

Final Independent External Peer Review Report Revisions to the Southwest Coastal Louisiana Feasibility Study

Prepared by
Battelle Memorial Institute

Prepared for
Department of the Army
U.S. Army Corps of Engineers
Coastal Storm Risk Management National Planning Center of Expertise
Baltimore District

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Final Independent External Peer Review Report Revisions to the Southwest Coastal Louisiana Feasibility Study

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Executive Summary

PROJECT BACKGROUND AND PURPOSE

The purpose of the Southwest Coastal Louisiana Draft Integrated Feasibility Report and Environmental Impact Statement (IFR/EIS) is to develop an integrated plan for hurricane/storm damage risk reduction and coastal restoration for the southwest Louisiana parishes of Cameron, Calcasieu, and Vermilion.

The study area is located in the southwest corner of Louisiana. It covers over 4,700 square miles and consists of three parishes (Calcasieu, Cameron, and Vermilion) and three major hydrologic basins (Calcasieu/Sabine, Mermentau, and Teche/Vermilion). The dominant hydrologic features are the Calcasieu, Sabine, Neches, Mermentau, and Vermilion rivers, as well as Calcasieu, Sabine, Grand, and White lakes. Man-made channels include the Sabine-Neches Waterway, Calcasieu Ship Channel, Gulf Intracoastal Waterway, Mermentau Ship Channel, and Freshwater Bayou Canal Navigational Channel. Various water control structures in the area include the Calcasieu and Leland Bowman Locks, the Freshwater Bayou Canal Lock, the Schooner Bayou Canal Structure, and the Catfish Point Control Structure. The Gulf of Mexico coastline is another major water resource of the area. The major highways are LA Highway 82 and LA Highway 27. The Coastal Protection and Restoration Authority of Louisiana is the non-Federal sponsor. The estimated cost for a potentially recommended plan could range from the hundreds of millions to several billion dollars.

This multi-purpose study has the potential to significantly affect national economic, environmental, and social interests, simply due to the study area location. The study area is part of one of the largest expanses of coastal wetlands in the contiguous United States and is significant on a national level.

The Southwest Coastal Louisiana Draft IFR/EIS has been conducted to meet the USACE modernized planning initiative (Specific, Measurable, Attainable, Risk Informed, Timely or SMART Planning), which is to complete investigations leading to a decision in less time by using a risk-informed evaluation with less detailed information.

Independent External Peer Review Process

Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific analysis. The U.S. Army Corps of Engineers (USACE) is conducting an Independent External Peer Review (IEPR) of revisions to and public comments on the Southwest Coastal Louisiana Draft IFR/EIS (hereinafter: Revisions to the Southwest Coastal Louisiana Feasibility Study IEPR). As a 501(c)(3) non-profit science and technology organization, Battelle is independent, free from conflicts of interest (COIs), and meets the requirements for an Outside Eligible Organization (OEO) per guidance described in USACE (2012). Battelle has experience in establishing and administering peer review panels for USACE and was engaged to coordinate the IEPR of the Revisions to the Southwest Coastal Louisiana Feasibility

Study. The IEPR was external to the agency and conducted following USACE and Office of Management and Budget (OMB) guidance described in USACE (2012) and OMB (2004). This final report presents the Final Panel Comments of the IEPR Panel (the Panel). Details regarding the IEPR (including the process for selecting panel members, the panel members' biographical information and expertise, and the charge submitted to the Panel to guide its review) are presented in appendices.

Battelle engaged four of the five panel members that had conducted the IEPR of the original Southwest Coastal Louisiana Feasibility Study in 2014: Dr. Ken Casavant, Dr. John Loomis, Ms. Kay Crouch, and Dr. Brian Bledsoe. The fifth panel member from the original IEPR (Dr. Ralph Ellis) was not required for this IEPR of the revisions because USACE stated that no changes had been made to the civil/geotechnical engineering portion of the review documents. Dr. Casavant, Dr. Loomis, and Ms. Crouch are all members of the Louisiana Water Resources Council (LWRC) Primary Panel and Dr. Bledsoe is a member of the LWRC Candidate Pool.

The Panel received electronic versions of the Revisions to the Southwest Coastal Louisiana Feasibility Study (1,322 pages in total), along with a charge that solicited comments on specific sections of the documents to be reviewed. Following guidance provided in USACE (2012) and OMB (2014), USACE prepared the charge questions, which were included in the revised draft and final Work Plans.

The USACE Project Delivery Team briefed the Panel and Battelle during a kick-off meeting held via teleconference prior to the start of the review to provide the Panel an opportunity to ask questions of USACE and clarify uncertainties. Other than Battelle-facilitated teleconferences, there was no direct communication between the Panel and USACE during the peer review process. The Panel produced individual comments in response to the charge questions.

IEPR panel members reviewed the Revisions to the Southwest Coastal Louisiana Feasibility Study documents individually. The panel members then met via teleconference with Battelle to review key technical comments 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/high, medium, medium/low, or low); and (4) recommendations on how to resolve the comment. Overall, 18 Final Panel Comments were identified and documented. Of these, two were identified as having medium/high significance, six had a medium significance, and ten had medium/low significance.

Battelle received public comments from USACE on the Southwest Coastal Louisiana Feasibility Study (approximately 440 total pages of comments) and provided them to the IEPR panel members. The panel members were charged with determining if any information or concerns presented in the public comments raised any additional discipline-specific technical concerns with regard to the Revisions to the Southwest Coastal Louisiana Feasibility Study review documents. After completing its review, the Panel confirmed that no new issues or concerns were identified that warranted a separate Final Panel Comment; rather, the Panel was able to reference issues identified in the public comments in a few of the Final Panel Comments.

Results of the Independent External Peer Review

The panel members agreed on their "assessment of the adequacy and acceptability of the economic, engineering, and environmental methods, models, and analyses used" (USACE, 2012; p. D-4) in the Revisions to the Southwest Coastal Louisiana Feasibility Study review documents. Table ES-1 lists the

Final Panel Comment statements by level of significance. The full text of the Final Panel Comments is presented in Section 4.2 of this report. The following summarizes the Panel's findings.

Based on the Panel's review, the IFR/EIS is well-written and logically constructed and the Project Delivery Team is to be commended for compiling a concise yet information-rich set of documents within the constraints for the SMART planning process. The Panel did identify several elements of the project that should be clarified or revised.

Economics: From an economics standpoint, the Panel was impressed with the structure-by-structure residential analysis to determine the economic feasibility of structure raising and they recognized that this effort will likely make project implementation easier. In addition, they were complimentary on the efforts made to survey the affected industrial facilities about replacement costs and depth-percentage-damage relationships. However, the Panel had concerns because some industrial facilities did not respond to the survey and therefore some flood reduction benefits were completely omitted, perhaps contributing to the elimination of National Economic Development (NED) structural measures. The Panel believes that efforts could have been made to estimate the benefits to the non-responding facilities by treating the facilities that did respond as a non-random sample. In addition, the Panel noted that there was no acknowledgement in the Draft IFR/EIS of the risk involved in relying on the autonomous parish governments to adopt more restrictive zoning and land use regulations, which is one of the non-structural measures in the NED Tentatively Selected Plan (TSP). The Panel suggests that the Draft IFR/EIS should include a discussion of the risk that some benefits might not be realized because two of the six non-structural measures rest with voluntary actions by the parish governments. The Panel also commented on the absence of background justification for some assumptions made in the Real Estate Appendix, namely that 5% of the residences in the Involuntary Program proposed for elevation will need to be acquired and that 2% of the residences in the Voluntary Program are occupied by rental tenants. Some documentation should be added to the Draft IFR/EIS of the empirical basis of these two assumptions. Finally, the Draft IFR/EIS could benefit from an explanation of how the Other Social Effects ratings were constructed and a summary of the scoring process and how the metric relates to the Social Vulnerability Index.

Hydraulic and Hydrologic Engineering: In terms of hydraulic and hydrologic (H&H) engineering, the TSP is very holistic and will substantively contribute to NED and National Ecological Restoration (NER) goals, with the emphasis on non-structural solutions appearing to be the correct approach. The Panel also noted that the revisions include an improved discussion of risks and uncertainties related to climate change, extreme events, and model limitations. However, the Panel was concerned that there was insufficient documentation provided on the H&H modeling accuracy, including how any inaccuracies may affect estimates of relative performance of NED alternatives, which has implications for the accuracy of risk estimates of the various plans. The Panel recommends that additional documentation on model accuracy be added to the Draft IFR/EIS, as well as the results of a scenario or sensitivity analysis to determine how modeling inaccuracies might affect the relative performance of the plans, with the implications being described in the Engineering Appendix. Another issue identified by the Panel was the lack of a clear rationale for selecting the Cameron-Creole Spillway as the sole hydrologic and salinity (H&S) measure in the NER TSP; the process of prioritization and reduction of the original 49 H&S control measures to one should be explained in the Draft IFR/EIS. The Panel also noted that the rationale behind why Plan CM-4 was selected as the NER TSP over the Best Buy alternative Plan CM-2 was not clearly described and the Panel suggested that a more complete explanation of that selection process be included in the Draft IFR/EIS. Finally, the Panel encourages USACE to include two additional brief discussions in the Draft IFR/EIS: one on the potential for the offshore segmented breakwater to have

influence on longshore sediment transport and lee side erosion, and one on the potential influence of the proposed sediment borrow pits on nearshore wave climate and erosion processes.

Environmental/Biology: With respect to the environmental and biology (including National Environmental Policy Act [NEPA]) part of the Draft IFR/EIS, the Panel felt that the revised sections of the NER TSP are detailed and comprehensive, providing a great deal of additional information on the measures, which was lacking in the previously reviewed version of the report. One finding of importance was that the criteria for qualifying for Federal assistance with non-structural measures might be unachievable for many property owners, particularly for vulnerable populations. The Draft IFR/EIS should clearly lay out the steps required to fulfill the requirements, what the potential expenses may be, and how vulnerable population members can get assistance in meeting eligibility criteria and assistance. There was some Panel concern about the risk of the expected benefits not being realized due to eminent domain opposition; if the NED TSP cannot be fully implemented without involuntary participation (e.g., eminent domain), which is a part of the NED TSP that seems to have substantial opposition, then the Draft IFR/EIS should include a full summary of this risk and consider including a sensitivity analysis on how benefits would be affected at different levels (less than 100%) of voluntary participation. Another risk that was not discussed in the report relates to the availability of funding for operation and maintenance, repair, replacement and rehabilitation (OMRR&R). Since annual funding is uncertain, the Draft IFR/EIS should include a risk-based discussion of what might happen to the NED and NER TSPs if funding were unavailable or decreased. The Panel also recommended that residual risk to affected populations be discussed in full detail (including public health/safety, critical infrastructure, and evacuation capability) and that a residual risk communication plan be included in the Draft IFR/EIS. Finally, although the Panel is aware that the public comment period ended just before the review documents were provided for the IEPR, NEPA requires that a full summary of public comments be included in the Draft IFR/EIS as well as USACE's response to those comments.

Civil Works Planning: Overall, the planning process was found to be clear and logical. The Panel did note that the selection of the flood plain increments (0-25, 25-50 years) appeared to be arbitrary because no rationale was provided on how they were chosen. The Draft IFR/EIS would benefit from a description of the selection process and the results of a sensitivity analysis showing how the benefit-cost ratio might be affected by different increments. In addition, the Panel questioned the validity of the NED TSP assumption that 100% of homeowners would participate in voluntary structure raising. The Panel recommended that a full description of that assumption should be added to the Draft IFR/EIS. The Panel also noted that the use of Rough Order of Magnitude (ROM) for real estate and navigation costs, while commonly used, may over- or underestimate the benefit-cost ratios (BCRs) for the non-structural program. The Panel recommended that, where possible, actual cost components be located and included in the analyses to ensure more certain BCRs. Finally, the Panel would like to see a more in-depth discussion on the mitigation plan added to the Draft IFR/EIS, including documentation of its \$100 million cost.

Table ES-1. Overview of 18 Final Panel Comments Identified by the Revisions to the Southwest Coastal Louisiana Feasibility Study IEPR Panel

No.	Final Panel Comment
Significance – Medium/High	
1	The accuracy of the hydrologic and hydraulic modeling underpinning most of the analyses is not well-described and documented, and it is unclear how inaccuracies may affect estimates of the relative performance of National Economic Development (NED) alternatives.
2	Many property owners, especially those who are part of vulnerable populations, may not be able to meet the criteria for qualifying for non-structural measures and associated Federal assistance.
Significance – Medium	
3	The omission of the flood damage reduction benefits to nearly one-third of the industrial properties may have narrowed the extent of the NED TSP.
4	The implementation of the NED TSP alternatives is at risk due to lack of support for the involuntary participation/eminent domain aspect of the non-structural measures, and long-term commitments on the part of the non-Federal sponsor and local entities may not be realized.
5	The validity and potential implications of the NED TSP assumption that 100% of homeowners will participate in voluntary structure-raising are not well-documented.
6	The single management measure selected for hydrology and salinity control in the National Ecosystem Restoration (NER) TSP may not be sufficient to achieve the salinity objective, and the process used to select that measure is not sufficiently described.
7	The voluntary nature of adopting changes to local building codes and zoning regulations poses an unacknowledged risk of not achieving the NED TSP benefits.
8	The selection of the flood plain increments for the NED TSP appears arbitrary because no rationale is provided.
Significance – Medium/Low	
9	The risk of funding not being available for operation, maintenance, repair, replacement, and rehabilitation (OMRR&R) of the TSPs is not fully explained.
10	Using Rough Order of Magnitude (ROM) for real estate costs may under- or overestimate the benefit-cost ratios for the non-structural program, which increases the uncertainty of selection of non-structural measures in the TSP.
11	The rationale for the selection of Plan CM-4 (NER TSP) over Plan CM-2 is not well-documented.

