

Final External Peer Review Report for Calcasieu River and Pass, Louisiana Dredged Material Management Plan and Supplemental Environmental Impact Statement

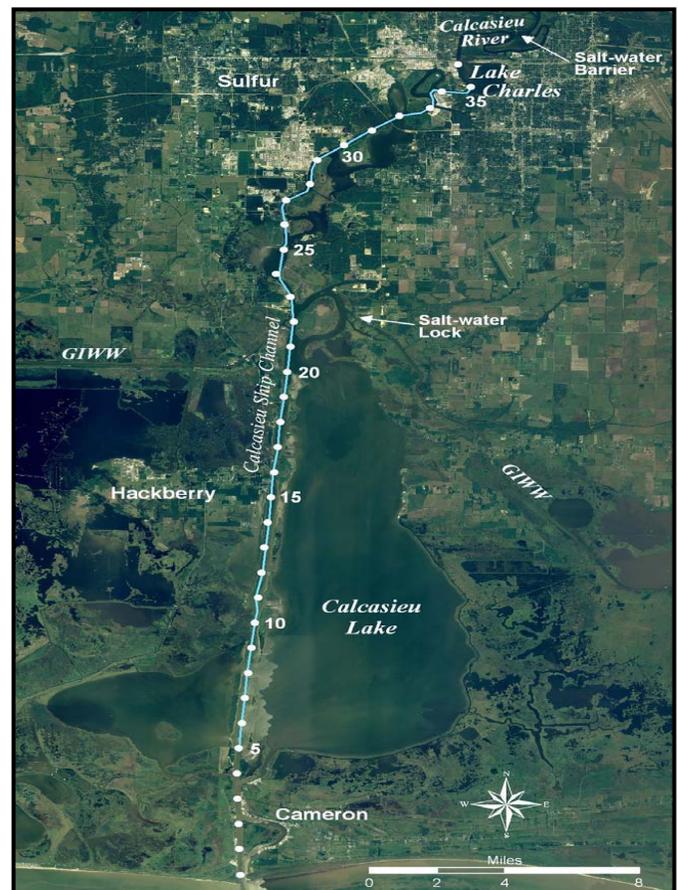
By

Battelle
505 King Avenue
Columbus, OH 43201

Prepared for
U.S. Army Corps of Engineers
Deep Draft Navigation
Planning Center of Expertise
Mobile District

Contract No. W911NF-07-D-0001
Task Control Number: 08224

August 29, 2008



FINAL
EXTERNAL PEER REVIEW REPORT

for

**Calcasieu River and Pass, Louisiana Dredged Material Management Plan
and Supplemental Environmental Impact Statement**

Prepared by

**Battelle
505 King Avenue
Columbus, Ohio 43201**

for

**Department of the Army
U.S. Army Corps of Engineers
Deep Draft Navigation Planning Center of Expertise
Mobile District**

August 29, 2008

**Contract Number: W911NF-07-D-0001
Task Control Number: 08224**

The views, opinions, and/or findings contained in this report are those of the authors and should not be construed as an official Department of the Army position, policy, or decision, unless so designated by other documentation.

TABLE OF CONTENTS

EXECUTIVE SUMMARY	III
1. INTRODUCTION	1
1.1 Background of Report Reviewed.....	1
1.2 Purpose of External Peer Review	2
2. METHODS	2
2.1 Planning and Schedule.....	2
2.2 Identification and Selection of External Peer Reviewers	3
2.3 Preparation of the Charge and Conduct of the Peer Review	4
2.4 Review of Verbatim Comments.....	5
2.5 External Peer Review Panel Consensus Discussion	5
2.6 Preparation of Final Comments	6
3. BIOGRAPHICAL INFORMATION ON EXTERNAL PEER REVIEWERS	7
4. RESULTS – SUMMARY OF PEER REVIEW COMMENTS.....	9
 Appendix A. Final Peer Review Comments on the Calcasieu River and Pass, Louisiana DMMP and SEIS	A-1
Appendix B. Charge to the Calcasieu River and Pass, Louisiana EPR Panel	B-1

LIST OF TABLES

Table ES-1. Overview of 14 Final Comments Identified by the Calcasieu River and Pass, Louisiana EPR Panel.....	v
Table 1. Schedule.....	3
Table 2. Calcasieu River and Pass, Louisiana EPR Panel: Technical Criteria and Areas of Expertise	7
Table 3. Overview of 14 Final Comments Identified by the Calcasieu River and Pass, Louisiana EPR Panel.....	10

**FINAL
EXTERNAL PEER REVIEW REPORT**

**For
Calcasieu River and Pass, Louisiana Dredged Material Management Plan
and Supplemental Environmental Impact Statement**

EXECUTIVE SUMMARY

The Calcasieu River and Pass, Louisiana, project (Calcasieu Ship Channel) spans 36 miles from Lake Charles, Louisiana, to the Gulf of Mexico and 32 miles offshore. The project area comprises the Calcasieu Ship Channel from river mile 5.0 to river mile 36.0 and proposed beneficial use sites in the marsh and open water near the eastern and western shores of Calcasieu Lake in Calcasieu and Cameron Parishes, Louisiana. The area is bounded on the north by Interstate 10, on the south by the Gulf of Mexico, and on the east and west by an artificial levee system. The beneficial use sites consist of unconfined marsh and/or open water that show no borders. The federal navigation channel is used for commercial, industrial, and private marine traffic. The beneficial use sites are generally privately owned and support commercial, recreational, and residential uses as well as oil and gas exploration. Population centers in the project area include the Cities of Lake Charles and Westlake and the Towns of Hackberry and Cameron.

The project handles about 50 million tons of cargo through deep-draft and shallow-draft vessels and barges every year. Unfortunately, dredged material disposal capacity is not adequate for maintaining the channel to federally authorized dimensions over the long term. Existing disposal sites are at or near capacity, and past maintenance deficiencies have resulted in substantial erosion of disposal facilities into adjacent water bodies. Other disposal sites have been lost to commercial development.

The Calcasieu River and Pass, Louisiana Dredged Material Management Plan and Supplemental Environmental Impact Statement (DMMP and SEIS) identifies areas for the placement of dredged material for the 20-year life of the Calcasieu River and Pass, Louisiana project. Dredged material management alternatives have been evaluated and screened so that recommended dredge placement operations are conducted in a timely, environmentally sensitive, and cost-effective manner. The local sponsor is the State of Louisiana through the Lake Charles Harbor and Terminal District.

Four alternatives for managing and placing dredged material for maintenance operations were evaluated. The alternative chosen as the Recommended Plan maximizes the use of the federal and local sponsors' investments in lands, easements, and costs for real estate improvements and involves the rehabilitation and maximum use of existing confined dredged material placement areas. The beneficial use sites proposed in this alternative have a high level of certainty regarding their availability for dredge placement over the life of the DMMP.

Because of the importance of this project and guidance provided in the Water Resources Development Act (WRDA 2007, Public Law 110-114), an external peer review (EPR) of the Calcasieu River and Pass, Louisiana DMMP and SEIS was conducted. Independent, objective

peer review is regarded as a critical element in ensuring the reliability of scientific analyses. The EPR followed the procedures described in the Department of the Army, U.S. Army Corps of Engineers (USACE), guidance *Peer Review of Decision Documents*, Engineering Circular (EC 1105-2-408) dated May 31, 2005, CECW-CP Memorandum dated March 30, 2007, and the Office of Management and Budget's *Final Information Quality Bulletin for Peer Review*, released December 16, 2004.

This final report describes the EPR process, summarizes final comments of the EPR panel, and describes the panel members and their selection. The results of this EPR report will be taken into consideration in preparation of the Chief of Engineer's Report.

Battelle initially identified 12 potential peer reviewers, confirmed their availability, evaluated their technical expertise, and inquired about potential conflicts of interest. Of those initially contacted, 6 EPR candidates confirmed their interest and availability, and 6 candidates declined due to the schedule and anticipated level of effort, because of disclosed conflicts of interest, or because they did not possess the technical expertise being sought. The reviewers selected were from academe or were independent engineering consultants. Corresponding to the technical content of the Work Plan for the Calcasieu River and Pass, Louisiana DMMP and SEIS, the areas of technical expertise of the selected peer reviewers included: coastal engineering (hydrological and hydraulics), coastal ecology, civil engineering (dredging expert), and planning (economics, cost, and plan formulation).

