battelle made the final selection of panel members according to the selection criteria described in the Work Plan. The completion of subcontracting procedures for the selected panel members was de

The four proposed primary reviewers constituted the final Panel. Subcontracting procedures for the selected panel members were extended due to schedule revisions associated with delay in the availability of the review documents. The remaining candidates were not proposed for a variety of reasons, including lack of availability, disclosed COIs, or lack of the precise technical expertise required.

The candidates were screened for the following potential exclusion criteria or COIs.[1] These COI questions were intended to serve as a means of disclosure and to better characterize a candidate's employment history and background. Providing a positive response to a COI screening question did not automatically preclude a candidate from serving on the Panel. For example, participation in previous USACE technical peer review committees and other technical review panel experience was included as a COI screening question. A positive response to this question could be considered a benefit.

- Involvement by you or your firm[2] in the Hurricane and Coastal Storm Damage Risk Reduction Project Draft Feasibility Report and Environmental Assessment Walton County, Florida.
- Involvement by you or your firm[2] in dune construction, beach nourishment, or coastal engineering projects in Walton County, Florida including (but not limited to) City of Destin in Okaloosa County, Florida, Choctawhatchee Bay, and the Gulf Intracoastal Waterway.
- Involvement by you or your firm[2] in the Hurricane and Coastal Storm Damage Risk Reduction Project Draft Feasibility Report and Environmental Assessment Walton County, Florida related projects.
- Current employment by the U.S. Army Corps of Engineers (USACE).
- Current or previous employment or affiliation with members of the cooperating agencies or local sponsors, including Walton County Tourist Development Council, U.S. Fish and Wildlife Service (USFWS), Gulf of Mexico Fishery Management Council, National Marine Fisheries Service (NMFS), Environmental Protection Agency (EPA), Florida Department of Environmental Protection (FDEP), Florida Fish and Wildlife Conservation Commission (FWCC), Florida Division of Historic Resources, and Florida State Parks (SP) including Grayton Beach SP, Topsail Hill SP, and Deer Lake SP (for pay or pro bono).
- Past, current, or future interests or involvements (financial or otherwise) by you, your spouse or children related to Walton County, Florida including (but not limited to) City of Destin in Okaloosa County, Florida, Choctawhatchee Bay, and the Gulf Intracoastal Waterway.
- Current personal involvement with other USACE projects, including whether involvement was to author any manuals or guidance documents for USACE. If yes, provide titles of documents or description of project, dates, and location (USACE district, division, Headquarters, ERDC, etc.), and position/role. Please highlight and discuss in greater detail any projects that are specifically with the Mobile District.

[1] Battelle evaluated whether scientists in universities and consulting firms that are receiving USACE-funding have sufficient independence from USACE to be appropriate peer reviewers. See OMB (2004, p. 18), "….when a scientist is awarded a government research grant through an investigator-initiated, peer-reviewed competition, there generally should be no question as to that scientist's ability to offer independent scientific advice to the agency on other projects. This contrasts, for example, to a situation in which a scientist has a consulting or contractual arrangement with the agency or office sponsoring a peer review. Likewise, when the agency and a researcher work together (e.g., through a cooperative agreement) to design or implement a study, there is less independence from the agency. Furthermore, if a scientist has repeatedly served as a reviewer for the same agency, some may question whether that scientist is sufficiently independent from the agency to be employed as a peer reviewer on agency-sponsored projects."

[2] Note: Includes any joint ventures in which your firm is involved.

- Current firm[2] involvement with other USACE projects, specifically those projects/contracts that are with the Mobile District. If yes, provide title/description, dates, and location (USACE district, division, Headquarters, ERDC, etc.), and position/role.
- Any previous employment by the USACE as a direct employee or contractor (either as an individual or through your firm[2]) within the last 10 years, notably if those projects/contracts are with the Mobile District. If yes, provide title/description, dates employed, and place of employment (district, division, Headquarters, ERDC, etc.), and position/role.
- Previous experience conducting technical peer reviews. If yes, please highlight and discuss any technical reviews concerning dune construction, beach nourishment, or coastal engineering, and include the client/agency and duration of review (approximate dates).
- Pending, current, or future financial interests in Hurricane and Coastal Storm Damage Risk Reduction Project Draft Feasibility Report and Environmental Assessment Walton County, Florida related contracts/awards from USACE.
- A significant portion (i.e., greater than 50%) of personal or firm[2] revenues within the last three years came from USACE contracts.
- Any publicly documented statement (including, for example, advocating for or discouraging against) related to Hurricane and Coastal Storm Damage Risk Reduction Project Draft Feasibility Report and Environmental Assessment Walton County, Florida.
- Participation in relevant prior Federal studies relevant to this project.
- Participation in prior non-Federal studies relevant to this project and/or "State of the Beaches" of Walton County, Florida 2001, 2002, 2003, 2004, and 2005 Walton County Development Council and Beach Management Feasibility Study for Walton County and Destin Florida, Taylor Engineering Inc., April 2003.
- Is there any past, present, or future activity, relationship or interest (financial or otherwise) that could make it appear that you would be unable to provide unbiased services on this project? If so, please describe.

In selecting the final members of the Panel from the list of candidates, Battelle chose experts who best fit the expertise areas and had no COIs. The four final reviewers were either affiliated with academic institutions or consulting companies or were independent engineering consultants. Battelle established subcontracts with the panel members when they indicated their willingness to participate and confirmed the absence of COIs through a signed COI form. USACE was given the list of candidate panel members, but Battelle made the final selections of the Panel. Section 4 of this report provides names and biographical information on the panel members.

Prior to beginning their review, all members of the Panel attended a kick-off meeting via a teleconference planned and facilitated by Battelle in order to review the IEPR process, the schedule, communication procedures, and other pertinent information for the Panel.

3.3 Preparation of the Charge and Conduct of the IEPR

The charge was prepared by USACE according to guidance provided in USACE (2010) and OMB (2004). Charge questions were provided by USACE and included in the draft and final Work Plans. In addition to a list of 89 charge questions/discussion points, the final charge included general guidance for the Panel on the conduct of the peer review (provided in Appendix B of this final report).

Battelle planned and facilitated a final kick-off meeting via teleconference during which USACE presented project details to the Panel. Before the meeting, the IEPR Panel received an electronic version of the final charge as well as the following relevant document, totaling 1,422 pages: Walton County, Florida Hurricane and Storm Damage Reduction Project Draft Feasibility Report and Environmental Assessment with all pertinent appendices and attachments

About halfway through the review of the Walton County DFR & EA, a teleconference was held with USACE, the Panel, and Battelle so that USACE could answer any questions the Panel had concerning either the review documents or the project.

3.4 Review of Individual Comments

The Panel was instructed to address the charge questions/discussion points within a comment-response form provided by Battelle. At the end of the review period, the Panel produced approximately 400 individual comments in response to the charge questions/discussion points. Battelle reviewed the comments to identify overall recurring themes, areas of potential conflict, and other overall impressions. As a result of the review, Battelle summarized the 400 comments into a preliminary list of 22 overall comments and discussion points. Each panel member's individual comments were shared with the full Panel in a merged individual comments table.

3.5 IEPR Panel Teleconference

Battelle facilitated a 3-hour teleconference with the Panel so that the panel members, many of whom are from diverse scientific backgrounds, could exchange technical information. The main goal of the teleconference was to identify which issues should be carried forward as Final Panel Comments in the Final IEPR Report and decide which panel member would serve as the lead author for the development of each Final Panel Comment. This information exchange ensured that the Final IEPR Report would accurately represent the Panel's assessment of the project, including any conflicting opinions. The Panel engaged in a thorough discussion of the overall positive and negative comments, added any missing issues of high-level importance to the findings, and merged any related individual comments. In addition, Battelle confirmed each Final Panel Comment's level of significance to the Panel.

At the end of these discussions, the Panel identified 18 comments and discussion points that should be brought forward as Final Panel Comments.

3.6 Preparation of Final Panel Comments

Following the teleconference, Battelle prepared a summary memorandum for the Panel documenting each Final Panel Comment (organized by level of significance). The memorandum

provided the following detailed guidance on the approach and format to be used to develop the Final Panel Comments for the Walton County DFR & EA:

- Lead Responsibility: For each Final Panel Comment, one Panel member was identified as the lead author responsible for coordinating the development of the Final Panel Comment and submitting it to Battelle. Battelle modified lead assignments at the direction of the Panel. To assist each lead in the development of the Final Panel Comments, Battelle distributed the merged individual comments table, a summary detailing each draft final comment statement, an example Final Panel Comment following the four-part structure described below, and templates for the preparation of each Final Panel Comment.
- Directive to the Lead: Each lead was encouraged to communicate directly with other IEPR panel members as needed and to contribute to a particular Final Panel Comment. If a significant comment was identified that was not covered by one of the original Final Panel Comments, the appropriate lead was instructed to draft a new Final Panel Comment.
- Format for Final Panel Comments: Each Final Panel Comment was presented as part of a four-part structure:
  1. Comment Statement (succinct summary statement of concern)
  2. Basis for Comment (details regarding the concern)
  3. Significance (high, medium, low; see description below)
  4. Recommendation(s) for Resolution (see description below).
- Criteria for Significance: The following were used as criteria for assigning a significance level to each Final Panel Comment:
  1. High: Describes a fundamental problem with the project that could affect the recommendation, success, or justification of the project. Comments rated as high indicate that the Panel analyzed or assessed the methods, models, and/or analyses and determined that there is a "showstopper" issue.
  2. Medium: Affects the completeness of the report in describing the project, but will not affect the recommendation or justification of the project. Comments rated as medium indicate that the Panel does not have sufficient information to analyze or assess the methods, models, or analyses.
  3. Low: Affects the understanding or accuracy of the project as described in the report, but will not affect the recommendation or justification of the project. Comments rated as low indicate that the Panel identified information (tables, figures, equations, discussions) that was mislabeled or incorrect or data or report sections that were not clearly described or presented.
- Guidance for Developing Recommendations: The recommendation section was to include specific actions that USACE should consider to resolve the Final Panel Comment (e.g., suggestions on how and where to incorporate data into the analysis, how and where to address insufficiencies, areas where additional documentation is needed).

At the end of this process, 18 Final Panel Comments were prepared and assembled. Battelle reviewed and edited the Final Panel Comments for clarity, consistency with the comment statement, and adherence to guidance on the Panel's overall charge, which included ensuring that

there were no comments regarding either the appropriateness of the selected alternative or USACE policy. There was no direct communication between the Panel and USACE during the preparation of the Final Panel Comments to ensure the integrity and independence of the IEPR process. The Final Panel Comments are presented in Appendix A of this report.

4. PANEL DESCRIPTION

Candidates for the Panel were identified using Battelle's Peer Reviewer Database, targeted Internet searches using key words (e.g., technical area, geographic region), searches of websites of universities or other compiled expert sites, and referrals. Battelle prepared a draft list of primary and backup candidate panel members (who were screened for availability, technical background, and COIs), and provided it to USACE for feedback. Battelle made the final selection of panel members.

An overview of the credentials of the final four primary members of the Panel and their qualifications in relation to the technical evaluation criteria is presented in Table 2. More detailed biographical information regarding each panel member and his or her area of technical expertise is presented in the text that follows the table.

Table 2. Walton County DFR & EA IEPR Panel: Technical Criteria and Areas of Expertise

Technical Criteria	Irish	Rogers	Thoemke	Milon
Coastal Engineering (one expert needed)				
Professional engineer with a minimum of 10 years demonstrated experience in coastal and hydraulic engineering and large beach nourishment projects including:	X			
Coastal processes	X			
Hydraulic theory and practice	X			
Familiar with USACE applications of risk and uncertainty analyses in hurricane and coastal storm damage risk reduction projects	X			
Familiar with standard USACE computer models including	X			
SBEACH	X			
GENESIS	X			
BEACH-Fx	X			
Familiar with USACE Safety Assurance Review (SAR)	X			
Active participation in related professional engineering and scientific societies	X			
M.S. degree or higher in engineering	X			
Plan Formulation (one expert needed)				
Minimum 10 years experience including:		X		
Minimum 5 years experience working on USACE civil works projects		X		
USACE hurricane and coastal storm damage risk reduction projects		X		
Hurricane/storm damage projects		X		
Familiar with USACE civil works planning policies, methodologies, and procedures		X		
M.S. degree or higher in an appropriate field of study		X		
Environmental/Biology (one expert needed)				
Minimum 10 years demonstrated experience with projects along the Gulf of Mexico coast of the United States			X	
Familiar with construction impacts on marine and terrestrial ecology of coastal regions of northern Gulf of Mexico			X	
Experience with environmental policies and processes including			X	
NEPA requirements			X	
Endangered Species Act			X	
Essential Fish Habitat			X	
Marine Mammals Protection Act			X	
Active participation in related professional engineering and scientific societies			X	
M.S. degree or higher in an appropriate field of study			X	

Technical Criteria	Irish	Rogers	Thoemke	Milon
Economics (one expert needed)				
Minimum 10 years experience with water resource economic evaluation or review				X
Minimum two years experience reviewing federal water resource economic documents justifying construction efforts				X
Minimum five years experience with HEC-FDA				X
Experience evaluating National Economic Development (NED) plan benefits associated with hurricane and coastal storm damage risk reduction projects				X
M.S. degree or higher in economics				X

Jennifer Irish, Ph.D., P.E., D.CE.