Table ES-1, continued. Overview of 18 Final Panel Comments Identified by the Revisions to the Southwest Coastal Louisiana Feasibility Study IEPR Panel

No.	Final Panel Comment
12	The potential that shorelines to the west of the segmented breakwaters might experience increased erosion is not discussed.
13	The influence of proposed sediment borrow pits in the Gulf of Mexico on the nearshore wave climate and the potential for induced erosion are not discussed.
14	The Real Estate Appendix makes certain unsupported assumptions about the Involuntary and Voluntary Programs that could affect NED TSP implementation costs.
15	Residual flood risk is minimally discussed and a plan for communicating the residual risk to affected populations is not included in the Draft IFR/EIS.
16	There is no supporting information provided for the \$100 million in mitigation costs for the structural alternatives.
17	The Draft IFR/EIS does not explain how the Other Social Effects (OSE) ratings were constructed and how the ratings were determined.
18	A summary of the stakeholder and public comments received in 2015 on the Draft IRF/EIS and USACE responses have not been included in the document.

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LIST OF ACRONYMS

AAHU	Average Annualized Habitat Unit
ATR	Agency Technical Review
BCR	Benefit-cost ratio
CE/ICA	Cost Effectiveness/Incremental Cost Analysis
COI	Conflict of Interest
CSV	Content-Structure-Value Ratios
DrChecks	Design Review and Checking System
EC	Engineer Circular
ER	Engineer Regulation
ERDC	Engineer Research and Development Center
FEMA	Federal Emergency Management Agency
H&H	Hydraulic and hydrologic
H&S	Hydrologic and salinity
IEPR	Independent External Peer Review
IFR/EIS	Integrated Feasibility Report/Environmental Impact Statement
LWRC	Louisiana Water Resources Council
NED	National Economic Development
NEPA	National Environmental Policy Act
NER	National Ecological Restoration
NFS	Non-Federal sponsor
OEO	Outside Eligible Organization
OMB	Office of Management and Budget
OMRR&R	Operation and Maintenance, Repair, Replacement and Rehabilitation
OSE	Other Social Effects
PDT	Project Delivery Team
ROM	Rough Order of Magnitude
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Services
TSP	Tentatively Selected Plan
WRDA	Water Resources Development Act

WVA Wetland Value Assessment

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1. INTRODUCTION

The purpose of the Southwest Coastal Louisiana Draft Integrated Feasibility Report and Environmental Impact Statement (IFR/EIS) is to develop an integrated plan for hurricane/storm damage risk reduction and coastal restoration for the southwest Louisiana parishes of Cameron, Calcasieu, and Vermilion.

The study area is located in the southwest corner of Louisiana. It covers over 4,700 square miles and consists of three parishes (Calcasieu, Cameron, and Vermilion) and three major hydrologic basins (Calcasieu/Sabine, Mermentau, and Teche/Vermilion). The dominant hydrologic features are the Calcasieu, Sabine, Neches, Mermentau, and Vermilion rivers, as well as Calcasieu, Sabine, Grand, and White lakes. Man-made channels include the Sabine-Neches Waterway, Calcasieu Ship Channel, Gulf Intracoastal Waterway, Mermentau Ship Channel, and Freshwater Bayou Canal Navigational Channel. Various water control structures in the area include the Calcasieu and Leland Bowman Locks, the Freshwater Bayou Canal Lock, the Schooner Bayou Canal Structure, and the Catfish Point Control Structure. The Gulf of Mexico coastline is another major water resource of the area. The major highways are LA Highway 82 and LA Highway 27. The Coastal Protection and Restoration Authority of Louisiana is the non-Federal sponsor. The estimated cost for a potentially recommended plan could range from the hundreds of millions to several billion dollars.

This multi-purpose study has the potential to significantly affect national economic, environmental, and social interests, simply due to the study area location. The study area is part of one of the largest expanses of coastal wetlands in the contiguous United States and is significant on a national level.

The Southwest Coastal Louisiana Draft IFR/EIS has been conducted to meet the USACE modernized planning initiative (Specific, Measurable, Attainable, Risk Informed, Timely or SMART Planning), which is to complete investigations leading to a decision in less time by using a risk-informed evaluation with less detailed information.

Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific analysis. The objective of the work described here was to conduct an Independent External Peer Review (IEPR) of the revisions to and public comments on the Southwest Coastal Louisiana Draft IFR/EIS (hereinafter: Revisions to the Southwest Coastal Louisiana Feasibility Study IEPR) in accordance with procedures described in the Department of the Army, U.S. Army Corps of Engineers (USACE), Engineer Circular (EC) *Civil Works Review* (EC 1165-2-214) (USACE, 2012) and the Office of Management and Budget (OMB), *Final Information Quality Bulletin for Peer Review* (OMB, 2004). 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).

This final report presents the Final Panel Comments of the IEPR Panel (the Panel) on the existing engineering, economic, environmental, and plan formulation analyses contained in the Revisions to the Southwest Coastal Louisiana Feasibility Study IEPR documents (Section 4). Appendix A describes in detail how the IEPR was planned and conducted. Appendix B provides biographical information on the IEPR panel members and describes the method Battelle followed to select them. Appendix C presents the final charge to the IEPR panel members for their use during the review.

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 (2012).

In general, the purpose of peer review is to strengthen the quality and credibility of the USACE decision documents in support of its Civil Works program. IEPR provides an independent assessment of the engineering, economic, environmental, and plan formulation analyses 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 Revisions to the Southwest Coastal Louisiana Feasibility Study was conducted and managed using contract support from Battelle, which is an Outside Eligible Organization (OEO) (as defined by EC 1165-2-214). Battelle, a 501(c)(3) organization under the U.S. Internal Revenue Code, has experience conducting IEPRs for USACE.

3. METHODS FOR CONDUCTING THE IEPR

The methods used to conduct the IEPR are briefly described in this section; a detailed description can be found in Appendix A. Table 1 presents the major milestones and deliverables of the Revisions to the Southwest Coastal Louisiana Feasibility Study IEPR. Due dates for milestones and deliverables are based on the contract modification authorization date of May 29, 2015. Note that the work items listed under Task 6 occur after the submission of this report. Battelle anticipates submitting the pdf printout of the USACE's Design Review and Checking System (DrChecks) project file (the final deliverable) on September 10, 2015. The actual date for contract end will depend on the date that all activities for this IEPR are conducted.

Table 1. Major Milestones and Deliverables of the Revisions to the Southwest Coastal Louisiana Feasibility Study IEPR

Task	Action	Due Date
1	Contract Modification Authorization	5/29/2015
	Review documents available	5/29/2015
2	Battelle modifies subcontracts for panel members	6/3/2015
3	Battelle convenes kick-off meeting with USACE and panel members	6/8/2015

Table 1. Major Milestones and Deliverables of the Revisions to the Southwest Coastal Louisiana Feasibility Study IEPR (continued)

Task	Action	Due Date
4	Panel members complete their individual reviews	6/16/2015
	Panel members provide draft Final Panel Comments to Battelle	6/25/2015
5	Battelle submits Final IEPR Report to USACE	7/13/2015
6 ^a	Battelle convenes Comment-Response Teleconference with panel members and USACE	8/18/2015
	Battelle submits pdf printout of DrChecks project file to USACE	9/10/2015
	Contract End/Delivery Date	2/9/2016

^a Task 6 occurs after the submission of this report.

Battelle engaged four of the five panel members that had conducted the IEPR of the original Southwest Coastal Louisiana Feasibility Study in 2014: Dr. Ken Casavant, Dr. John Loomis, Ms. Kay Crouch, and Dr. Brian Bledsoe. The fifth panel member from the original IEPR (Dr. Ralph Ellis) was not required for this IEPR of the revisions because USACE stated that no changes had been made to the civil/geotechnical engineering portion of the review documents. Dr. Casavant, Dr. Loomis, and Ms. Crouch are all members of the Louisiana Water Resources Council (LWRC) Primary Panel and Dr. Bledsoe is a member of the LWRC Candidate Pool. The identification and selection of the panel members is described in Appendix B. Battelle modified the subcontracts of the four panel members when they indicated their willingness to participate and confirmed the continued absence of COIs through a signed COI form.

The Panel reviewed the Revisions to the Southwest Coastal Louisiana Feasibility Study documents and produced 18 Final Panel Comments in response to 71 charge questions provided by USACE for the review. This charge included two overview questions added by Battelle. Battelle instructed the Panel to develop the Final Panel Comments using a standardized four-part structure:

1. Comment Statement (succinct summary statement of concern)
2. Basis for Comment (details regarding the concern)
3. Significance (high, medium/high, medium, medium/low, or low; in accordance with specific criteria for determining level of significance)
4. Recommendation(s) for Resolution (at least one implementable action that could be taken to address the Final Panel Comment).

Battelle reviewed all Final Panel Comments for accuracy, adherence to USACE guidance (EC 1165-2-214, Appendix D), and completeness prior to determining that they were final and suitable for inclusion in the Final IEPR Report. There was no direct communication between the Panel and USACE during the preparation of the Final Panel Comments. The Panel's findings are summarized in Section 4.1; the Final Panel Comments are presented in full in Section 4.2.

4. RESULTS OF THE IEPR

This section presents the results of the IEPR. A summary of the Panel's findings and the full text of the Final Panel Comments are provided.

4.1 Summary of Final Panel Comments

The panel members agreed on their "assessment of the adequacy and acceptability of the economic, engineering, and environmental methods, models, and analyses used" (USACE, 2012; p. D-4) in the Revisions to the Southwest Coastal Louisiana Feasibility Study review documents. Table ES-1 lists the Final Panel Comment statements by level of significance. The full text of the Final Panel Comments is presented in Section 4.2 of this report. The following summarizes the Panel's findings.

Based on the Panel's review, the IFR/EIS is well-written and logically constructed and the Project Delivery Team is to be commended for compiling a concise yet information-rich set of documents within the constraints for the SMART planning process. The Panel did identify several elements of the project that should be clarified or revised.

Economics: From an economics standpoint, the Panel was impressed with the structure-by-structure residential analysis to determine the economic feasibility of structure raising and they recognized that this effort will likely make project implementation easier. In addition, they were complimentary on the efforts made to survey the affected industrial facilities about replacement costs and depth-percentage-damage relationships. However, the Panel had concerns because some industrial facilities did not respond to the survey and therefore some flood reduction benefits were completely omitted, perhaps contributing to the elimination of National Economic Development (NED) structural measures. The Panel believes that efforts could have been made to estimate the benefits to the non-responding facilities by treating the facilities that did respond as a non-random sample. In addition, the Panel noted that there was no acknowledgement in the Draft IFR/EIS of the risk involved in relying on the autonomous parish governments to adopt more restrictive zoning and land use regulations, which is one of the non-structural measures in the NED Tentatively Selected Plan (TSP). The Panel suggests that the Draft IFR/EIS should include a discussion of the risk that some benefits might not be realized because two of the six non-structural measures rest with voluntary actions by the parish governments. The Panel also commented on the absence of background justification for some assumptions made in the Real Estate Appendix, namely that 5% of the residences in the Involuntary Program proposed for elevation will need to be acquired and that 2% of the residences in the Voluntary Program are occupied by rental tenants. Some documentation should be added to the Draft IFR/EIS of the empirical basis of these two assumptions. Finally, the Draft IFR/EIS could benefit from an explanation of how the Other Social Effects ratings were constructed and a summary of the scoring process and how the metric relates to the Social Vulnerability Index.

