

Final Independent External Peer Review Report 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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Executive Summary

PROJECT BACKGROUND AND PURPOSE

The purpose of the Southwest Coastal Louisiana Draft Integrated Feasibility Report and Programmatic Environmental Impact Statement (Draft IFR/PEIS) 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/PEIS 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. USACE is conducting an Independent External Peer Review (IEPR) of the Southwest Coastal Louisiana Draft IFR/PEIS (hereinafter Southwest Coastal Louisiana IEPR). Battelle has experience in establishing and administering peer review panels for the U.S. Army Corps of Engineers (USACE) and was engaged to coordinate the IEPR of the Southwest Coastal Louisiana Draft IFR/PEIS. As a 501(c)(3) non-profit science and technology organization, Battelle is independent, is free from conflicts of interest (COIs), and meets the requirements for an Outside Eligible Organization (OEO) per guidance described in USACE (2012). 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.

Based on the technical content of the Southwest Coastal Louisiana review documents and the overall scope of the project, Battelle identified candidates for the Panel in the following key technical areas: Civil Works planning, economics, environmental/biology, hydrology and hydraulic engineering, and civil/geotechnical engineering. All five technical areas 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 selected four experts for the Panel (Dr. Ken Casavant, Dr. John Loomis, Dr. Ralph Ellis, and Ms. Kay Crouch) from the LWRC Primary Panel. The fifth panel member, Dr. Brian Bledsoe, was chosen from the LWRC Selected Pool Members.

The Panel received an electronic version of the 939 pages of Southwest Coastal Louisiana review documents, along with a charge that solicited comments on specific sections of the Southwest Coastal Louisiana Draft IFR/PEIS. In addition, approximately 303 pages of public comments were provided to the Panel for review. USACE prepared the charge questions following guidance provided in USACE (2012) and OMB (2004), which were included in the draft and final Work Plans.

The USACE Project Delivery Team (PDT) briefed the Panel and Battelle during a kick-off meeting held via teleconference prior to the start of the review 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 Southwest Coastal Louisiana Draft IFR/PEIS 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, 14 Final Panel Comments were identified and documented. Of these, two were identified as having medium/high significance, five had medium significance, five had medium/low significance, and two had low significance.

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 Southwest Coastal Louisiana Draft IFR/PEIS. 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 Draft IFR/PEIS is well written, organized, and provides an excellent presentation and support of information through the use of photographs, maps, diagrams, tables, and appendices. The Executive Summary is clear and focused and effectively summarizes the planning and decision-making process for the project. While the Draft IFR/PEIS adequately assessed the economic, engineering, and environmental issues of the Southwest Coastal Louisiana project, the Panel identified several elements of the report that should be clarified or revised.

Civil Works Planning: The plan formulation is structured, explained, and documented well, producing a National Economic Development (NED) and National Ecosystem Restoration (NER) Tentatively Selected Plan (TSP) that is logical and defensible. Model usage and analysis (particularly concerning the benefit/cost analysis and the cost effectiveness and incremental cost analysis) are consistent with USACE's Principles and Guidelines. In addition, previous studies and projects are used efficiently to generate some assumptions needed for model application. However, the Panel believes that this sourcing of assumptions and coefficients is incomplete and the Draft IFR/PEIS would benefit from a more in-depth discussion, particularly on how the assumptions or coefficients were developed. One of the most important findings from the Panel concerns the assumption of 100% homeowner compliance with non-structural measures is not supported with data from surveys, studies, or local agencies. This key issue could be resolved by obtaining data from past projects or consulting compliance experts to develop a data-driven estimate of past participation in similar voluntary activities in the area. Finally, from the Panel's review of the public comments, a key finding was that the Benefit Cost Analysis appears to have not considered Henry Hub, future growth, and the Biggert Waters Act in the NED benefits. In addition, the Benefits Cost Analysis did not consider less expensive gate designs and mitigation costs in the NED cost. Both of these omissions would potentially result in underestimating the benefit cost ratios of structural measures and therefore potentially omitting economically feasible structural measures.

Economics: The NED economic analysis is very well laid out with thorough and comprehensive application of the NED analysis to each of the 90 non-structural reaches. The NER cost effectiveness/incremental cost analysis was also done well. One of the Panel's economics-related concerns includes that the NED analysis did not account for future development in the area, despite the fact that the Economics Appendix forecasted future growth. By reanalyzing the Louisiana Highway Armoring and Abbeville Levee measures incorporating future development and carrying these alternatives forward into the Focused Array of NED Alternatives, this issue might be resolved. In addition, there was little discussion in the Draft IFR/PEIS about residual risk to affected populations and how this might be communicated to the public. This is especially important because of the voluntary nature of the NED TSP's non-structural measures; commercial facilities and residential structures that the owners decide not to raise or flood proof might have residual risk. USACE could resolve this issue by including a discussion of residual risk associated with the NED TSP plan that includes public health/safety, critical infrastructure, and evacuation capability. In addition, the future operation, maintenance, repair, replacement, and rehabilitation (OMRR&R) costs are not described in enough detail for the Panel to assess their reasonableness.

Environmental/Biology: The Panel found that the environmental issues are clearly addressed in the Draft IFR/PEIS and all of the required National Environmental Policy Act (NEPA) topics are discussed appropriately. Aside from the concern about the 100% compliance with voluntary non-structural measures and the lack of discussion about residual risk (which all panel members identified as concerns), the Panel believes that the report's completeness would be improved if evidence were included that the non-Federal sponsor is committed in the long term to providing funds to implement the project. In addition, the Draft IFR/PEIS would benefit from a discussion of the Wetland Value Assessment (WVA) assumptions, specifically how the effects of salinity and hydrology control measures were evaluated in WVAs. Finally, the Panel found that the risk and uncertainty associated with the NER plan are not discussed in enough detail and the report would be improved if further information were included.

Hydrology/Hydraulics Engineering: Based on the hydrology and hydraulics (H&H) information provided in the Draft IFR/PEIS, the Panel found that USACE seemed to select the appropriate alternative and the

narrative clearly steered the reader through the process of arriving at that TSP. Given the level-of-detail constraints mandated by SMART planning, the Southwest Coastal Louisiana Feasibility Study does a good job compiling a large amount of information and presenting it in a concise format. However, of primary concern to the Panel was that the H&H methods and assumptions are not documented clearly enough, particularly with regard to how the combined effects of inland flooding and storm surge may have been addressed. In addition, the State Master Plan models that were used to determine the benefits and other effects of the alternatives may have too coarse a resolution to assess accurately the hydrology and salinity (H&S) controls; the report would benefit from a risk and uncertainty discussion associated with H&S control feature modeling. The Draft IFR/PEIS would also be improved by a discussion of the implications of climate non-stationarity and relative sea level rise on the performance of the non-structural measures and the H&S features.

Civil/Geotechnical Engineering: From a civil/geotechnical engineering point of view, the Draft IFR/PEIS is sound and a good example of the efficiency afforded by the SMART planning process. While the risk assessment and analyses were done well, the report would be improved by including some of that risk information. In addition, with regard to public safety, the Draft IFR/PEIS does not clearly describe whether the proposed alternatives are appropriate to protect human life and public safety, and what the evacuation capabilities would be. The Panel also recommends that some discussion be included on the potential for increased erosion and sediment transport disruption from offshore segmented breakwaters.

Table ES-1. Overview of 14 Final Panel Comments Identified by the Southwest Coastal Louisiana IEPR Panel

No.	Final Panel Comment
Medium/High Priority	
1	It is unclear how the potential combined effects of storm surge and inland rainfall/flooding are accounted for in hydrologic and hydraulic modeling of the National Economic Development plan.
2	The Benefit Cost Analysis appears to have not considered Henry Hub, future growth, and the Biggert Waters Act in the NED benefits, and less expensive gate designs and mitigation costs in the NED cost.
Medium Priority	
3	The effects of the hydrologic and salinity controls are highly uncertain and their inclusion in the TSP is not fully justified.
4	The NED TSP assumption that 100% of homeowners will comply with the non-structural measures in the program is not supported with data.
5	The risks and uncertainties associated with climate non-stationarity are not sufficiently considered to describe a plausible range of future with-project conditions.
6	The assumptions of the high and low commercial navigation delay costs are not supported completely and the impact of these costs on the TSP is not identified.

No.	Final Panel Comment
7	Evidence of long-term commitments from USACE and the non-Federal sponsor to maintain the restored ecological resource quality is not presented.
Medium/Low Priority	
8	The NED analysis does not include future development even though the Economics Appendix forecasts future growth in the study area.
9	The hydraulic and hydrologic modeling methods and assumptions are not documented in enough detail to assess their adequacy and acceptability.
10	The assumptions for the Wetland Value Assessment (WVA) models, including salinity assumptions, are not explained and the results and accuracy of the models cannot be assessed.
11	Some elements affecting risk and uncertainty (including limiting factors) of the NER TSP are not specifically addressed.
12	The Draft IFR/PEIS and its appendices do not include a discussion on whether the proposed alternatives are appropriate for protecting public safety.
Low Priority	
13	The future OMRR&R costs for the NED TSP were not included in the Southwest Coastal Louisiana Draft IFR/PEIS and are not sufficiently documented for the NER TSP to assess the reasonableness of the estimates.
14	The potential for offshore segmented breakwaters to partially disrupt longshore sediment transport and increase lee side erosion is not discussed as one of the environmental consequences.