Role: This panel member was chosen primarily for her coastal engineering experience and expertise.
Affiliation: Department of Civil and Environmental Engineering, Virginia Tech

Jennifer Irish, Ph.D., P.E. is an associate professor of civil engineering at Virginia Tech. She earned her Ph.D. in Civil Engineering from the University of Delaware in 2005, is a licensed professional engineer in NY, and has15 years experience in the coastal and civil engineering field. Prior to taking a faculty position, Irish was a coastal engineer for USACE from 1994-2005, and held a research position at the USACE Coastal and Hydraulics Laboratory (CHL) from 1994–2001. She has performed research on the measurement of bathymetry and ocean waves, navigation channel shoaling, wetlands restoration, shore protection, and coastal processes, storm damage reduction, including numerical modeling and risk assessment of storm surge, waves, and morphological response. She was the lead technical engineer for the Fire Island to Montauk Point Storm Damage Reduction Study and technical expert on the Hurricane Katrina surge study for New Orleans, LA (Interagency Performance Evaluation Task Force).

Dr. Irish is experienced in coastal processes and hydraulic theory and has conducted research and engineering activities related to fluid dynamics, storm surge, coastal hazard risk assessment, wave mechanics, coastal storm morphodynamics, beach erosion barrier island breaching, beach nourishments, and tidal inlet dynamics. She has an in-depth understanding of USACE application of risk and uncertainty analyses in hurricane and coastal storm damage risk reduction projects, with coastal flood risk and uncertainty the main focus of her research.

In addition, Dr. Irish has extensive experience with standard USACE computer models. She has used SBEACH for engineering projects in Long Island, New York, uses SBEACH in the courses she teaches, and has used GENESIS for basic applications and has coded a one-line model similar to GENESES for research. Dr. Irish has also followed the development of BEACH-fx and is familiar with the principles and utility of this model. She is familiar with USACE SAR, and has served as a technical consultant and reviewer for numerous USACE, Federal Emergency Management Agency (FEMA), and USGS projects.

Dr. Irish has authored more than 30 journal papers, either published or in review, and more than 30 published conference proceedings relating to civil engineering. She is Governing Board Secretary of the American Society of Civil Engineers (ASCE) Coasts, Oceans, Ports, and Rivers Institute (COPRI), and ASCE COPRI Coastal and Estuarine Hydrosciences Committee. Dr. Irish has been the recipient of numerous USACE and U.S. Army achievement awards, including the 2008 Department of the Army Superior Civilian Service Award (U.S. Army Director of Civil Works) and two 2006 Department of the Army Commander's Awards for Civilian Service (USACE New York District and USACE Mississippi Valley Division).

Barton Rogers

Role: This panel member was chosen primarily for his plan formulation experience and expertise.
Affiliation: GEC, Inc.

Barton Rogers is a senior biologist and project manager with GEC, Inc. specializing in Civil Works and wetland projects. He earned his M.S. in forestry, wildlife, and fisheries from Louisiana State University in 1979, and received his USACE Planning Associate Certification in 2004. Mr. Rogers served with USACE from 1994 to 2005 as regulatory project manager, environmental manager, and project manager. He has 35 years of experience conducting environmental evaluations, is experienced in multi-purpose planning, and is familiar with USACE plan formulation standards and procedures, having worked for more than 10 years on USACE Civil Works projects. Mr. Rogers has served as a planner for several hurricane and coastal storm damage risk reduction projects including the Louisiana Coastal Area Amite River Diversion Canal, Morganza to the Gulf, and Donaldsonville to the Gulf. His experience with hurricane/storm damage projects includes six years with the New Orleans District as Project Manager in the New Orleans District's Planning, Programs, and Project Management Division, Project Management–West Branch.

As a Project Manager/Environmental Functional Team Leader/Team Member in the Environmental Branch, Mr. Rogers was planning and project manager under many regulations and covered all phases of planning and project management including reconnaissance, feasibility, preconstruction, engineering and design, and construction. His knowledge and skills in the planning process include those necessary to negotiate Feasibility Cost Share Agreements, Project Partnering Agreements, and other project-related documents. He has also integrated the planning, design, cost engineering, construction, and environmental considerations for water resources projects and has knowledge and understanding of USACE Business Process, Planning Guidance, Principles and Guidelines, and NEPA. He has managed projects that used either the NED benefit assessment or the National Ecosystem Restoration benefits as outlined in ER 1105-2-100.

Mr. Rogers has acquired experience with USACE Civil Works planning policies, methodologies and procedures through his 12 year tenure with USACE and his experience as instructor for a USACE Core Planners Curriculum "Hydrologic and Hydraulic Considerations in Planning." He has served on several ecosystem restoration/flood management-related USACE IEPR panels as the plan formulation expert including the East Branch Dam Flood Risk Management Study and Cedar Rapids Iowa Flood Risk Management Feasibility Study. He has been the recipient of

numerous planning related awards including two Chief of Engineer's Awards and several USACE Team Achievement Awards.

Kris Thoemke, Ph.D., CEP

Role: This panel member was chosen primarily for environmental/biology experience and expertise.
Affiliation: Coastal Engineering Consultants, Inc.

Kris Thoemke Ph.D., CEP, is a Senior Associate Scientist for Coastal Engineering Consultants Inc. He received his Ph.D. in biology from the University of South Florida in 1979 and is a Certified Environmental Professional (CEP). Dr. Thoemke has over 30 years experience as a professional ecologist in south Florida. He has been a researcher and land manager for the State of Florida, private ecological consultant, free-lance environmental and outdoor communicator, Everglades Project Manager for a non-profit organization, and taught graduate level environmental management, ecology, water management, and permitting and compliance courses. He has worked on a variety of projects involving environmental protection and habitat restoration as well as growth and development issues in south Florida.

Dr. Thoemke's experience with construction impacts on marine and terrestrial ecology of coastal regions of the Gulf of Mexico includes identification and assessment of construction impacts to seagrass, mangrove, shorebird, and dune plant communities at Stump Pass and Blind Pass, Florida, and gopher tortoise habitat at Clam Pass and Vanderbilt Beach Parks, Florida. He is also experienced with environmental policies and processes. He was a member of an integrated team of scientists and engineers that prepared the Environmental Impact Statement for the Terrebonne Basin Barrier Island Shoreline Restoration Project, Louisiana, which included Endangered Species Act, essential fish habitat, and NEPA requirements. In addition, he is currently under contract to prepare an EA for offshore dredged material disposal for the USACE Jacksonville District, which includes NEPA compliance.

He has prepared Section 7 assessments for listed species under NMFS jurisdiction and provided essential fish habitat consultation for projects in several south FL locations. Currently he is involved in ongoing coordination with USFWS to prepare a Biological Opinion for nesting sea turtles and shorebirds on Marco Island, FL. Dr. Thoemke is a member of the National Association of Environmental Professionals and the Academy of Board Certified Environmental Professionals.

Walter Milon, Ph.D.

Role: This panel member was chosen primarily for economics experience and expertise.
Affiliation: University of Central Florida

Walter Milon, Ph.D., is the Department Chair and the Provost's Distinguished Research Professor in the Department of Economics at the University of Central Florida's College of Business Administration, where he teaches graduate level courses in benefit cost and social impact analyses, economic theory, and natural resource and environmental economics. He earned a Ph.D. in economics from Florida State University in 1978 and has 30 years of experience in natural resource and environmental economics and water resource economic

evaluation. Dr. Milon has more than five years' experience reviewing Federal water resource economic documents justifying construction efforts and is experienced in evaluating NED plan benefits associated with hurricane and coastal storm damage risk reduction projects. He has participated in the planning and technical advisory for the USACE Florida Everglades Restudy (1995-1999), was lead economist on three USACE IEPRs including the C-111 Spreader Canal Project Implementation Report and the Louisiana Coastal Area Restoration Project (2009-2011).

Dr. Milon has more than five years' experience with Hydrologic Engineering Center Flood Damage Reduction Analysis (HEC-FDA), having taught graduate level courses on flood risk damage assessment, participated in the IEPR Panel for the White Oak Bayou Federal Flood Damage Reduction Plan, and served as a member of the National Research Council Committee on USACE Water Resources Science, Engineering, and Planning. He was also the principal investigator for the research project, Socioeconomic Evaluation of Hurricane Evacuation Response, for the Florida Hurricane Research alliance, and of Florida's Coastal Environmental Resources: Economic Valuation and Analysis. Dr. Milon is a member of the Committee on Water Resources Science, Engineering and Policy, National Research Council, National Academies of Science.

5. SUMMARY OF FINAL PANEL COMMENTS

The panel members agreed among one another on their "assessment of the adequacy and acceptability of the economic, engineering, and environmental methods, models, and analyses used" (USACE, 2010; p. D-4) in the Walton County DFR & EA document. Table 3 lists the 18 Final Panel Comment statements by level of significance. The full text of the Final Panel Comments is presented in Appendix A. The following statements summarize the Panel's findings.

The Panel found that the Walton County project generally follows USACE planning guidelines and describes the methods and analyses used to develop the TSP. The Panel also recognizes the pioneering effort to use Beach-fx in the planning process. The Main Report and appendices provide a great deal of information about the project. However, in many instances a summary of key information is not provided and the reader is referred to the appendices or to a separate report that has not been included in the project documents provided to the Panel for this IEPR. In addition, the current organization of the project documents affects the readability and impedes the understanding of the project. The Main Report should contain the key information necessary to understand the methods and analyses as well as how the conclusions are supported without referencing the appendices. Integrating the Main Report with the Environmental Assessment may greatly improve readability and allow the reader to clearly understand the problem, alternatives, and how the recommended plan was developed and justified.

The Panel identified several deficiencies in the methods and analyses, which raises questions about the technical support for the project recommendations. The engineering and economic analyses are based on limited data, and these data are typically for time periods prior to 2006. In some instances the analyses do not appear to follow more recent USACE guidance, most notably as related to use and reporting of risk and uncertainty. In addition, significant information, such

as baseline environmental conditions, was not included for the Panel's review in the project documents.

Plan Formulation – The Panel found that the Main Report adheres well to the USACE planning process, with some exceptions. The project justification depends on the project costs and benefits (Benefit Cost Ratio or BCR). Additional information is needed to specifically demonstrate that the TSP provides the greatest net benefits, particularly as related to quantifying risk and uncertainty. The selection of the TSP relies on the economic analysis, which in turn relies on the engineering analysis. The engineering analysis is critical to establish replenishment rates, erosion, and costs for the project alternatives.

Engineering – The Panel concluded that the engineering information appears to be well done, but not well explained or well justified. The Panel believes that the outstanding issues can be addressed and explained. Some items appear to have been calculated, for example, shoreline recovery rates and local inundation for damage calculation, but these calculations are not presented in the project documents. The storm set selection was of concern because the justification appeared to have been based on older multiple storm events and no consideration was given to more contemporary methods that consider alternate plausible storm scenarios. The beach profiles appear to be dated, and are about seven years old (2005). While it appears that uncertainty was quantified for some engineering calculations, such as erosion volumes and long-term shoreline change rates, it is unclear how these uncertainties were incorporated into the economic evaluation. A more rigorous discussion of risk and uncertainty should be used throughout the entire study for the engineering estimates as well as the economic analysis. For example, the risk and uncertainty concerning the volume of available sand at the borrow area was not addressed.

Economics – The Panel found that the project documents do not provide sufficient economic analyses to justify the recommendations for the project. The economic analyses rely on a limited use of available data, partial analysis of project alternatives, and reporting of single values rather than a probabilistic description of expected outcomes. The Panel acknowledges the Monte Carlo simulations within the Beach-fx model analyses, but very little information about the distribution of expected outcomes is included in the economic analyses provided in the report. Further analyses are needed that integrate risk and uncertainty in both the engineering and economic parameters.

Environmental – The Panel could not compare the project alternatives since baseline and future without project conditions were not established in the Main Report. This information may be contained in a plan previously developed by the non-Federal sponsor, and could help in describing and justifying the TSP. The environmental impacts and benefits of the project are not quantified. For example, the Panel did not find a thorough description or evaluation of the borrow area, a major project feature. The description of the existing beach conditions relies on data from 2005 and may not reflect the current conditions. The Panel is aware of several published reports from 2007-2010 that contain data that appear to be relevant to this project, and a review of more current data may increase the potential for project success. In addition, critical information and data from the 2003 Taylor Engineering report are not included in the Main Report or Environmental Assessment for review; this information is required to provide support

for certain statements and conclusions. Finally, the Panel did not find a thorough discussion of public coordination efforts commensurate with a project of this scale.