Hydraulic and Hydrologic Engineering: In terms of hydraulic and hydrologic (H&H) engineering, the TSP is very holistic and will substantively contribute to NED and National Ecological Restoration (NER) goals, with the emphasis on non-structural solutions appearing to be the correct approach. The Panel also noted that the revisions include an improved discussion of risks and uncertainties related to climate change, extreme events, and model limitations. However, the Panel was concerned that there was insufficient documentation provided on the H&H modeling accuracy, including how any inaccuracies may affect estimates of relative performance of NED alternatives, which has implications for the accuracy of risk estimates of the various plans. The Panel recommends that additional documentation on model accuracy be added to the Draft IFR/EIS, as well as the results of a scenario or sensitivity analysis to

determine how modeling inaccuracies might affect the relative performance of the plans, with the implications being described in the Engineering Appendix. Another issue identified by the Panel was the lack of a clear rationale for selecting the Cameron-Creole Spillway as the sole hydrologic and salinity (H&S) measure in the NER TSP; the process of prioritization and reduction of the original 49 H&S control measures to one should be explained in the Draft IFR/EIS. The Panel also noted that the rationale behind why Plan CM-4 was selected as the NER TSP over the Best Buy alternative Plan CM-2 was not clearly described and the Panel suggested that a more complete explanation of that selection process be included in the Draft IFR/EIS. Finally, the Panel encourages USACE to include two additional brief discussions in the Draft IFR/EIS: one on the potential for the offshore segmented breakwater to have influence on longshore sediment transport and lee side erosion, and one on the potential influence of the proposed sediment borrow pits on nearshore wave climate and erosion processes.

Environmental/Biology: With respect to the environmental and biology (including National Environmental Policy Act [NEPA]) part of the Draft IFR/EIS, the Panel felt that the revised sections of the NER TSP are detailed and comprehensive, providing a great deal of additional information on the measures, which was lacking in the previously reviewed version of the report. One finding of importance was that the criteria for qualifying for Federal assistance with non-structural measures might be unachievable for many property owners, particularly for vulnerable populations. The Draft IFR/EIS should clearly lay out the steps required to fulfill the requirements, what the potential expenses may be, and how vulnerable population members can get assistance in meeting eligibility criteria and assistance. There was some Panel concern about the risk of the expected benefits not being realized due to eminent domain opposition; if the NED TSP cannot be fully implemented without involuntary participation (e.g., eminent domain), which is a part of the NED TSP that seems to have substantial opposition, then the Draft IFR/EIS should include a full summary of this risk and consider including a sensitivity analysis on how benefits would be affected at different levels (less than 100%) of voluntary participation. Another risk that was not discussed in the report relates to the availability of funding for operation and maintenance, repair, replacement and rehabilitation (OMRR&R). Since annual funding is uncertain, the Draft IFR/EIS should include a risk-based discussion of what might happen to the NED and NER TSPs if funding were unavailable or decreased. The Panel also recommended that residual risk to affected populations be discussed in full detail (including public health/safety, critical infrastructure, and evacuation capability) and that a residual risk communication plan be included in the Draft IFR/EIS. Finally, although the Panel is aware that the public comment period ended just before the review documents were provided for the IEPR, NEPA requires that a full summary of public comments be included in the Draft IFR/EIS as well as USACE's response to those comments.

Civil Works Planning: Overall, the planning process was found to be clear and logical. The Panel did note that the selection of the flood plain increments (0-25, 25-50 years) appeared to be arbitrary because no rationale was provided on how they were chosen. The Draft IFR/EIS would benefit from a description of the selection process and the results of a sensitivity analysis showing how the benefit-cost ratio might be affected by different increments. In addition, the Panel questioned the validity of the NED TSP assumption that 100% of homeowners would participate in voluntary structure raising. The Panel recommended that a full description of that assumption should be added to the Draft IFR/EIS. The Panel also noted that the use of Rough Order of Magnitude (ROM) for real estate and navigation costs, while commonly used, may over- or underestimate the benefit-cost ratios (BCRs) for the non-structural program. The Panel recommended that, where possible, actual cost components be located and included in the analyses to ensure more certain BCRs. Finally, the Panel would like to see a more in-depth

discussion on the mitigation plan added to the Draft IFR/EIS, including documentation of its \$100 million cost.

4.2 Final Panel Comments

This section presents the full text of the Final Panel Comments prepared by the IEPR panel members.

Final Panel Comment 1

The accuracy of the hydrologic and hydraulic modeling underpinning most of the analyses is not well-described and documented, and it is unclear how inaccuracies may affect estimates of the relative performance of National Economic Development (NED) alternatives.

Basis for Comment

Several aspects of the NED analysis hinge on the accuracy of the hydrologic and hydraulic (H&H) modeling performed with HEC-RAS and ADCIRC. The H&H modeling fundamentally affects which structures are included in the NED plan, as well as the relative performance of structural versus non-structural plans.

Results from the uncoupled HEC-RAS and ADCIRC models were combined through extrapolation and interpolation of rainfall flooding and storm surge model outputs. Storm surge flooding becomes increasingly dominant in project areas nearer to the coast, and modeling of the 0-25 year floodplain in project areas relatively near the coast is of particular importance given that the NED Tentatively Selected Plan (TSP) focuses on structures in the 0-25 year floodplain. However, ADCIRC storm surge modeling was only performed for 100- and 500-year events. Thus, it seems that in areas dominated by storm surge flooding, the extent of structures included in the various plans would be especially sensitive to how the 100-year ADCIRC results were extrapolated to higher frequency events and the 0-25 year floodplain. Calibration and testing of the ADCIRC model and the accuracy of its extrapolated results for assessing structural and non-structural alternatives are not documented for this study area. The HEC-RAS model was calibrated for a single storm event in a subset of the study area in 2002.

Although the project documentation acknowledges that the additive effects of storm surge and inland rainfall flooding are not accounted for in the modeling, there is currently insufficient discussion of the accuracy of the H&H models and no meaningful analysis of how modeling inaccuracies may affect the relative performance of NED alternatives. Specifically, there is no scenario analysis or sensitivity analysis to assess how H&H modeling inaccuracies may have affected the relative performance of various alternatives and the extent of structures included in the NED TSP.

Significance – Medium/High

There is insufficient documentation to assess the soundness of the H&H methods and models, and whether the H&H analyses provide reasonably accurate estimates of risk and relative performance of structural and non-structural plans.

Recommendation for Resolution

1. Provide additional documentation on the accuracy of the H&H models and how modeling inaccuracies may affect the relative performance of NED plans.
2. Perform scenario analysis and/or sensitivity analysis to assess how H&H modeling inaccuracies may have affected the relative performance of various plans and the extent of structures included in the non-structural NED TSP, and describe the implications in the Engineering Appendix.

Final Panel Comment 2

Many property owners, especially those who are part of vulnerable populations, may not be able to meet the criteria for qualifying for non-structural measures and associated Federal assistance.

Basis for Comment

Chapter 4 of the Draft IFR/EIS describes the criteria that must be met before a structure's owner is considered eligible to participate in the non-structural TSP. Several of the criteria represent what are potentially large expenditures on the part of the owner. For example, there is a requirement that the owner demonstrate that there is no hazardous, toxic, or radioactive waste or material present and that any asbestos-containing materials have been properly remediated. Performing the studies required to determine whether toxic materials or asbestos are present can be a significant expense. Remedial activities that are associated with these types of materials are complicated and very expensive and many property owners in the study area would not be able to afford the testing or remediation, or know how to locate a contractor to conduct these activities if they could afford them. These eligibility criteria may place vulnerable populations at a particular disadvantage, including the elderly and those with low income, causing them to drop out of the voluntary non-structural program and raising Environmental Justice concerns.

Significance – Medium/High

The criteria for eligibility to participate in the NED TSP and associated expenses may discourage the participation of property owners and may place members of vulnerable populations at a significant disadvantage.

Recommendation for Resolution

1. Describe in more detail and in layman's terms the steps required to participate in the NED TSP, including *how* property owners may go about fulfilling the requirements. This information may be included in an Appendix and referenced in the Draft IFR/EIS.
2. Develop examples of the expenses that a property owner can expect to incur under various scenarios (included in an Appendix per #1 above)
3. Create and describe a method for assisting members of vulnerable populations in meeting eligibility criteria (included in an Appendix per #1 above).

Final Panel Comment 3

The omission of the flood damage reduction benefits to nearly one-third of the industrial properties may have narrowed the extent of the NED TSP.

Basis for Comment

The chosen NED TSP for the 0-25 year floodplain has a very favorable benefit-cost ratio (BCR), however, none of the structural alternatives — Plan 1 (Lake Charles Eastbank), Plan 4 (Delcambre/Erath), and Plan 6 (Abbeville to Delcambre) — was included in the NED TSP due to relatively low BCRs, ranging from slightly above 1.0 to slightly below 1.0 (Draft Integrated Feasibility Report/Environmental Impact Statement [Draft IFR/EIS], Table 2-7).

USACE contacted 71 owners/operators of industrial facilities via phone requesting information on replacement costs of at-risk facilities and depth-percentage-damage relationships (Draft IFR/EIS, p. 2-5). Of the 71 industrial facilities, 27 did not respond with information and USACE omitted any potential benefits to these 27 industrial facilities, reasoning that it would be “speculative” (Draft IFR/EIS, p. 2-5) to include any benefits.

USACE could legitimately estimate the benefits to the 27 non-responding facilities by treating the 44 facilities that did respond as a major sample from which to estimate the benefits to the 27 facilities that did not respond. If the types and sizes of industrial facilities are heterogeneous, as possible here, then first stratifying the sample of 44 responsive facilities by type and size might allow better matching of the damage reduction benefits to the 27 non-responding industrial facilities. The Panel believes that including estimates of benefits to the 27 non-responding industrial facilities could result in favorable BCRs for the structural measures (e.g., levees) for these facilities or their inclusion in a 25-50 year non-structural plan (e.g., berms). This would broaden the NED TSP and better address the project’s Planning Objective #1, to reduce the risk of damages and losses from hurricane and storm surge flooding (Draft IFR/EIS, p. ii).

The procedure described by the Panel is very similar to one used by USACE in calculating the flood damages to contents of residential and non-residential buildings. USACE used a small non-random sample of residential households (n=10) to calculate the Content-Structure-Value-Ratios (CSVs) by type of residential unit (e.g., one-story, two-story, etc.) (Economics Appendix, p. D9, and Tables 11 and 12). Then USACE applied the sampled CSVs for each residential type to the 3,750 residential properties to arrive at a total of flood damages to all residential structures. In a similar procedure, 80 interviews of businesses stratified by business type were applied to all 396 businesses.

Significance – Medium

Omitting the benefits to the 27 non-responding industrial facilities may have contributed to the elimination of NED TSP structural measures, the inclusion of which could have led to a further reduction in the economically justified risk of flood damages and losses in the study area.

Recommendation for Resolution

1. Calculate the flood damage reduction benefits from structural measures to the 27 non-responding industrial facilities by using the information provided by the 44 responding facilities.
2. Re-calculate the BCRs of the structural measures by including the flood damage reduction benefits to all 71 industrial facilities (the 44 responding and the 27 not responding).

Final Panel Comment 4

The implementation of the NED TSP alternatives is at risk due to lack of support for the involuntary participation/eminent domain aspect of the non-structural measures, and long-term commitments on the part of the non-Federal sponsor and local entities may not be realized.

Basis for Comment

The NED TSP requires significant voluntary participation in non-structural measures in order to realize the stated benefits; however, this may be not a reasonable expectation of the owners of structures or local entities. The non-Federal sponsor, as well as the general public and local government entities, has expressed opposition to involuntary participation in the form of eminent domain. In a March 15, 2015 letter, the non-Federal sponsor expresses support for involuntary participation only for properties that have experienced repetitive losses per the Federal Emergency Management Agency (FEMA) or those located in a regulated FEMA floodplain. Comment letters from the general public and formal resolutions by local governmental entities also show opposition to involuntary participation and to non-structural plans that include this measure. In addition, the local governments that are strongly opposed to involuntary measures are also responsible for meeting long-term commitments such as enforcement of easements, covenants, and control agreements. Failure to meet these commitments may affect benefits that the NED TSP is expected to achieve.

Political and public opposition could undermine both voluntary and involuntary participation and ultimately the effectiveness of the proposed non-structural measures, which could ultimately jeopardize full implementation of the NED TSP.

Significance – Medium

The NED TSP plan may not be fully implementable due to public and political opposition to involuntary participation in the non-structural measures, and the risk that the expected benefits may not be realized is not fully explained in the Draft IFR/EIS.

Recommendation for Resolution

1. Provide a full summary in the Draft IFR/EIS of the risk associated with lack of participation in the NED TSP, including a discussion of the information gleaned from stakeholder and public comments.
2. Consider summarizing several sensitivities showing benefits that can be achieved using various percentages of voluntary participation that are less than 100%.
3. Discuss the impact of failure on the part of local entities to implement local long-term commitments such as enforcement of easements, covenants, and control agreements in terms of potential reduced benefits.

Final Panel Comment 5

The validity and potential implications of the NED TSP assumption that 100% of homeowners will participate in voluntary structure-raising are not well-documented.

Basis for Comment

In the Draft IFR/EIS (pp. 2-14 and 2-21 to 2-22), the TSP assumes that 100% of the homeowners will participate in the voluntary structure-raising, but no documentation is offered to support this assumption, even though it could directly decrease the benefits and the BCR. In addition, the Draft IFR/EIS states (pp. 4-5 and 4-9) that non-participating households would be randomly selected and that if “participation is less than 100% then both the benefits and costs are expected to decline in a similar proportion such that the benefit/cost ratio would remain unchanged.” Not only is it unclear how or if the 100% assumption will be achieved, it is also unclear how sensitive the BCRs are to the voluntary participation rates.