The peer reviewers were sent CDs of the documents for the Calcasieu River and Pass, Louisiana DMMP and SEIS via overnight courier (FedEx) the week of July 21, 2008, along with a charge that solicited their comments on specific sections of the documents that were to be reviewed. Peer reviewers were instructed to submit responses to the charge questions no later than August 14, 2008. More than 260 individual comments were received from the EPR panel in response to the charge questions.

Following the individual reviews of the documents for the Calcasieu River and Pass, Louisiana DMMP and SEIS by the EPR panel members, the EPR panel participated in a consensus discussion facilitated by Battelle to review key technical comments, discuss charge questions in which there were conflicting responses, and reach consensus on the final comments to be provided to USACE. The final comments were documented according to a five-part format that included, (1) nature of the comment, (2) basis for the comment, (3) significance of the comment (high, medium, and low), (4) comment cross-referencing if related to other comments, and (5) recommendations on how to resolve the comment. Overall, 14 final EPR comments were identified and documented. Of the 14 final comments, 8 were identified as having high significance, 3 were identified as having medium significance, and 3 comments were identified as having a low level of significance. Table ES-1 summarizes the final comments by level of significance. Clarifications of each comment are contained in Appendix A of this report.

Overall, the external peer reviewers find that the Calcasieu River and Pass, Louisiana DMMP and SEIS presents a good overview of the need for the project, the goals of the DMMP, and the alternatives considered. Both alternatives B (Preferred Alternative) and C seem to generally meet the project objectives of cost-effectiveness, beneficial use of dredged materials, and

provision of sufficient disposal capacity. Overall, this appears to be a straightforward project involving channel maintenance and disposal, and there are no insurmountable engineering or technical issues. However, the EPR panel finds that certain aspects of the report, including portions of the plan formulation, technical analyses, economic analysis, and mitigation, should be presented more clearly and with a greater level of detail to assist with the evaluation of disposal alternatives. The strategic value as a national energy port is clear, and the EPR panel recognizes that there is some urgency to finalize the DMMP because of limited existing confined disposal facility (CDF) capacity. Most comments can therefore be addressed through revision of the existing report. Some comments may require more detailed analysis, thus the EPR panel recommends that the DMMP be revised in five years to address these larger concerns.

Table ES-1. Overview of 14 Final Comments Identified by the Calcasieu River and Pass, Louisiana EPR Panel.

#	Comment:
Significance – High	
1	The long-term sustainability of the project, beyond a 20-year time period, needs to be considered in the comparison of project alternatives and in the assessment of project impacts.
2	Options to reduce the dredging requirement (average rate of dredging) should be investigated.
3	A Sediment Budget Analysis is needed to diagnose the causes of the very high shoaling rates, and to improve the DMMP.
4	Several appendices were written primarily to support Alternative B and thus, do not evaluate Alternative C. If Alternative C is ultimately selected as the preferred plan, several appendices may not apply and additional work may be required.
5	Technical analyses do not sufficiently establish the required dike cross sections, placement locations, or stability. The feasibility of many dike sections is not established.
6	The impacts to the aquatic ecosystems in the vicinity need to be better addressed. Impacts to the Gulf shore are not mentioned.
10	The selection, use, and assumptions used for the Wetland Value Assessment functional assessment procedure and the details for how the measures of wetland services and functions are translated into Habitat Suitability Index are poorly described.
11	The hydrodynamic modeling did not fully support the alternative analysis. It is not clear that the lateral extents of the model are sufficient to fully model the system.
Significance – Medium	
7	The report does not provide sufficient detail about the proposals and the selection process for Beneficial Use (BU) sites.
8	The method for combining evaluation criteria to determine evaluation scores is not sufficiently supported.
9	Several elements within the economic analysis are not sufficiently described.
Significance – Low	
12	A more thorough summary of prior studies, and of public and agency input, is needed.
13	Report needs to eliminate inconsistencies between appendices and the main body of the report.
14	There is little discussion of risk or uncertainty, and limitations of the data or analysis methods may impact the credibility of some conclusions.

1. INTRODUCTION

1.1 Background of Report Reviewed

The Calcasieu River and Pass, Louisiana, project (Calcasieu Ship Channel) spans 36 miles from Lake Charles, Louisiana, to the Gulf of Mexico and 32 miles offshore. The project area comprises the Calcasieu Ship Channel from river mile 5.0 to river mile 36.0 and proposed beneficial use sites in the marsh and open water near the eastern and western shores of Calcasieu Lake in Calcasieu and Cameron Parishes, Louisiana. The area is bounded on the north by Interstate 10, on the south by the Gulf of Mexico, and on the east and west by an artificial levee system. The beneficial use sites consist of unconfined marsh and/or open water that show no borders. The federal navigation channel is used for commercial, industrial, and private marine traffic. The beneficial use sites are generally privately owned and support commercial, recreational, and residential uses as well as oil and gas exploration. Population centers in the project area include the Cities of Lake Charles and Westlake and the Towns of Hackberry and Cameron.

The project handles about 50 million tons of cargo through deep-draft and shallow-draft vessels and barges every year. Unfortunately, dredged material disposal capacity is not adequate for maintaining the channel to federally authorized dimensions over the long term. Existing disposal sites are at or near capacity, and past maintenance deficiencies have resulted in substantial erosion of disposal facilities into adjacent water bodies. Other disposal sites have been lost to commercial development.

The Calcasieu River and Pass, Louisiana DMMP and SEIS identifies areas for the placement of dredged material for the 20-year life of the Calcasieu River and Pass, Louisiana project. Dredged material management alternatives have been evaluated and screened so that recommended dredge placement operations are conducted in a timely, environmentally sensitive, and cost-effective manner. The local sponsor is the State of Louisiana through the Lake Charles Harbor and Terminal District.

Four alternatives for managing and placing dredged material for maintenance operations were evaluated. The alternative chosen (Alternative B) as the Recommended Plan maximizes the use of the federal and local sponsors' investments in lands, easements, and costs for real estate improvements and involves the rehabilitation and maximum use of existing confined dredged material placement areas. The beneficial use sites proposed in this alternative have a high level of certainty regarding their availability for dredge placement over the life of the DMMP.

Because of the importance of this project and guidance provided in the Water Resources Development Act (WRDA 2007, Public Law 110-114), an EPR of the Calcasieu River and Pass, Louisiana DMMP and SEIS was conducted. Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific analyses. The EPR followed the procedures described in the Department of the Army, USACE, guidance *Peer Review of Decision Documents* (EC 1105-2-408) dated May 31, 2005, CECW-CP Memorandum dated

March 30, 2007, and the Office of Management and Budget's *Final Information Quality Bulletin for Peer Review*, released December 16, 2004.

This final report describes the EPR process by an external panel of experts, summarizes final comments of that EPR panel, and describes the panel members and their selection. The results of this EPR report will be taken into consideration in preparation of the Chief of Engineer's Report.

1.2 Purpose of External Peer Review

The purpose of EPR, in general, is to strengthen USACE's quality control processes for the development of decision documents in support of its Civil Works program. Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific and engineering analyses.

To help ensure that USACE documents are supported by the best scientific and technical information, a peer review process has been implemented by USACE that utilizes EPR to complement the internal technical review (ITR), as described in the Department of the Army, USACE, guidance *Peer Review of Decision Documents* (EC 1105-2-408) dated May 31, 2005, and CECW-CP Memorandum dated March 30, 2007. In this case, the EPR of the Calcasieu River and Pass, Louisiana DMMP and SEIS was conducted and managed using contract support from an independent 501(c)(3) organization (Battelle Memorial Institute; hereafter Battelle) to ensure independent objectivity, along with a high degree of flexibility and responsiveness, which was essential for USACE to meet deadlines.