Table 3. Overview of 18 Final Panel Comments Identified by the Walton County DFR and EA IEPR Panel

No.	Final Panel Comment
	Significance – High
1	The results of the economic analysis are reported as point estimates and do not include a thorough assessment of risk and uncertainty as required by ER 1105-2-101.
2	The methods used to calculate structure and content values, as well as sensitivity tests related to these values, are not consistent with USACE guidelines; in addition, technical details regarding the economic analysis are not provided.
3	Risks associated with wind and flood damage from previous storm events are not provided and the relative magnitudes of these risks are not addressed in the report.
4	The decision criteria for selecting the NED plan and TSP are not provided and it could not be determined how incremental analysis was used in the evaluation of alternatives.
5	Conflicting with and without project benefit information is presented throughout the project documents and raises concerns about the alternatives selected using the benefit-cost analysis.
6	The uncertainties associated with many of the engineering calculations are not presented and do not appear to be carried through the analyses.
7	The borrow area is a major project feature, but its physical and environmental aspects have not been thoroughly described or quantified to understand how this feature will function.
8	The implications of the 2010 Deepwater Horizon oil spill, and the potential impacts to the project, if contaminants are found, are not fully discussed.
9	The engineering and environmental data presented may not be representative of more recent conditions within the project area.
	Significance – Medium
10	The statistical analyses are not consistent with contemporary methods, and the details of the extreme value statistical analysis are not provided.
11	The Panel could not determine how inundation was included within the Beach-fx analysis, or if full inundation occurred for any of the SBEACH-simulated storm conditions.
12	Technical details of the engineering analysis are not provided in the project documents, making it difficult to understand the process of conducting the analysis.
13	Technical details regarding the Beach-fx model and implementation are not provided in the project documents, making it difficult to understand the process for conducting the modeling.
14	The potential impacts of sea-level rise and climate change on flooding damages and environmental conditions do not appear to have been considered or accounted for in the uncertainty analysis.
15	Data quantifying the potential environmental impacts and ecosystem benefits of the project are not summarized in the Main Report or Environmental Assessment (EA).
16	The Environmental Assessment contains unsupported statements and numerous readability issues that impair the Panel's ability to determine if the analysis of the environment and natural resources are sufficient to support selection of the TSP.
17	Public input and stakeholder engagement in the planning process are not discussed, and the level and resources of local sponsor support is unknown.
	Significance – Low
18	Technical details of the engineering computational modeling are not provided in the project documents, making it difficult to understand the process of conducting the analysis.

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APPENDIX A

Final Panel Comments

on the

Walton County DFR & EA

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Comment 1
The results of the economic analysis are reported as point estimates and do not include a thorough assessment of risk and uncertainty as required by ER 1105-2-101.
Basis for Comment:
A risk analysis of all alternatives and a presentation of a probabilistic analysis are required for flood and storm damage reduction studies to evaluate whether net benefits are positive and the Benefit Cost Ratio (BCR) is at or above 1.0 (ER 1105-2-101, 7.e.; USACE 2006). These analyses are used to compare plans in terms of the variability of physical performance, economic success, and residual risk. The presentation and analysis of the National Economic Development (NED) plan in Table 20 (p. 79) and Table B-35A (p. B-85) only report single point estimates of net benefits and the BCR. Similarly, no BCR or probabilistic analyses are provided for the project alternatives or Tentatively Selected Plan (TSP).
Significance – High:
Risk and uncertainty analysis is an intrinsic part of flood and storm damage studies and a requirement under USACE planning guidelines.
Recommendations for Resolution:
1. Provide tabular presentations with the mean and standard deviation of Expected Annual Damages, Net Benefits, and the BCR for each project alternative, NED plan and TSP that are consistent with ER 1105-2-101.

Literature cited

USACE (2006). Risk Analysis for Flood Damage Reduction Studies. Engineer Regulation (ER) 1105-2-101, Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. 3 January.

Comment 2
The methods used to calculate structure and content values, as well as sensitivity tests related to these values, are not consistent with USACE guidelines; in addition, technical details regarding the economic analysis are not provided.
Basis for Comment:
The information provided about structure and content values is very limited and has not been updated for current market conditions in 2012. Both the main report and the economic Appendix B provide a description of the local real estate market that is subjective and highly questionable in light of the national economic recession in 2008–2009 and subsequent impact on real estate markets within Florida. For example: • "Selling prices over the last 5-10 years have been much above what would normally be expected in the market place. Turnovers are occurring in as little as two years and there are large increases in the selling price when compared to purchasing prices." (Main Report, p. 31) • "The real estate market is very hot and property turnover is commonplace." (Appendix B, p. B-19) • "Investors and homeowners of structures on the beach have not panicked because of the economic downturn. Relatively few structures have been sold indicating the belief is that values are where they should be." (Appendix B, p. B-139). The Real Estate Plan (Appendix C) presents some data on changes in the real estate market over the 2005–2010 period, but only briefly notes that market values "…showed a significant reduction" over this time period. A markup factor for structure values is used to increase residential property values above assessed values in 2004 by: (a) 200 percent for pre-1990 construction and, (b) 125 percent for post-1990 construction (Main Report, pp. 30–31). These markups were necessary because "Assessed values were very low when compared to calculated depreciated replacement costs" (p. B-21). No details are provided about the method used to estimate depreciated replacement costs or the assessed values. It is also not stated whether assessed values refer to land or building values since both are available from the Walton County Property Appraiser. Furthermore, the statement that "When these structures are sold they are usually torn down for larger and more expensive ones" (p. 30) suggests that the structure value markups are intended to estimate full replacement value rather than depreciated replacement costs. This would represent betterment and is not consistent with USACE guidelines (IWR 2011). Values of $160 and $175 per square foot are used for multifamily structures depending on the size of the structure. Walkovers are valued at $200 to $275 per lineal foot. No information is provided to support these estimates. Similarly, a content-to- structure ratio of 62.5 percent is used for content values, but this is only a midpoint based on a range of 50 to 75 percent of replacement cost reportedly from a web search of insurance underwriters. No discussion or supporting data are provided as to whether these estimates are appropriate for the vacation/rental properties

that characterize the area or how this ratio might change by type of structure. Also, there is no discussion of whether generic depth-damage functions were used in the Beach-fx analysis as in other flood damage models such as HEC-FDA.

Finally, sources of uncertainty related to structure and content values are discussed in general terms (e.g., Main Report, pp. 33–34; Appendix B, pp. B-23–B-24), but no details, such as minimum/maximum values or standard deviations, are presented in the report. These sources of uncertainties would include structure foundation heights, structure and content depreciated replacement values, and the damage functions for each damage type (e.g., erosion, inundation, and wave).

Significance – High:

Storm damage reductions to structures and content are among the main economic benefits from the proposed project. Accurate measures of existing building asset values and potential damages are necessary for plan alternative evaluation and justification of the BCR.

Recommendations for Resolution:

1. Provide an evaluation of trends in land and building values over the 2000–2012 period using data from the Walton County Property Appraiser.
2. Describe the methods used to calculate depreciated replacement costs for all structures and provide a comparison between these estimated costs and the appraised building values.
3. Provide summary statistics for assessed land and building values and provide a comparison of the variability in these values with the mean and standard deviations used for land and building values in the storm damage reduction analysis in Beach-fx. This would facilitate an assessment of uncertainties related to the Walton County real estate market and appropriate values for the economic analysis.
4. Provide survey data or other information to justify the content to structure values for different building types and a discussion of the appropriate standard deviations for the analysis.
5. Describe the damage functions used within Beach-fx to determine structure and content damages and provide information about the means and standard deviations for foundation heights and other components of the damage reduction analysis.
6. Re-estimate the analysis of alternatives and benefit-cost results with the updated land, structure, and building values and the uncertainty parameters using probabilistic analysis consistent with ER 1105-2-101 (USACE 2006).

Literature cited

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Comment 3
Risks associated with wind and flood damage from previous storm events are not provided and the relative magnitudes of these risks are not addressed in the report.
Basis for Comment:
Several remarks are made in the report about prior storm damages in the study area but no specific information was provided regarding the extent of flood and wind damages from prior storms. Appendix B (p. B-21) notes that no prior claims were recorded with the National Flood Insurance Agency in the study area. No information is presented about flood zones or maps to describe the extent of the flood risk exposure. The absence of prior flood damage claims raises questions about the actual flood damage threats and the accuracy of the BCR as stated in the NED and TSP. In addition, while wind and flood/wave/erosion risks are different sources of damage, potentially they could all affect the same structures. For example, Hurricane Ivan in 2004 generated a storm surge in Escambia County, Florida greater than 10 feet and generated wind speeds in excess of 100 mph (Stewart 2005). Florida Building Codes, especially in the Panhandle region, typically would not prevent damage to structures at these wind speeds. Mitigating the flood risks for a structure does not create economic benefits if the same structure is damaged or destroyed by high winds. This is especially important in characterizing the residual risks that may remain in the 'with project' condition since many of the potential residual damages will be jointly impacted by water and wind forces.
Significance – High:
Avoided damage to structure and contents are the major economic benefits of the project but the analysis does not recognize the risks associated with wind damage to these same structures. These risks are not independent and should be included to determine the NED benefits.
Recommendations for Resolution:
1. Provide information about wind and water damage from prior storms in the study area. 2. Provide maps showing FEMA flood zones to better communicate the areas at risk in the study region. 3. Provide supplementary analyses to evaluate and/or describe the potential wind risks and the effects on NED benefits; it is understood that Beach-fx does not currently include a module to evaluate wind damage risks. At a minimum, wind damage risks should be discussed as part of the residual risks associated with the project for different storm events.

Literature cited

Stewart, Stacy R. (2005). Tropical Cyclone Report: Hurricane Ivan. National Hurricane Center, 27 May.

Comment 4
The decision criteria for selecting the NED plan and TSP are not provided and it could not be determined how incremental analysis was used in the evaluation of alternatives.
Basis for Comment:
The purpose of evaluating plan alternatives is to identify the benefits, costs, and risks associated with each alternative. If an alternative that yields maximum net benefits is rejected in favor of an alternative that yields lower net benefits, then an analysis of risks or other factors can be provided to describe why the lower net benefits alternative is preferred. The basis for engineering principles in the preferred design can be further supported through an evaluation of the initial or recurring costs of the project. This type of analysis provides information to decision-makers about the variability of physical performance, economic success, and residual risks for all the alternatives. The information presented in the Main Report and Appendix B does not explain the criteria used to select the NED plan. Table 12 (p. 64) reports that the highest average annual net benefits ($4.13 million) are provided from the MiniMin alternative. The NED plan in Table 20 reports net benefits of $1.92 million, which is 46% of the MiniMin alternative net benefits. This is partially explained in the Main Report as an effort to define a 'constructible dune width alternative' (pp. 69–70) that accounts for 'coastal engineering principles and previous experience.' However, an incremental analysis was not presented to show the benefit and cost tradeoffs for the constructible alternative, or which plan would have a higher probability of achieving a BCR greater than 1 as required by ER 1105-2-101 (USACE 2006).
Significance – High:
Alternatives that deviate from economic planning criteria should be fully evaluated to provide information that explains the basis for the selection.
Recommendations for Resolution:
1. Provide a more complete comparison of the benefits and costs of the constructible NED plan, the MiniMin alternative, and other project alternatives that were compared. This would include a probabilistic analysis of the performance of design structures, as well as a probabilistic analysis of the benefits and costs for each alternative.

Literature cited

USACE (2006). Risk Analysis for Flood Damage Reduction Studies. Engineering Regulation (ER) 1105-2-101. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C., 3 January.

IWR (2011). Coastal Storm Risk Management. IWR Report 2011-R-09. Institute for Water Resources. November.

Comment 5
Conflicting with and without project benefit information is presented throughout the project documents and raises concerns about the alternatives selected using the benefit-cost analysis.
Basis for Comment:
Without project average annual (AA) damages are presented in Table 7 as $6,144,750 ($3,834,781 for structure and content; $2,309,969 for emergency renourishment). Table 7A shows AA structure and content damages of $3,414,241 (i.e., $2,574,895 and $836,346). No explanation of the difference in these estimates for without project structure and content damages was provided. Also, Table 5 provides no details about the economic value of the structures at risk in the different reaches. With project AA NED benefits (without recreation) are presented in Table 20 as $6,375,000. These NED benefits from reducing storm damages are greater than the without project damages. The report does not explain how the NED plan could provide greater reductions in storm damages than the damages expected without the project. This discrepancy between with and without project results is further highlighted by the estimate of $896,936 in AA residual damages in Table 32 or B-47. Given that the NED plan provides greater benefits than the expected damages, the source for these residual damages is not apparent and no details are provided about the types of residual damages.
Significance – High:
Accurate measures of without project damages and the benefits of proposed alternatives are necessary for plan alternative evaluation, justification of the BCR, and to communicate the relative damage risks for different storm events.
Recommendations for Resolution:
1. Provide a more complete description of without project damages, including the value of structure and content damages by reach; tables and/or figures showing the levels of inundation and damages for different storm events (not just average annual estimates as in Tables 7,7A and B-14, 14A) would help communicate the storm damage risks. 2. Provide a complete description of with project storm damage reduction by damage category. 3. Provide more detailed information about the residual risks, including a breakdown of damages by type and for different storm events.