Significance – Medium

If the 100% participation rate is not met, the ability of the NED TSP to achieve the project goals may be affected.

Recommendation for Resolution

1. Review the literature and the experience of other comparable projects to determine a probable “realized” participation rate.
2. Conduct an analysis of the impact of the “realized” rate on the BCR to determine the sensitivity of participation levels.

Final Panel Comment 6

The single management measure selected for hydrology and salinity control in the National Ecosystem Restoration (NER) TSP may not be sufficient to achieve the salinity objective, and the process used to select that measure is not sufficiently described.

Basis for Comment

Saltwater intrusion is a system-level problem in the project area. The problem is well-documented and includes increased salinity levels after storm surge events, saltwater movement into the upper estuaries as a result of ship channels in the Calcasieu and Sabine Rivers, impacts on agricultural and seafood industries, and extensive habitat loss. In addressing these system-level issues, the Draft IFR/EIS identifies a specific objective of managing tidal flows to improve drainage and prevent salinity from exceeding 2 parts per thousand (ppt) for fresh marsh and 6 ppt for intermediate marsh (Planning Objective #2; Draft IFR/EIS, pp. ii and 2-1).

The Initial Array of NER Alternative Plans contained 49 hydrologic and salinity (H&S) control features in the Hydrologic and Salinity Control Plan (Draft IFR/EIS, p. 2-29). These 49 features were ultimately reduced to one measure (Cameron-Creole Spillway [measure 74a]) in the TSP. The only rationale provided in the Draft IFR/EIS for carrying forward H&S control features is they have larger-scale benefits, such as those that helped maintain greater than 500 net acres as determined by the State Master Plan models. A Wetland Value Assessment (WVA) analysis of H&S controls was not completed because the model cannot adequately describe the benefits of these features across such a large area (Draft IFR/EIS, p. 2-29) and the extent of salinity problems. It is therefore difficult for the Panel to understand why the Cameron-Creole Spillway (measure 74a) is the only H&S control measure included in the TSP. The prioritization and reduction of H&S control measures from 49 to one is not well-documented.

In general, the Panel found that the Draft IFR/EIS does not provide an analysis supporting the efficacy of a single H&S control measure (located outside the ship channels) in achieving the specific salinity targets identified in Objective 2 for fresh and intermediate marsh at local and system scales.

Significance – Medium

The absence of a clear rationale for selecting the Cameron-Creole Spillway (measure 74a) as the sole H&S control measure in the TSP, as well as insufficient analysis supporting the performance of this measure in achieving the specific salinity targets in Planning Objective #2, increases the uncertainty that the salinity issues are adequately addressed.

Recommendation for Resolution

1. Explain in the Draft IFR/EIS the rationale and process used to reduce the 49 H&S control features in the Hydrologic and Salinity Control to the one measure included in the NER TSP (Cameron-Creole Spillway [measure 74a]).
2. Provide in the Draft IFR/EIS analysis or evidence indicating that the Cameron-Creole Spillway (measure 74a) has a reasonable likelihood of achieving Planning Objective #2.

Final Panel Comment 7

The voluntary nature of adopting changes to local building codes and zoning regulations pose an unacknowledged risk of not achieving the NED TSP benefits.

Basis for Comment

The NED TSP relies on several non-structural measures to obtain its Planning Objective #1 (reduction of the risk of damages and losses from hurricane and storm surge flooding) (Draft IFR/EIS, p. ii). These measures include #6, which is to encourage local governments to adopt “more restrictive parish and municipal building codes, land use & zoning regulations, and other development controls.” (Draft IFR/EIS, p. 2-21). Another measure (#4) involves the consistency of parish development plans with the Non Federal Sponsor (NFS) Floodplain Management Plan.

However, the authority for building codes, land use, zoning, and development controls rests with the local parishes and not with USACE or the NFS. USACE and the NFS do not have the enforcement authority to require the local parishes to make these changes. Therefore, these two measures of the NED TSP may not be fully implemented as assumed by USACE in the Draft IFR/EIS.

Thus, there is an unacknowledged risk that the parishes may not adhere to more restrictive zoning and land use regulations that are assumed in calculating the benefits of the NED TSP.

Significance – Medium

There is no recognition in the Draft IFR/EIS that the NED net benefits of the TSP may not be achieved due to reliance on the voluntary nature of two of the six measures in the NED TSP.

Recommendation for Resolution

1. Acknowledge in the Draft IFR/EIS that there is a risk that the anticipated NED TSP benefits from reduction in damages from hurricane and storm surge flooding might not be realized because implementation of two of the six measures of the NED TSP rest with voluntary actions of local government over which USACE or the NFS have no control.

Final Panel Comment 8

The selection of the flood plain increments for the NED TSP appears arbitrary because no rationale is provided.

Basis for Comment

The analysis of elevation benefits that would be realized under the NED TSP was conducted mainly for the 0-25 and 25-50 year floodplain increments. However, no rationale is given for why these increments were selected; without an explanation, their selection appears arbitrary. It is possible that using different increments (e.g., 0-35, 0-40) may be more cost-effective and more comprehensive, thereby increasing the benefits. However, without a rationale for why the 25-year increments were chosen, it cannot be determined whether they are the most cost-effective and comprehensive choice.

Significance – Medium

It is not clear if the current floodplain elevation increments evaluation results in the most cost-effective or comprehensive TSP, with all beneficial measures being included.

Recommendation for Resolution

1. Using existing data, test the impact of different floodplain elevation increments on the chosen measures, the TSP selected, and the overall BCR. Add the results to the report, whether the new increments have a negative impact, a positive impact, or no impact, for report completeness.

Final Panel Comment 9

The risk of funding not being available for operation, maintenance, repair, replacement, and rehabilitation (OMRR&R) of the TSPs is not fully explained.

Basis for Comment

OMRR&R serves to ensure project sustainability and success going forward for both the NED and the NER TSPs. One key risk is the uncertainty of securing the annual funding that the non-Federal sponsor requires for implementation of OMRR&R. The State of Louisiana, as the non-Federal sponsor, is subject to annual budget authorizations approved by its state legislature. The legislature may not authorize annual funding, either partially or fully, to maintain the TSPs. The absence of, or a reduction in, year-to-year funding required to monitor and maintain the TSPs could result in failure to achieve the expected benefits and/or expected Average Annualized Habitat Units (AAHUs).

Significance – Medium/Low

The Draft IFR/EIS does not fully discuss the funding mechanism for OMRR&R or the risk that funding may not be available to fully implement OMRR&R over the life of the TSPs.

Recommendation for Resolution

1. Describe how funding uncertainties may affect the success of the TSPs.
2. Describe any Federal contingency potentially available if OMRR&R funding is absent or inadequate year-to-year.

Final Panel Comment 10

Using Rough Order of Magnitude (ROM) for real estate costs may under- or overestimate the benefit-cost ratios for the non-structural program, which increases the uncertainty of selection of non-structural measures in the TSP.

Basis for Comment

While using ROM to estimate costs is sometimes necessary, particularly when time and funding are short, the ROM approach can increase risk and uncertainty in the process. Specific and documented cost items decrease the uncertainty around the estimates and, therefore, decrease the risk to the project.

For the Southwest Coastal Louisiana Feasibility Study, ROMs are used to estimate navigation costs dealing with the salinity structures (Draft IFR/EIS, pp. 2-35 to 2-36). Because these costs could be either too high or too low, the risk in choosing the appropriate NED measures within the TSP is increased. Another example is in the NED Real Estate Plan (Appendix E, p.14), where real estate costs have been estimated using ROM, thereby increasing the uncertainty of the estimates.

Significance – Medium/Low

By relying on ROM estimates for some important real estate and navigation costs, the benefit-cost ratios for the TSP are less certain.

Recommendation for Resolution

1. Locate available cost information on the real estate and navigation cost components and incorporate them into the analyses and report in order to reduce reliance on ROM.
2. If more detailed costs are not available, conduct sensitivity analyses around the ROM to determine the importance of varying cost assumptions on the benefit-cost ratios.

Final Panel Comment 11

The rationale for the selection of Plan CM-4 (NER TSP) over Plan CM-2 is not well-documented.

Basis for Comment

The selection of Plan CM-4 as the NER TSP is somewhat supported by the Cost Effectiveness/ Incremental Cost Analysis (CE/ICA) analysis, which shows it is cost-effective. The rationale given for selecting Plan CM-4 rather than Plan CM-2 is that CM-4 produces 73.4% of the benefits at 74.0% of the cost, and costs \$400 million less than CM-2. However, the Best Buy alternative, CM-2, has a somewhat lower cost per AAHU than the TSP (Draft IFR/EIS, p. 2-40). Table 47 in the Economics Appendix shows that Plan CM-2 seems to be the most comprehensive NER plan, with a reasonably small incremental cost per AAHU (\$9.34); the next plan (CM-6) has a cost per AAHU of \$14.11. Thus, one could potentially interpret the analysis to suggest that CM-2 may be preferred as the NER TSP.

Significance – Medium/Low

The Draft IFR/EIS does not provide a complete explanation (including budget constraints) for selecting Plan CM-4 as the NER TSP over Plan CM-2, which affects the completeness of the report.

Recommendation for Resolution

1. Provide in the Draft IFR/EIS a more complete explanation of the rationale, constraints, and considerations that were used to select Plan CM-4 over Plan CM-2 as the NER TSP.

Final Panel Comment 12

The potential that shorelines to the west of the segmented breakwaters might experience increased erosion is not discussed.

Basis for Comment

Approximately 26.4 miles of offshore segmented breakwaters are included in the NER TSP for shoreline protection from Calcasieu River to Freshwater Bayou. The Draft IFR/EIS acknowledges the potential for partial disruption of longshore sediment transport resulting in potential environmental impacts, but does not mention the potential for increased lee side erosion as a result of disrupted longshore sediment transport.

Significance – Medium/Low

A complete understanding of the environmental consequences resulting from the segmented breakwaters is not possible without a discussion of potential effects on lee side shoreline erosion.

Recommendation for Resolution

1. Include in the FR/EIS a brief discussion of the potential influence that construction of offshore segmented breakwaters may have on both longshore sediment transport and lee side erosion.

Final Panel Comment 13

The influence of proposed sediment borrow pits in the Gulf of Mexico on the nearshore wave climate and the potential for induced erosion are not discussed.

Basis for Comment

Dredging offshore borrow pits in the Gulf will change the sea floor morphology, which could alter wave transformation and result in changes in the nearshore wave climate. The depth increases associated with borrow pits can reduce wave energy bottom dissipation, increase leeward wave energy and heights, and induce erosion in leeward coastline areas. Alternatively, if a borrow pit is located far enough offshore and in deep enough water, effects may be minimal. The Draft IFR/EIS does not address the potential environmental consequences of altered sediment transport and erosion patterns along the coastline areas in the lee of Gulf borrow pits.

Significance – Medium/Low

A complete understanding of the environmental consequences resulting from the proposed Gulf borrow pits in the TSP is not possible without acknowledging the potential for altered sediment transport and erosion patterns along the coastline areas in the lee of borrow pits.

Recommendation for Resolution

1. Include in the Draft IFR/EIS a brief discussion of the potential influence of proposed sediment borrow pits in the Gulf on the nearshore wave climate and erosion processes.
2. Analyze the potential influence on longshore sediment transport and lee side erosion resulting from the proposed sediment borrow pits in the Gulf.

Final Panel Comment 14

The Real Estate Appendix makes certain unsupported assumptions about the Involuntary and Voluntary Programs that could affect NED TSP implementation costs.

Basis for Comment

In the Real Estate Appendix (Figure 3, footnotes A and D, p. 15), there are two assumptions that are not supported, yet have significant influence on the real estate costs.

The first unsupported assumption is that 5% of the residences in the Involuntary Program proposed for elevation will need to be acquired. The cost of acquisition is approximately \$200,000 per structure, while the cost per elevation is approximately \$20,000, a ten-fold difference. Thus, varying the assumption of what percentage of residences proposed for elevation that must be acquired has a significant influence on real estate costs. While this difference in cost may not change the economic feasibility of the NED TSP, completeness of the Real Estate Appendix would be improved by documenting and providing a source for this assumption because it affects the cost of implementation of the NED TSP.

The second unsupported assumption is that 2% of the residences in the Voluntary Program are occupied by rental tenants. Renters of residences in the Voluntary Program are entitled to temporary relocation assistance, whereas such relocation assistance is not allowed for owners of residences in the Voluntary Program. While relocation assistance only adds approximately \$8,000 per residence to the elevation costs (and therefore does not affect the economic feasibility of the TSP), the completeness of the Real Estate Appendix would be improved by providing a basis for the assumption about rental rate of residences in the Voluntary Program.

Significance – Medium/Low

While these assumptions do not affect the economic feasibility of the NED TSP, the lack of documentation affects the completeness of the Real Estate Appendix and the combined effect of these two assumptions does have a potential to affect NED TSP implementation costs.