2. METHODS

This section describes the methodology followed in selecting external peer reviewers, and in planning and conducting the EPR. The EPR was conducted following procedures described in USACE's guidance cited above (Section 1.2) and in accordance with the Office of Management and Budget's *Final Information Quality Bulletin for Peer Review*, released December 16, 2004. Supplemental guidance on evaluation for conflicts of interest used the National Academies' *Policy on Committee Composition and Balance and Conflicts of Interest for Committees Used in the Development of Reports*, dated May 12, 2003.

2.1 Planning and Schedule

Table 1 defines the schedule followed in execution of the EPR.

Table 1. Schedule.

Task	Action	Completed by Date
Task 1	Submit Draft Work Plan	8 July 2008
Task 2	Recruit and collect information on up to 8 potential peer reviewers; prepare summary information	9 July 2008
Task 3	Submit draft charge USACE approves draft charge Submit final charge, included in Final Work Plan USACE approves final charge	15 July 2008 21 July 2008 25 July 2008 25 July 2008
Task 4	Select 4 external peer reviewers Submit list of selected peer reviewers Complete subcontracts for peer reviewers	9 July 2008 9 July 2008 23 July 2008
Task 5	Review documents and charge sent to external peer reviewers Kick off meeting with external peer reviewers	23 July 2008 24 July 2008
Task 6	External peer reviewers complete their review Convene consensus teleconference Prepare final comments Submit final peer review report, including final comments	14 August 2008 20 August 2008 26 August 2008 29 August 2008
Task 7	USACE provides clarifying questions Submit response to clarifying questions	5 September 2008 12 September 2008
	Project Closeout	30 September 2008

2.2 Identification and Selection of External Peer Reviewers

Battelle initially identified 12 potential peer reviewers, confirmed their availability, evaluated their technical expertise, and inquired about potential conflicts of interest. Of those initially contacted, 6 external peer review candidates confirmed their interest and availability, and 6 candidates declined due to the schedule and anticipated level of effort, because of disclosed conflicts of interest, or because they did not possess the technical expertise being sought.

The reviewers selected were from academe or were independent engineering consultants. Corresponding to the technical content of the Work Plan for the Calcasieu River and Pass, Louisiana DMMP and SEIS, the areas of technical expertise of the selected peer reviewers included: coastal engineering (hydrological and hydraulics), coastal ecology, civil engineering (dredging expert), and planning (economics, cost, and plan formulation).

The credentials of the peer reviewers were evaluated according to the overall scope of the Calcasieu River and Pass, Louisiana DMMP and SEIS, focusing on the key areas listed above. Participation in previous USACE technical review committees and other technical review panel experience was also considered.

The peer reviewers were screened for the following *potential* exclusion criteria or conflicts of interest:

- Involvement in producing the DMMP and SEIS (including related technical reports and supporting appendices) pertaining to Calcasieu River and Pass, Louisiana;
- Involvement in any USACE projects in the Calcasieu River and Pass, Louisiana area;
- Current USACE employee;
- Other USACE affiliation [Scientist employed by the USACE (except as described in National Academy of Sciences (NAS) criteria, see EC 1105-2-408 section 9d)];^a
- A significant portion of personal or company revenues within the last 3 years came from USACE contracts;
- Current or future financial interests in Calcasieu River and Pass, Louisiana contracts/awards from USACE;
- Any publicly documented statement made by the reviewer or reviewer's firm advocating for or against the subject project;
- Other possible perceived conflict of interest for consideration, e.g.,
 - Former USACE employee
 - Repeatedly served as USACE technical reviewer.

In selecting final peer reviewers from the list of potential peer review candidates, an effort was also made to select experts who best fit the criteria and factors described above. Based on these considerations, four peer reviewers were selected from the potential list (see Section 3 for names and biographical information on the selected peer reviewers). Battelle established subcontracts with the peer reviewers who had indicated their willingness to participate and confirmed the absence of conflicts of interest (through a signed conflict of interest form).

2.3 Preparation of the Charge and Conduct of the Peer Review

A charge for peer review, which contained specific questions regarding the Calcasieu River and Pass, Louisiana DMMP and SEIS and appendices, was developed to assist the EPR panel. The draft charge was prepared by Battelle with input from USACE and guidance provided in USACE's guidance *Peer Review of Decision Documents* (EC 1105-2-408) and the Office of Management and Budget's *Final Information Quality Bulletin for Peer Review*, released December 16, 2004.

^a Note: 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 the OMB memo 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."

A draft charge was submitted to the USACE for consideration and evaluation. The USACE approved the charge questions as submitted and the charge was finalized. The charge was presented in comment-response table format, and was organized according to the order of the documents to be reviewed. The charge consisted of 116 total questions/discussion points; 68 questions/discussion points on the DMMP and SEIS and 48 questions/discussion points on the appendices from the DMMP and SEIS. The EPR panel was instructed to respond to the charge questions within the comment-response form table. The final charge is shown in Appendix B of this final report.

The peer reviewers were provided with electronic copies of the draft final charge and supporting documentation on July 23, 2008. Peer reviewers were instructed to submit responses to the charge questions no later than August 14, 2008.

2.4 Review of Verbatim Comments

More than 260 verbatim (i.e., individual) comments in response to the charge questions were received from the individual EPR panel members. Battelle reviewed these comments to identify overall recurring themes, potential areas of conflict, and other impressions of the report. As a result of this review, Battelle developed a preliminary list of 36 overall comments and discussion points that emerged from the EPR panelists' verbatim comments, including 27 negative and five positive comments. In addition, four comments that were conflicting among the various reviewers were identified for further discussion by the panel. Each reviewer's verbatim comments were shared with the EPR panel.

2.5 External Peer Review Panel Consensus Discussion

Battelle facilitated a consensus discussion conference call with the EPR panel on August 20, 2008. The purpose of the consensus discussion was to allow the exchange of technical information among the panel experts, many of whom are from diverse scientific backgrounds. This information exchange ensured that the EPR report represents the consensus of the panel and avoided isolated or conflicting information and analyses. The main goal of the consensus discussion was to review the overall comments and ascertain and confirm their importance to the EPR panel, remove points having a lack of consensus, identify and add any missing issues of high-level importance to the EPR panel, and finally, reach consensus on the final comments to be provided to USACE.

The panel discussion resulted in 15 overall consensus comments. A memorandum describing each consensus comment organized by level of significance, as defined by the EPR panel, was also prepared and distributed to the EPR panel by Battelle on August 21, 2008. The memorandum provided a detailed approach for developing the final comments for the Calcasieu River and Pass, Louisiana DMMP and SEIS.

In addition to reaching consensus on the final comments to be provided to USACE, the EPR panel discussed responses to four specific charge questions where there appeared to be disagreement among the reviewers. The disagreement was resolved (e.g., reviewers in conflict deferred to other panel members' professional knowledge) and the comment was either

incorporated into the final comments or determined to stand as is (i.e., was not important enough to include as a final comment).

2.6 Preparation of Final Comments

The EPR panel used the 15 overall consensus comments as a basis for preparing the final comments. A memorandum was distributed on August 21, 2008 to the EPR panel providing detailed instructions on developing the final comments. A summary of the directive is provided below:

- Lead Responsibility: A lead reviewer was assigned for each consensus comment, who was responsible for coordinating the development of the final comment and submitting it to Battelle by August 26, 2008. Lead assignments were modified by Battelle at the direction of the EPR panel. To assist each lead in the development of the final comments, Battelle distributed individual verbatim comments in the comment-response table format, a summary detailing each consensus comment (in the memorandum), an example final comment following the five-part structure (described below), and a template for the preparation of the final comments.
- Directive to the Lead: Each lead was encouraged to communicate directly with other reviewers, as needed, to contribute to a particular consensus comment. If a significant comment was identified that was not covered by one of the original 15 overall consensus comments, the appropriate lead was instructed to draft a new consensus comment. For this EPR, no additional comments were identified by the EPR panel; however, two consensus comments were consolidated into one comment, resulting in 14 final comments. If a consensus comment was related to another consensus comment, the lead was to cross-reference them.
- Format for Final Comments: Each final comment was presented as part of a five-part structure, including:
 1. Nature of comment (i.e., succinct summary statement of concern)
 2. Basis for comment (i.e., details regarding the concern)
 3. Significance (high, medium, low; see description below)
 4. Comment cross-referencing
 5. Recommendation (see description below).
- Criteria for Significance: The following were used as criteria for assigning a significance level to each final comment:
 - High Describes a fundamental problem with the project that could affect the recommendation or justification of the project
 - Medium Affects the completeness or understanding of the reports/project
 - Low Affects the technical quality of the reports but will not affect the recommendation of the project.
- Guidance for Developing the Recommendation: The recommendation was to include specific actions that the USACE should consider to resolve the 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, etc.).