Comment 6

The uncertainties associated with many of the engineering calculations are not presented and do not appear to be carried through the analyses.

Basis for Comment:

Quantification of uncertainty in the engineering calculations is essential both for developing a robust design and for justifying the selected alternative in the context of economic analysis. Uncertainties in a number of engineering calculations are not discussed or presented within the Main Report or Appendices A and B. These are:

- Beach fill volumes: It cannot be determined if uncertainty in the fill volumes was carried through to the cost analysis and whether these uncertainties would have a significant impact on alternative selection or project justification.
- Sediment budget: It cannot be determined whether uncertainties in bulk sediment transport rates (e.g., longshore transport) and in sediment volume changes were quantified.
- Shoreline change: It cannot be determined if error in the GENESIS shoreline change estimates were carried through the engineering analysis for alternative selection and project justification.
- Beach profile representation: While it is understood why simplified profiles must be assumed for the Beach-fx analysis, it could not be determined what uncertainty is added to the analysis by assuming simplified profile representations.

Significance – High:

The discussion and presentation of engineering calculation uncertainties are incomplete and do not provide a sufficient basis for probabilistic benefit-cost analysis; as a result, the relative magnitude of these uncertainties or their implications for the economic analysis, alternative selection, and project justification cannot be determined.

Recommendations for Resolution:

1. Discuss the uncertainties in the beach fill volume calculations within the text, particularly given their large size; for example, the standard deviation is about half of the mean value. In addition, discuss how these large uncertainties impact project costs and the BCR.
2. Quantify and discuss uncertainties in the sediment budget transport and volumes in the report.
   a. The implications of these uncertainties on subsequent alternative selection and justification should be discussed within the report.
   b. If this uncertainty analysis was not completed, a complete justification for omitting sediment budget uncertainty analysis needs to be given within the report, and the implications of this omission on the engineering analysis and project justification needs to be discussed.
3. Discuss the uncertainty (error) in GENESIS shoreline change estimates in the context of impacts to alternative selection and project justification. Specifically, address how uncertainty in shoreline change is carried through the Beach-fx analysis and whether or not its impact is significant on alternative selection and project justification.

4. Discuss the uncertainties introduced by assuming simplified beach profiles for the SBEACH and Beach-fx simulation. Specifically, quantify to the extent possible the uncertainty added to the analysis by this assumption, as well as possible implications on alternative selection and project justification.

Comment 7
The borrow area is a major project feature, but its physical and environmental aspects have not been thoroughly described or quantified to understand how this feature will function.
Basis for Comment:
The borrow area is an important project feature and should be fully described and discussed in the Main Report and Environmental Assessment (EA) as per ER 1105-2-100 (USACE 2000) and ER 200-2-2 (USACE 1988). The Geotechnical Report is provided in the Engineering Appendix, but this information is not summarized in the Main Report, nor is an alternative site analysis for the borrow area presented. The sole reference to the borrow area presented in the project documents is a location map provided in the EA for borrow area (BA)-4. While BA-7 is indicated as the source for this material in other locations in the document, the environmental aspects of this location are not addressed. Alternative borrow areas and analyses are not presented and the proposed borrow site is not demonstrated to be the most cost-effective and practicable alternative. BA-1 through BA-10 are described in detail in Appendix A, Section 2, Geotechnical Considerations; however, this Appendix section is not referenced in the Main Report as it relates to the borrow area analysis. No information is presented in the report on the proposed depth of excavation for the borrow area, such as side slopes, cross sections, buffer zones, and how much sand is available. The route for transporting sand from the borrow area to the beach site or work (i.e., unloading) area is not identified. The risk and uncertainty associated with the amount of available sand is not discussed. The total fill amount required for the Walton County project is stated as over 11,000,000 cubic yards; however, this quantity is greater than the 10,000,000 cubic yards available in borrow site BA-4. It is possible that the refill rate of the borrow area(s) could make up for this difference; however, the relationship between the amount of sand available and how quickly it will be replenished is not addressed. The borrow area appears to be the back end of the ebb shoal of East Pass (CPE 2010). No contingency plan or discussion is provided to address the possible implications for the project if the volume of sand that the borrow area can provide is insufficient to meet the demands of the project. The project documents do not address whether the proposed borrow site will be used for other projects in neighboring counties. If the site may be used for other projects, this raises additional concerns about having sufficient material in the borrow site for this project. There is no evaluation or analysis of the potential effects of using this borrow area on beach erosion. The location of the borrow area is roughly two miles offshore; a change in wave refraction could potentially increase erosion rates. This potential increase in beach erosion is related to the depth, size, and distance from shore to the borrow area. The analysis for the City of Destin Report (CPE 2010, p. 63) concluded: “Overall, based on surveys, site visits (Coastal Tech, 2006), and numerical modeling, the erosional impacts of the Walton County/Destin borrow area, if any, have appeared to be minor.” This conclusion was based on surveys, site visits, and numerical modeling, and could possibly be applied to the Walton County project to demonstrate minimal impacts on erosion.

The environmental effects on the hardbottom, benthos, and nekton located in the borrow site are not fully discussed. For example, Section 3.4.1.9 of the Main Report (p. 46) states, "Dredging activities would result in significant mortality of non-motile benthic organisms." However, a discussion, with citations from the literature, is provided in the EA to demonstrate that impacts to benthic organisms in the area to be nourished are not significant due to the ability of the benthic organisms inhabiting the area to withstand these perturbations. Similarly, there is a body of scientific information for other borrow areas outside of this project area that indicates mortality of non-motile species, and the rate of recolonization can be several years.

Compliance with the Clean Water Act is stated as a "primary concern" for this project (Main Report, p. 40); however, this topic is not discussed in sufficient detail to understand how this issue has been addressed as it relates to the borrow area.

Discussions of cultural resources appear to only focus on the fill areas (Section 3.11 in EA, Section 3.4.1.5 in Main Report); no information on the borrow area is presented.

Significance – High:

Description and analysis of borrow sites are critical to determining the most cost-effective site; any effects on the borrow site need to be fully disclosed.

Recommendations for Resolution:

1. Develop a detailed summary for the Main Report of the borrow locations investigated and an analysis for each site that includes:
   a. Information to determine if the proposed borrow area is the most cost-effective, practicable alternative and that it meets the needed requirements.
   b. Comparison of sand on the existing beach and borrow area, including color, grain size, etc. It is recommended to include discussions that the borrow site has .3 mm sand and the existing beach is .26 mm. It is critical that at least the same size or larger sand is placed on the beach; the sand compatibility analysis should be summarized in the Report.
2. Describe in the Report the proposed borrow area with detailed drawings and maps, including cross sections, transportation routes, replenishment rates, etc. Discuss how the total volume available compares to the total volume needed plus uncertainty in the volume estimates, both for fill and source.
3. Develop a more detailed discussion of the borrow area in the EA of the effects on environmental and cultural resources (i.e., hardbottom, fisheries, plankton, benthos, etc.) at the borrow area and erosion rates on the shoreline. Magnetic investigation is a method to determine if potential sites exist that could affect cultural or the dredging operations.

Literature cited.

CPE (2010). City of Destin, Florida, East Pass Inlet Study and Management Considerations. Coastal Planning and Engineering, Inc. Destin, Florida. http://bcs.dep.state.fl.us/env-prmt/okaloosa/pending/0175572_Norriego_Point_Stabilization/Application/Norriego%20Point%20Stabilization%20Project%20JCP%20Application%2002-12/Attachment%20No.%2033%20-%20Effects%20on%20the%20Coastal%20System/Final%20East%20Pass%20Inlet%20Study%20Oct.%202010.pdf

USACE (2000). Planning Guidance Notebook. ER 1105-2-100. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. 22 April.

USACE (1988). Procedures for Implementing NEPA. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. 4 March.

Comment 8
The implications of the 2010 Deepwater Horizon oil spill, and the potential impacts to the project, if contaminants are found, are not fully discussed.
Basis for Comment:
There is no mention or analysis concerning the possible effects of the 2010 Deepwater Horizon Oil Spill on the borrow and fill areas. On April 20, 2010, the drilling unit *Deepwater Horizon,* was drilling a well for BP Exploration and Production, Inc. (BP) in the Macondo prospect (Mississippi Canyon 252 – MC252), experienced an explosion, leading to a fire and its subsequent sinking in the Gulf of Mexico. This incident resulted in discharges of oil and other substances from the rig and the submerged wellhead into the Gulf of Mexico. An estimated 5 million barrels (210 million gallons) of oil were subsequently released from the well over a period of approximately 3 months (Oil Budget Team 2010). In addition, approximately 771,000 gallons of dispersants were applied to the waters of the spill area in an attempt to minimize impacts from spilled oil. Oil contamination on beaches has been documented from Louisiana to the panhandle of Florida. National Oceanic and Atmospheric Administration's (NOAA) Environmental Response Management Application maximum oiling map characterizes the coastal area to Panama City Beach as lightly oiled (NOAA 2012). The amount of contamination was reduced in the eastern portion. Accordingly, sediment contamination could range from Louisiana to Florida, again likely becoming less in the eastern portions. This borrow site could potentially have some contamination from this spill. In addition, any oil present on the beach could be covered by the fill material. A status of the oil contamination on the beach should be provided. Hydrocarbons can have negative effects on marine organisms, especially benthos. Disturbance of sediments could re-suspend hydrocarbon contamination, which could affect organisms in the water column. Placement of oil-contaminated sand on the beach would be problematic and create a costly cleanup situation. It is important to determine the potential risk of the borrow site sands containing significant hydrocarbons. Unless there are other data available, it would be prudent to collect samples from the proposed borrow site and test the sediment for oil and related compounds to confirm that the material can be used for nourishment. At a minimum, the risk and uncertainty surrounding the potential contamination derived from this oil spill should be addressed. The potential environmental impacts to the habitats and species in these areas are also not discussed, and the level of contaminants that would render the borrow fill unusable is unknown. Alternative borrow sites are not identified for this project; the potential loss of some or all of the designated borrow area due to contamination could have serious impacts to the project. For example, if some portion of the material from the borrow site were found to be contaminated to a level where it could not be used, the remaining volume of material may be insufficient for implementing the TSP.

Significance – High:
If the designated borrow area has been impacted by the 2010 Deepwater Horizon Oil Spill, the volume of available fill of acceptable quality could be significantly reduced, impacting the success of the project.
Recommendations for Resolution:
1. Develop an analysis and discussion of how the 2010 Deepwater Horizon Oil Spill would, or would not, have any effect on the proposed borrow and fill areas. Perhaps some Natural Resources Damage Assessments or Shoreline Cleanup Assessment Team reports may have some information. If other data or information are not available, then some testing should be considered. 2. Evaluate the risk and uncertainty surrounding the potential for contaminants.

Literature cited

Oil Budget Team (2010). Oil Budget Calculator, Technical Documentation. Federal Interagency Solutions Group, Oil Budget Calculator Science and Engineering Team. November. http://www.restorethegulf.gov/sites/default/files/documents/pdf/OilBudgetCalc_Full_HQ-Print_111110.pdf

NOAA (2012). Emergency Response Management Application (ERMA) Gulf Response. National Oceanic and Atmospheric Administration. http://gomex.erma.noaa.gov/erma.html#x=-88.25810&y=27.03211&z=6&layers=17770+5723+20442+20489

Comment 9
The engineering and environmental data presented may not be representative of more recent conditions within the project area.
Basis for Comment:
The Main Report provides very few references dated later than 2005, and appears to rely heavily on the information from the 2003 Taylor Engineering report. As such, the Panel assumes that the 2003 Taylor Engineering report contains the bulk of the data and serves as the basis for the 2012 Report. There is a concern that this information is out of date and the conclusions and recommendations of the report, including selection of the TSP, do not reflect current conditions. If more recent reports were not available, the Panel understands the use of the 2005 and earlier information. However, the Panel is aware of The City of Destin, Florida, East Pass Inlet Study & Management Considerations report (CPE 2010), which contains more recent data concerning the status of Walton County beaches and references other studies from 2007-2009 (pp. 9 and 10) that also appear to have data on the County's beaches. The City of Destin report cites two documents that concern the Walton County/Destin Beach Restoration Project: a monitoring report of 2007 activities (Bridges et al. 2008), and a two-year post-construction report (Arnouil and Trudnak 2009). This implies that the permitting for this restoration project began on or before 2007 and that data exist that could be used to update the information in the 2003 Taylor Engineering report. Table 2-4 of The City of Destin Report indicates that 844,700 cubic yards of fill was placed on the beaches in Walton County, making this a significant restoration project. The Panel is concerned that there is no mention of this project in the Main Report, despite the fact that data from at least five years prior to the date of the 2012 Main Report appear to have been available. • The use of more recent data will allow USACE to establish annual erosion/accretion rates for more recent years and compare those data to the earlier data on which the TSP is based. • If the beach has accreted since the years of multiple storms, the initial fill requirements, based on years of high erosion rates, may be less than calculated. • The estimated impacts to new beach mouse and sea turtle nesting habitat may be different if accretion is occurring. • The use of rates calculated on the years that multiple storms impacted the project area could overestimate the estimated damage. • Changes to the erosion rates may have a direct bearing on the modeling studies and the engineering analysis on which the TSP is based.
Significance – High
Including data from recent studies (i.e., 2007-2009), which were available in the time frame of the project study, could significantly change the results of the modeling and analyses used to develop the TSP.