Recommendation for Resolution

1. Document the empirical basis of these two assumptions in the Real Estate Appendix.
2. If there is no empirical basis for the assumptions, perform a sensitivity analysis of the cost of the NED TSP to a reasonable range of the two percentages assumed in the Real Estate Appendix and recalculate the BCRs using the results of the sensitivity analysis.

Final Panel Comment 15

Residual flood risk is minimally discussed and a plan for communicating the residual risk to affected populations is not included in the Draft IFR/EIS.

Basis for Comment

The Economics Appendix identifies residual flood risk at between 14% and 17% (p. D-21). There is still risk of flooding even once the NED plan is implemented. The rate at which the public will evacuate, which is considered a non-structural measure, is assumed to be the same in terms of voluntary participation both before and after structures are raised. This assumption is not explained and it may not be the case, because the public can assume an unrealistic sense of security once the NED measures are in place. No plan for communicating residual flood risk to the public is included in the review documents, so it could not be evaluated by the Panel. In the absence of risk communication that fully describes and explains the residual flood risk, the implementation of an NED plan, whether structural or non-structural, may lead to false safety assumptions on the part of the public, which may adversely affect public safety.

Significance – Medium/Low

There is residual flood risk to structures and the public after implementation of the NED TSP and this risk and how it would be communicated, is an important to the success of the project.

Recommendation for Resolution

1. Include a full discussion of residual flood risk associated with the NED TSP that includes public health/safety, critical infrastructure, and evacuation capability.
2. Develop and include a plan for communicating residual risk to the public.

Final Panel Comment 16

There is no supporting information provided for the \$100 million in mitigation costs for the structural alternatives.

Basis for Comment

The Draft IFR/EIS does not include any documentation or rationale for the mitigation plan and why mitigation costs for the structural alternatives cost \$100 million (pp. 2-19 to 2-21). Inclusion of this amount nearly cancels out the NED net benefits for some structural alternatives. It is not possible for the Panel to ascertain the appropriateness of the components of the mitigation plan or the proposed costs because no information is presented.

Significance – Medium/Low

The lack of sourcing and rationale for this \$100 million mitigation plan prevents the Panel from assessing the appropriateness of the costs.

Recommendation for Resolution

1. Provide the sources for the elements in the mitigation plan and discuss the rationale for the mitigation plan as well as its costs and structure in the Draft IFR/EIS.

Final Panel Comment 17

The Draft IFR/EIS does not explain how the Other Social Effects (OSE) ratings were constructed and how the ratings were determined.

Basis for Comment

The Other Social Effects (OSE) provides a qualitative assessment of the effects of the NED TSP and NER TSP on several social factors of importance to individual and communities. OSE potentially provides valuable supplemental information about impacts of the TSPs not reflected in the NED monetary evaluation and NER wildlife habitat evaluation.

However, the only discussion of OSE in Chapter 1 of the Draft IFR/EIS (p.1-6) is in terms of the Social Vulnerability Index. There is some discussion of calculation of the scores and interpretation of the scores for each parish under the existing condition. Table 3-1 (p. 3-4) displays the OSE impacts of the NED and NER alternatives; however, the Social Vulnerability Index is mentioned in just one sentence. The Social Vulnerability Index does not appear to be used to calculate impacts. Rather “Social Factors and Metrics” are used in Table 3-1. These Social Factors and Metrics do not match up with the description (p. 1-6) of the Social Vulnerability Index. Rather, in Table 3-1, the Social Factors and Metrics include Physical Health/Safety, Regional Healthcare, Employment Opportunities, Community Cohesion, Vulnerable Groups, Residents of Study Area, and Recreational Activities. While the Panel feels these Social Factors and Metrics are appropriate OSE metrics for measuring impacts, there is no explanation of how each of these metrics was obtained.

Each metric is rated on a -3 to +3 scale relative to the Without Project Condition on the impacts of the alternatives on daily life (DL in the table) and impacts during storm/flood events (FE in the table). The scores in Table 3-1 are expressed as whole numbers such as 1/1, or 0/0, or 0/-2. There is little explanation provided on how the scores were developed and who did the rating. Without more information on the definitions of the metrics and how they were scored, it is difficult to assess the adequacy of the measurement of impacts on Other Social Effects from the alternatives being evaluated.

Significance – Medium/Low

While OSE does not affect the selection of the NED TSP and NER TSP, completeness of the document would be improved by a thorough explanation of the metrics used and scores in Table 3-1.

Recommendation for Resolution

1. Define the construction of each of the Social Factors and Metrics.
2. Describe the process of scoring the four alternatives.
3. Identify who did the scoring.
4. Describe how this metric relates to the Social Vulnerability Index.

Final Panel Comment 18

A summary of the stakeholder and public comments received in 2015 on the Draft IRF/EIS and USACE responses have not been included in the document.

Basis for Comment

While the Panel understands that the public comment period ended very recently, a summary of the comments received, as well as a plan to address those comments, is missing from the Draft IFR/EIS as required by the National Environmental Policy Act (NEPA).

Appendix J broadly discusses major themes garnered from comments received from agencies and the public during the comment period for the original draft report and states that the original document was revised significantly based on stakeholder and public comments.

The 2015 comments on the Draft IFR/EIS have been provided to the Panel. Many comments reflect an opposing point of view with respect to involuntary participation in the NED TSP, and many reflect opposition to elements of the NER plan. It is appropriate to summarize these comments and address them in the document.

Significance – Medium/Low

Stakeholder and public comments received during 2015 on the Draft IFR/EIS were not summarized or addressed in the Draft IFR/EIS in compliance with NEPA.

Recommendation for Resolution

1. Develop and include a full summary of comments, grouped by theme, received in 2015 on the Draft IFR/EIS.
2. Include responses, by theme, to the comments.

5. REFERENCES

OMB (2004). Final Information Quality Bulletin for Peer Review. Executive Office of the President, Office of Management and Budget, Washington, D.C. Memorandum M-05-03. December 16.

The National Academies (2003). Policy on Committee Composition and Balance and Conflicts of Interest for Committees Used in the Development of Reports. The National Academies (National Academy of Science, National Academy of Engineering, Institute of Medicine, National Research Council). May 12.

USACE (2012). Water Resources Policies and Authorities: Civil Works Review. Engineer Circular (EC) 1165-2-214. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. December 15.

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

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APPENDIX A

IEPR Process for the Revisions to the Southwest Coastal Louisiana Feasibility Study

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A.1 Planning and Conduct of the Independent External Peer Review (IEPR)

Table A-1 presents the schedule followed in executing an IEPR on the revisions to and the public comments on the Southwest Coastal Louisiana Feasibility Study (hereinafter: Revisions to the Southwest Coastal Louisiana Feasibility Study IEPR). Due dates for milestones and deliverables are based on the contract modification authorization date of May 29, 2015. The review documents were provided by U.S. Army Corps of Engineers (USACE) on May 29, 2015. Note that the work items listed under Task 6 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. Battelle will provide USACE and the Panel a pdf printout of all DrChecks entries, through comment closeout, as a final deliverable and record of the IEPR results.

Table A-1. Revisions to the Southwest Coastal Louisiana Feasibility Study Complete IEPR Schedule

Task	Action	Due Date
1	Contract Modification Authorization	5/29/2015
	Review documents available	5/29/2015
	Battelle submits draft Work Plan ^a	6/12/2015
	USACE provides comments on draft Work Plan	6/29/2015
	Battelle submits final Work Plan ^a	7/14/2015
2	Battelle modifies subcontracts for panel members	6/3/2015
3	Battelle sends review documents to panel members	6/3/2015
	Battelle convenes kick-off meeting with USACE and panel members	6/8/2015
	Battelle and panel members participate in the Agency Decision Milestone meeting	7/20/2015
4	Panel members complete their individual reviews	6/16/2015
	Battelle provides panel members with talking points for Panel Review Teleconference	6/18/2015
	Battelle convenes Panel Review Teleconference	6/18/2015
	Battelle provides Final Panel Comment templates and instructions to panel members	6/18/2015
	Panel members provide draft Final Panel Comments to Battelle	6/25/2015
	Battelle provides feedback to panel members on draft Final Panel Comments; panel members revise Final Panel Comments	6/25/2015 – 7/6/2015
	Panel finalizes Final Panel Comments	7/6/2015

Table A-1. Revisions to the Southwest Coastal Louisiana Feasibility Study Complete IEPR Schedule

Task	Action	Due Date
5	Battelle provides Final IEPR Report to panel members for review	7/7/2015
	Panel members provide comments on Final IEPR Report	7/9/2015
	Battelle submits Final IEPR Report to USACE ^a	7/13/2015
6 ^b	Battelle inputs Final Panel Comments to DrChecks and provides Final Panel Comment response template to USACE	7/14/2015
	Battelle convenes teleconference with USACE to review the Post-Final Panel Comment Response Process	7/16/2015
	USACE provides draft Project Delivery Team (PDT) Evaluator Responses to Battelle	8/6/2015
	Battelle provides the panel members the draft PDT Evaluator Responses	8/7/2015
	Panel members provide Battelle with draft BackCheck Responses	8/13/2015
	Battelle convenes teleconference with panel members to discuss draft BackCheck Responses	8/14/2015
	Battelle convenes Comment-Response Teleconference with panel members and USACE	8/18/2015
	USACE inputs final PDT Evaluator Responses to DrChecks	8/25/2015
	Battelle provides final PDT Evaluator Responses to panel members	8/27/2015
	Panel members provide Battelle with final BackCheck Responses	9/1/2015
	Battelle inputs the Panel's final BackCheck Responses in DrChecks	9/3/2015
	Battelle submits pdf printout of DrChecks project file ^a	9/4/2015
		CWRB Meeting (Estimated Date) ^c
	Contract End/Delivery Date	2/9/2016

^a Deliverable.

^b Task 6 occurs after the submission of this report

^c The CWRB meeting was listed in the Performance Work Statement under Task 3 but was relocated in this schedule to reflect the chronological order of activities.

Shortly after the contract modification was received, 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). Any revisions to the schedule were submitted as part of the final Work Plan. The final charge consisted of 69 charge questions provided by USACE, two overview questions added by Battelle (all questions were included in the draft and final Work Plans), and general guidance for the Panel on the conduct of the peer review (provided in Appendix C of this final report).

Prior to beginning their review and within five days of their subcontracts being finalized, all the members of the Panel attended a kick-off meeting via teleconference during which USACE presented project details to the Panel. Before the meetings, the IEPR Panel received an electronic version of the final charge, as well as the Revisions to the Southwest Coastal Louisiana Feasibility Study review documents and reference materials listed below. The documents and files in bold font were provided for review; the other documents were provided for reference or supplemental information only.

- **Draft Integrated Report and EIS (specifically the Executive Summary and Chapters 2, 3 and 4) (95 pages)**
- **Appendix A and Annexes A-W (550 pages)**
- **Appendix D, Economics (79 pages)**
- **Appendix E, Real Estate Plan (64 pages)**
- **Appendix J, Comments on First Draft (17 pages)**
- **Appendix K, NER Fact Sheets (58 pages)**
- **Appendix L, Draft Nonstructural Implementation Plan (19 pages)**
- **Public Comments (440 pages)**
- USACE guidance, *Civil Works Review* (EC 1165-2-214), December 15, 2012
- Office of Management and Budget, *Final Information Quality Bulletin for Peer Review*, December 16, 2004.

A.2 Review of Individual Comments

The Panel was instructed to address the charge questions/discussion points within a charge question response table provided by Battelle. At the end of the review period, the Panel produced 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. At the end of the review, Battelle summarized the individual comments in a preliminary list of 20 overall comments and discussion points. Each panel member's individual comments were shared with the full Panel in a merged individual comments table.

A.3 IEPR Panel Teleconference

Battelle facilitated a four-hour teleconference with the Panel so that the panel members 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 should 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 significant importance to the findings, and merged any related individual comments. At the conclusion of the teleconference, Battelle reviewed each Final Panel Comment with the Panel, including the associated level of significance, and confirmed the lead author for each comment.

The Panel also discussed responses to two specific charge questions where there appeared to be disagreement among panel members. The conflicting comments were resolved based on the professional

judgment of the Panel, and all sets of comments were determined not to be conflicting. Each comment was either incorporated into a Final Panel Comment, determined to be consistent with other Final Panel Comments already developed, or determined to be a non-significant issue.

At the end of these discussions, the Panel identified 19 comments and discussion points that should be brought forward as Final Panel Comments.

A.4 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 Revisions to the Southwest Coastal Louisiana Feasibility Study IEPR:

- **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 the other panel member 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/high, medium, medium/low, and 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 issue with the project that affects the current recommendation or justification of the project, and which will affect its future success, if the project moves forward without the issue being addressed. Comments rated as high indicate that the Panel determined that the current methods, models, and/or analyses contain a “showstopper” issue.
 2. **Medium/High:** Describes a potential fundamental issue with the project, which has not been evaluated at a level appropriate to this stage in the SMART Planning process. Comments rated as medium/high indicate that the Panel analyzed or assessed the methods, models,

and/or analyses available at this stage in the SMART Planning process and has determined that if the issue is not addressed, it could lead to a “showstopper” issue.