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LIST OF ACRONYMS

AAHU	Annual Average Habitat Units
ADCIRC	Advanced Circulation
ATR	Agency Technical Review
CE/ICA	Cost Effectiveness/Incremental Cost Analysis
COI	Conflict of Interest
DrChecks	Design Review and Checking System
EAR	Engineering Alternatives Report
EC	Engineer Circular
EIS	Environmental Impact Statement
ER	Engineer Regulation
ERDC	Engineer Research and Development Center
H&H	hydrology and hydraulics
H&S	hydrology and salinity
HEC-RAS	Hydraulic Engineering Center-River Analysis System
HSDRRS	Hurricane and Storm Damage Risk Reduction System
IEPR	Independent External Peer Review
LPV	Lake Pontchartrain and Vicinity
LWRC	Louisiana Water Resources Council
NED	National Economic Development
NEPA	National Environmental Policy Act
NER	National Ecosystem Restoration
OEO	Outside Eligible Organization
OMB	Office of Management and Budget
OMRR&R	operation, maintenance, repair, replacement, and rehabilitation
PDD	Project Description Document
PDT	Project Delivery Team
PIER	Programmatic Individual Environmental Report
PPA	Project Partnership Agreements
RSLR	relative sea level rise
SMART	Specific, Measurable, Attainable, Risk Informed, Timely

TSP	Tentatively Selected Plan
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Services
TSMPA	Tentatively Selected Mitigation Plan Alternative
WRDA	Water Resources Development Act
WVA	Wetland Value Assessment

1. INTRODUCTION

The purpose of the Southwest Coastal Louisiana Draft Integrated Feasibility Report and Programmatic Environmental Impact Statement (Draft IFR/PEIS) 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/PEIS 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 Southwest Coastal Louisiana Feasibility Study (hereinafter Southwest Coastal Louisiana 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) bulletin *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 plan formulation, economic, environmental, and engineering analyses contained in the Southwest Coastal Louisiana Draft IFR/PEIS (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; the final charge was submitted to USACE on January 20, 2014.

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 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 Southwest Coastal Louisiana Draft IFR/PEIS 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 Southwest Coastal Louisiana IEPR. Due dates for milestones and deliverables are based on the pre-award funding date of December 12, 2013.¹ 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 April 4, 2014.

Table 1. Major Milestones and Deliverables of the Southwest Coastal Louisiana IEPR

Task	Action	Due Date
1	Pre-Award Funding Authorization	12/12/2013
	Notice to Proceed	12/23/2013
	Review documents available	12/16/2013
2	Battelle submits list of selected panel members	12/17/2013
	USACE confirms the panel members have no COI	12/26/2013

¹ Pre-award funding authorization was received from the USACE Contracting Officer's Representative and the Army Research Office's (ARO) Contracting Officer to begin initial work on the project on December 12, 2013 to meet the expedited schedule.

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

Task	Action	Due Date
3	Battelle convenes kick-off meeting with USACE	12/16/2013
	Battelle convenes kick-off meeting with USACE and panel members	01/13/2014
4	Panel members complete their individual reviews	01/28/2014
	Panel members provide draft Final Panel Comments to Battelle	02/11/2014
5	Battelle submits Final IEPR Report to USACE	03/03/2014
6 ^a	Battelle convenes Comment-Response Teleconference with panel members and USACE	03/24/2014
	Battelle submits pdf printout of DrChecks project file to USACE	04/04/2014
	Contract End/Delivery Date	12/10/2014

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

Battelle identified, screened, and selected five panel members to participate in the IEPR based on their expertise in the following disciplines: Civil Works planning, economics, environmental/biology, hydrology and hydraulic engineering, and civil/geotechnical engineering. The Panel reviewed the Southwest Coastal Louisiana Draft IFR/PEIS and public comments and produced 14 Final Panel Comments in response to 120 charge questions provided by USACE for the review. This charge included two additional questions added by Battelle that sought summary information from the IEPR Panel. 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 Southwest Coastal Louisiana Draft IFR/PEIS. 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.

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Civil Works Planning: The plan formulation is structured, explained, and documented well, producing a National Economic Development (NED) and National Ecosystem Restoration (NER) Tentatively Selected Plan (TSP) that is logical and defensible. Model usage and analysis (particularly concerning the benefit/cost analysis and the cost effectiveness and incremental cost analysis) are consistent with USACE’s Principles and Guidelines. In addition, previous studies and projects are used efficiently to generate some assumptions needed for model application. However, the Panel believes that this sourcing of assumptions and coefficients is incomplete and the Southwest Coastal Louisiana Draft IFR/PEIS would benefit from a more in-depth discussion, particularly on how the assumptions or coefficients were developed. One of the most important findings from the Panel concerns the assumption of 100% homeowner compliance with non-structural measures is not supported with data from surveys, studies, or local agencies. This key issue could be resolved by obtaining data from past projects or consulting compliance experts to develop a data-driven estimate of past participation in similar voluntary activities in the area. Finally, from the Panel’s review of the public comments, a key finding was that the Benefit Cost Analysis appears to have not considered Henry Hub, future growth, and the Biggert Waters Act in the NED benefits. In addition, the Benefits Cost Analysis did not consider less expensive gate designs and mitigation costs in the NED cost. Both of these omissions would potentially result in underestimating the benefit cost ratios of structural measures and therefore potentially omitting economically feasible structural measures.

Economics: The NED economic analysis is very well laid out with thorough and comprehensive application of the NED analysis to each of the 90 non-structural reaches. The NER cost effectiveness/incremental cost analysis was also done well. One of the Panel’s economics-related concerns includes that the NED analysis did not account for future development in the area, despite the fact that the Economics Appendix forecasted future growth. By reanalyzing the Louisiana Highway Armoring and Abbeville Levee measures incorporating future development and carrying these alternatives forward into the Focused Array of NED Alternatives, this issue might be resolved. In addition, there was little discussion in the Southwest Coastal Louisiana Draft IFR/PEIS about residual risk to affected populations and how this might be communicated to the public. This is especially important because of the voluntary nature of the NED TSP’s non-structural measures; commercial facilities and residential structures that the owners decide not to raise or flood proof might have residual risk. USACE could resolve this issue by including a discussion of residual risk associated with the NED TSP plan that includes public health/safety, critical infrastructure, and evacuation capability. In addition, the future

operation, maintenance, repair, replacement, and rehabilitation (OMRR&R) costs are not described in enough detail for the Panel to assess their reasonableness.

Environmental/Biology: The Panel found that the environmental issues are clearly addressed in the Draft IFR/PEIS and all of the required National Environmental Policy Act (NEPA) topics are discussed appropriately. Aside from the concern about the 100% compliance with voluntary non-structural measures and the lack of discussion about residual risk (which all panel members identified as concerns), the Panel believes that the report's completeness would be improved if evidence were included that the non-Federal sponsor is committed in the long term to providing funds to implement the project. In addition, the Draft IFR/PEIS would benefit from a discussion of the Wetland Value Assessment (WVA) assumptions, specifically how the effects of salinity and hydrology control measures were evaluated in WVAs. Finally, the Panel found that the risk and uncertainty associated with the NER plan are not discussed in enough detail and the report would be improved if further information were included.

Hydrology/Hydraulics Engineering: Based on the hydrology and hydraulics (H&H) information provided in the Southwest Coastal Louisiana Draft IFR/PEIS, the Panel found that USACE seemed to select the appropriate alternative and the narrative clearly steered the reader through the process of arriving at that TSP. Given the level-of-detail constraints mandated by SMART planning, the Southwest Coastal Louisiana Draft IFR/PEIS does a good job compiling a large amount of information and presenting it in a concise format. However, of primary concern to the Panel was that the H&H methods and assumptions are not documented clearly enough, particularly with regard to how the combined effects of inland flooding and storm surge may have been addressed. In addition, the State Master Plan models that were used to determine the benefits and other effects of the alternatives may have too coarse a resolution to assess accurately the hydrology and salinity (H&S) controls; the report would benefit from a risk and uncertainty discussion associated with H&S control feature modeling. The Southwest Coastal Louisiana Draft IFR/PEIS would also be improved by a discussion of the implications of climate non-stationarity and relative sea level rise on the performance of the non-structural measures and the H&S features.