Recommendations for Resolution:
1. Update the Main Report to include a comparison of the reported data to recent data. Specifically, discuss any major differences between the baseline datasets used in the analysis and the more recent information and discuss the possible implications of these changes on the analysis, alternative selection, and costs. 2. Provide a statement documenting the components of the analysis that need to be revisited during the Preconstruction Engineering & Design phase, if the more recent data sets referenced in this comment are found to be significantly different from those used for this project.

Literature cited

Arnouil, D., and Trudnak, M. (2009). Walton County/Destin Beach Restoration Project, Walton County and Okaloosa County, Florida, 2009. Two-Year Post-Construction Monitoring Report, Taylor Engineering, Inc.

Bridges, A., Trudnak, M., and Krecic, M. (2008). Walton County/Destin Beach Restoration Project, Walton County and Okaloosa County, Florida, 2007. Monitoring Report, Taylor Engineering, Jacksonville, FL.

CPE (2010). City of Destin, Florida, East Pass Inlet Study and Management Considerations. Coastal Planning and Engineering, Inc. Destin, Florida. http://bcs.dep.state.fl.us/env-prmt/okaloosa/pending/0175572_Norriego_Point_Stabilization/Application/Norriego%20Point%20Stabilization%20Project%20JCP%20Application%2002-12/Attachment%20No.%2033%20-%20Effects%20on%20the%20Coastal%20System/Final%20East%20Pass%20Inlet%20Study%20Oct.%202010.pdf

Comment 10

The statistical analyses are not consistent with contemporary methods, and the details of the extreme value statistical analysis are not provided.

Basis for Comment:

There have been significant changes in the state-of-knowledge on hurricane statistics for coastal engineering applications since the initiation of this project. As a result, the extreme-value analysis approach for hurricanes adopted in this study, namely the use of the historical sample alone, is no longer considered the method of choice for coastal engineering studies. However, it should be noted that use of the historical sample was considered the contemporary method at the initiation of this project. Nonetheless, the implications of using the historical sample in light of recent developments in the field must be addressed within the report. Furthermore, the report does not provide a general description of the extreme-value statistical approach, and many details regarding the extreme-value analysis are not presented. As a result the accuracy and precision of this analysis cannot be determined.

The specific issues identified are:

- In the application of Beach-fx, the storm sample used is assumed to be fully represented by the historical storms alone. While this was standard practice at the time this project began, a joint-probability approach that uses a wide range of hypothetical storms has been shown to be much more effective in producing statistically stable results (with respect to the historical population approach used here; Irish et al. 2011).
- The criteria (e.g., time period considered, threshold values) for selecting the historical storm population does not appear in the Main Report or Appendix A.
- It could not be determined how storm event sequences and number of realizations used in Beach-fx were justified, generated, and employed. It needs to be demonstrated that the storm sequences used in the Beach-fx lifecycles are consistent with the assumed probability distribution and that the number of realizations used is sufficient to give convergence in the end results. These factors are important for assessing the validity of the Beach-fx analysis and subsequent design and economic decisions.
- The statistical reliability of seasonal storm rate of occurrence probabilities could not be determined by the information presented. The historical storm population selected is a relatively small sample, thus subdividing it to determine seasonal trends introduces added uncertainty that will carry through development of the Beach-fx realizations, results, and economic analysis.

Significance – Medium:

A detailed comparison of the statistical methods used in this study with contemporary methods is required to understand any significant limitations in the accuracy, bias, and statistical error associated with the methods used, and to understand the selection of project alternatives.

Recommendations for Resolution:
1. Address uncertainty added by using the historical storm sample only. 2. Discuss and justify the adequacy of the historical storm sample to represent all plausible future events. References to consider in preparing this discussion are Resio et al. (2009), Niedoroda et al. (2010), Irish et al. (2011), Resio et al. (in press). 3. Include details of the historical storm sample selection in the Main Report and Appendix A, including peaks-over-threshold selection value, time period considered, storm rate of occurrence, and quantitative information regarding parameter ranges represented (e.g., surge, wave heights, etc.). 4. Include a discussion of the details of how storm event sequences for Beach-fx were developed, including how storms in the parent population were weighted, what statistical distributions were used or assumed (the statement "empirical storm frequencies" must be explained in detail), and how the population was resampled. 5. Discuss how the number of lifecycle realizations was optimized. 6. Explain if the same storm sequences and realizations were used to evaluate all alternatives. 7. Discuss the statistical reliability of the seasonal storm probabilities. Specifically address how many historical storms are used to inform each seasonal grouping and comment on the impact of very small samples on the statistical reliability of the results.

Literature cited

Irish, J.L., Resio, D.T., Divoky, D.D. (2011). Statistical properties of hurricane surge along a coast. Journal of Geophysical Research, 116, C10007.

Niedoroda, A.W., Resio, D.T., Toro, G.R., Divoky, D.D., Das, H.S., Reed, C.W. (2010). Analysis of the coastal Mississippi storm surge hazard. Ocean Engineering, 37, 82-90.

Resio, D.T., Irish, J., Cialone, M. (2009). A surge response function approach to coastal hazards assessment - part 1: basic concepts. Natural Hazards, 51, 163-182.

Resio, D.T., Wamsley, T.V., Cialone, M.A., and Massey, T.C. (in press-2012). The estimation of very-low probability hurricane storm surges for design and licensing of nuclear power plants in coastal areas, Nuclear Regulatory Commission.

Comment 11
The Panel could not determine how inundation was included within the Beach-fx analysis, or if full inundation occurred for any of the SBEACH-simulated storm conditions.
Basis for Comment:
Inundation estimation is a critical input parameter for the damage analysis within Beach-fx. However, there is no discussion in the Main Report or appendices regarding how inundation was determined for local damage calculations. The degree of inundation also affects the reliability of the SBEACH results, since this model treats only runup overwash (intermittent inundation by individual waves) and does not treat inundation overwash (when the dune or other elevation feature is fully inundated by the quasi-steady flood level) (see SBEACH documentation as well as model description given in the project documents). The Panel cannot determine from the information presented whether or not this limitation in SBEACH is potentially problematic for application in this study. Specifically, the Panel could not determine: • How inundation is included within Beach-fx, specifically, if the ADCIRC results provide output at all locations of interest for damage calculation, or if shoreline values were extrapolated inland. • If the flood elevations simulated in SBEACH resulted in full inundation of the dune (or other relevant elevation feature), and if it occurs, whether there is a significant impact on the engineering analysis and project justification.
Significance – Medium:
Reliable quantification of inundation and storm-induced erosion throughout the study area is critical for quantification of damage and beach fill volumes, which directly affect the alternative selection, project justification, and accuracy of the subsequent economic analysis.
Recommendations for Resolution:
1. Include a detailed discussion in the Main Report and Engineering Appendix of how ADCIRC flood elevations are used to determine inundation extent and flow depths throughout the study area. 2. Include a discussion in the Main Report and Engineering Appendix of the implications of flood elevation on the SBEACH analysis. a. Address how maximum flood elevations compare to the dune heights, and how often the dunes are fully inundated. b. If such inundation does occur in some SBEACH simulations, quantify the implications on the Beach-fx in terms of uncertainty introduced by this model limitation.

Literature cited

SBEACH documentation (multiple documents) available here:
http://chl.erdc.usace.army.mil/chl.aspx?p=s&a=Software!31

Comment 12
Technical details of the engineering analysis are not provided in the project documents, making it difficult to understand the process of conducting the analysis.
Basis for Comment:
Assessing the suitability and validity of the engineering analysis requires that the methods and analysis procedures used throughout the study are thoroughly presented and discussed. However, details on assumptions and procedures used are missing in many locations throughout the project documents. Specific areas requiring clarification are provided in the following list. • It cannot be determined from reviewing the Main Report and Engineering Appendix how the placed beach fill volumes were calculated. The Panel notes that a cursory discussion appears in the Environmental Assessment. (Appendix A, p. A-2-12, Section 7, related to Environmental Assessment; p. EA-39, Section 4.11, second paragraph) • The impacts on the project, and on the availability of borrow material specifically, if the available volumes are greatly reduced is not discussed. (Appendix A, p. A-2-13, Section 7: end of first paragraph) • It cannot be determined why the natural berm and dune heights were selected, and no justification for this selection is provided in the report. (Executive Summary, p. 2, second paragraph; also in Main Report, e.g., p. 9, 61, and appendices) • The justification given in the report for selecting the 5 reaches is not thorough. It also cannot be determined if there are implications to the analysis, and uncertainty in the analysis, due to the study being limited to 5 reaches. (Main Report, p. 16, first paragraphs, and other places in the report and appendices) • There is no justification provided for using the specified definition of storm-induced erosion. (Main Report, p. 36, Section 3.3.11, first paragraph) • It cannot be determined how each screening measure was evaluated, nor is it certain if the initial screening was quantitatively and/or qualitatively conducted. (Main Report, Section 4.3.1) • It is not stated why a 25-ft increment was selected for optimizing berm width, whereas a 10-ft increment was selected for optimizing dune width. (Main Report, Sections 4.4.2.1-4.4.3) • It is not stated how the 2.4 ft in 50 years sea-level rise value was estimated. (Main Report, p. 122, Section 6.4.2, third paragraph)
Significance – Medium:
The suitability and quality of the engineering analysis cannot be determined without reviewing the specified technical details currently missing from the project documents.
Recommendations for Resolution:
1. Include a discussion in the Main Report detailing how fill volumes were computed. Clarify how overfill was computed. An overfill ratio of 1.0 is given in the Environmental Assessment (this appears to imply no overfill was considered). 2. Include a discussion regarding the project implications should the available borrow

volumes be reduced. Discuss contingency plans should the identified areas be insufficient to yield the volume needed over the project life.

3. Include a discussion of the berm and dune height selections in the Main Report.
   a. Discuss how the berm and dune height selection was determined for the referenced Bay County study, and why this study is applicable to the Walton County project.
4. Include a more rigorous, scientifically based justification for reducing the study to 5 reaches, along with the potential implications of this reduction.
   a. Discuss possible impacts on the analysis and uncertainty introduced into the final results. For example, discuss whether or not it is reasonable to assume that the 11 selected representative profiles (as referenced on p. 18 of the Main Report) will be representative in all future years, given they were not representative before Hurricane Ivan.
5. Discuss a rationale for using the specified definition of storm-induced erosion, and provide references where this definition has been used. Discuss why this definition is preferred for the Walton County project.
6. Provide information in the Main Report regarding how the screening measures were evaluated. Expand the discussion to provide details on the quantitative and qualitative analyses used to conduct the initial screening.
7. Provide a rationale for selecting a 25-ft increment for optimizing berm width. Include in the Main Report the information provided during the Battelle, USACE and Panel conference call on May 29, 2012 regarding sensitivity of the berm-with selection analysis to berm width changes.
   a. Discuss the implications of this coarser resolution on the berm width selection, in terms of uncertainty in final design optimization.
   b. Discuss whether an alternate berm width would have been selected if a finer resolution for optimization was used.
8. Expand the discussion to explain how the 2.4 sea-level rise value was determined, and discuss all assumptions made to develop this estimate.