As a result of this process, 14 final comments were prepared. Battelle reviewed and edited all final comments for clarity and adherence to the requested final comment template format. The final EPR comments were assembled and are presented in Appendix A.

3. BIOGRAPHICAL INFORMATION ON EXTERNAL PEER REVIEWERS

Potential peer review candidates were identified through Battelle’s EPR Database, targeted internet searches using key words (e.g., technical area, geographic region), search of websites of universities or other compiled expert sites, and through referrals from candidates who declined. A draft list of screened (for availability, technical background, conflict) potential reviewers was prepared by Battelle and provided to USACE. The final list of peer reviewers was determined by Battelle.

An overview of the credentials of the four reviewers selected for the EPR panel and their qualifications in relation to the technical evaluation criteria is presented in Table 2. Reviewer identities were unknown to the USACE authors of the Calcasieu River and Pass, Louisiana DMMP and SEIS during the EPR process. More detailed biographical information regarding each candidate and his or her technical areas of expertise is presented following Table 2.

Table 2. Calcasieu River and Pass, Louisiana EPR Panel: Technical Criteria and Areas of Expertise.

Name	Affiliation	Primary Areas of Expertise			
		Civil engineering (dredging expert)	Coastal ecology	Coastal engineering (hydrology and hydraulics)	Planning (economics, costs, plan formulation)
Robert Battalio	Philip Williams & Associates, Ltd.	x			
Robert Diaz	College of William and Mary		x		
Eric English	Stratus Consulting				x
David L. Kriebel	United States Naval Academy			x	

Robert Battalio, P.E., Principal

Role: This reviewer was chosen primarily for his expertise in civil engineering (dredging, wetlands and coastal processes).

Affiliation: Philip Williams & Associates, Ltd., San Francisco, CA

Mr. Battalio has extensive experience with flood management, wetland restoration, restoration design, marsh restoration, and coastal engineering. Mr. Battalio assisted the USACE Long-Term Management Strategy for Dredged Material in San Francisco Bay with the evaluation of upland disposal and beneficial reuse sites and review of means to reduce maintenance dredging requirements by project modification. He has also been involved in the preparation of reports for maintenance dredging for boating facilities, and dredging for wetland restoration projects. Mr. Battalio had responsible charge as a professional civil engineer for 3,000 acres of wetland restoration recently completed, the largest project of its kind in California to date. The project included consideration of the 10,000-acre wetland complex the site exists in, as well as modeling and sediment budget analysis for San Francisco Bay. Over an 8-year period, he served as the senior consultant leading the planning and engineering on this project from planning through construction. Mr. Battalio maintains extensive experience related to shoreline management and sand transport processes, including modeling of wave transformation and shoreline evolution. He holds an M.S. in Civil Engineering (Coastal Engineering) from University of California, Berkeley and is a registered Professional Engineer, State of Washington and Civil Engineer, State of California.

Robert Diaz, Ph.D.

Role: This reviewer was chosen primarily for his expertise in coastal ecology.

Affiliation: School of Marine Science, Virginia Institute of Marine Science, Gloucester Pt., VA

Dr. Diaz has over 35 years of experience working on environmental issues in a variety of marine and freshwater habitats from the Chesapeake to Antarctica and from the intertidal to the deep-sea. He specializes in documenting disturbance, both natural and human, to systems and has developed several methods for evaluating benthic habitats and identifying benthic resource value. His specific expertise includes organism-sediment interactions, fish and benthic habitat, biological processes, and environmental quality. He is recognized both nationally and internationally as an expert in benthic habitat assessment and the effects of low oxygen. Dr. Diaz has served as a peer reviewer of the National Marine Fisheries Service (NMFS) Essential Fish habitat models and a member of the Outer Continental Shelf Scientific Committee of the Minerals Management Advisory Board of the Minerals Management Service (MMS) Agency. Dr. Diaz holds a Ph.D. in Marine Science from University of Virginia.

Eric English

Role: This reviewer was chosen primarily for his planning expertise (economics, costs, and plan formulation).

Affiliation: Stratus Consulting Inc., Boulder, CO

Mr. English has investigated the benefits and costs of navigational dredging at several sites on the Atlantic Coast and in the Great Lakes region, including investigation of the cost of dredging and the cost of disposal of dredged materials, as well as the benefits forgone when dredging is not feasible due to sediment contamination. He has analyzed the additional cost of transportation of goods due to the use of shallower-draft vessels and the use of alternative transportation routes or more expensive modes of transportation. This work has involved models of the origin and destination of goods and the examination of vessel operating costs. His work on the management of dredged materials has included valuation of the beneficial use of dredged materials for habitat restoration in addition to costs of alternative disposal methods. Mr. English holds both an M.A. from Cornell University in Economics, and a second M.A. from Cornell University in Public Administration.

David L. Kriebel, Ph.D.

Role: This reviewer was chosen primarily for his expertise in coastal engineering (hydrology and hydraulics).

Affiliation: United States Naval Academy, Annapolis, MD

Dr. Kriebel is the Director of the Ocean Engineering Program, United States Naval Academy. Expertise areas include analysis of natural hazards, ocean waves and wave statistics, wave-structure interaction, sediment transport and erosion processes, and coastal zone management. He has conducted research for National Science Foundation, Office of Naval Research, Naval Facilities Engineering Command, USACE, U.S. Coast Guard, and Mobil Research & Development Corporation. Representative projects include: deep water wave statistics and wave crest elevations, near-shore wave transformation, sediment transport, shoreline erosion control, wave runup on beaches, analytical and numerical methods for predicting beach profile response, wave interaction with vertical-wall breakwaters, wave and current loading on cylinders, ship-generated waves, and passing vessel effects. Dr. Kriebel holds a Ph.D. in Coastal and Ocean Engineering from University of Florida and an M.S. in Civil Engineering from the University of Delaware.

4. RESULTS – SUMMARY OF PEER REVIEW COMMENTS

As a result of the consensus discussion process, the EPR panel identified 14 final comments, segmented into rankings of high, medium, and low significance. In total, as shown in Table 3, 8 were identified as having high significance, 3 were identified as having medium significance, and 3 comments were identified as having a low level of significance.

Table 3. Overview of 14 Final Comments Identified by the Calcasieu River and Pass, Louisiana EPR Panel.

#	Comment:
Significance – High	
1	The long-term sustainability of the project, beyond a 20-year time period, needs to be considered in the comparison of project alternatives and in the assessment of project impacts.
2	Options to reduce the dredging requirement (average rate of dredging) should be investigated.
3	A Sediment Budget Analysis is needed to diagnose the causes of the very high shoaling rates, and to improve the DMMP.
4	Several appendices were written primarily to support Alternative B and thus, do not evaluate Alternative C. If Alternative C is ultimately selected as the preferred plan, several appendices may not apply and additional work may be required.
5	Technical analyses do not sufficiently establish the required dike cross sections, placement locations, or stability. The feasibility of many dike sections is not established.
6	The impacts to the aquatic ecosystems in the vicinity need to be better addressed. Impacts to the Gulf shore are not mentioned.
10	The selection, use, and assumptions used for the Wetland Value Assessment functional assessment procedure and the details for how the measures of wetland services and functions are translated into Habitat Suitability Index are poorly described.
11	The hydrodynamic modeling did not fully support the alternative analysis. It is not clear that the lateral extents of the model are sufficient to fully model the system.
Significance – Medium	
7	The report does not provide sufficient detail about the proposals and the selection process for Beneficial Use (BU) sites.
8	The method for combining evaluation criteria to determine evaluation scores is not sufficiently supported.
9	Several elements within the economic analysis are not sufficiently described.
Significance – Low	
12	A more thorough summary of prior studies, and of public and agency input, is needed.
13	Report needs to eliminate inconsistencies between appendices and the main body of the report.
14	There is little discussion of risk or uncertainty, and limitations of the data or analysis methods may impact the credibility of some conclusions.