Civil/Geotechnical Engineering: From a civil/geotechnical engineering point of view, the Southwest Coastal Louisiana Draft IFR/PEIS is sound and a good example of the efficiency afforded by the SMART planning process. While the risk assessment and analyses were done well, the report would be improved by including some of that risk information. In addition, with regard to public safety, the Southwest Coastal Louisiana Draft IFR/PEIS does not clearly describe whether the proposed alternatives are appropriate to protect human life and public safety, and what the evacuation capabilities would be. The Panel also recommends some discussion is warranted on the potential for increased erosion and sediment transport disruption from offshore segmented breakwaters.

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

It is unclear how the potential combined effects of storm surge and inland rainfall/flooding are accounted for in hydrologic and hydraulic modeling of the National Economic Development plan.

Basis for Comment

The southwest Louisiana study area is subject to flooding hazards from both heavy inland rainfall and coastal storm surge. The severity of storm surge flooding can increase when intense rain falls upstream on coastal rivers influenced by tides and surge. In the H&H modeling approach used in the NED analysis, the models used to predict flooding caused by heavy inland rainfall are not coupled to the models used to predict coastal storm surge flooding. To model flooding due to inland rainfall, Hydraulic Engineering Center-River Analysis System (HEC-RAS) model boundary conditions were set to a single water surface elevation for storms of all frequencies (stated in mid-review teleconference with Battelle and USACE on 1/24/14). Therefore, the HEC-RAS modeling used to estimate inland flooding risks does not account for the potential additive effects of storm surge and inland flooding. The Advanced Circulation (ADCIRC) modeling of storm surge flooding appears to have included only river flux boundary conditions for the Mississippi and Atchafalaya Rivers (USACE, 2008). Thus, it appears that the storm surge model did not account for the potential influence of freshwater inflows from the Sabine, Calcasieu, and Mermentau River watersheds. The Panel's understanding, therefore, is that the H&H modeling approach treated storm surge and inland rainfall/flooding as separate processes even though these processes can potentially combine to increase flood heights.

Instead of coupling the two types of models to account for the combined effects of storm surge and inland rainfall/flooding, USACE used the higher of the two estimates of flood elevations for events with 100-year and larger return periods, and interpolated between the two flood elevations for more frequent events. Although this approach considers both types of flooding events, it does not appear to account for the potential additive effects of storm surge and inland flooding.

The potential for interactions between storm surge and inland flooding has implications for selection of the NED plan. Specifically, if the selection of non-structural reaches in the NED plan has omitted reaches with net positive benefits due to underestimated flood magnitudes and frequencies, then expected risk reduction is not assessed in an appropriate manner. A sensitivity analysis could indicate whether modest changes in model boundary conditions (to represent potential additive effects of storm surge and inland flooding/river flows and climate non-stationarity) brings more NED non-structural reaches into the positive benefit category. Such information could also inform the benefit-cost analysis of structural features.

Significance – Medium/High

Risks associated with the potential combined effects of inland flooding and storm storage have not been evaluated, which could lead to underestimation of hurricane and storm damage risk.

Recommendations for Resolution

1. Document and further explain (in the Southwest Coastal Louisiana Draft Integrated Feasibility Report/Integrated Environmental Impact Statement [Draft IFR/PEIS]) the limitations of the uncoupled HEC-RAS/ADCIRC modeling approach, uncertainty in current estimates of overall flooding risks, and the risks associated with these uncertainties (e.g., potentially omitting non-

structural reaches with net positive benefits). Revise the risk register, if appropriate, in alignment with additional discussion of risks and uncertainties.

2. Provide an explanation for omitting the effects of antecedent rainfall and river flows on the ADCIRC boundary conditions and assuming that these processes have an insignificant effect on the flood levels that result from storm surges. Similarly, provide an explanation for omitting tidal and storm storage effects on HEC-RAS boundary conditions and assuming that these processes have an insignificant effect on the water levels that result from inland flooding.
3. Perform a sensitivity analysis on the selection of NED non-structural reaches in the Feasibility Design Phase. This can be accomplished with adjusted model boundary conditions or error bounds to represent the potential combined effects of inland flooding and storm surge, and other important uncertainties such as the potential for higher than intermediate relative sea level rise.

Literature Cited:

USACE (2008). Draft Flood Insurance Study: Southwestern Parishes, Louisiana, Intermediate Submission 1: Scoping and Data Review. August 11.

Final Panel Comment 2 (derived from the Panels' review of the public comments)

The Benefit Cost Analysis appears to have not considered Henry Hub, future growth, and the Biggert Waters Act in the NED benefits, and did not consider less expensive gate designs and mitigation costs in the NED cost.

Basis for Comment

The public comments call for economic analysis, particularly of structural features, to be reevaluated or even recalculated. For example,

- Section 4 of the Calcasieu Parish Resolution asks that the most current FEMA flood maps be used in the benefit cost analysis (BCA). Section 8, indicates that 1' freeboard requirement adopted this summer may change the BCA. Section 9 requests the BCA be recalculated for levee alignments incorporating the Biggert Waters Act of 2012. Section 11 points out that Calcasieu Parish is expected to experience an estimated \$62 billion in future growth, which should be factored into the calculation of the BCA.
- On page 45 of the Abbeville Public Meeting transcript, one of the speakers takes issue with the high costs of fill, pump stations, and expensive sector gates as compared to barge gates, stating that these estimates overstate the costs.
- On page 52 of the Abbeville Public Meeting transcript, the commenter notes that benefits to preventing infrastructure damage seem to be omitted.
- On page 43 of the Lake Charles Public Meeting transcript, the Coastal Protection and Restoration Authority of Louisiana suggested that real estate costs were overstated.
- On page 51 of the Lake Charles Public Meeting transcript, a commenter asked that USACE include future economic development in the area, especially considering that there were be increased housing demand from development, and there are benefits from protecting those houses.

The Panel believes that the omission of the Henry Hub and barge gates from the BCA makes questionable the elimination of levees with benefit cost ratio (BCR) near unity based on highly uncertain mitigation costs. There are multiple lines of evidence suggesting that the costs of structural features may be overstated, and that the benefits may be underestimated.

Significance – Medium/High

If cost estimates are not refined and the BCA is not reexamined or recalculated, structural and other measures qualifying for further consideration could be omitted and the current TSP may be incomplete.

Recommendations for Resolution

1. Review the sections mentioned in the Basis for Comment and conduct a sensitivity analysis.
2. Examine the economic analysis, particularly of structural features, and reevaluate or even consider revisiting the BCR for the levee(s) that were close to BCR=1 to include the Henry Hub, future growth, and the Biggert Waters Act in the NED benefits. This could potentially include better estimates of gate and mitigation costs.
3. Utilize the sensitivity analyses to determine what the relevant BCAs are for determination of the TSP.
4. Identify and specify the residual risks of alternative choices.

Final Panel Comment 3

The effects of the hydrologic and salinity controls are highly uncertain and their inclusion in the TSP is not fully justified.

Basis for Comment

The likelihood of meeting project objectives for salinity control cannot be assessed with current modeling. State Master Plan modeling of hydrologic and salinity (H&S) control measures in the National Ecological Restoration (NER) TSP appears to lack the resolution and detail needed to assess the effects of different combinations of these features on salinity patterns, and to fully justify selection of specific H&S control structures. This is in contrast to project objectives and numeric monitoring criteria for salinity that are specific and precise (Appendix A, Annex L). The habitat units and benefits that are projected to result from the H&S features are highly uncertain because future without-project versus future with-project salinity conditions are highly uncertain.

Significance – Medium

Insufficient understanding of the influence of H&S control measures on future without-project versus future with-project salinity patterns affects justification of features included in the TSP and the accuracy of estimated habitat improvements.

Recommendations for Resolution

1. Document the risk and uncertainty (in the Main Report, Section 4.2.4) associated with current modeling of H&S control features and their potential for reducing salinity to targeted levels.
2. Perform a more detailed evaluation of the H&S measures in the feasibility design phase using a modeling approach that can adequately resolve the effects of individual structures and different combinations of control measures on salinity levels.

Final Panel Comment 4

The NED TSP assumption that 100% of homeowners will comply with the non-structural measures in the program is not supported with data.

Basis for Comment

In the Southwest Coastal Louisiana Draft IFR/PEIS (p. 4-2), the NED reach-by-reach non-structural economic analysis assumes that there will be 100% voluntary participation among eligible homeowners in the program to raise their structures by as much as 13 feet, relocate the homeowners, or buy them out. No data from surveys, prior projects, or local parish agencies are provided to substantiate this assumption.

The Real Estate Appendix (p. 8) states, “As participation in the non-structural project feature is voluntary, the landowners are not eligible for relocation assistance benefits, in accordance with the Uniform Relocation Assistance and Real Property Acquisition for Federal and Federally-Assisted Programs.” Given that homeowners will not be compensated for relocation costs during the raising of their structures, and will also incur inconvenience costs during this time as well, it seems to the Panel that participation is likely to be less than 100%.