Comment 13
Technical details regarding the Beach-fx model and implementation are not provided in the project documents, making it difficult to understand the process for conducting the modeling.
Basis for Comment:
The setup and procedures used throughout the Beach-fx model framework must be fully understood in order to assess the suitability and validity of this model, as well as to understand how it was implemented. Beach-fx also plays an integral role in informing the engineering and economic analysis used in the selection of project alternatives. Details on assumptions and procedures used for Beach-fx are missing in many locations. In addition, there are specific locations in the project documents that require further explanation. • How dune height is used as a trigger for nourishment; dune height was not used as a design parameter, thus these statements appear to be inconsistent with prior comments made in the report. (Main Report, p. 35,Section 3.3.10) • How long-term shoreline recession, short-term shoreline recovery, and permanent structure (building) losses are incorporated into the Beach-fx analysis. (Main Report, Section 3.5.2; also Appendix B, p. B-13) • Specification of the GENESIS results that were integrated into the Beach-fx analysis. (Main Report, Section 5.3.2, p. 72, second paragraph) • How post-storm recovery is computed and integrated into the Beach-fx analysis. (Appendix A, p. A-1-92, second paragraph) • Whether there are sediment or geological factors within the study area that may limit the validity of these assumptions. (Main Report, p. 13, paragraph in Section 3.1.5) • How the initial pre-storm profile condition is specified in Beach-fx throughout the lifecycle. (Main Report, Section 4.4.3.1, p. 62, last paragraph)
Significance – Medium:
The suitability and quality of the Beach-fx model and application cannot be determined based on the information provided.
Recommendations for Resolution:
1. Discuss in detail how dune height is used as a trigger, and explain the inconsistency with prior statements in the report. 2. Expand the discussion to explain how long-term shoreline recession, short-term shoreline recovery, and permanent structure losses are incorporated into the Beach-fx analysis. 3. Discuss which GENESIS results were used in Beach-fx and clarify how these results were used within the Beach-fx lifecycle framework. 4. Discuss how post-recovery is quantified and implemented. 5. Discuss any sediment or geological factors that may limit the validity of the assumptions made for the Beach-fx application. For example, discuss if all sand to be used throughout the project has a similar grain diameter.

6. Discuss in detail how the initial pre-storm profile condition is specified in Beach-fx. Specifically, explain if the initial pre-storm profile is always set to the design profile, and how the profile is treated over the lifecycle realization.

Comment 14

The potential impacts of sea-level rise and climate change on flooding damages and environmental conditions do not appear to have been considered or accounted for in the uncertainty analysis.

Basis for Comment:

While the study addresses the long-term implications of sea-level rise on long-term erosion rates, potential implications on flooding damage and environmental conditions are not quantified or discussed. Other aspects of climate change are not considered in the project documents, specifically:

- Flooding Damage: It does not appear that the impacts of sea-level rise on hurricane flooding and flooding-related damage were considered in the analysis. It also does not appear that other climate-change impacts were considered, namely potential future changes in hurricane climate (i.e., storm intensity and rate of occurrence).
- Environmental Conditions: Sea-level rise has the potential to impact sea turtle nesting habitat and species that use coastal habitats. The impact of sea-level rise on environmental conditions are not addressed in the Main Report, Section 3.4, Environmental, or 6.4, Risk and Uncertainty or in the Environmental Assessment.

Significance – Medium:

Uncertainties arising from accelerated damage and environmental consequences due to potential sea-level rise and climate change related impacts are essential for understanding possible project performance in future years.

Recommendations for Resolution:

1. Revise the uncertainty analysis to comply with the relevant guidance given in EC 1165-2-212 (USACE 2011), or provide a justification within the Main Report why it is not needed for this project.
2. Describe how the impact of sea-level rise on flooding and flood-related damages was considered in the analysis, and quantitatively discuss uncertainties and biases (likely in favor of the project) introduced by accelerated damage and how these impact alternative selection and BCR.
    a. If such an analysis is not performed, provide a detailed discussion of the potential implications to project design and justification. Suggested recent references include Condon and Sheng (2012) and Frey et al. (2011).
3. Include a short discussion in the report regarding possible implications of future hurricane intensification and changes in storm frequency on the statistical analysis, life-cycle analysis, and overall project performance.
4. Include an analysis of the effects of sea-level rise on environmental conditions along Walton County beaches in the appendix, and a summary of the potential impacts added to the Main Report.
    a. If this analysis is not conducted, provide an explanation of why this was not required; this action will demonstrate that the issue was addressed.

Literature cited

Condon, A.J., Sheng, Y.P. (2012). Evaluation of coastal inundation hazard for present and future climates. Natural Hazards, 62(2), 345-373.

Frey, A.E., Olivera, F., Irish, J.L., Dunkin, L.M., Kaihatu, J.M., Ferreira, C.M., Edge, B.L. (2010). Potential impact of climate change on hurricane flooding inundation, population affected and property damages in Corpus Christi. Journal of the American Water Resources Association, 46(5), 1049-1059.

USACE (2011). Sea-Level Change Considerations for Civil Works Programs. Engineer Circular (EC) 1165-2-212. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. 1 October.

Comment 15
Data quantifying the potential environmental impacts and ecosystem benefits of the project are not summarized in the Main Report or Environmental Assessment (EA).
Basis for Comment:
The Main Report should be a stand-alone document that can be read and understood without referring the reader to the appendices for supporting information and details. Although in some instances the reader is referred to the appendices or other reports, these documents do not provide detailed data and information, and are relied upon to demonstrate a critical aspect of the project. Section 3.4, Environmental, of the Main Report focuses on demonstrating that the TSP is environmentally acceptable to the review agencies, but does not provide the data on which this conclusion is based, referring the reader to the appendices. The Main Report also extensively references the 2003 Taylor Engineering report. However, this document is not included as an appendix for review and verification of the information in question. The Panel offers three examples of statements which require a summary paragraph with appropriate figures and tables that reference the data supporting the conclusion: • "Major dune recession occurred throughout the County, including a number of locations where high dune-bluff escarpments replace the once established dune systems" and "Environmental Impacts associated with Hurricane Ivan have resulted in decreased beach area and elevation. Such impacts directly affect availability for suitable nesting habitat required for nesting sea turtles." (Main Report, p. 38) • "A more detailed discussion of the listed species can be found in the EA. Formal consultation has been conducted with both the USFWS and NMFS in accordance with Section 7 of the ESA for species and critical habitats under their purview." (Main Report, p. 44) • "The non-Federal sponsor has conducted offshore studies to include geological and geophysical interpretation of seismic records and vibracores, performed by Taylor Engineering, Inc." and "To satisfy the state's stringent sand suitability standards, an assessment has been conducted to compare and show that the selected borrow area sand is reasonably compatible with that of the native beach sand." (Note: The Main Report refers the reader to a detailed assessment, "included in the geotechnical section of this report." but does not provide the summary paragraph.) (Main Report, Section 3.4.1.7, p. 45) Other portions of the text requiring further explanation and supporting information include: • The paragraph beginning with "The general environmental criteria…." The term general environmental criteria was not defined and is not understood. (Main Report, Section 3.4.1, p. 39) • "Of primary concern is compliance with the Clean Water Act. Potential water quality impacts associated with the borrowing and placement of fill material

associated with beach nourishment operations must be considered." Data were not provided to support this statement, and the discussion on water quality in the Main Report was limited. (Main Report, p. 40)

- "Dredging activities would result in significant mortality of non-motile benthic organisms." This statement could be considered to be alarming to the average reader. A discussion with citations from the literature is provided in the EA to demonstrate that impacts on benthic organisms in the area to be nourished are not significant due to the ability of the benthic organisms inhabiting the area to withstand these perturbations. Similarly, there is a body of scientific information to show that the same issues occur in borrow sites, yet this information is not presented in the Report or the EA . (Main Report, Section 3.4.1.9, p. 46)

Although these examples do not represent all of the statements that require a summary paragraph (along with appropriate figures and tables) referencing the data supporting the conclusion, they provide examples of the type of information that should be in the Main Report. With the absence of environmental data in the Main Report, it cannot be determined if the conclusions of the report and selection of the TSP are supported by scientifically based data.

Significance – Medium:

Analyses of existing environmental and natural resources within the study area, as presented in the Main Report, do not provide a sufficient level of detail to understand the estimation of impacts for the array of alternatives.

Recommendations for Resolution:

1. Revise the Main Report and EA to be less dependent upon the appendices and other reports to demonstrate critical aspects of the project. Include summary figures, tables, concluding paragraphs, and other appropriate items from the 2003 Taylor Engineering report, Environmental Assessment, and Engineering Analysis.
2. Review Section 3.4 of the Main Report and provide additional information and citations as required to understand the basis for the statements given above as examples, as well as other similar statements not specified in this Final Panel Comment.
3. Include the 2003 Taylor Engineering report as an appendix to the Main Report.

Comment 16

The Environmental Assessment contains unsupported statements and numerous readability issues that impair the Panel's ability to determine if the analysis of the environment and natural resources are sufficient to support selection of the TSP.

Basis for Comment:

The EA and its attachments contain useful information. However, there are numerous statements in the EA that are not supported by qualitative or quantitative data. A thorough technical review of the EA cannot be conducted without a review of this supporting information. Some examples include:

- The paragraph that begins, "Historical analysis conducted by ……" and concludes that, "Most recent storm events occurring since 2000, notably Hurricanes Ivan, Dennis, and Katrina, indicate that this trend will continue without some form of storm damage protection measures."; and the paragraph that begins "Future conditions associated with not restoring the beach and dune system would result in the continued degradation of a valuable beach ecosystem and loss of these types of habitats and associated benefits." (EA, Section 2.1, p. EA-7). A table or text that describes acres of habitat lost/gained over time is not provided to support this statement.
- "Coastal ecological resources throughout Walton County have consistently been diminished due to the high shoreline recession rates exhibited in this region," and "There is currently little beach within the project area which reduces the capabilities of this area of supporting sea turtle nesting activities." (EA, Section 2.3, p. EA-13). Quantitative data are not provided to support these statements.
- "In general, future conditions associated with not restoring the beach and dune system would result in the continued degradation of a valuable beach ecosystem and loss of these types of habitats and associated benefits." (EA, Section 4.1, p. EA-27). Recent data or model estimates of the projected losses are not provided and the severity of the situation presented is not well understood.
- "Dredging activities would result in significant mortality of non-motile benthic organisms." (EA, Section 4.3, p. EA-28). Quantitative data are not provided to support this statement.
- "It is not known at this time where dune vegetation is beginning to re-establish itself prior to construction of the project." (EA, Section 4.6.5, p. EA-33). References or citations to scientific literature supporting this statement are not provided yet are readily available.

In addition, there are numerous instances in the EA of confusing and contradictory text that interferes with the Panel's ability to conduct a thorough technical review of the EA. Some examples are:

- The paragraph that begins, "Modeling using a model called Beach-fx…," is disjointed and does not explain the Beach-fx model at the level of the non-technical reader. (EA, Section 2.0, p. EA-5)

- "It has been demonstrated that a loss of nesting habitat related to placement of coastal structures has had an impact on nesting sea turtles in Florida. …… Because of the effects on sea turtle nesting habitat believed to be caused by coastal structures, ….." (EA, Section 2.1.2, p. EA-8). These sentences are contradictory, and using the phrase, "it has been demonstrated" requires the writer to provide evidence to support the statement.
- (EA, Section 2.1.3, pp. EA-8-9). The Panel does not understand the first sentence. The second sentence refers to the "design," but design is not explained. Three lines below this, reference is made to emergency nourishment action, but this is not explained.
- (EA, Section 2.2, p. EA-11). The length and the number of issues presented in the first sentence make this statement difficult to understand.
- "By restoring berm width there will be increased opportunities towards protecting and enhancing sea turtle nesting opportunities." (EA, Section 2.3, p. EA-13). This wording is awkward.
- "Locally generated waves or sea conditions characterize these waves." [EA, Section 3.2.2, p. EA-15]. This wording is confusing.
- "The natural dunes described above provide optimal habitat for the Choctawhatchee beach mouse throughout the primary and secondary dunes and occasionally scrub and interdunal areas." (EA, Section 3.3.1, p. EA-16). This statement seems to imply Pleistocene bluffs; does not describe beach mouse habitat; and does not define the primary and secondary dunes.
- "The proposed beach fill design for the selected plan discussed in Section 2.1.4 includes maintaining the natural berm elevations and providing a 100-foot buffer east and west of the existing outfall channel banks with a fill shall slope 1V:15H from the design elevations of the construction template to the existing grade at the buffer zone locations." (EA, Section 4.4, p. EA-29). The meaning of the sentence is not clear.
- "As mentioned earlier in Section 2.1.5 the non-Federal sponsor for this project has proceeded with pursuing beach restoration on their own with a local plan that totally envelopes the tentatively selected plan." (EA, Section 4.6, p. EA-30). If the Locally Preferred Plan (LPP) is the Tentatively Selected Plan (TSP) as stated in the Main Report (p. 95), it is not clear how the LPP mentioned in this sentence envelops the TSP. This comment is repeated in several other sections of the EA.

Significance – Medium:

The cumulative effects of unsupported statements and readability issues, as illustrated by the examples presented above, significantly affect the understanding of the information presented in the EA.

Recommendations for Resolution:

1. Rigorously edit the current draft EA. If possible, this should be performed by two editors; one with the scientific expertise to provide succinct summaries of the supporting data, and a technical editor who can address the readability issues to ensure consistency between the data and the EA.