Overall, the external peer reviewers find that the Calcasieu River and Pass, Louisiana DMMP and SEIS presents a good overview of the need for the project, the goals of the DMMP, and the alternatives considered. Both alternatives B (Preferred Alternative) and C seem to generally meet the project objectives of cost-effectiveness, beneficial use of dredged materials, and provision of sufficient disposal capacity. Overall, this appears to be a straightforward project involving channel maintenance and disposal, and there are no insurmountable engineering or

technical issues. However, the EPR panel finds that certain aspects of the report, including portions of the plan formulation, technical analyses, economic analysis, and mitigation, should be presented more clearly and with a greater level of detail to assist with the evaluation of disposal alternatives. The strategic value as a national energy port is clear, and the EPR panel recognizes that there is some urgency to finalize the DMMP because of limited existing CDF capacity. Most comments can therefore be addressed through revision of the existing report. Some comments may require more detailed analysis, thus the EPR panel recommends that the DMMP be revised in five years to address these larger concerns.

As indicated in Table 3, the majority of the comments focus on areas viewed by the reviewers as needing improvement or additional discussion, or that were omitted. The final EPR comments in their entirety are included in Appendix A.

Appendix A

Final Peer Review Comments on the Calcasieu River and Pass, Louisiana DMMP and SEIS

Comment 1:

The long-term sustainability of the project, beyond a 20-year time period, needs to be considered in the comparison of project alternatives and in the assessment of project impacts.

Basis for Comment:

Sustainability issues related to the project beyond 20 years should be considered in the DMMP. While the report consistently addresses the 20-year life of the project, ER 1105-2-100 states that DMMP plans are to consider at least the next 20 years. This distinction is important with regard to future sustainability, as the ER implies that 20 years is the minimum planning period and that some consideration should be given to the longer term beyond 20 years.

It is important to consider sustainability because it may influence selection of one alternative over another. Planning Objective 4, to provide flexibility for future disposal of dredged material, implies that sustainability is an important objective, yet the report does not address which of the plan alternatives is most sustainable beyond the 20 year minimum planning period. The long-term sustainability should be addressed in the discussion of alternatives and should be a criterion in the evaluation of alternatives. If two alternatives are otherwise comparable, the one capable of adapting over the long-term and remaining sustainable for more than 20 years should receive higher ratings.

Several specific issues should be addressed with regard to long-term sustainability:

(1) Sustainability of Confined Disposal Facilities (CDFs) over the long term. The end point of Alternative B at year 20 is no excess disposal capacity with CDFs filled to capacity. Questions that should be evaluated over a longer time horizon include the ability to create new CDFs, the ability of CDFs to be expanded further in various segments of the channel, impacts of further expansion on Lake Calcasieu and oyster habitat, and the eventual need to abandon CDFs in favor of beneficial use (BU) sites after year 20.

(2) Expansion of BU sites over the long term. Several sustainability issues exist for Alternative C, where concerns over long-term real-estate acquisition may be more important, and where costs of spreading of large quantities of dredge material through long pipelines and spreading in thin layers over thousands of acres are more uncertain. On the positive side, this alternative may have greater environmental sustainability in the long term.

(3) The impact of the deep navigation channel on its surroundings. Deep-dredged channels can act as sediment traps to enhance or accelerate erosion of land and marsh areas surrounding them, and these channels can accelerate the removal of sediment out of the estuary. The physical impacts of the channel on surroundings wetland and shallow lake environments, with removal of 96 mcy in 20 yr and almost 250 mcy in 50 yrs, should be addressed. The sustainability of long-term disposal of material from the entrance channel into the Ocean Dredged Material Disposal Site (ODMDS) should be addressed.

(4) The impact of future sea level rise (SLR) on the various alternatives. The very high relative SLR in coastal Louisiana, and the EPA projections of accelerated SLR in the future, will have impacts on the various alternatives. A key factor in the successful functioning of the marshes that will be created will be their elevation relative to sea level. Even over a 20-year period the relative rise in sea level in the project area may be significant, in terms of water level and potential for erosion of created marshes. How sea level factors into future land loss needs to be considered. It would seem reasonable to at least discuss the erosion potential and sea level rise (eustatic and subsidence) for the next 20 years and how this will affect the functions provided by the marsh creation.

Significance – High:

The navigation channel will likely be maintained well beyond 20 years and the DMMP must address sustainability issues beyond 20 years. Long-term sustainability may influence the evaluation and selection of alternatives.

Comment Cross-referencing:

- (2) *Options to reduce the dredging requirement (average rate of dredging) should be investigated.*
- (3) *A Sediment Budget Analysis is needed to diagnose the causes of the very high shoaling rates, and to improve the DMMP.*
- (6) *The impacts to the aquatic ecosystems in the vicinity need to be better addressed. Impacts to the Gulf shore are not mentioned.*
- (8) *The method for combining evaluation criteria to determine evaluation scores is not sufficiently supported.*

Recommendations for Resolution:

To resolve these concerns, the report would need to be expanded to include:

- The time period of the analysis should be divided into an initial 20-year segment examined in significant detail (as done in the DMMP) and an additional 20 or 30 year segment examined in more general terms for longer-term sustainability issues.
- Issues noted in Basis for Comment above should be addressed. The most important issue is that long-term sustainability should be addressed for the four main project alternatives, and sustainability should be included in the analysis and selection of alternatives.
- Sustainability can be addressed through additional text. Apart from simple numerical projections, e.g. 96 mcy in 20 yrs projected to 240 mcy in 50 yrs, no lengthy numerical analysis is suggested or required, and there is no need to run cost, volume, or similar lengthy tables out beyond 20 years.

Comment 2:

Options to reduce the dredging requirement (average rate of dredging) should be investigated.

Basis for Comment:

Dredging practice may be contributing significantly to the dredging requirement, thereby contributing to the disposal capacity deficit. For example, the report states that erosion of the CDFs, located adjacent to the channel, is contributing to channel shoaling.

Reducing the dredging requirement may be a more cost-effective way of increasing disposal capacity, and may increase project sustainability. If, for example, the CDFs are a significant contributor to the channel shoaling, placing more sediment in the CDFs may be counter-productive.

The report states the purpose of the DMMP is to "...develop a plan for the placement of material dredged from the maintenance of the Calcasieu Ship Channel and anticipated improvements, to develop management strategies to maximize the capacity of the recommended placement plan, and to attempt to reduce dredging frequencies and quantities." While the report focuses adequately on the first two goals, it does not address the third goal. Reduction in dredging volume and frequency (and therefore cost) should be a primary goal of a DMMP, and this report does not present any strategies or options for reducing the amount of material dredged or the frequency of dredging. This issue needs to be addressed in the final report and plan.

There is an assumption in the report that dredging must maintain authorized project dimensions of 40-ft depth and 400-ft width. However, a portion of the channel has not been maintained to the authorized width, and no data are presented that shows this reduction in width is having a negative effect on navigation safety or economics. The lack of demonstrated safety or economic consequences of reducing channel width leads to the question: Can this reduction in width be part of the permanent solution to minimize dredging volumes for all or portions of the channel? This should be addressed.

Significance – High:

Options to reduce dredging requirement may greatly improve the project performance. If dredging practice is not changed, there is a risk that the rate of future dredging may be higher than estimated for the selected alternative.