Significance – Medium

If 100% compliance with non-structural measures is not realized, the objective of the NED TSP for providing hurricane and storm damage risk reduction is compromised even in the economically justified reaches.

Recommendations for Resolution

1. Obtain data from past projects or convene a group of compliance experts to develop a data-driven estimate of the past percentage of voluntary participation in the non-structural measures in this geographic region.
2. If (1) above is not feasible, as an alternative proxy measure for voluntary participation, review the rates of voluntary participation in the National Flood Insurance Program in the study area.
3. Identify the impact of these estimates(in (1) above) of the deviation from 100% participation on the benefits of the NED TSP.

Final Panel Comment 5

The risks and uncertainties associated with climate non-stationarity are not sufficiently considered to describe a plausible range of future with project conditions.

Basis for Comment

The section on risk and uncertainty in the report is brief and lacks a substantive discussion of risks associated with the potential interactive effects of relative sea level rise (RSLR) and climate non-stationarity. Significant uncertainties and risks associated with climate non-stationarity (i.e., more frequent and/or extreme events) are only mentioned in passing for the NED plan, and not at all for the NER plan.

The documentation does not describe any systematic evaluation of how future with-project conditions could be affected by more frequent and higher intensity storms that could result from climate change, and how these could combine with RSLR that exceeds the assumed intermediate scenario. More substantive consideration and transparent discussion of the implications of these risks is necessary to support the analysis and documentation. In particular, the report is lacking a sufficiently thorough evaluation and discussion of climate/RSLR uncertainty with respect to selection of only 11 of 90 non-structural reaches in the NED plan, possibly underestimating risks due to combined effects of heavy inland rainfall preceding a storm surge, and the performance of H&S control structures.

Significance – Medium

A substantive evaluation of the risks associated with the combined effects of RSLR and climate non-stationarity is necessary for defining the risk level and the range of plausible project outcomes.

Recommendations for Resolution

1. Briefly describe the potential implications of combined climate non-stationarity and RSLR on the performance of the NED non-structural measures and the NER hydrology and salinity control measures.
2. Provide a concise but substantive discussion (Southwest Coastal Louisiana Draft IFR/PEIS , Sections 4.1.5 and 4.2.4) of the most important risks and uncertainties, and the implications of these risks for project outcomes.
3. Perform a sensitivity analysis in the Feasibility Design Phase that considers how possible errors in underestimating both RSLR and storm intensities/frequencies could propagate into the NED analysis of the unselected non-structural reaches where the benefit-cost ratio was relatively close to unity.

Final Panel Comment 6

The assumptions of the high and low commercial navigation delay costs are not supported and the impact of these costs on the TSP is not identified.

Basis for Comment

The project statements refer to the necessity of maintaining and paying for navigation costs impacts from structures in the chosen measures. This constraint leads to the need for accuracy in navigation cost estimates.

The Draft IFR/PEIS states (p. 2-29):

“In the CE/ICA analysis shown in Figure 2-8, a Rough Order of Magnitude (ROM) average annual cost of \$10,000,000 was added to plans that include Plan “A” to represent the potentially high navigation impact cost resulting from the operable closure structure. The cost in this analysis represents traffic delays to all 2011 deep draft traffic in the Calcasieu Ship Channel. All alternatives with Plan “A” were run through CE/ICA both with and without the structure in place in order to isolate the relative performance of the structure. Plans in red are best-buys and those in blue are cost-effective.”

However, one page later, the Draft IFR/PEIS presents low navigation costs of \$7,672,500 by adjusting the \$10,000,000 cost (p. 2-30). Though these navigational costs are shown to have an effect on NER costs, no data sources for the estimates are provided. There is little explanation of the assumptions going into the navigational costs and what discussion is given is unclear.

The selection of measures within the TSP, especially the choice of best buy alternatives within the Cost Effectiveness/Incremental Cost Analysis (CE/ICA), may be dependent on the varying estimates of impact, so full support for and documentation of the sources of the estimates is critical.

Significance – Medium

If the navigational costs are inaccurate or just a ROM, without any justification, the accuracy of the Cost Effectiveness Analysis is diminished.

Recommendations for Resolution

1. Determine and present the sources for the navigational costs in the Economics Appendix.
2. Review the discussion in Section 2.4.4.2 dealing with CE/ICA results and present a more complete discussion of how navigation costs affect best-buy alternatives.

Final Panel Comment 7

Evidence of long-term commitments from USACE and the non-Federal sponsor to maintain the restored ecological resource quality is not presented.

Basis for Comment

The Panel understands that the study has a non-Federal sponsor, the Coastal Protection and Restoration Authority Board of Louisiana (CPRAB). However, the Southwest Coastal Louisiana Draft IFR/PEIS does not provide evidence that CPRAB or other non-Federal sponsor(s) are committed to providing funds for construction, operation, and maintenance of the NER plan. If a non-Federal sponsor does not commit to the NER plan, it may not be implemented. The State of Louisiana (ultimately the funding mechanism for CPRAB), per the documentation, has declined to sponsor or has withdrawn sponsorship from other, similar projects (see Southwest Coastal Louisiana Draft IFR/PEIS, pp. 1-37 and 3-21).

Significance – Medium

The absence of definitive information regarding a committed non-Federal sponsor for construction, operation, and maintenance creates uncertainty that the NER plan will be implemented.

Recommendations for Resolution

1. Add information to the Southwest Coastal Louisiana Draft IFR/PEIS regarding non-Federal sponsorship options.
2. Explain where the project is in the process of obtaining sponsorship.
3. Explain the effect on the project if there is no non-Federal sponsor.

Final Panel Comment 8

The NED analysis does not include future development even though the Economics Appendix forecasts future growth in the study area.

Basis for Comment

The Southwest Coastal Louisiana Draft IFR/PEIS (p. 2-7) assumes no future development in the project area when screening the NED alternatives based on benefits and costs. Thus, any NED benefits from protecting new developments that are built over the next 60 years are not included in the NED benefits.

Therefore, the Panel is concerned that the structural NED benefits of the alternatives presented in Table 2-4 (pp. 2-7 to 2-8) may be sufficiently understated so as to have prematurely eliminated Louisiana Highway armoring and much of the Abbeville levee alternatives due to finding that damages did not justify structural solution costs.

The assumption of no future growth used in screening the NED Alternatives in the Southwest Coastal Louisiana Draft IFR/PEIS are in contrast to USACE statements in Table 2 (Economics Appendix), however, which forecast substantial growth in Calcasieu and Vermillion parishes between 2020 and 2080.

Significance – Medium/Low

Omitting damages avoided in areas of future development will underestimate the future benefits of structural measures, potentially causing them to be screened out of further consideration prematurely.

Recommendations for Resolution

1. Reanalyze the Louisiana Highway Armoring and Abbeville Levee measures incorporating future development and carry these alternatives forward into the Focused Array of NED Alternatives, if warranted by the revised NED analysis.

Final Panel Comment 9

The hydraulic and hydrologic modeling methods and assumptions are not documented in enough detail to assess their adequacy and acceptability.

Basis for Comment

Several aspects of the H&H modeling methods and assumptions are not sufficiently documented. Hence, the accuracy and appropriateness of the H&H models in estimating future without-project versus future with-project conditions cannot be confirmed from the information provided.

Most of the models used in this study were adapted from previous USACE projects and are described in previous reports; however, the FR/EIS for this study does not effectively use this existing information through citations and references. Some previous reports from these projects are cited, but in some instances, the actual references are not provided in the report.

Specifically, the Southwest Coastal Louisiana Draft IFR/PEIS main report and Engineering Appendix do not sufficiently document and explain the following topics:

- Defining and providing a rationale for ADCIRC and HEC-RAS model boundary conditions (location and specification)
- Methods and assumptions used to account for river fluxes and performing river “spinup” in ADCIRC
- ADCIRC forcing, including the appropriateness of the storm tracks used to generate input wind fields
- Technical basis for modeling storage areas that were added to an existing HEC-RAS model (Calcasieu Lock study) without the benefit of information on the channels adjacent to these storage areas
- Description and justification of key assumptions, including the decision to decouple inland flooding and storm surge models, and the decision to omit river fluxes in the study area from the ADCIRC boundary conditions
- Spatial and temporal resolution of State Master Plan models in assessing the effects of the NER selected features (and eliminated features, e.g., Plan A) on hydrology and salinity levels
- Testing and validation of the various models used in the analyses.

Significance – Medium/Low

The soundness of the H&H methods and models, and whether the H&H analyses provide reasonably accurate estimates of future without-project versus future with-project conditions and risks cannot be assessed based on the information provided.