Comment 17
Public input and stakeholder engagement in the planning process are not discussed, and the level and resources of local sponsor support is unknown.
Basis for Comment:
Appendix B of ER 1105-2-100 (USACE 2000) recommends the development of a public involvement strategy. The review documents note that only one comment was received from the April 27, 2010 public notice (Environmental Assessment (EA)-43, Section 5.1, 2nd paragraph); there appears to be no discussion of any other public involvement. In addition, there is no mention of public coordination, meetings, or workshops that may have been held. Although these meetings are not specifically required by NEPA, it is prudent that a project of this magnitude has public and stakeholder involvement and coordination. Projects that will require significant non-Federal resources should develop strong public and stakeholder support. The planning process description (Main Report, p. 6, item 3) refers to the study team as composed of "…County and local officials and interested individuals." However, the report does not provide any summary of coordination with these non-Federal interests. Such a summary could be presented to demonstrate any resolution of issues and to gauge support for the project. Public support is important for the non-Federal sponsor to generate the funds to cost share such a large project. However, the report does not present the financial resources of the non-Federal sponsor and public support. The Main Report (p. 79) states that the Project Delivery Team met with the non-Federal sponsor to present the NED plan. The sponsor indicated that they had a Locally Preferred Plan and got a waiver from the Assistant Secretary of the Army for Civil Works (Main Report, p. 95). Documentation of these positions should be presented in the Main Report, with copies of the correspondence in an Appendix.
Significance – Medium
Public support is critical to the funding and success of such a high profile and costly project; public support is needed by the non-Federal sponsor to be able to cost share and to garner the Federal support to construct the project.
Recommendations for Resolution:
1. Provide a summary and synopsis of any public coordination and input on this project, including similar earlier projects completed by the non-Federal sponsor or others. Include documentation of meetings and correspondence. 2. Describe the non-Federal sponsor's financial plan to cost share in this project and his ability to support his cost-share.

Literature cited

USACE (2000). Planning Guidance Notebook. ER 1105-2-100. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. 22 April.

Comment 18
Technical details of the engineering computational modeling are not provided in the project documents, making it difficult to understand the process of conducting the analysis.
Basis for Comment:
Assessment of the suitability and validity of the engineering modeling results requires that the reviewer must be able to fully understand the models and assumptions. Details on assumptions and procedures used in the engineering analysis are missing in many locations of the project documents. Specifically, the following items require clarification as noted by location within the project documents: • It is not clear whether the ADCIRC surge results were taken from prior studies or if new simulations were made for this project. (Main Report, Section 3.3.2, p. 32; also in appendices) • Key model (e.g., SBEACH, GENESIS, and ADCIRC) assumptions and limitations as currently described are not understood, and the impacts of these assumptions and limitations on the analysis and end results are unknown. (Main Report, Section 3.1 and appendices). • Information supporting the selection of the May 2004 survey as initial bathymetry for the STWAVE analysis, and the use of the post-Hurricane Ivan dataset for the remainder of the analyses was not provided. (Appendix A, p. A-1-40, second paragraph).
Significance – Low:
The engineering computational modeling cannot be fully understood without information detailing the assumptions and procedures used for this study.
Recommendations for Resolution:
1. Include information (e.g., citation and summary of prior work [Scheffner et al., 1994]) in all appropriate locations such that the use of this study is unambiguous) on the ADCIRC simulations in the project documents that was provided by the Walton County Project Delivery Team subsequent to the mid-review teleconference. 2. Include a summary of the assumptions given in model documentation (SBEACH, GENESIS, ADCIRC) in the engineering appendix; key impacts of these assumptions should be summarized in the Main Report as well. 3. Provide a justification in the project documents for the inconsistency among the baseline data sets used for the various models.

APPENDIX B

Final Charge to the Independent External Peer Review Panel
as
Submitted to USACE on May 11, 2012

on the

Walton County DFR & EA

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Charge Questions and Guidance to the Peer Reviewers
for the
Independent External Peer Review
of the
Walton County, Florida, Hurricane and Storm Damage Reduction Project
Draft Feasibility Report and Environmental Assessment

BACKGROUND

Walton County is located approximately 103 miles east of Pensacola, Florida and approximately 98 miles west of Tallahassee, Florida. The beaches of Walton County encompass approximately 26 miles of shoreline extending from the City of Destin in Okaloosa County, Florida. The western two-thirds of Walton County are comprised of coastal peninsula extending from the mainland, and the eastern third is comprised of mainland beaches. Choctawhatchee Bay lies to the north of the peninsula. Walton County includes approximately 11.9 miles of state-designated critically eroding areas and three State of Florida park areas that cover approximately 6 miles of the approximately 26-mile shoreline.

Walton County's shoreline is receding, and the protective dunes and high bluffs are being destroyed by hurricane and storm forces that are occurring more frequently. Storm events have damaged properties and environmental resources along the coast.

The selected plan recommended for construction is the Locally Preferred Plan (LPP). The project would be composed of a 50-foot berm width, a 25-foot berm, and an additional 25 feet of nourishment in all construction reaches. The project will also feature added dune width in all construction reaches of either 10 or 30 feet. The modeling efforts have predicted fill requirements of 2,400,000 cubic yards. This plan extends the coverage area to the westernmost limits of Walton County where the National Economic Development (NED) plan could not justify the coverage. Approved borrow sources lie offshore within the State of Florida waters. The dune construction would be planted with at least three species of dune vegetation.

OBJECTIVES

The objective of this work is to conduct an independent external peer review (IEPR) of the Walton County, Florida, Hurricane and Storm Damage Reduction Project Draft Feasibility Report and Environmental Assessment (hereinafter: Walton County IEPR) in accordance with the Department of the Army, USACE, Water Resources Policies and Authorities' *Civil Works Review Policy* (EC 1165-2-209) dated January 31, 2010, and the Office of Management and Budget's *Final Information Quality Bulletin for Peer Review* released December 16, 2004.

Peer review is one of the important procedures used to ensure that the quality of published information meets the standards of the scientific and technical community. Peer review typically evaluates the clarity of hypotheses, validity of the research design, quality of data collection procedures, robustness of the methods employed, appropriateness of the methods for the hypotheses being tested, extent to which the conclusions follow from the analysis, and strengths and limitations of the overall product.

The purpose of the IEPR is to assess the "adequacy and acceptability of the economic, engineering, and environmental methods, models, and analyses used" (EC 1165-2-209; p. D-4) for the Walton County documents. The IEPR will be limited to technical review and will not involve policy review. The IEPR will be conducted by subject matter experts (i.e., IEPR panel members) with extensive experience in coastal engineering, Civil Works planning, environment/biology and economic issues relevant to the project. They will also have experience applying their subject matter expertise to flood risk management.

The Panel will be "charged" with responding to specific technical questions as well as providing a broad technical evaluation of the overall project. Per EC 1165-2-209, Appendix D, review panels should identify, explain, and comment upon assumptions that underlie all the analyses, as well as evaluate the soundness of models, surveys, investigations, and methods. Review panels should be able to evaluate whether the interpretations of analysis and the conclusions based on analysis are reasonable. Reviews should focus on assumptions, data, methods, and models. The panel members may offer their opinions as to whether there are sufficient analyses upon which to base a recommendation.

DOCUMENTS PROVIDED

The following document, totaling 1,422 pages, was provided to all the panel members for their review: Walton County, Florida Hurricane and Storm Damage Reduction Project Draft Feasibility Report and Environmental Assessment with all pertinent appendices and attachments.

SCHEDULE

The review schedule is based on an estimated May 2, 2012 receipt of final review documents and will be formalized upon their receipt. Note that dates presented in the schedule below could change due to document, panel member, and USACE availability.

Task	Action	Days to Complete	Due Date
Conduct Peer Review	Battelle sends review documents to IEPR Panel	Within 1 day of Panel being under subcontract or submission of final Work Plan, whichever is later	5/14/2012
	Battelle/IEPR Panel kick-off meeting	Within 2 days of Panel being under subcontract or submission of final Work Plan, whichever is later	5/17/2012
	USACE/Battelle/Panel kick-off meeting	Within 2 days of Panel being under subcontract or submission of final Work Plan, whichever is later	5/18/2012
	Battelle convenes mid-review teleconference for panel to ask clarifying questions of USACE	Upon panel members completing 75% of review	5/29/2012
	Panel members complete their individual reviews	**Within 15 days of Battelle/Panel kick-off meeting**	**6/6/2012**
Prepare Final Panel Comments and Final IEPR Report	Battelle provides Panel merged individual comments and talking points for Panel Review Teleconference	Within 2 days of panel members completing their review	6/11/2012
	Battelle convenes Panel Review Teleconference	Within 6 days of panel members completing their review	6/14/2012
	Panel members provide draft Final Panel Comments to Battelle	**Within 6 days of Panel Review Teleconference**	**6/22/2012**
	Battelle provides feedback to Panel on draft Final Panel Comments; Panel provides revised draft Final Panel Comments per Battelle feedback (iterative process)	Iterative process, no more than 2 days for each revision	6/23/2012 -6/29/2012
	Final Panel Comments finalized	**Within 6 days of receipt of draft Final Panel Comments**	**7/3/2012**
	Battelle provides Final IEPR Report to Panel for review	Within 2 days Final Panel Comments being finalized	7/5/2012
	Panel provides comments on Final IEPR Report	**Within 1 day of receipt of Final IEPR Report**	**7/6/2012**
	*Battelle submits Final IEPR Report to USACE	Within 10 days of panel members providing draft Final Panel Comments to Battelle	7/9/2012

Task	Action	Days to Complete	Due Date
Comment/ Response Process	Battelle convenes teleconference with Panel to review the Post-Final Panel Comment Response Process (if necessary)	Within 2 days of submittal of Final IEPR Report	7/12/2012
	USACE provides draft PDT Evaluator Responses to Battelle	Within 5 days of receipt of Final IEPR Report	7/17/2012
	Battelle provides the Panel the draft PDT Evaluator Responses	Within 1 days of receipt of draft PDT Evaluator Responses	7/18/2012
Comment/ Response Process, Continued	**Panel members provide Battelle with draft comments on draft PDT Evaluator Responses (i.e., draft BackCheck Responses)**	**Within 2 days of receipt of draft PDT Evaluator Responses from Battelle**	**7/20/2012**
	Battelle convenes teleconference with Panel to discuss draft BackCheck Responses	Within 3 days of receipt of draft BackCheck Responses	7/25/2012
	Battelle convenes teleconference with Panel and USACE to discuss Final Panel Comments and draft responses	Within 6 days of USACE providing draft Evaluator Responses	7/25/2012
	USACE inputs final PDT Evaluator Responses in DrChecks	Within 4 days of Final Panel Teleconference	7/31/2012
	Battelle provides PDT Evaluator Responses to Panel	Within 2days of final PDT Evaluator Responses being available	8/2/2012
	Panel members provide Battelle with final BackCheck Responses	**Within 3 days of receipt of final PDT Evaluator Responses**	**8/7/2012**
	Battelle inputs the Panel's BackCheck Responses in DrChecks	Within 6 days of notification that USACE final PDT Evaluator Responses have been posted in DrChecks	8/8/2012
	*Battelle submits pdf printout of DrChecks project file	Within days of DrChecks closeout	8/8/2012

CHARGE FOR PEER REVIEW

Members of this IEPR Panel are asked to determine whether the technical approach and scientific rationale presented in the Walton County documents are credible and whether the conclusions are valid. The Panel is asked to determine whether the technical work is adequate, competently performed, properly documented, satisfies established quality requirements, and yields scientifically credible conclusions. The Panel is being asked to provide feedback on the economic, engineering, environmental resources, and plan formulation. The panel members are not being asked whether they would have conducted the work in a similar manner.

Specific questions for the Panel (by report section or Appendix) are included in the general charge guidance, which is provided below.

General Charge Guidance

Please answer the scientific and technical questions listed below and conduct a broad overview of the Walton County documents. Please focus your review on the review materials assigned to your discipline/area of expertise and technical knowledge. Even though there are some sections with no questions associated with them, that does not mean that you cannot comment on them. Please feel free to make any relevant and appropriate comment on any of the sections and appendices you were asked to review. In addition, please note the following guidance. Note that the Panel will be asked to provide an overall statement related to 2 and 3 below per USACE guidance (EC 1165-2-209; Appendix D).

1. Your response to the charge questions should not be limited to a "yes" or "no." Please provide complete answers to fully explain your response.
2. Assess the adequacy and acceptability of the economic and environmental assumptions and projections, project evaluation data, and any biological opinions of the project study.
3. Assess the adequacy and acceptability of the economic analyses, environmental analyses, engineering analyses, formulation of alternative plans, methods for integrating risk and uncertainty, and models used in evaluating economic or environmental impacts of the proposed project.
4. If appropriate, offer opinions as to whether there are sufficient analyses upon which to base a recommendation.
5. Identify, explain, and comment upon assumptions that underlie all the analyses, as well as evaluate the soundness of models, surveys, investigations, and methods.
6. Evaluate whether the interpretations of analysis and the conclusions based on analysis are reasonable
7. Please focus the review on assumptions, data, methods, and models.

Please **do not** make recommendations on whether a particular alternative should be implemented, or whether you would have conducted the work in a similar manner. Also please **do not** comment on or make recommendations on policy issues and decision making. Comments should be provided based on your professional judgment, **not** the legality of the document.