3. **Medium:** Describes an issue with the project, which does not align with the currently assessed level of risk assigned at this stage in the SMART Planning process. Comments rated as medium indicate that, based on the information provided, the Panel identified an issue that would raise the risk level if the issue is not appropriately addressed.
 4. **Medium/Low:** Affects the completeness of the report at this time in describing the project, but will not affect the recommendation or justification of the project. Comments rated as medium/low indicate that the Panel does not currently have sufficient information to analyze or assess the methods, models, or analyses.
 5. **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 that was mislabeled or incorrect or that certain data or report section(s) were not clearly described or presented.
- **Guidelines 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).

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. During the Final Panel Comment development process, the Panel determined that one of the Final Panel Comments could be merged into another Final Panel Comment; therefore, the total Final Panel Comment count was reduced to 18. At the end of this process, 18 Final Panel Comments were prepared and assembled. There was no direct communication between the Panel and USACE during the preparation of the Final Panel Comments. The Final Panel Comments are presented in the main report.

A.5 Conduct of the Public Comment Review

Battelle received multiple PDF files containing a total of approximately 440 pages of public comments on the Revisions to the Southwest Coastal Louisiana Feasibility Study from USACE on May 29, 2015. The public comments were provided to the Panel at the same time as the other review documents. One charge question was provided to the Panel to address the public comments:

- 1. Does information or concerns raised in the public comments raise any additional discipline-specific technical concerns with regard to the overall report?**

The Panel produced individual comments in response to the two charge questions. Battelle reviewed the comments to identify any new technical concerns that had not been previously identified during the initial IEPR. Upon review, Battelle determined and the Panel confirmed that no new issues or concerns were identified that warranted a separate Final Panel Comment; rather, the Panel was able to reference issues identified in the public comments in a few of the Final Panel Comments

APPENDIX B

Identification and Selection of IEPR Panel Members
for the Revisions to the Southwest Coastal Louisiana Feasibility Study

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B.1 Panel Identification

The panel members for the Revisions to the Southwest Coastal Louisiana Feasibility Study Independent External Peer Review (IEPR) had also conducted the original Southwest Coastal Louisiana IEPR (hereinafter, the original IEPR). During the recruitment phase of the original IEPR, those panel members were evaluated based on their technical expertise in the following key areas: Civil Works planning, economics, environmental/biology, and hydrology and hydraulic engineering. These areas correspond to the technical content of the Southwest Coastal Louisiana Draft IFR/EIS and overall scope of the Southwest Coastal Louisiana project.

Civil Works planning, economics, environmental/biology, and hydrology and hydraulic engineering are technical areas of expertise previously identified for the Louisiana Water Resources Council (LWRC, as defined in the Water Resources Development Act [WRDA] 2007, Section 7009) Primary Panel. Battelle consulted with the appropriate LWRC Primary Panel Members for these expertise areas (Dr. Ken Casavant, Dr. John Loomis, and Ms. Kay Crouch) and confirmed that their schedule commitments made them suitable to serve on the Panel (their expertise had been confirmed during the recruitment phase for the original IEPR). Dr. Brian Bledsoe had been recruited during the original IEPR from the LWRC Selected Pool. The fifth panel member from the original IEPR (Dr. Ralph Ellis) was not required for this IEPR of the revisions because USACE stated that no changes had been made to the civil/geotechnical engineering portion of the review documents.

The final Panel was composed of four expert reviewers. During the original IEPR, 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.

The candidates were rescreened 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.

- Previous and/or current involvement by you or your firm² in the Southwest Coastal Louisiana Feasibility Study or any project related to the Louisiana Coastal Protection and Restoration (LACPR) effort.

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 Includes any joint ventures in which a panel member's firm is involved and if the firm serves as a prime or as a subcontractor to a prime.

- Previous and/or current involvement by you or your firm³ in hurricane/storm damage risk reduction and coastal restoration studies or projects in Louisiana.
- Previous and/or current involvement by you or your firm³ in Southwest Coastal Louisiana Feasibility Study-related projects.
- Previous and/or current involvement by you or your firm³ in the conceptual or actual design, construction, or O&M of any Southwest Coastal Louisiana Feasibility Study-related projects or any project related to the Louisiana Coastal Protection and Restoration (LACPR) effort.
- Current employment by the U.S. Army Corps of Engineers (USACE).
- Previous and/or current involvement with paid or unpaid expert testimony related to the Southwest Coastal Louisiana Feasibility Study
- Previous and/or current employment or affiliation with the non-Federal sponsors (Louisiana Coastal Protection and Restoration Authority) or any of the following cooperating Federal, State, County, local, and regional agencies, environmental organizations, and interested groups: Louisiana Department of Natural Resources (for pay or pro bono).
- Past, current or future interests or involvements (financial or otherwise) by you, your spouse, or your children related to southern Louisiana, especially Calcasieu, Cameron, and Vermilion parishes.
- 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 New Orleans District.
- Previous or current involvement with the development or testing of models that will be used for or in support of the Southwest Coastal Louisiana Feasibility Study, which includes HMS, MIKE 11, and MIKE 21.
- Current firm³ involvement with other USACE projects, specifically those projects/contracts that are with the New Orleans District. If yes, provide title/description, dates, and location (USACE district, division, Headquarters, ERDC, etc.), and position/role. Please also clearly delineate the percentage of work you personally are currently conducting for the New Orleans District. Please explain.
- Any previous employment by USACE as a direct employee, notably if employment was with the New Orleans District. If yes, provide title/description, dates employed, and place of employment (district, division, Headquarters, ERDC, etc.), and position/role.
- Any previous employment by USACE as a contractor (either as an individual or through your firm³) within the last 10 years, notably if those projects/contracts are with the New Orleans 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 in hurricane/storm damage risk reduction and coastal restoration, and include the client/agency and duration of review (approximate dates).
- Pending, current, or future financial interests in Southwest Coastal Louisiana Feasibility Study-related contracts/awards from USACE.
- A significant portion (i.e., greater than 50%) of personal or firm³ revenues within the last 3 years came from USACE contracts.

- A significant portion (i.e., greater than 50%) of personal or firm³ revenues within the last 3 years from contracts with the non-Federal sponsor (Louisiana Coastal Protection and Restoration Authority).
- Any publicly documented statement (including, for example, advocating for or discouraging against) related to the Southwest Coastal Louisiana Feasibility Study or any project related to the Louisiana Coastal Protection and Restoration (LACPR) effort.
- Participation in relevant prior and/or current Federal studies relevant to the Southwest Coastal Louisiana Feasibility Study.
- Previous and/or current participation in prior non-Federal studies relevant to the Southwest Coastal Louisiana Feasibility Study.
- 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.

Other considerations:

- Participation in previous USACE technical review panels
- Other technical review panel experience.

B.2 Panel Selection

Battelle modified the subcontracts of four of the panel members who conducted the original IEPR. An overview of the credentials of the final four members of the Panel and their qualifications in relation to the technical evaluation criteria is presented in Table B-1. More detailed biographical information regarding each panel member and his or her area of technical expertise is presented in Section B.3.

Table B-1. Southwest Coastal Louisiana IEPR Panel: Technical Criteria and Areas of Expertise

Technical Criterion	Casavant	Loomis	Crouch	Bledsoe
Civil Works Planner				
Minimum 15 years of experience in water resource planning	X			
Experience identifying and evaluating measures and alternatives (using appropriate planning methodologies) to address hurricane storm damage risk reduction system and ecosystem restoration studies	X			
Familiarity with USACE economic evaluation techniques, including cost effectiveness-incremental cost analyses (CE/ICA) and procedures associated with identifying the National Ecosystem Restoration (NER) plan and National Economic Development (NED) plan	X			
Familiarity with evaluation of alternative plans for ecosystem restoration projects	X			
Familiarity with USACE plan formulation process, procedures, and standards	X			
Experience working for or with USACE	X			
B.S. degree or higher	X			
Economist				
Minimum 15 years of experience (or combined equivalent of education and experience) in economics		X		
Recognized expert in applied economics related to water resource economic evaluation (hurricane storm damage risk reduction and ecosystem restoration analyses) or review		X		
Experience working with risk-informed approaches to decision making, risk models, and disaster scenarios with regard to economic impact		X		
Minimum 2 years of experience working with the Hydrologic Engineering Center-Flood Damage Reduction Analysis (HEC-FDA) modeling software		X		
Minimum 2 years of experience reviewing Federal water resources economics documents justifying construction efforts		X		
Ability to evaluate the appropriateness of CE/ICA, as applied to dollar costs and ecosystem restoration benefits		X		

Table B-1. Southwest Coastal Louisiana IEPR Panel: Technical Criteria and Areas of Expertise (continued)

Technical Criterion	Casavant	Loomis	Crouch	Bledsoe
Familiarity with the USACE Institute for Water Resources (IWR) Planning Suite for CE/ICA		X		
Minimum 5 years of experience directly working for or with USACE		X		
M.S. degree or higher in economics		X		
Environmental/Biologist				
Minimum 15 years of experience working with National Environmental Policy Act (NEPA) impact assessments, including cumulative effects analyses, for complex multi-objective public works projects with competing tradeoffs			X	
Familiarity with the ecology and restoration of coastal wetlands and estuarine environments in the Gulf of Mexico			X	
Experience reviewing the application of Wetland Value Assessment (WVA) methodology			X	
Knowledge of the Endangered Species Act with regional knowledge of south Louisiana-specific regulatory requirements and Federal services regulations			X	
Active participation in related professional societies			X	
M.S. degree or higher in an appropriate field of study			X	
Hydrology/Hydraulics (H&H) Engineer				
Minimum 15 years of experience (or combined equivalent of education and experience) assessing hurricane storm damage risk reduction systems and ecosystem restoration projects				X
Direct H&H design or construction management experience with regard to:				
levees				X
floodwalls				X
retaining walls				X
pump stations				X
gate well structures				W ¹

Table B-1. Southwest Coastal Louisiana IEPR Panel: Technical Criteria and Areas of Expertise (continued)

Technical Criterion	Casavant	Loomis	Crouch	Bledsoe
utility penetrations				W ¹
stop log and sandbag gaps				X
interior drainage				X
drainage structures				X
Experience with engineering analyses related to wetland restoration in coastal areas and flood/coastal storm damage risk reduction with extensive background in coastal processes				X
Familiarity with standard USACE H&H computer models				X
Minimum 5 years of experience working with numerical modeling applications for storm surge and wave analysis modeling and interior hydraulic modeling				X
Familiarity with USACE applications of risk and uncertainty analysis in hurricane storm damage risk reduction studies				X
Active participation in related professional societies				X
M.S. degree or higher in civil engineering or H&H				X
Registered Professional Engineer (P.E.)				X

¹ Waiver statement presented as part of Task 2 deliverable and approved by USACE.

B.3 Panel Member Qualifications

Ken Casavant, Ph.D.

Role: Civil Works planning expertise.

Affiliation: Independent Consultant

Dr. Casavant, an independent consultant, is a professor and agricultural economist at the School of Economic Sciences at Washington State University, Director of the Freight Policy Transportation Institute, and, since 2002, an adjunct professor at North Dakota State's Upper Great Plains Transportation Institute. He earned his Ph.D. in agricultural economics from Washington State University in 1971. He has 46 years of experience as an economist, with expertise in transportation economics and water resource planning. He has served as an economic consultant detailing the tradeoffs necessary on several public works projects, most recently on studies of the deep draft national and international maritime industry.

Dr. Casavant has over 16 years of experience in plan formulation, evaluating and comparing alternative plans for numerous ecosystem restoration projects, navigation studies, and feasibility studies. This experience includes technical reviews of the Lower Columbia River Channel Deepening Project, the Delaware River Main Channel Deepening Project, the Upper Mississippi and Illinois Navigation Study, the Sabine-Neches Waterway Channel Improvement Project Study, the Barataria Basin Barrier Shoreline Restoration Study, and the Mississippi River Gulf Outlet Ecosystem Restoration Plan. Many of his reviews (for example, the Donaldsonville to the Gulf and West Shore Lake Pontchartrain projects) have included the assessment and sensitivity analyses of hurricane and coastal storm damage risk reduction. Many of these projects looked directly at the impact of alternative plan formulation on NED accounts and/or NER, using benefit/cost analysis for the NED and benefits analysis for the NER efforts.

Over the last nine years, Dr. Casavant's work on more than 15 USACE projects has familiarized him with a detailed and complete inventory of the USACE standards and procedures, including the IWR Planning Suite methodologies, with a focus on ecological output per dollar of relevant expenditure for alternative project formulations. His experience with the USACE six-step planning process, which is governed by Engineer Regulation 1105-2-100, Planning Guidance Notebook, has been established from his work as a technical reviewer and peer reviewer on more than 20 USACE projects involving shoreline restoration, flood damage risk management, hurricane protection, hydrologic diversion, and lock operations. These include the Port of Iberia Channel Deepening Project in 2006. In this work, as in others, cost effectiveness has often been a vehicle for analysis; in several studies, cost effectiveness was combined with incremental cost analysis (CE/ICA) tools to refine Tentatively Selected Plans and mitigation plan structuring. He was a team member on the USACE-directed project developing the "External Independent Economic Opinion on Identifying and Measuring NED Benefits: Navigation Shipping in 2007".