Recommendations for Resolution

1. Provide complete citations and references for relevant modeling reports, in particular: (1) Calcasieu Lock Draft Integrated Feasibility Study and Environmental Impact Statement, and (2) Flood Insurance Study: Southwestern Parishes, Louisiana Intermediate Submission 1: Scoping and Data Review 11 August 2008.
2. Specify or provide citations for the boundary condition used in the ADCIRC and HEC-RAS models, and provide a brief explanation of the engineering reasoning behind the selected

boundary conditions with respect to tides and river fluxes.

3. Describe methods and assumptions used to account for river fluxes and perform river “spinup” in ADCIRC.
4. Briefly explain how the lack of HEC-RAS geometry data for river channels and the Gulf Intracoastal Waterway in the storage areas added for this study (prefix XA) affects the accuracy of estimated inland flood elevations relative to the storage areas that were previously modeled in the Calcasieu Lock study (prefix SA).
5. Document and explain the assumption of not coupling the inland rainfall and storm surge models to account for the potential interaction and combined effects of these flooding processes.
6. Provide documentation or citations describing the spatial and temporal resolution of the State Master Plan models in assessing the effects of the selected NER features (and eliminated features, e.g., Plan A) on hydrology and salinity levels.
7. Describe or cite available evidence supporting the accuracy of the models Engineering Appendix, including model testing and validation from previous studies.

Final Panel Comment 10

The assumptions for the Wetland Value Assessment (WVA) models, including salinity assumptions, are not explained and the results and accuracy of the models cannot be assessed.

Basis for Comment

Appendix T of the Southwest Coastal Louisiana Draft IFR/PEIS presents the WVA modeling results but provides no information on the assumptions used in the models. The Panel therefore does not have sufficient information to analyze or assess the WVA modeling results.

Of primary concern is the lack of information on salinity patterns and how salinity was evaluated using the WVA models, given the complex hydrodynamics of the large system comprising the National Ecosystem Restoration Plan (NER Plan). The State Master Plan and MIKE FLOOD models that serve as a partial basis for the WVA models cannot resolve the effects of individual structures and different combinations of measures on salinity patterns. The absence of salinity information affects the results of the WVA modeling and associated AAHUs.

The Panel found that the WVA models used to determine Annual Average Habitat Units (AAHUs) are, in most cases, not certified.

Significance – Medium/Low

The lack of information on the assumptions used in the WVA models, including salinity patterns, makes it difficult to assess the results of the modeling and associated AAHUs.

Recommendations for Resolution

1. Include an explanation of the WVA modeling assumptions in Appendix T or elsewhere in the documentation.
2. Explain how the effects of salinity and hydrology control measures were evaluated during the WVA modeling effort.
3. Explain the limitations of using uncertified models.
4. Explain how the use of certified WVA models during the next planning phase may affect the NER Plan.

Final Panel Comment 11

Some elements affecting risk and uncertainty (including limiting factors) of the NER TSP are not specifically addressed.

Basis for Comment

The Panel found that the discussion of risk and uncertainty included in the Southwest Coastal Louisiana Draft IFR/PEIS lacks sufficient detail. The Panel has identified the following additional risks and limiting factors; there may be others that USACE has considered but not documented:

- Adaptive Management Plan (process-oriented at this stage of the study as opposed to outlining definitive procedures that will be used to ensure that success criteria are achieved)
- Herbivory
- Lack of detail for saltwater intrusion measures (risk to project elements that depend on reduced salinities)
- Development in or near the restoration sites, in particular oil and gas development, mining, and vegetation removal from the cheniers (risk to the NER plan)
- Planting failures, in particular tree plantings (risk to the cost estimate)
- Inability to discern which other projects in the region will be implemented (risk that the system as a whole may not be sustainable, and risk to the functionality of the NER plan within a broader ecological system)
- Unanticipated cumulative effects
- Extreme weather events resulting from climate change and attendant effects on hydrology and salinities
- Failed hydrology and salinity control structures.

Significance – Medium/Low

The brevity of the risk and uncertainty discussion in the documentation affects the completeness of the report.

Recommendations for Resolution

1. Develop a comprehensive list of risks and uncertainties that may be associated with the NER Plan.
2. Present these risks in the documentation, possibly in tabular form.
3. Revise risk documentation, if appropriate, in alignment with additional discussion of risks and uncertainties.

Final Panel Comment 12

The Southwest Coastal Louisiana Draft IFR/PEIS and its appendices do not include a discussion on whether the proposed alternatives are appropriate for protecting public safety.

Basis for Comment

The impact of the NED TSP on public health/safety, including critical infrastructure and evacuation capability, has not been presented consistently in the Southwest Coastal Louisiana Draft IFR/PEIS. Public safety is included in the Draft IFR/PEIS discussion of the future without-project condition. The view of the non-Federal sponsor is that the NED TSP would “reduce life, health, and safety risk” (Southwest Coastal Louisiana Draft IFR/PEIS, p. 2-36). In addition, the Southwest Coastal Louisiana Draft IFR/PEIS includes “physical health/safety” as a social factor and metric and is judged to provide a positive impact of +2 during a storm/flood event (Table 3-1, p. 3-3). On the other hand, protection of public safety is not given as an NED objective (Southwest Coastal Louisiana Draft IFR/PEIS, p. 2-2).

Significance – Medium/Low

A clear presentation of the NED TSP impact on public safety and residual risk is not provided in the Draft IFR/PEIS and as a consequence the public is not informed with regard to public safety and residual risk aspects of the NED TSP.

Recommendations for Resolution

1. Include a discussion of residual risk associated with the NED TSP plan that includes public health/safety, critical infrastructure, and evacuation capability.

Final Panel Comment 13

The future OMRR&R costs for the NED TSP were not included in the Southwest Coastal Louisiana Draft IFR/PEIS and are not sufficiently documented for the NER TSP to assess the reasonableness of the estimates.

Basis for Comment

The charge questions developed by USACE and provided to the Panel (by Battelle) directed them to evaluate whether the OMRR&R costs were adequately described and were reasonable.

However, for the NED TSP (i.e., the non-structural plan), the Southwest Coastal Louisiana Draft IFR/PEIS states (p. 4-3) that “OMRR&R obligations of the NFS for the NED TSP have not been identified at this time but will be refined in the final feasibility report.”

For NER, OMRR&R costs of \$5,382,000 will apply to “marsh renourishment, through the periodic addition of dredged sediment, to maintain wetland elevations, future lifts and additions of material for rock and/or rip-rap features, and maintenance, repair and replacement of the hydrologic/salinity control features” (Southwest Coastal Louisiana Draft IFR/PEIS , p. 4-8). However, there is no explanation of how this number was developed. This number also appears in the Economics Appendix (Table 50), but again with no explanation of how this number was derived.

Given the available documentation in the Southwest Coastal Louisiana Draft IFR/PEIS and the Economics Appendix, the Panel is unable to judge the reasonableness of the OMRR&R costs.

Significance – Low

Confidence in the report would be improved if OMRR&R costs for the NED TSP and the NER TSP were provided and explained.

Recommendations for Resolution

1. Provide separate tables in the Economics Appendix showing the categories of costs, unit costs, total number of units, and total OMRR&R costs for the NED TSP and the NER TSP, along with documentation of the sources of these cost estimates.

Final Panel Comment 14

The potential for offshore segmented breakwaters to partially disrupt longshore sediment transport and increase lee side erosion is not discussed as one of the environmental consequences.

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. Partial disruption of the existing longshore sediment transport may accelerate erosion on the down current side of the breakwater structures, resulting in localized loss of shoreline. The potential for partial disruption of longshore sediment transport resulting in potential environmental impacts is not acknowledged and discussed in the Southwest Coastal Louisiana Draft IFR/PEIS.

Significance – Low

A complete understanding of the environmental consequences resulting from the offshore breakwaters is not possible without a discussion of potential effects on sediment transport.

Recommendations for Resolution

1. Include (in the Southwest Coastal Louisiana Draft IFR/PEIS) a discussion of the potential for influence on longshore sediment transport and erosion resulting from the construction of offshore segmented breakwaters.
2. Analyze, during the Feasibility Design Phase, the potential influence on longshore sediment transport resulting from the construction of the offshore segmented breakwaters.

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. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. Engineer Circular (EC) 1165-2-214. December 15.

USACE (2008). Draft Flood Insurance Study: Southwestern Parishes, Louisiana, Intermediate Submission 1: Scoping and Data Review. August 11.