1. If desired, panel members can contact one another. However, panel members **should not** contact anyone who is or was involved in the project, prepared the subject documents, or was part of the USACE Independent Technical Review.
2. Please contact the Battelle Project Manager (Julian DiGialleonardo, digialleonardoj@battelle.org) or Program Manager (Karen Johnson-Young (johnson-youngk@battelle.org) for requests or additional information.
3. In case of media contact, notify the Battelle Program Manager, Karen Johnson-Young (johnson-youngk@battelle.org) immediately.
4. Your name will appear as one of the panel members in the peer review. Your comments will be included in the Final IEPR Report, but will remain anonymous.

Please submit your comments in electronic form to Julian DiGialleonardo, digialleonardoj@battelle.org, no later than June 5, 2012, 5 pm EDT.

Independent External Peer Review
of the
Walton County, Florida, Hurricane and Storm Damage Reduction Project
Draft Feasibility Report and Environmental Assessment
Final Charge Questions and Relevant Sections As Provided By USACE

GENERAL QUESTIONS

1. Were all models used in the analyses used in an appropriate manner?

2. Are the models used sufficiently discriminatory to support the conclusions drawn from them (i.e., identify meaningful differences between alternatives)?

3. Were risk and uncertainty sufficiently considered?

4. Are potential life safety issues accurately and adequately described under existing, future without project, and future with project conditions?

5. In your opinion, are there sufficient analyses upon which to base the recommendation?

SAFETY ASSURANCE REVIEW QUESTIONS

6. For the selected alternative, are the quality and quantity of the surveys, investigations, and engineering sufficient for design?

7. For the selected alternative, are the models used to assess hazards appropriate?

8. For the selected alternative, are the assumptions made for the hazards appropriate?

9. Does the analysis adequately address the uncertainty given the consequences associated with the potential for loss of life for this type of project?

10. Is there sufficient information presented to identify, explain, and comment on the assumptions that underlie the engineering analyses?

11. Do the physical data and observed data provide adequate information to characterize the selected alternative and its performance?

12. Have the hazards that affect the selected alternative been adequately described?

13. Have the appropriate alternatives been considered and adequately described?

14. Have the potential impacts of each alternative been clearly described and adequately presented?

15. Do the alternatives and their associated costs appear reasonable?

16. Do the benefits and consequences appear reasonable?

17. Are there any additional analyses or information available or obtainable that would affect decisions regarding the selected alternative?

18. Has anything significant been overlooked in the development of the assessment of the alternatives and the selected alternative?

19. Have appropriate considerations been made to support the decisions regarding the selected alternative?

SPECIFIC QUESTIONS

Section One: Introduction

Section 1.4 - Purpose and Scope of Study

20. To what extent does the present study achieve its stated purposes to: 1) assess the needs for hurricane and storm damage protection by reducing the damaging effects of hurricanes and severe storms to properties along the coast and stabilize or restore the shoreline by eliminating long-term erosion, 2) assess opportunities for environmental restoration and protection along the Gulf of Mexico of Walton County, Florida, and 3) identify an alternative that would be constructible, acceptable to the public, environmentally sustainable, and justified by an economic evaluation?

Sections 1.5 and 1.6 - Description of Study Area/Background

21. Has the character and scope of the study area been adequately described, and is the identified study area appropriate in terms of determining the feasibility of providing beach nourishment, shore protection, and environmental restoration?

Section Two: Problems and Opportunities

Sections 2.1 and 2.2 – Problems/Opportunities

22. Are the problems and opportunities adequately and correctly defined?

23. Do the identified problems and opportunities reflect a systems approach, addressing a geographic area large enough to ensure that plans address the cause and effect relationships among affected resources and activities that are pertinent to achieving the study objectives (i.e., evaluate the resources and related demands as a system)?

Sections 2.1 through 2.5

24. Comment on whether the stated problems, opportunities, goals and objectives, assumptions, and constraints embrace all of the key elements that need to be taken into account in the project. If not, what should be added?

Section Three: Inventorying and Forecasting Resources

Sections 3.1 through 3.1.5

25. To what extent are the input parameters, methods, models, and analyses used in the study methodology appropriate and consistent with current best management practices?

26. Do you agree with the method by which plausible storms and predefined profiles were computed?

Section 3.1.4 – Storm Set

27. Was the storm set discussion sufficient to characterize current baseline conditions and to allow for evaluation of how forecasted conditions (with and without proposed actions) are likely to affect shoreline conditions?

Sections 3.2.1 through 3.2.3

28. Were socioeconomic conditions adequately addressed? Were specific socioeconomic issues not addressed?

Section 3.2.11 – Value of Coastal Inventory

29. Were the methods to calculate structure and content values adequately described?

30. Were the structures and content values required for economic analyses adequately described?

Section 3.3 and all subsections – Economic Benefit Evaluation

31. Was the methodology to assess storm damages and storm damage reductions adequately described?

32. Are the assumptions used to assess storm damages and storm damage reductions explicit and justified? If not, explain.

33. Are the four categories used to determine economic benefits complete? If not, what additional categories should be included?

Section 3.3.16 – Recreation Benefits

34. Comment on the adequacy of the sources of recreational benefits methodology.

35. Are the assumptions used for the recreational benefits methodology explicit and justified? If not, explain.

36. Was the discussion of recreational resources sufficient to characterize current baseline conditions and to allow for evaluation of forecasted conditions (with and without proposed actions)?

Section 3.4 – Environmental

37. For your particular area of expertise, provide an in-depth review of whether the analyses of the existing environmental and natural resources within the study area are sufficient to support the estimation of impacts for the array of alternatives.

38. Was the discussion of environmental and natural resources sufficient to characterize current baseline conditions and to allow for evaluation of forecasted conditions (with and without proposed actions)?

Sections 3.4.1 and all subsections

39. Given your area of expertise, do these sections adequately and appropriately describe the existing conditions of environmental and natural resources pertinent to the study?

40. Were surveys conducted to evaluate the existing environmental and natural resources, and were the surveys adequate? If not, what types of surveys should have been conducted?

Sections 3.4.1.1 through 3.4.1.4

41. Do you agree with the general analyses of the environmental considerations, including the coastal and marine resources, threatened and endangered species, critical habitats, and essential fish habitat within the study area?

Section 3.5 – Future Without-Project Condition

42. Were the assumptions used as the basis for developing the most probable future without-project conditions reasonable?

43. Were the potential effects of climate change and sea level rise adequately addressed?

44. Are the future conditions expected to exist in the absence of a Federal project logical and adequately described and documented?

45. Please comment on the conclusion of the most probable future without-project condition. Do you envision other potential probable outcomes?

46. Comment on the adequacy of the without-project damage estimates included in the analysis.

47. Are the magnitudes and timeframes assumed for damages related to expected future losses reasonable?

Section Four: Formulating Alternative Plans

Section 4.1 – Developing Measures

48. Was a reasonably complete array of possible structural and non-structural measures considered in the development of alternatives?

Section 4.4 – Developing Alternative Plans

49. Were the assumptions made for use in developing the future with-project conditions for each alternative reasonable?
    a. Were adequate scenarios considered?
    b. Were the assumptions reasonably consistent across the range of alternatives and/or adequately justified where different?

Section Five: Comparing Alternative Plans

Sections 5.1 through 5.4

50. Are there any unmitigated environmental impacts not identified, and, if so, could they impact plan selection?

51. Are the uncertainties inherent in the evaluation of benefits, costs, and impacts, and any risk associated with those uncertainties, adequately addressed and described for each alternative?

Sections 5.2 through 5.4

52. Are the estimated efforts and costs of continuing construction (renourishment) reasonable?

Section Six: Selecting a Plan

Section 6.1.1 – NED and LPP Plan for Construction with Renourishments

53. Are the required long-term commitments (both Federal and non-Federal) to sustaining the selected plan adequately described and adequately demonstrated?

Section 6.3 – Residual Damages

54. Are residual damages adequately described and is there a sufficient plan for communicating the residual risk to affected populations?

Section 6.4 and all subsections

55. Are there other categories that should be included in the risk and uncertainty analyses? If so, explain.

56. Discuss the extent to which risk and uncertainty in the plan selection has been addressed.

57. Are residual risks adequately described and is there a sufficient plan for communicating the residual risk to affected populations?

Section Seven: Tentative Recommendation

Section 7.0 – Tentative Recommendation

58. Please comment on the completeness of the recommended plan (i.e., will any additional efforts, measures, or projects be needed to realize the expected benefits).

59. Are the costs adequately justified?

60. Please comment on the likelihood that the recommended plan will achieve the expected outputs.

61. Were the engineering, economic, and environmental analyses used for this study consistent with generally accepted methodologies? Why or why not?

Appendix A: Engineering Design – Section 1 Hydraulic Considerations

GENERAL QUESTIONS

62. To what extent are the input parameters, methods, models, and analyses used in the study methodology as documented in the Engineering Design Appendix appropriate and consistent with current best management practices?

SPECIFIC QUESTIONS

Natural Forces

63. Was the storm set discussion sufficient to characterize current baseline conditions and to allow for evaluation of how forecasted conditions (with and without proposed actions) are likely to affect shoreline conditions?

64. Were the potential effects of climate change and sea level rise adequately addressed?

Shoreline Conditions

65. Were the data surveys conducted to evaluate the historical and existing shoreline conditions adequate to develop representative profiles? If not, what types of surveys or evaluations should have been conducted?

66. Was the analysis to determine the sediment budget adequate?

Genesis Shoreline Change Modeling

67. Was the GENESIS model and the supplementary models (STWAVE, NEMOS, and CEDAS) used in an appropriate manner? If not, explain.

68. Were the assumptions used as the basis for developing the most probable future without-project shoreline conditions and representative profiles reasonable?

69. Was the discussion of the future without-project shoreline condition sufficient for the evaluation and comparison between with-project conditions for proposed alternatives?

Storm Induced Beach Profile Change

70. Was the S-BEACH model used in an appropriate manner? If not, explain.

Beach-FX Monte Carlo Simulation Model

71. Was the Beach-FX model used in an appropriate manner? If not, explain.

Appendix A: Engineering Design – Section 2 Geotechnical Considerations

GENERAL QUESTIONS

72. To what extent are the input parameters, methods, models, and analyses used in the study methodology as documented in the Engineering Design Appendix appropriate and consistent with current best management practices?

73. Given your area of expertise, does this section adequately and appropriately describe the existing geotechnical conditions pertinent to the study?

SPECIFIC QUESTIONS

Borrow Areas

74. Were the geotechnical analyses to determine borrow area sediments and quantities adequate? If not, what types of analyses should have been conducted?

Appendix A: Engineering Design – Section 3 Cost Engineering

Project Cost and Schedule Risk Analysis Report

75. Are there other categories that should be included in the risk and uncertainty analyses? If so, explain.

Appendix B: Economic Investigations

GENERAL QUESTIONS

76. To what extent are the input parameters, methods, models, and analyses used in the study methodology as documented in the Economics Investigation Appendix appropriate and consistent with current best management practices?

SPECIFIC QUESTIONS

Section 5.1 and all subsections

77. Was the methodology to assess storm damages, and storm damage reductions adequately described?

78. Are the assumptions used to assess storm damages, and storm damage reductions explicit and justified? If not, explain.

Section 12.0 Sensitivity Analysis – Worst Case Impacts of Economic Downturn (2009-2010) on Project Justification

79. Are the assumptions used to assess and evaluate the effects a downturn in the economy would have on the justification of the project adequate? If not, explain.

Attachment I – Recreation Analysis

80. Are the assumptions used for the recreational benefits methodology explicit and justified? If not, explain.

81. Was the discussion of recreational resources sufficient to characterize current baseline conditions and to allow for evaluation of forecasted conditions (with and without proposed actions)?

Environmental Assessment

GENERAL QUESTION

82. In your opinion, does the environmental assessment adequately describe existing conditions as well as potential impacts to environmental and natural resources from with-project conditions? If not, explain.

SPECIFIC QUESTIONS

Sections 3.2 through 3.12 and all subsections

83. For your particular area of expertise, provide an in-depth review of whether the analyses of the existing environmental and natural resources within the study area are sufficient to support the estimation of impacts for the array of alternatives.

84. Was the discussion of environmental and natural resources sufficient to characterize current baseline conditions and to allow for evaluation of forecasted conditions (with and without proposed actions)?

Sections 4.1 through 4.9 and all subsections

85. Are the impacts associated with the with-project conditions adequately described for each alternative?

86. Are there any unmitigated environmental impacts not identified, and, if so, could they impact plan selection?

Sections 4.6 through 4.9 and all subsections

87. Do you agree with the evaluation related to impacts to coastal and marine resources, threatened and endangered species, critical habitats, and essential fish habitat for with-project conditions within the study area?

Section 4.19 – Cumulative Effects Summary

88. Do you agree with the evaluation related to the cumulative effects of with-project conditions within the study area?

FINAL OVERVIEW QUESTION

89. What is the most important concern you have with the document or its appendices that was not covered in your answers to the questions above?