Comment Cross-referencing:

- (1) *The long-term sustainability of the project, beyond a 20-year time period, needs to be considered in the comparison of project alternatives and in the assessment of project impacts.*
- (3) *A Sediment Budget Analysis is needed to diagnose the causes of the very high shoaling rates, and to improve the DMMP.*
- (4) *Several appendices were written primarily to support Alternative B and thus, do not evaluate Alternative C.*

- (5) *Technical analyses do not sufficiently establish the required dike cross sections, placement locations, or stability.*
- (6) *The impacts to the aquatic ecosystems in the vicinity need to be better addressed. Impacts to the Gulf shore are not mentioned.*
- (9) *Several elements within the economic analysis are not sufficiently described.*
- (14) *There is little discussion of risk or uncertainty, and limitations of the data or analysis methods may impact the credibility of some conclusions.*

Recommendations for Resolution:

To resolve these concerns, the report would need to be expanded to include:

- In Appendix A: Shoaling Analysis include more detailed analysis of shoaling patterns and rates using surveys of channel depths, including: grade changes beyond the channel, to the limits of significant changes
- Also in Appendix A, quantify erosion of CDFs and investigate ship wake and quantify linkage to CDF and other erosion and shoaling.
- Investigate ship traffic operational controls that reduce wave-induced erosion and sedimentation, such as reduced speeds, moving with (not against) tide and navigation route (e.g., distance from bank, direction)
- Information pertaining to dredging design needs to be reconsidered. For example:
 - Channel side slope stability - Investigate slope stability and benefit of cutting flatter slopes, in order to reduce slope sloughing and sedimentation.
 - Discuss whether box cuts and over-dredging are increasing the maintenance dredging requirement
 - Discuss different channel dimensions – e.g. narrower channel similar to existing.
 - Define whether the concept of placing CDFs adjacent to the channel to block wind waves is valid based on available information
 - Discuss whether off-site disposal reduces the rate of recycling of dredged material
 - Develop CDF armoring options, including an evaluation of innovative biotechnical methods.
 - Update the Geotechnical Analysis (Appendix B) to include slope stability analysis of dredged channel slopes (including box cuts), slope stability analysis of existing CDF dikes, including eroded state, and analysis of rock structures proposed for CDFs

Comment 3:

A Sediment Budget Analysis is needed to diagnose the causes of the very high shoaling rates, and to improve the DMMP.

Basis for Comment:

The very high shoaling rates and project costs logically lead practitioners to the question “Where is all this sediment coming from?” A Sediment Budget Analysis is mentioned several times, but results are not provided to a level useful to the DMMP.

Three estimates of future dredging are identified (in million cubic yards per 20 years): 68, 97 and 126. While the selected projection (97 mcy/20 years) may be reasonable, the range of estimates is disconcerting. Also, the risk of higher dredging rates was not addressed.

Appendix A does not analyze the sources of sediment shoaling, and the appendix does not give the reader the impression that sources of sediment are well understood. It does not address the fundamental question: “Where does 96 mcy of material come from over 20 years?”

This is a major weakness of the study. Some form of sediment budget is required to update the DMMP. The hydrodynamic and sediment transport study (Appendix C) addresses transport of sediment but not sources of sediment. The report does not provide clear indications of the relative importance of the following on sedimentation: (1) river discharge of the Calcasieu River, (2) erosion of surrounding marshes, (3) erosion of the channel banks, dikes, and existing CDFs, or (4) tidal inflow from the Gulf of Mexico. As noted previously, reduction in the dredge volumes should be a major goal of the project - and sedimentation volumes can only be reduced if their source is understood.

No analysis of shoaling in the Entrance Channel is included. As noted, the sediment volume dredged from the Entrance channel (8 mcy/yr) exceeds that dredged from interior channel (projected at 4.8 mcy/yr) so some treatment of the entrance channel shoaling should be included.

In several places, the report suggests that erosion of channel-side dikes has contributed to shoaling volumes. For example, p.1-13 states that: “The authorized plan ...has washed back into the lake and channel because of failure of the lake-side retaining dikes. These failures have resulted in excessive shoaling and maintenance requirements, and environmental damage to adjacent lake areas.” The report does not address this issue in a coherent and systematic way. This should get more attention, especially given the large costs projected for revetment construction to prevent erosion of the CDFs back into the channel.

Significance – High:

The credibility of the study is undermined by an inadequate explanation of the causes of the high shoaling and maintenance dredging requirements, and in particular whether the future dredging estimates are likely to be accurate, and whether the alternative selection is justified.

Comment Cross-referencing:

- (1) *The long-term sustainability of the project, beyond a 20-year time period, needs to be considered in the comparison of project alternatives and in the assessment of project impacts.*
- (3) *A Sediment Budget Analysis is needed to diagnose the causes of the very high shoaling rates, and to improve the DMMP.*
- (4) *Several appendices were written primarily to support Alternative B and thus, do not evaluate Alternative C.*
- (5) *Technical analyses do not sufficiently establish the required dike cross sections, placement locations, or stability.*
- (6) *The impacts to the aquatic ecosystems in the vicinity need to be better addressed. Impacts to the Gulf shore are not mentioned.*
- (9) *Several elements within the economic analysis are not sufficiently described.*
- (14) *There is little discussion of risk or uncertainty, and limitations of the data or analysis methods may impact the credibility of some conclusions.*

Recommendations for Resolution:

The report should be revised to include a sediment budget analysis for sediment depositing in the channel. The goal is to understand sediment processes to facilitate key objectives: (1) reduce maintenance dredging, 2) support an estimate of future dredging requirement, (3) mitigate project effects that are negative, (4) maximize beneficial reuse of sediment as a resource. The analysis should address influx, outflux and storage changes within the project vicinity in terms of volumes over time, and including transport mechanisms, pathways, and rates. In addition, an analysis of historic and future conditions, using geomorphic interpretations that build upon shoaling and hydrodynamic analyses should be included. Specific items that will probably be needed are:

- Erosion from CDFs
- Volume from marshes, including pathways
- Volume from lakes, including tides and waves
- Volume from gulf (sands and fine sediment inflow), link analysis to change in inlet to Gulf due to navigation entrance; include beaches in sand budget
- Volume from river and flocculation processes
- Transport and deposition rates, based on surveys
- Link the sediment budget to geomorphic and morphometric analyses that address the sediment budget change over time, in response to major disturbances including the Calcasieu Channel and Gulf Intercoastal Waterway.
- Link the sediment budget analysis with hydrodynamic tools such as the hydrodynamic modeling.
- Estimate storage changes based on elevation changes (surveys and maps).
- Address relative sea level rise and biomass production which affect sediment budget.
- More detailed shoaling analysis (Appendix A) to support sediment budget.
- Expanded Geotechnical assessment (Appendix B) to address slope failures and subsidence.
- Improvement of hydrodynamic analysis (Appendix C) to support sediment budget.
- Define the source(s) of fines and sands based on data and analysis.

Comment 4:

Several appendices were written primarily to support Alternative B and thus do not evaluate Alternative C. If Alternative C is ultimately selected as the preferred plan, several appendices may not apply and additional work may be required.

Basis for Comment:

At the outset of the review, the Peer Review Group was informed that the preferred alternative and recommended plan may change from Alternative B to Alternative C in the final report. To fit the tight time constraints for peer review, the report was reviewed “as written” with Alternative B as the preferred alternative. It is noted, however, that many of the appendices appear to have been written with Alternative B having specifically been identified as the preferred plan. As a result, these appendices do not treat Alternative C (or other Alternatives) in the same level of detail or in a balanced way. If Alternative C were to be ultimately selected, some of technical appendices would have to be re-written, and some technical analyses redone, to support Alternative C.

Specific issues include the following:

(1) Appendix A (Shoaling) and Main Report contain detailed aerial photographs and maps of CDFs under Alternative B but do not show similar levels of detail for Beneficial Use sites under Alternative C.

(2) Appendix B (Geotechnical) evaluates sediment characteristics and dike stability issues associated with confined disposal sites under Alternative B. No similar analysis was conducted for dike stability or geotechnical issues related to Beneficial Use sites listed under Alternative C. One unique aspect of Beneficial Use sites is that some dikes are to be designed to degrade over time, but the geotechnical aspects of this were not evaluated.

(3) Appendix C (Hydrodynamics and Sediment Transport) evaluates conditions for Alternative B and does not consider conditions related to Alternative C. Alternative C mainly involves wetland creation or marsh enhancement in areas well west of the shipping channel. Some of these areas are presently open shallow water. Filling large open water areas and digging sidecast borrow ditches may alter the hydrodynamic regime in these areas, and may influence transport of suspended sediment in these areas. These impacts have not been investigated in Appendix C or anywhere else in the DMMP.