APPENDIX A

IEPR Process for the Southwest Coastal Louisiana Project

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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 the Southwest Coastal Louisiana Draft IFR/PEIS Independent External Peer Review (hereinafter Southwest Coastal Louisiana IEPR). Due dates for milestones and deliverables are based on the pre-award funding date of December 12, 2013. The review documents were provided by the U.S. Army Corps of Engineers (USACE) on December 16, 2013. Note that the work items listed under Task 6 occur after the submission of this report. Battelle will enter the 14 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. Southwest Coastal Louisiana Complete IEPR Schedule

Task	Action	Due Date
1	Pre-award funding authorization	12/12/2013
	Notice to Proceed	12/23/2013
	Review documents available	12/16/2013
	Battelle submits draft Work Plan ^a	12/23/2013
	USACE provides comments on draft Work Plan	12/19/2013
	Battelle submits final Work Plan ^a	1/20/2014
2	Battelle requests input from USACE on the conflict of interest (COI) questionnaire	12/16/2013
	USACE provides comments on COI questionnaire	12/18/2013
	Battelle submits list of selected panel members ^a	12/17/2013
	USACE confirms the panel members have no COI	12/26/2013
	Battelle completes subcontracts for panel members	1/2/2014
3	Battelle convenes kick-off meeting with USACE	12/16/2013
	Battelle sends review documents to panel members	1/3/2014
	Battelle convenes kick-off meeting with panel members	1/13/2014
	Battelle convenes kick-off meeting with USACE and panel members	1/13/2014
	Battelle convenes mid-review teleconference for panel members to ask clarifying questions of USACE	1/24/2014

Table A-1. Southwest Coastal Louisiana Complete IEPR Schedule (continued)

Task	Action	Due Date
4	Panel members complete their individual reviews	1/28/2014
	Battelle provides panel members with talking points for Panel Review Teleconference	2/2/2014
	Battelle convenes Panel Review Teleconference	2/3/2014
	Battelle provides Final Panel Comment templates and instructions to panel members	2/3/2014
	Panel members provide draft Final Panel Comments to Battelle	2/11/2014
	Battelle provides feedback to panel members on draft Final Panel Comments; panel members revise Final Panel Comments	2/11-2/20/14
	Panel finalizes Final Panel Comments	2/20/2014
5	Battelle provides Final IEPR Report to panel members for review	2/24/2014
	Panel members provide comments on Final IEPR Report	2/27/2014
	Battelle submits Final IEPR Report to USACE ^a	3/3/2014
6 ^b	Battelle inputs Final Panel Comments to DrChecks and provides Final Panel Comment response template to USACE	3/4/2014
	Battelle convenes teleconference with USACE to review the Post-Final Panel Comment Response Process	3/4/2014
	Battelle convenes teleconference with Panel to review the Post-Final Panel Comment Response Process	3/5/2014
	USACE provides draft Project Delivery Team (PDT) Evaluator Responses to Battelle	3/10/2014
	Battelle provides the panel members the draft PDT Evaluator Responses	3/11/2014
	Panel members provide Battelle with draft BackCheck Responses	3/18/2014
	Battelle convenes teleconference with panel members to discuss draft BackCheck Responses	3/21/2014
	Battelle convenes Comment-Response Teleconference with panel members and USACE	3/24/2014
	USACE inputs final PDT Evaluator Responses to DrChecks	3/27/2014
	Battelle provides final PDT Evaluator Responses to panel members	3/28/2014
	Panel members provide Battelle with final BackCheck Responses	4/2/2014
	Battelle inputs the Panel's final BackCheck Responses in DrChecks	4/3/2014
	Battelle submits pdf printout of DrChecks project file ^a	4/4/2014
	Contract End/Delivery Date	12/10/2014

^a Deliverable^b Task 6 occurs after the submission of this report

After receiving the pre-award funding for the Southwest Coastal Louisiana IEPR, 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. In addition, 120 charge questions were provided by USACE and included in the draft and final Work Plans. Battelle added two additional questions that sought summary information from the IEPR Panel. The final charge also included 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 seven days of their subcontracts being finalized, members of the Panel attended a kick-off meeting via teleconference planned and facilitated by Battelle in order to review the IEPR process, the schedule, communication procedures, and other pertinent information for the Panel. Battelle planned and facilitated a second 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 Southwest Coastal Louisiana 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.

- **Southwest Coastal Louisiana Draft Integrated Feasibility Report/Programmatic Environmental Impact Statement (Draft IFR/PEIS) (128 pages)**
- **Engineering Appendix (100 pages)**
- **Economics (50 pages)**
- **Real Estate (41 pages)**
- **Plan Formulation (123 pages)**
- **Environmental (480 pages)**
- **Other Social Effects (9 pages)**
- **Decision Management Plans (4 pages)**
- **Risk Register (4 pages)**
- **Public Comments (303 pages²)**
- USACE guidance Civil Works Review, (EC 1165-2-214) dated 15 December 2012
- Office of Management and Budget's *Final Information Quality Bulletin for Peer Review* released December 16, 2004.

About halfway through the review of the Southwest Coastal Louisiana Draft IFR/PEIS, a teleconference was held with USACE, the Panel, and Battelle so that USACE could answer any questions the Panel had concerning either the review documents or the project. Prior to this teleconference, Battelle submitted

² Battelle anticipated receiving approximately 50 pages of public documents. While 303 pages were received in total, a large portion of this higher page count was from duplicated documents (e.g., one public meeting transcript was included twice, once as a stand-alone document and once as an attachment to another comment). In addition, comment cards that were received at the public meetings were counted as one page; however, the feedback on these cards rarely was a full page in length.

seven panel member questions to USACE. USACE was able to provide responses to all of the questions during the teleconference or later that day via email.

On February 5, 2014, USACE provided approximately 303 pages of public comments to the Panel for review. Battelle provided the Panel with two charge questions (approved by USACE) to guide their review of the public comments.

In addition, throughout the review period, USACE provided documents at the request of panel members. These documents were provided to Battelle and then disseminated to the Panel as additional information only and were not part of the official review. A list of these additional documents requested by the Panel is provided below.

- White Paper on Estimating Hurricane Inundation Probabilities (126 pages)
- Flood Insurance Study: Southwestern Parishes, Louisiana; Intermediate Submission 1: Scoping and Data Review (112 pages)
- Flood Insurance Study: Southeastern Parishes, Louisiana; Intermediate Submission 2: Offshore Water Levels and Waves (235 pages)

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 17 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 4-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 would serve as the lead author for the development of each Final Panel Comment. This information exchange ensured that the Final IEPR Report would accurately represent the Panel's assessment of the project, including any conflicting opinions. The Panel engaged in a thorough discussion of the overall positive and negative comments, added any missing issues of 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.

At the end of these discussions, the Panel identified 13 comments and discussion points that should be brought forward as Final Panel Comments.

The public comments were provided after this teleconference and, collaborating through email, the Panel developed one Final Panel Comment that addressed their concerns with regard to these comments. This additional Final Panel Comment rounded out the final total to 14.

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 Southwest Coastal Louisiana 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).

At the end of this process, 14 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.

APPENDIX B

Identification and Selection of IEPR Panel Members
for the Southwest Coastal Louisiana Project

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B.1 Panel Identification

The candidates for the Southwest Coastal Louisiana Feasibility Study Independent External Peer Review (hereinafter Southwest Coastal Louisiana IEPR) Panel were evaluated based on their technical expertise in the following key areas: Civil Works planning, economics, environmental/biology, hydrology and hydraulic engineering, and civil/geotechnical engineering. These areas correspond to the technical content of the Southwest Coastal Louisiana Draft IFR/PEIS and overall scope of the Southwest Coastal Louisiana project.

Civil Works planning, economics, environmental/biology, hydrology and hydraulic engineering, and civil/geotechnical 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, Dr. Ralph Ellis, and Ms. Kay Crouch) and confirmed that their expertise and schedule commitments made them suitable to serve on the Panel. One panel member, an expert in hydrology and hydraulic engineering, had to be recruited from the LWRC Selected Pool.

Battelle made the final selection of panel members according to the selection criteria described in the Work Plan. The final Panel was composed of five expert reviewers, with four experts coming from the LWRC Primary Panel and one coming from the LWRC Selected Pool. 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 five selected reviewers constituted the final Panel. The remaining candidates were not proposed for a variety of reasons, including lack of availability, disclosed COIs, or lack of the precise technical expertise required.

The candidates were screened for the following potential exclusion criteria or COIs.³ 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.

³ 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."

- Previous and/or current involvement by you or your firm⁴ in the Southwest Coastal Louisiana Feasibility Study or any project related to the Louisiana Coastal Protection and Restoration (LACPR) effort.
- 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.

⁴ 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 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

In selecting the final members of the Panel, Battelle chose experts who best fit the expertise areas and had no COIs. One of the five final reviewers is affiliated with a consulting company; the other four are independent consultants. Battelle established subcontracts with the panel members when they indicated their willingness to participate and confirmed the absence of COIs through a signed COI form. USACE was given the list of candidate panel members, but Battelle selected the final Panel.