Dr. Casavant has experience identifying and evaluating impacts on environmental resources from structural flood risk and impacts related to hurricane and coastal storm damage risk reduction projects. The six most recent projects he has contributed to had critical components concerning the impacts on environmental resources from flood risk and coastal storm damage. He has also been a plan formulation expert on seven separate IEPRs; of these, several projects had a specific objective to evaluate the damage reduction and the risk associated with achieving benefits of the flood risk management, and one project focused specifically on the impact on shorelines.

Dr. Casavant has published more than 70 journal articles and has contributed to hundreds of other publications. He is a member of numerous professional associations, including the Transportation Research Board - National Research Council, the International Agricultural Economics Association, and the Logistics and Physical Distribution Association.

John Loomis, Ph.D.

Role: Economics expertise.

Affiliation: Colorado State University

Dr. Loomis is an independent consultant and professor of economics in the Department of Agricultural and Resource Economics at Colorado State University (CSU). He earned his Ph.D. in economics from CSU in 1983. He has taught courses in economics at the University of California-Davis and CSU since 1985, and has conducted economic water resource evaluations for over 26 years. He has served as economics reviewer for such studies as the Lower Colorado River Authority and San Antonio Water System, Texas, transbasin water public project and has provided research and consulting services to numerous Federal and state agencies.

Dr. Loomis is a recognized expert in applied economics related to water resource economic evaluation. He has published more than a dozen journal articles on water resource economics in various journals and has written several journal articles dealing specifically with economic valuation of ecosystem restoration. One such article, published in the journal *Ecological Economics*, has been cited hundreds of times as an example of how to conduct such analyses. He has also completed a book manuscript titled *Determining the Economic Value of Water* (2nd edition) due to be published in 2014. He recently served as the IEPR economics panel member for several hurricane storm damage risk reduction projects in USACE's New Orleans District (Donaldsonville to the Gulf, Morganza to the Gulf, West Shore Lake Pontchartrain), demonstrating in-depth experience in NED evaluation of hurricane storm damage risk reduction to structures, contents, and infrastructure.

Dr. Loomis has experience working with risk-informed approaches to decision-making, risk models, and disaster scenarios with regard to economic impact. He recently served as the economist on an IEPR for the New Orleans District's first SMART (Specific, Measurable, Attainable, Risk Informed, Timely) planning process. He has published articles on economic valuation of risk reduction in journals such as *Land Economics* and *Journal of Environmental Management* and is very familiar with risk-informed decision-making and risk models such as Monte Carlo. Dr. Loomis also has working knowledge of the Hydrologic Engineering Center-Flood Damage Reduction Analysis (HEC-FDA) modeling software and other USACE computer programs such as content-to-structure value ratios. He demonstrated this experience during his recent peer review work on the Donaldsonville to the Gulf, Morganza to the Gulf, and Surf City (North Carolina) IEPRs.

Dr. Loomis is familiar with the review of Federal water resources economic documents justifying construction efforts, and has demonstrated experience in NED analysis procedures related to flood risk management, coastal storm damage reduction, and economic benefit calculations. Since 2010, he has served as the economics expert on IEPRs for USACE's New Orleans and Chicago Districts reviewing NED benefit-cost analyses of construction projects. He also has taught courses in water resources economic analysis, which included benefit-cost analysis using NED; his graduate-level water resource economics course at CSU includes NED benefit calculations (benefit-cost ratios, net present value, and discounting). In addition, Dr. Loomis is able to evaluate the appropriateness of CE/ICA as applied to

dollar costs and ecosystem restoration benefits and is familiar with the IWR-Planning Suite, USACE's tool for CE/ICA.

Dr. Loomis has long-standing, direct experience working with USACE and is familiar with USACE planning process, guidance, and economic evaluation techniques. His experience working on NED analyses on water resource economics projects began in the early 1980s, when, as an economics instructor at the U.S. Fish and Wildlife Service, he developed training courses that were offered nationwide to USACE Waterways Experiment Station (WES) employees. In that capacity, he worked closely with USACE-WES economists to train employees on NED procedures as presented in the U.S. Water Resources Council's *Economic and Environmental Principles and Guidelines*. From 1998 to 2001, as a USACE contractor, he evaluated the economics of reoperation versus removal of dams in the Lower Snake River system; his analysis was used in USACE's feasibility study and environmental impact statement.

Dr. Loomis has served as associate editor for the journal *Water Resources Research*. He is currently associate editor for the *American Journal of Agricultural Economics* and co-editor of the Association of Environmental and Resource Economists newsletter. He also has served as an elected officer for the Association of Environmental and Resource Economists.

Kay Crouch

Role: Biology/ecology expertise.

Affiliation: Crouch Environmental Services, Inc.

Ms. Crouch is president of Crouch Environmental Services, Inc., specializing in NEPA analysis, environmental site assessment, permitting, and mitigation for projects with high public and interagency interests. She earned her M.S. in biology/aquatic ecology in 1978 from Steven F. Austin State University, and has received additional academic training in the NEPA process from the Duke University Nicholas School of Environmental and Earth Sciences (2004-05). Ms. Crouch has 26 years of nationwide experience in conducting environmental site assessments and NEPA impact assessments for complex multi-objective public works projects with competing tradeoffs. She has performed numerous environmental evaluations throughout the coastal ecosystems of Louisiana and Texas in support of Federal Energy Regulatory Commission filings and NEPA documentation. She has also performed numerous IEPRs, including the Mississippi River Gulf Outlet, Center Hill Dam, Barataria Basin Barrier Shoreline, New Orleans to Venice (levee), and Morganza to the Gulf Hurricane Protection projects.

For the first 10 years of her consulting career, Ms. Crouch worked predominantly in Louisiana performing NEPA analyses for oil and gas pipelines crossing the Louisiana Coastal Zone. She has prepared over 100 NEPA documents since 1978. Ms. Crouch has experience working with NEPA impact assessment in marsh and urban areas and related ecosystem species and habitats. She has performed extensive analyses on the coastal marsh habitats that span the Gulf Coast. She has experience in high and low tidal marsh restoration and evaluation, as well as inland wetlands. Additionally, she has worked on projects in Louisiana involving evaluation of chenieres and inland swamps. In the mid-1990s, Crouch Environmental Services Inc. designed and constructed the Baytown Nature Center, Texas, a large

coastal marsh creation project for which the company received the 1998 Award of Excellence from the National Association of Landscape Architects.

Ms. Crouch is familiar with USACE calculations of environmental benefits and routinely performs cumulative effects analyses on high-visibility public works projects as part of her extensive NEPA practice. She has experience reviewing the application of Wetland Value Assessment (WVA) methodology and has calculated the environmental losses and benefits of USACE projects using the hydrogeomorphic approach (HGM), habitat evaluation procedures (HEP), and WVA, as well as other models. Most recently, she performed WVA analysis for the Addicks and Barker Dams environmental assessment in Harris County, Texas, for the Galveston District. She also has served as an environmental expert for previous IEPRs of USACE projects. She has more than 35 years of experience applying and analyzing species and habitats under the Endangered Species Act, including specific experience in Louisiana. This work has included state-listed species in the Louisiana coastal zone. Ms. Crouch is a member of the Society of Wetland Scientists.

Brian Bledsoe, P.E., Ph.D.

Role: Hydrology/hydraulics engineer expertise.

Affiliation: Independent Consultant

Dr. Bledsoe, an independent consultant, is currently a Professor of Civil and Environmental Engineering at Colorado State University (CSU). He earned his Ph.D. in civil engineering and river mechanics from CSU in 1999 and is a registered professional engineer (P.E.) in Colorado and North Carolina. He is a registered P.E. in North Carolina and Colorado. Dr. Bledsoe has 27 years of experience as an engineer and environmental scientist in academia and in the public and private sectors. He has conducted engineering analyses and wetland restoration-related research in coastal areas since 1991. His research and teaching interests are focused on the interface between hydraulic engineering and ecology with an emphasis on the development of effective and ecologically based stream, river, wetland, and watershed restoration practices. Prior to joining CSU, Dr. Bledsoe served as a wetland restoration specialist for the North Carolina Department of Environment and Natural Resources' (NCDENR) Divisions of Coastal Management and Water Quality. In that capacity, he conducted research on the hydrology, hydraulics, water quality, and ecology of wetlands to determine design criteria for wetland/riparian restoration projects. He later served as the state's lead engineer in the development, implementation, and retrofitting of best management practices and ecosystem rehabilitation measures designed to restore water quality to impaired water bodies, including the Albemarle-Pamlico estuary. While with NCDENR, Dr. Bledsoe conducted engineering analyses related to flood and coastal storm damage reduction.

Through nearly two decades of experience teaching H&H design, modeling various types of flood mitigation structures, and conducting peer review and consulting work, Dr. Bledsoe has gained design experience with levees, floodwalls, retaining walls, pump stations, stop log and sandbag gaps, interior drainage, and other drainage structures. He is very familiar with HEC- RAS, HEC-2, HEC-1, HEC-6T, and HEC-Hydrologic Modeling System (HEC-HMS). He is also familiar with RMA-2, SBEACH, STWAVE, and GENESIS as well as various TABS hydrodynamic models. Dr. Bledsoe has taught HEC-RAS short courses at CSU and introduces several of these models in the engineering courses he teaches. He also has taught short courses for the Colorado Association of Stormwater and Floodplain managers on non-structural measures and ecosystem restoration. He has experience with large complex Civil Works projects, having worked on the New Bern Bypass project (North Carolina Department of Transportation); the Potash Corp. of Saskatchewan Phosphate Mine Expansion (Edward, North Carolina); and the

Northern Integrated Supply Project (Larimer County, Colorado). In addition, he was selected to participate in the IEPRs for the Biscayne Bay Coastal Wetlands Project Implementation Report and the Amite River Diversion Canal Modification Study. He is familiar with USACE risk and uncertainty applications through his consulting experience, academic training in risk analysis, and peer review activities.

Dr. Bledsoe's M.S. research at North Carolina State University focused on coastal wetland ecology and hydrology; since then, he has authored more than 100 publications related to wetlands, stream and watershed processes, restoration, and water quality. He is a member of the American Society of Civil Engineers and the American Geophysical Union.

APPENDIX C

Final Charge to the IEPR for the
Revisions to the Southwest Coastal
Louisiana Feasibility Study

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CHARGE QUESTIONS AND GUIDANCE TO THE PANEL MEMBERS FOR THE IEPR OF THE REVISIONS TO THE SOUTHWEST COASTAL LOUISIANA FEASIBILITY STUDY

BACKGROUND

The purpose of this Feasibility Study is to develop an integrated plan for hurricane/storm damage risk reduction and coastal restoration for the southwest Louisiana parishes of Cameron, Calcasieu, and Vermilion. The document requires a Chief of Engineers Report and Congressional authorization. An integrated Environmental Impact Statement (EIS) will be prepared along with the document. The study area is located in the southwest corner of Louisiana. It covers over 4,700 square miles and consists of three parishes (Calcasieu, Cameron, and Vermilion) and three major hydrologic basins (Calcasieu/Sabine, Mermentau, and Teche/Vermilion). The dominant hydrologic features are the Calcasieu, Sabine, Neches, Mermentau and Vermilion rivers, as well as Calcasieu, Sabine, Grand, and White lakes. Man-made channels include the Sabine-Neches Waterway, Calcasieu Ship Channel, Gulf Intracoastal Waterway (GIWW), Mermentau Ship Channel, and Freshwater Bayou Canal Navigational Channel. Various water control structures in the area include the Calcasieu and Leland Bowman Locks, the Freshwater Bayou Canal Lock, the Schooner Bayou Canal Structure, and the Catfish Point Control Structure. The Gulf of Mexico coastline is another major water resource of the area. The major highways are LA Highway 82 and LA Highway 27. The Coastal Protection and Restoration Authority of Louisiana is the non-Federal sponsor. The estimated cost for a potentially recommended plan could range from the hundreds of millions to several billion dollars.

This multi-purpose study has the potential to significantly affect national economic, environmental, and social interests, simply due to the study area location. The study area is part of one of the largest expanses of coastal wetlands in the contiguous United States and is significant on a National level.

The Southwest Coastal Louisiana Feasibility Report has been conducted to meet the USACE modernized planning initiative, which is to complete investigations leading to a decision in less time by utilizing a risk-informed evaluation with less detailed information.

This new process has not been business as usual and has required heavy involvement as well as input and decisions from the Vertical Team at multiple points throughout the study. Instead of following the traditional USACE planning milestones, the study has been divided into phases, each with key milestones and associated In-Progress Reviews (IPR). A risk register and other risk management documentation will accompany the feasibility study decision document. Although one of the objectives of IEPR is to evaluate whether sufficient information was available or technical analyses were completed, the IEPR must be completed within the context of the risk-informed decision-making process.