(4) Appendix K (CZMA (or Coastal Zone Management Act) Consistency Determination) is written mainly for Alternative B, as cited under description of Proposed Action, and may not fully apply to Alternative C.

(5) Appendix T (Real Estate) appears to focus on Alternative B and has very little text and no cost estimates for Alternative C. Other sections of the report describe real estate issues as being more uncertain for Alternative C than B, but these issues are not fully evaluated in this appendix. As a result, the appendix gives an incomplete assessment of real estate issues, when these are crucial to the viability of alternative C.

Significance – High:

Alternative C, which is a close second in the project evaluation and which appears to be the preferred plan for local interests, was not evaluated in detail in many of the technical Appendices. If Alternative C is ultimately selected, many of these appendices will have to be modified to support the selected plan.

Comment Cross-referencing:

- (5) Technical analyses do not sufficiently establish the required dike cross sections, placement locations, or stability. The feasibility of many dike sections is not established.*
- (7) The report does not provide sufficient detail about the proposals and the selection process for Beneficial Use (BU) sites.*
- (9) Several elements within the economic analysis are not sufficiently described.*
- (11) The hydrodynamic modeling did not fully support the alternative analysis. It is not clear that the lateral extents of the model are sufficient to fully model the system.*
- (12) A more thorough summary of prior studies, and of public and agency input, is needed.*

Recommendations for Resolution:

To resolve these concerns, the report would need to be expanded to include:

- Issues noted in Basis for Comment above must be addressed if Alternative C is eventually selected as the recommended plan over Alternative B.
- A more balanced treatment of alternatives would be useful in the appendices but is probably not required in this DMMP unless the recommended plan changes to Alternative C
- Future revisions of the DMMP (in 5 years or so) should adopt a more balanced view of major alternatives to ensure that each is addressed in technical appendices.

Comment 5:

Technical analyses do not sufficiently establish the required dike cross sections, placement locations, or stability. The feasibility of many dike sections is not established.

Basis for Comment:

The report contains just two “typical” or generic cross sections of the proposed dike sections in Figures 5-1 and 5-2, but these do not appear to be representative of many of the dikes required to implement the recommended plan, and they are insufficient to establish the feasibility of all dike sections. While it is recognized that this is a planning level document, and not a detailed design, the typical plans do not adequately portray the many different types of dikes described in the document.

Specific issues may be identified:

(1) Figure 5-1 is unclear and must be redrawn as it does not convey realistic site conditions. The drawing does not show a vertical datum or typical water levels. Typical existing grade elevations are not indicated. As a result, it is unclear if the existing grade, or dike toe, is above or below mean sea level. The vertical cut (or depth) of the borrow pit is not indicated. This may affect slope stability and was not evaluated in Appendix B.

(2) Figure 5-1 does not represent dikes required to expand CDFs D/E and 17/19 toward the channel on the west and into Lake Calcasieu on the east.

(a) Figure 5-1 does not represent channel-side or foreshore dikes that are to be advanced toward the channel into finite water depth. The report states that these dikes would be 23 ft high (-3 ft to +20 ft), much higher than shown in Fig 5-1. A new drawing should show these dike elevations, the existing grade extending to the 40-ft deep navigation channel, and the stone shore protection planned for these dikes.

(b) Figure 5-1 does not represent lake-side dikes that are to be advanced into finite water depth of Lake Calcasieu. No indication is given of toe depths or of stone shore protection for these dikes. A new drawing should be more realistic, with realistic lake bed elevations, and should show marsh cross sections to be built at the toe of this dike. Rock dikes planned to extend the marsh into the lake should also be indicated.

(3) Figure 5-2 for Beneficial Use sites must be re-drawn to provide more detail. There is no indication of datum, existing grade elevations, water levels, or of proposed fill elevations. Dimensions of side-cast borrow ditches adjacent to the dike should be shown.

(4) The slope stability analysis in Appendix B uses dike cross sections that do not reflect either the typical cross section in Figure 5-1 or the various other dike cross sections noted in (2) and (3) above. The stability of the analyzed dike cross section has a rather low factor of safety. Higher dikes, with deeper water at the toe are proposed that may have lower factors of safety. For example, the dike analyzed in App B is raised 5 ft from +7 to +12, while the main report notes dikes beings raised by 8 to 10 ft and by up to 23 ft for foreshore dikes. These have not been analyzed and their stability has not been established.

(5) The influence on dike stability of the large drawdown due to passing ships (over 5 ft lowering of water level shown in App C) should be addressed. It would appear that new 23 ft high channel-side or foreshore dikes, may have minimum stability during these draw down events. This should be analyzed to prove the viability and feasibility of these dikes required to expand the capacity of CDFs.

(6) The need for, or lack of need for, stone armoring of channel side or lake-side dikes has not been fully established. A specific linkage between vessel wakes and erosion or stability of these dikes was not established. No analysis of wind-waves on the dike slopes was considered. As a result, miles of stone armoring are proposed that have not been fully justified. Other miles of unarmored dikes could be at risk, but the erosion risk has not been evaluated.

(7) The report is inconsistent in use or vertical datums. Some figures use NAVD88, some use GLW, and other show no datum at all (Figure 5-1, Plate 3 App B). Some discussion of datums is needed because raising dike elevations and establishing marshes to certain elevations is critical to the project.

(8) Plans for wetlands in BU sites are not very detailed, and it is hard to understand what is proposed in sufficient detail to assess likely performance. Technical issues such as hydrodynamic flows in side-cast borrow ditches, degradation of dikes has not been analyzed, and effects relative sea level rise have not been evaluated. These will become a critical comment if Alternative C is selected as the preferred plan.

Significance – High:

Dike construction is the major technical or engineering challenge of the project yet planning level details or analysis of the various dike designs are not sufficient to establish the feasibility of the various dike cross sections.

Comment Cross-referencing:

- (1) *The long-term sustainability of the project, beyond a 20-year time period, needs to be considered in the comparison of project alternatives and in the assessment of project impacts.*
- (2) *Options to reduce the dredging requirement (average rate of dredging) should be investigated.*
- (3) *A Sediment Budget Analysis is needed to diagnose the causes of the very high shoaling rates, and to improve the DMMP.*
- (7) *The report does not provide sufficient detail about the proposals and the selection process for Beneficial Use (BU) sites.*
- (11) *The hydrodynamic modeling did not fully support the alternative analysis. It is not clear that the lateral extents of the model are sufficient to fully model the system.*
- (14) *There is little discussion of risk or uncertainty, and limitations of the data or analysis methods may impact the credibility of some conclusions.*

Recommendations for Resolution:

To resolve these concerns, the report would need to be expanded to include:

- Issues noted in Basis for Comment above should be addressed.
- It is critical to develop better graphics of dike cross-sections. This change must be incorporated into the final DMMP
- It is critical to establish the stability and feasibility of the highest and least stable dike cross sections proposed. This is critical to viability of the recommended plan.

Comment 6:

The impacts to the aquatic ecosystems in the vicinity need to be better addressed. Impacts to the Gulf shore are not mentioned.

Basis for Comment:

The SEIS is deficient in assessing the project impacts to the Gulf of Mexico shoreline, and the tributary wetlands, and whether the DMMP could be modified to mitigate these impacts to some degree.

Tributary Wetlands: The SEIS states that the wetlands in the vicinity are being lost due to subsidence and other factors, including reduced sediment supply. The SEIS also states that there are sediment pathways from wetlands to the channel, and that the channel may be contributing to a sediment deficit leading to degradation of wetlands. What is the cumulative impact of increased dredging on the tributary wetlands? Does Alternative C mitigate this adverse effect more than Alternative B?

The Selected Alternative includes beneficial reuse of dredged sediments to enhance wetlands in the Sabine and other wetland areas to the west of the channel. However, without addressing the impacts of the Calcasieu Channel project, it is difficult to assess whether the proposed wetland enhancement mitigates for project impacts.