An overview of the credentials of the final five 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	Ellis
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			
Familiarity with the USACE Institute for Water Resources (IWR) Planning Suite for CE/ICA		X			

Technical Criterion	Casavant	Loomis	Crouch	Bledsoe	Ellis
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	
utility penetrations				W ¹	
stop log and sandbag gaps				X	
interior drainage				X	
drainage structures				X	

Technical Criterion	Casavant	Loomis	Crouch	Bledsoe	Ellis
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	
Civil/Geotechnical Engineer					
Minimum 15 years of experience (or combined equivalent of education and experience) in civil engineering, including assessing hurricane storm damage risk reduction system projects and ecosystem restoration projects					X
Direct civil engineering design or construction management experience					X
Familiarity with geotechnical practices with regard to:					
levees					X
floodwalls					X
retaining walls					X
pump stations					X
gate well structures					X
utility penetrations					X
stop log and sandbag gaps					X
interior drainage					X
drainage structures					X
utility relocations					X
non-structural measures					X

Technical Criterion	Casavant	Loomis	Crouch	Bledsoe	Ellis
Experience in associated contracting procedures, total cost growth analysis, and related cost-risk analysis					X
Familiarity with similar projects across the United States and the related cost engineering					X
Familiarity with construction industry and practices used in wetland restoration, flood damage/coastal storm damage reduction in the Gulf of Mexico coast					X
Experience in hurricane storm damage risk reduction system design					X
Ability to address the USACE Safety Assurance Review (SAR) aspects of all projects					X
Active participation in related professional societies					X
M.S. degree or higher					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 45 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 15 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 eight 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 25 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 35 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 26 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.

Ralph Ellis, P.E., Ph.D.

Role: Civil/geotechnical engineer expertise.

Affiliation: Independent consultant.

Dr. Ellis is an independent consultant and an associate professor in the Department of Civil Engineering at the University of Florida specializing in civil engineering and construction engineering. He earned his Ph.D. in civil engineering from the University of Florida in 1989 and is a registered professional engineer (P.E.) in Florida. During his 40-year career in industry and academia, he has gained more than 35 years of experience with large-scale civil engineering projects, including hurricane protection and storm damage risk reduction system projects. Currently, Dr. Ellis teaches the fundamentals of project design and delivery and the fundamentals of assessing hurricane protection and storm damage risk systems, and is up to date with current standards of hurricane storm damage risk reduction studies through his teaching and his participation on previous USACE IEPRs.

Dr. Ellis's work on large-scale civil engineering projects has involved both regional and international experience in industry (1973-1989), including the design and construction of levees, pumping stations, piping, and other structures related to water control, construction of temporary and permanent sheet pile walls, and dewatering operations. Many of the projects involved floodwalls, retaining walls, gate well structures, utility penetrations and relocations, interior drainage systems and structures, and the application of stoplog, sandbag, and other non-structural measures. Before joining the University of Florida, Dr. Ellis was president of the Hammer Corporation construction firm and director of projects for the FMI-Hammer Joint Venture. From 1975 to 1985, he directed Joint Venture operations in south Florida and Central America for U.S. government agencies, USACE, the U.S. Navy, and the Panama Canal Company. Many of these projects involved significant earthwork structures (including flood control projects) and large-scale control structures. He also has been responsible for many projects involving utility relocations and penetrations and has conducted national research on utility relocations.

Dr. Ellis has experience in performing cost engineering/construction management for all phases of flood risk management and hurricane and coastal storm damage risk reduction projects. During his industry experience from 1973 to 1985, he was directly responsible for cost engineering (including the preparation of construction cost estimates) and for the supervision of project management. He also was directly responsible for contracting issues on many USACE projects. As an experienced IEPR panel member, he has reviewed many project cost estimates at all levels and is completely familiar with USACE cost estimating procedures and standards. Overall, he has participated in 11 ecosystem restoration and flood control project IEPRs in the areas of civil engineering, cost engineering, and construction management.

In his current position at the University of Florida, he has maintained up-to-date knowledge of current practice with regard to project management and to cost engineering as practiced in all phases of flood risk management and hurricane and coastal storm damage risk reduction projects. He is experienced in the development of schedule and cost risk analysis, including the use of current risk analysis software applications.

Dr. Ellis also has maintained up-to-date knowledge of Safety Assurance Review (SAR) aspects of USACE projects. As a result, he was selected to participate in several Louisiana coastal storm damage reduction and ecosystem restoration project IEPRs for USACE, assessing analyses associated with cost engineering and construction management. He also has participated in an IEPR for a SAR of an impoundment project in Palm Beach County, Florida.

Dr. Ellis is an active member of the American Society of Civil Engineers (ASCE). From 2009 to 2012, he was a member of the ASCE Committee on Critical Infrastructure, providing input on national infrastructure renewal issues, and was a director of the ASCE Education and Research Directorate from 2003 to 2007.

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APPENDIX C

Final Charge to the IEPR Panel
as Submitted to USACE on January 20, 2014,
for the Southwest Coastal Louisiana Project

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CHARGE QUESTIONS AND GUIDANCE TO THE PANEL MEMBERS FOR THE INDEPENDENT EXTERNAL PEER REVIEW OF THE SOUTHWEST COASTAL LOUISIANA FEASIBILITY STUDY

BACKGROUND

The purpose of the Southwest Coastal Louisiana Draft Integrated Feasibility Report and Programmatic Environmental Impact Statement (Draft IFR/PEIS) 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. An integrated Environmental Impact Statement (EIS) has been 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, 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/PEIS 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.

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 Draft IFR/PEIS (hereinafter: Southwest Coastal Louisiana IEPR) in accordance with the Department of the Army, USACE, Water Resources Policies and Authorities' *Civil Works Review* (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, hydrology and hydraulic engineering, and civil/geotechnical 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
Southwest Coastal Louisiana Draft IFR/PEIS	128	All
Engineering Appendix	100	Hydrology and Hydraulic (H&H) Engineering; Civil/Geotechnical Engineering
Economics	50	Economics
Real Estate	41	Economics
Plan Formulation	123	Civil Works Planning
Environmental	480	Environmental/Biology
Other Social Effects	9	Economics; Civil Works Planning
Decision Management Plans	4	All
Risk Register	4	All
Public Comments	TBD*	All
Total Page Count	939	

*Anticipated to be 50 pages or less

Documents for Reference

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

SCHEDULE

This final schedule is based on the December 23, 2013 receipt of the final review documents. The schedule will be revised upon receipt of final review documents.

Task	Action	Due Date
Conduct Peer Review	Battelle sends review documents to panel members	12/23/2013
	Battelle convenes kick-off meeting with panel members	1/13/2014
	Battelle convenes kick-off meeting with USACE and panel members	1/13/2014
	Battelle convenes mid-review teleconference for panel members to ask clarifying questions of USACE	1/24/2014
	Panel members complete their individual reviews	1/28/2014
Prepare Final Panel Comments and Final IEPR Report	Battelle provides panel members with talking points for Panel Review Teleconference	2/3/2014
	Battelle convenes Panel Review Teleconference	2/3/2014
	Battelle provides Final Panel Comment templates and instructions to panel members	2/3/2014
	Panel members provide draft Final Panel Comments to Battelle	2/11/2014
	Battelle provides feedback to panel members on draft Final Panel Comments; panel members revise Final Panel Comments	2/11-2/20/14
	Battelle finalizes Final Panel Comments	2/20/2014
	Battelle provides Final IEPR Report to panel members for review	2/24/2014
	Panel members provide comments on Final IEPR Report	2/27/2014
	*Battelle submits Final IEPR Report to USACE	3/3/2014
Comment/Response Process	Battelle inputs Final Panel Comments to DrChecks and provides Final Panel Comment response template to USACE	3/4/2014
	Battelle convenes teleconference with Panel to review the Post-Final Panel Comment Response Process (if necessary)	3/5/2014
	USACE provides draft PDT Evaluator Responses to Battelle	3/10/2014
	Battelle provides the panel members the draft PDT Evaluator Responses	3/11/2014
	Panel members provide Battelle with draft BackCheck Responses	3/18/2014
	Battelle convenes teleconference with panel members to discuss draft BackCheck Responses	3/21/2014
	Battelle convenes Comment-Response Teleconference with panel members and USACE	3/24/2014
	USACE inputs final PDT Evaluator Responses to DrChecks	3/27/2014
	Battelle provides final PDT Evaluator Responses to panel members	3/28/2014
	Panel members provide Battelle with final BackCheck Responses	4/2/2014
	Battelle inputs the panel members' final BackCheck Responses to DrChecks	4/3/2014
	*Battelle submits pdf printout of DrChecks project file	4/4/2014
Civil Works Review	Panel prepares and/or reviews slides for CWRB	TBD

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, 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 January 28, 2014, 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. Are the expected changes in the quality and abundance of desired ecological resources clearly and precisely specified in justifying the ecosystem restoration and protection investment?
11. 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)?
12. Do planning models and procedures clearly link habitat improvement to the needs of the targeted ecological resources?
13. Do planning models and procedures adequately consider and provide for limiting factors beyond quality and quantity of habitat?
14. Is it clear that the restored ecological resource quality will be sustainable over the long run?