OBJECTIVES

The objective of this work is to conduct an independent external peer review (IEPR) of the Southwest Coastal Louisiana Feasibility Study (hereinafter: Southwest Coastal Louisiana IEPR) in accordance with the Department of the Army, U.S. Army Corps of Engineers (USACE), Water Resources Policies and Authorities' *Civil Works Review* (Engineer Circular [EC] 1165-2-214, dated December 15, 2012), and the

Office of Management and Budget's *Final Information Quality Bulletin for Peer Review* (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 1165-2-214; p. D-4) for the Southwest Coastal Louisiana 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 Civil Works planning, economic, environment/biology, and hydrology and hydraulic engineering issues relevant to the project. They will also have experience applying their subject matter expertise to coastal storm 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 1165-2-214, 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 is a list of documents, supporting information, and reference materials that will be provided for the review.

Documents for Review

The following documents are to be reviewed by designated discipline:

Title	Approx. No. of Pages	Required Disciplines
Draft Integrated Report and EIS (specifically the Executive Summary and Chapters 2, 3 and 4)	95	All Disciplines
Appendix A and Annexes A-W	550	Environmental/Biology
Appendix D, Economics	79	Economics
Appendix E, Real Estate Plan	64	Economics; Civil Works Planning
Appendix J, Comments on First Draft	17	All Disciplines
Appendix K, NER Fact Sheets	58	All Disciplines
Appendix L, Draft Nonstructural Implementation Plan	19	All Disciplines
Public Comments	440	All Disciplines
Total Page Count		1,322

Supporting Information

- Draft Integrated Report and EIS (specifically Chapters 1, 5, and 6)
- Appendix B, Engineering
- Appendix C, Plan Formulation
- Appendix F, References
- Appendix G, Index
- Appendix H, List of Preparers
- Appendix I, Agencies, Organizations, etc.
- Appendix M, Initial Southwest Coastal Louisiana Draft Report and EIS
- Original Final IEPR Report From First Review
- Risk Register

Documents for Reference

- USACE guidance *Civil Works Review*, (EC 1165-2-214, December 15, 2012)
- Office of Management and Budget's *Final Information Quality Bulletin for Peer Review* (December 16, 2004)

SCHEDULE

This schedule is based on the May 29, 2015, receipt of the final review documents. Note that dates presented in the schedule below could change due to panel member and USACE availability.

Task	Action	Due Date
Conduct Peer Review	Battelle sends review documents to panel members	6/3/2015
	Battelle convenes kick-off meeting with panel members	6/8/2015
	Battelle convenes kick-off meeting with USACE and panel members	6/8/2015
	Battelle convenes mid-review teleconference for panel members to ask clarifying questions of USACE	6/15/2015
	Panel members complete their individual reviews	6/16/2015
Prepare Final Panel Comments and Final IEPR Report	Battelle provides panel members with talking points for Panel Review Teleconference	6/18/2015
	Battelle convenes Panel Review Teleconference	6/18/2015
	Battelle provides Final Panel Comment templates and instructions to panel members	6/18/2015
	Panel members provide draft Final Panel Comments to Battelle	6/25/2015
	Battelle provides feedback to panel members on draft Final Panel Comments; panel members revise Final Panel Comments	6/25/2015 - 7/06/2015
	Panel finalizes Final Panel Comments	7/6/2015
	Battelle provides Final IEPR Report to panel members for review	7/7/2015
	Panel members provide comments on Final IEPR Report	7/9/2015
	Battelle submits Final IEPR Report to USACE*	7/13/2015
	USACE PCX Provides Decision on Final IEPR Report Acceptance	7/20/2015
Comment/Response Process	Battelle inputs Final Panel Comments to DrChecks and provides Final Panel Comment response template to USACE	7/14/2015
	USACE Project Delivery Team (PDT) provides draft Evaluator Responses to USACE Planning Center of Expertise (PCX) for review	7/30/2015
	USACE PCX reviews draft Evaluator Responses and works with USACE PDT regarding clarifications to responses, if needed	8/5/2015
	USACE PCX provides draft PDT Evaluator Responses to Battelle	8/6/2015
	Battelle provides the panel members the draft PDT Evaluator Responses	8/7/2015
	Panel members provide Battelle with draft BackCheck Responses	8/13/2015
	Battelle convenes teleconference with panel members to discuss draft BackCheck Responses	8/18/2015

	Battelle convenes Comment-Response Teleconference with panel members and USACE	8/20/2015
	USACE inputs final PDT Evaluator Responses to DrChecks	8/27/2015
	Battelle provides final PDT Evaluator Responses to panel members	8/31/2015
	Panel members provide Battelle with final BackCheck Responses	9/3/2015
	Battelle inputs the panel members' final BackCheck Responses to DrChecks	9/11/2015
	*Battelle submits pdf printout of DrChecks project file	5/21/2015
Civil Works Review Board (CWRB)	Panel prepares and/or reviews slides for CWRB	TBD
	Civil Works Review Board	12/8/2015

* Deliverables

CHARGE FOR PEER REVIEW

Members of this IEPR Panel are asked to determine whether the technical approach and scientific rationale presented in the Southwest Coastal Louisiana documents are credible and whether the conclusions are valid. The Panel is asked to determine whether the technical work is adequate, competently performed, and 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 Southwest Coastal Louisiana 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 1165-2-214; 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 Agency Technical Review (ATR).
2. Please contact the Battelle Project Manager (Corey Wisneski, wisneskic@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 Corey Wisneski, wisneskic@battelle.org, no later than June 16, 2015, 10 pm ET.

Independent External Peer Review
of the
Southwest Coastal Louisiana Feasibility Study
Charge Questions and Relevant Sections as Supplied by USACE

General Questions

1. Within the context of risk-informed decision-making, to what extent has it been shown that the project is technically sound?
2. Are the assumptions that underlie the engineering, and environmental analyses sound?
3. Within the context of risk-informed decision-making, are the engineering, and environmental methods, models and analyses used adequate and acceptable?
4. Were all models used in the analyses used in an appropriate manner with assumptions appropriately documented and explained?
5. Were risk and uncertainty sufficiently considered?
6. Was the process used to select the recommended alternatives rational and was the process implemented in a reasonable manner given the project constraints?
7. Does the environmental impact statement satisfy the requirements of National Environmental Policy Act (NEPA)? Were adequate considerations given to significant resources by the project?
8. Assess the recommended alternatives from the perspective of systems. They should also include systemic aspects being considered from a temporal perspective, including the potential effects of climate change.
9. In your opinion, are there sufficient analyses upon which to base the recommendation for the TSPs?
10. Is the significance of the sought ecological resources clearly determined by institutionalized national goals (e.g., the ESA national goal to sustain native fish and wildlife, the NEPA goal to preserve natural heritage)?
11. Do planning models and procedures adequately consider and provide for limiting factors beyond quality and quantity of habitat?
12. Is it clear that the restored ecological resource quality will be sustainable over the long run?
13. Are the risks facing successful restoration of sustainable ecological resource quality clearly shown to be managed and any residual risks identified in terms of: sufficient geophysical support (hydrology and geomorphology), sufficient environmental chemistry, sufficient biological support (e.g., food, habitat and systems-stabilizing species), and changes in climate and in the influential ecoregion (e.g., major land use changes).

14. Are the required long-term commitments (both Federal and non-Federal) to sustaining the restored ecological resource quality adequately described and adequately demonstrated?

Safety Assurance Review Questions

15. Have the appropriate alternatives been considered and adequately described for this project and do they appear reasonable?
16. Within the context of risk-informed decision-making, do the project features adequately address redundancy, resiliency, or robustness with an emphasis on interfaces between structures, materials, members, and project phases?
17. Have the hazards that affect the structures been adequately documented and described?
18. Are the models used to assess hazards appropriate?
19. Are the assumptions made for the impacts appropriately documented and explained in the report documentation?
20. Is there sufficient information presented to identify, explain, and comment on the assumptions that underlie the engineering analyses for the alternatives?
21. From a public safety perspective, are the proposed alternatives reasonably appropriate or are there other alternatives that should be considered?
22. Has anything significant been overlooked in the development of the assessment of the project or the alternatives?
23. Do the alternatives and their associated costs appear reasonable? Do the benefits and consequences appear reasonable?

SPECIFIC QUESTIONS

Objectives

24. Is the purpose of the project adequately defined? If not, why?
25. Has the project need been clearly described?
26. Have the public concerns been identified and adequately described?
27. Are the specific objectives adequately described?

Problems/Opportunities

28. 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)?
29. Comment on whether the stated problems and opportunities embrace all of the key elements that need to be taken into account in the project. If not, what should be added?

Alternatives

30. Have the criteria to eliminate plans from further study been clearly described?
31. Are the design, environmental, and construction considerations outlined for the tentatively selected plans appropriate and adequate?
32. Are the general characteristics of the dredged and fill material accurate and adequately described?
33. Have the operations and maintenance considerations of the tentatively selected plans been addressed?
34. Was a reasonably complete array of possible structural and non-structural measures considered in the development of alternatives for the NED plan?
35. Is each of the different alternative plans clearly described?
36. Were the assumptions made for use in developing the future with-project conditions for each alternative reasonable? Were adequate scenarios considered? Were the assumptions reasonably consistent across the range of alternatives and/or adequately justified where different?
37. Are the changes between the without- and with-project conditions adequately described for each alternative?
38. Have comparative impacts been clearly and adequately described?
39. Please comment on the likelihood that the recommended alternatives will achieve the expected outputs.
40. Are residual risks adequately described and is there a sufficient plan for communicating the residual risk to affected populations?
41. Are the ecosystem output models reasonable and appropriate for evaluating project benefits/impacts?
42. Do the plans adequately address all real estate interests (public and private) and requirements allowing for appropriate comparisons across all alternatives?
43. Are the proposed actions/solutions for addressing the potential issues surrounding privately owned lands adequate?

Monitoring Plan and Adaptive Management

44. Are the performance measures, desired outcomes, and monitoring designs for each of the project objectives sufficiently detailed?

Affected Environment

45. Is the general description of the proposed project area accurate and comprehensive?
46. Does the description of existing conditions provide for a sufficient understanding of all affected resources in the study area?

47. Is the hydrology discussion sufficient to allow for an evaluation of the effects of implementation of the proposed plan compared to current baseline conditions?
48. Is the discussion on the relationship between flow and water levels and the hydrodynamics of the project area complete?
49. Is the description of the historical and existing socioeconomic resources in the study area complete and accurate?

Environmental Consequences

50. Are the scope and detail of the potential adverse effects to significant resources that may arise as a result of project implementation sufficiently described and supported?
51. Have the short- and long-term impacts associated with the alternatives been adequately discussed and evaluated?
52. To what extent have the potential impacts of the alternatives on cultural resources been addressed and supported?
53. Based on your experience with similar projects, has adequate public, stakeholder, and agency involvement occurred to determine all issues of interest and to ensure that the issues have been adequately addressed to the satisfaction of those interested parties? Should additional public outreach and coordination activities be conducted?

Cumulative Impacts

54. Are cumulative impacts adequately described and discussed? If not, please explain.

Civil Design

55. Have the design and engineering considerations been clearly outlined and will they achieve the project objectives?
56. 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?
57. Were the data surveys conducted to evaluate the existing environmental and natural resources adequate? If not, what types of surveys should have been conducted?
58. Was the ADCIRC model used in an appropriate and technically sound manner? If not, explain.
59. Are any additional design assumptions necessary to validate the preliminary design of the primary project components?

Real Estate Plan

60. Comment on the extent to which assumptions and data sources used in the economics analyses are clearly identified and the assumptions are justified and reasonable.
61. Does the Real Estate Plan adequately address all real estate interests (public and private)?

Economics Appendix

62. Were the benefit categories used in the economic analysis adequate to calculate a benefit-to-cost ratio for each of the project alternatives?
63. To what extent are the input parameters, methods, models and analyses used in the study methodology as documented in the Economics Appendix appropriate and consistent with current best management practices?
64. Were the methods to calculate structure and content values appropriate and adequately described?
65. Was the methodology to assess storm damages, and storm damage reduction appropriate and adequately described?
66. Has the report adequately addressed the issue of repetitive flood damages and the subsequent extent of rebuild/repair by property owners as relates to annual damage estimation and have scenarios identified in the report adequately addressed the range of impact to project justification?
67. Were risk and uncertainty sufficiently considered in relation to the future development process?

Environmental Appendix

68. Is the biological assessment of aquatic and terrestrial resources in the project area complete and accurate?

FINAL OVERVIEW QUESTIONS

69. 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?
70. Please identify the most critical concerns (up to five) you have with the project and/or review documents. These concerns can be (but do not need to be) new ideas or issues that have not been raised previously.
71. Please provide positive feedback on the project and/or review documents.

Public Comment Question

72. Does information or do concerns raised by the public raise any additional discipline-specific technical concerns with regard to the overall report?

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