15. 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).
16. 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

17. Within the context of risk-informed decision-making, were the methods used to evaluate the condition of the structural features for the alternatives adequate and appropriate given the circumstances?
18. Have the appropriate alternatives been considered and adequately described for this project and do they appear reasonable?
19. 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?
20. For the current designs developed using limited detailed information, are the quality and quantity of the surveys, investigations, and engineering sufficient to assess expected risk reduction?
21. Have the hazards that affect the structures been adequately documented and described? If not, is the risk register documented accordingly?
22. Are the models used to assess hazards appropriate?
23. Are the assumptions made for the impacts appropriately documented and explained in the report documentation and/or risk register?
24. Is there sufficient information presented to identify, explain, and comment on the assumptions that underlie the engineering analyses for the alternatives? Has the risk register adequately documented assumptions and corresponding risks associated with limited detailed information associated with the various engineering analyses?
25. Are there any additional analyses or information available or readily obtainable that would affect decisions on the alternatives regarding the structures?
26. Does the physical data and observed data provide adequate information to characterize the structures and their performance? If not, is the risk register documented accordingly?
27. Have all characteristics, conditions, and scenarios leading to potential failure, along with the potential impacts and consequences, been clearly identified and described? Have all pertinent factors, including but not necessarily limited to population-at-risk been considered?
28. Does the analysis adequately address the uncertainty given the consequences associated with the potential loss of life for this type of project?

29. From a public safety perspective, are the proposed alternatives reasonably appropriate or are there other alternatives that should be considered?
30. Has anything significant been overlooked in the development of the assessment of the project or the alternatives?
31. Do the alternatives and their associated costs appear reasonable? Do the benefits and consequences appear reasonable?

SPECIFIC QUESTIONS

Objectives

32. Is the purpose of the project adequately defined? If not, why?
33. Has the project need been clearly described?
34. Have the public concerns been identified and adequately described?
35. Are the specific objectives adequately described?
36. In your opinion, are there any other issues, resources, or concerns that have not been identified and/or addressed?

Problems/Opportunities

37. 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)?
38. 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

39. Have the criteria to eliminate plans from further study been clearly described?
40. Are the tentatively selected plans sufficiently detailed?
41. Are the design, environmental, and construction considerations outlined for the tentatively selected plans appropriate and adequate?
42. Are the general characteristics of the dredged and fill material accurate and adequately described?
43. Is the quantity of the dredged and fill material adequate and factually supported?
44. Have the operations and maintenance considerations of the tentatively selected plans been addressed?

45. Was a reasonably complete array of possible structural and non-structural measures considered in the development of alternatives for the NED plan?
46. Is each of the different alternative plans clearly described?
47. 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?
48. Are the changes between the without- and with-project conditions adequately described for each alternative?
49. Have comparative impacts been clearly and adequately described?
50. Are future Operation, Maintenance, Repair, Replacement, and Rehabilitation efforts adequately described and are the estimated cost of those efforts reasonable for each alternative?
51. Are there any unmitigated environmental impacts not identified and if so could they impact project designs?
52. Please comment on the likelihood that the recommended alternatives will achieve the expected outputs.
53. Are residual risks adequately described and is there a sufficient plan for communicating the residual risk to affected populations?
54. Have the impacts to the existing infrastructure been adequately addressed?
55. Are the ecosystem output models reasonable and appropriate for evaluating project benefits/impacts?
56. Are the descriptions of the risk and uncertainties associated with the development, selection, and construction of the tentatively selected plans sufficiently comprehensive?
57. Please comment on the likelihood that the recommended plans achieve the expected outputs.
58. Do the plans adequately address all real estate interests (public and private) and requirements allowing for appropriate comparisons across all alternatives?
59. Are the proposed actions/solutions for addressing the potential issues surrounding privately owned lands adequate?

Monitoring Plan and Adaptive Management

60. Are the performance measures, desired outcomes, and monitoring designs for each of the project objectives sufficiently detailed?
61. Are the proposed monitoring procedures appropriate and adequate?
62. Is the monitoring program assessment process appropriate and thorough?

63. Are the costs for administering a monitoring and assessment program reasonable and realistic?

Affected Environment

64. Is the general description of the proposed project area accurate and comprehensive?
65. Is the description of the climate in the study area sufficiently detailed and accurate?
66. Is the description of the geomorphic and physiographic setting of the proposed project area accurate and comprehensive?
67. Does the description of existing conditions provide for a sufficient understanding of the presence and distribution of soils and water bottoms in the study area?
68. Is the hydrology discussion sufficient to allow for an evaluation of the effects of implementation of the proposed plan compared to current baseline conditions?
69. Is the discussion on the relationship between flow and water levels and the hydrodynamics of the project area complete?
70. Are the factors affecting estuarine circulation adequately discussed? Based on your experience, are there additional factors to be considered?
71. Is the description of the historical and existing sedimentation and erosion conditions in the study area adequate?
72. Are the water quality and salinity discussions sufficient to allow for an evaluation of the effects of implementation of the proposed plan compared to current baseline conditions?
73. Is the description of the historical and existing wetland vegetation resources in the study area adequate?
74. Is the description of the historical and existing vegetation resources in the study area adequate?
75. Is the description of the historical and existing wildlife and habitat resources in the study area complete and accurate?
76. Is the description of aquatic resources in the project area complete and accurate?
77. Is the description of the historical and existing fishery resources in the study area complete and accurate?
78. Is the description of threatened and endangered species resources in the study area complete and accurate?
79. Is the description of the historical and existing recreational resources in the study area complete and accurate?
80. Is the description of the historical and existing socioeconomic resources in the study area complete and accurate?

Environmental Consequences

81. Are the scope and detail of the potential adverse effects that may arise as a result of project implementation sufficiently described and supported?
82. Are the environmental effects of changes to soils and water bottoms in the project area, based on each alternative, adequately described?
83. Have the short- and long-term impacts associated with the alternatives been adequately discussed and evaluated?
84. Are the environmental effects of changes to near shore hydrology from the alternatives reasonable and factually supported?
85. Are environmental effects of changes to flow and water levels from the alternatives reasonable and factually supported?
86. Are environmental effects of changes to sedimentation and erosion from the alternatives reasonable and factually supported?
87. Are environmental effects of changes to water quality and salinity from the alternatives reasonable and factually supported?
88. Are environmental effects of changes to wetland vegetation resources from the alternatives reasonable and factually supported?
89. Is the description of projected impacts to aquatic resources for each of the alternatives reasonable and factually supported?
90. Are environmental effects of changes to fishery resources from the alternatives reasonable and factually supported?
91. To what extent have the potential impacts of the alternatives on cultural resources been addressed and supported?
92. Have the potential impacts to recreation resources from the alternatives been adequately considered?
93. 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

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

Mitigation

95. Are mitigation measures adequately described and discussed? If not, please explain.

Hydrology and Hydraulics Appendix

96. Was the hydrology 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 hydrologic conditions?

Geotechnical Engineering

97. Is the description of the geomorphic and physiographic setting of the proposed project area accurate and comprehensive?
98. Were the geotechnical analyses adequate and appropriate for the current level of design as presented in the report documentation?

Civil Design

99. Have the design and engineering considerations been clearly outlined and will they achieve the project objectives?
100. Do you agree with the method by which plausible storms and predefined profiles were computed?
101. 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?
102. Were the data surveys conducted to evaluate the existing environmental and natural resources adequate? If not, what types of surveys should have been conducted?
103. Was the ADCIRC model used in an appropriate and technically sound manner? If not, explain.
104. Are any additional design assumptions necessary to validate the preliminary design of the primary project components?
105. Are the assumptions used to determine the cost of operations and maintenance for the proposed project adequately documented and explained?

Real Estate Plan

106. 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.
107. Does the Real Estate Plan adequately address all real estate interests (public and private)?

Cost Estimates and Economics

108. To what extent have significant project construction costs been adequately identified and described?
109. Are the costs adequately justified?

Public Involvement and Correspondence

110. 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?

Economics Appendix

111. Were the benefit categories used in the economic analysis adequate to calculate a benefit-to-cost ratio for each of the project alternatives?
112. 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?
113. Were the methods to calculate structure and content values appropriate and adequately described?
114. Was the methodology to assess storm damages, and storm damage reduction appropriate and adequately described?
115. Were the methods used to develop the content-to-structure value ratios (CSVRs) appropriate and were the generated results applicable to the study area?
116. 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?
117. Were risk and uncertainty sufficiently considered in relation to the future development process?

Environmental Appendix

118. Is the biological assessment of aquatic and terrestrial resources in the project area complete and accurate?
119. Comment on the extent to which assumptions and data sources used in the biological assessment are clearly identified and the assumptions are justified and reasonable.
120. Are the impacts of the recommended plans as they relate to designated and proposed critical habitat and essential fish habitat adequately described in the biological assessment?

FINAL OVERVIEW QUESTIONS

121. 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?
122. Please provide positive feedback on the project and/or review documents.