Gulf of Mexico Shoreline: The update to the DMMP does not include a serious assessment of the lower reaches of the project (the entrance and lower five miles of the channel). For example, the report indicates that marine sands deposit in the entrance and lower 5 to 10 miles of the channel, and disposal is (all?) offshore or inland. Also, the report states that the pre-project tidal inlet had a shallow depth. Therefore, it is logical to conclude that the project results in removal of marine sands from the Gulf shores at a rate higher than the natural historic rate. Large deficits to beach sand budgets typically result in shore erosion, resulting in a desire for nearshore disposal to mitigate erosion. That this DMMP/SEIS update is largely silent on this topic is puzzling and a shortcoming.

The report does not adequately address the dredge material management issues in the entrance channel (mile 0 to -32), or the continued use of the ODMDS. The entire Calcasieu River and Pass extends from mile -32 (offshore) to mile 36 (Lake Charles) for a distance of 68 miles, yet the DMMP really only addresses miles 5 to 36 in detail. Dredge management issues related to miles -32 to +5 need more thorough coverage. The report indicates that annual dredging requirements for the entrance channel, about 8 mcy/yr, exceed those of the lake and river channels, about 4.8mcy/yr. Extrapolation indicates that over 20 years the entrance channel requires roughly 160 mcy of dredging versus 97 mcy for interior channels so that more than 60 percent of total dredging occurs in the entrance channel. Certainly the large volumes dredged from the entrance channel justify some major treatment and discussion in the DMMP report.

As a result of the above comments, we cannot accept the statement at the top of p. 1-7 which, for the entrance channel and ODMDS, states: "...there is not a need for a detailed analysis for managing the disposal of material dredged from these reaches.." The DMMP should seriously

address all dredge material disposal issues, and the Entrance Channel and ODMDS represent a significant portion of the entire project.

Significance – High:

A DMMP update is an opportunity to improve project performance by reducing adverse effects to the ecology and human-serving potential of the shore and wetlands, which are highly valued by modern society. The credibility of the SEIS is undermined by avoiding this opportunity. It is also undermined by avoiding serious treatment of the entrance channel and ODMDS. The CZMA Consistency Determination (App. K) may be incorrect.

Comment Cross-referencing:

- (1) The long-term sustainability of the project, beyond a 20-year time period, needs to be considered in the comparison of project alternatives and in the assessment of project impacts.*
- (2) Options to reduce the dredging requirement (average rate of dredging) should be investigated.*
- (3) A Sediment Budget Analysis is needed to diagnose the causes of the very high shoaling rates, and to improve the DMMP.*
- (11) The hydrodynamic modeling did not fully support the alternative analysis. It is not clear that the lateral extents of the model are sufficient to fully model the system.*
- (14) There is little discussion of risk or uncertainty, and limitations of the data or analysis methods may impact the credibility of some conclusions.*

Recommendations for Resolution:

To resolve these concerns, the report would need to be expanded to address the following:

Overall

- Identify Project Effects to Gulf shore and wetlands tributary to the channel
- Identify change in project impacts associated with each alternative
- Consider options to improve alternatives to mitigate adverse effects.

Entrance / Gulf sands:

- **Beach Erosion:** Around the U.S., disposal of dredge material into an ODMDS is often controversial with states and the public because beach quality littoral sands can be lost from the active littoral system, possibly leading to enhanced shore erosion.
- **Beneficial Reuse:** Material dredged from the Entrance Channel might be suitable for beneficial use and might more appropriately be transported inland for that purpose at local cost. This should be explored relative to the State of Louisiana and CZMA consistency.
- **Sustainability and Dredge Practice:** Related to the sustainability issues, it is stated that material placed in the ODMDS is “swept” from the site by currents. Check entrance / ODMDS sand budget to check for sand recycling from ODMDS to channel.
- **Inlet / Entrance sand budget:** Develop an inlet/entrance sand budget including shoreline changes on either side of inlet

Tributary Wetlands:

- Sediment budget of wetlands
- Identify sediment pathways – are tributary channels incising, eroding?
- Investigate beneficial reuse of dredged material to mitigate wetland degradation.

Comment 7:

The report does not provide sufficient detail about the proposals and the selection process for Beneficial Use sites.

Basis for Comment:

Optimizing the beneficial use of dredged material is cited in Section 1 as an objective of the DMMP. In addition, the evaluation of environmental benefits is a criterion for selecting a recommended management alternative (see page 2-73). For these reasons it is important to provide a detailed presentation of viable Beneficial Use projects and a transparent description of the Beneficial Use project-selection process.

The selection process for Beneficial Use sites is not transparent because the reasons for the selection or rejection of projects are not clearly presented. Many of the 78 proposed projects that are not included among the selected projects are rejected for specified reasons. However, over 40 of the proposed projects, most of them Beneficial Use projects, are dropped for reasons which are not specifically identified. At least two of the projects (numbers 26 and 47) are identified on page 2-25 as selected projects but do not appear in the tables describing the projects actually included in the developed alternatives (Tables 2-5 and 2-6).

The report lacks detail regarding several aspects important to the evaluation of Beneficial Use sites. For example, site-specific maps for the Beneficial Use sites, such as those included for the CDF sites, are not included in the report. The report cites uncertainty about landowner status for several projects but does not explain why this uncertainty could not be further resolved. The report states that additional Beneficial Use sites that may become available in future years would be included in Alternative B, but does not indicate how the sites would be identified and incorporated into the disposal plan. The report also does not examine the long-term viability of Beneficial Use sites relative to CDF sites, and does not describe how strongly specific projects were suggested or recommended by the public.

Significance – Medium:

A more precise analysis of Beneficial Use projects and the project-selection process could lead to revisions in the selection of projects comprising Alternatives B and C.

Comment Cross-referencing:

NA

Recommendations for Resolution:

To resolve the concerns raised by this comment, the report would need to include in Section 2 the following information:

- A thorough presentation of the reasons for selecting or rejecting all projects, including a table showing the final disposition of all proposed projects.
- Site-specific maps for the Beneficial Use sites, such as those included for the CDF sites.
- Clarification of the reasons why uncertainty about landowner status for several projects could not be further resolved.
- A description of how additional Beneficial Use sites that may become available in future years would be identified and included in Alternative B.

- A description of whether the upland disposal sites in Alternative C would be sufficient for disposal of dredged materials during an emergency such as a hurricane or ship grounding, and if not, why not.
- Clarification of the consequences of abandoning CDF sites in Alternative C and what investments would be lost.
- Consideration of sea-level rise and the effects on marsh habitats.
- Consideration of the long-term viability of Beneficial Use sites relative to CDF sites.
- A description of public support for each project, specifically, the number people and public agencies expressing support for each project.

Comment 8:

The method for combining evaluation criteria to determine evaluation scores is not sufficiently supported.

Basis for Comment:

The selection of a recommended disposal alternative is based on scores that are determined using six specified criteria. Each alternative is scored on each criterion, and the total score for each alternative is the sum of the six criteria-specific scores. The six criteria are thus given equal weight in the development of a recommended plan. More careful consideration of how the relevant criteria relate to one another and how they should be weighted and combined would better support the selection of a particular option.

Difficulties associated with the current scoring process are illustrated by the example of landowner participation in the Beneficial Use projects. Uncertainty in the willingness of some landowners to participate in Beneficial Use projects is cited as the basis for assigning a low score to Alternative C on three of the six criteria: “Capacity,” “Acceptability Risk,” and “Use Risk.” Risks associated with the acceptability of the projects to landowners (acceptability risk) and the resulting uncertainties in the use of the sites (Use Risk) are in fact the same issue, and should not be counted two or three times as separate components of the evaluation. The same is true for the capacity criterion, since potential limitations in disposal capacity are equivalent to limitations in the use of the disposal sites. The treatment of capacity as an evaluation criterion seems inappropriate, because the alternatives under consideration were all developed to provide sufficient capacity, as demonstrated in Section 2.0.

The risk associated with each project, and with Beneficial Use sites in particular, is an important factor in the evaluation. However, several factors affecting risk are not sufficiently considered. For example, if significant risk results from the fact that “geotechnical and engineering studies have not yet been conducted” for many Beneficial Use sites (2-75), then further study could eliminate these risks and this possibility is relevant to the evaluation of risk. The risk that CDFs will erode and result in recycling of dredged material into the channel or loss of disposal capacity is not sufficiently considered when evaluating the alternatives, especially given the project history of extensive erosion of CDFs and the lack of measures to address this erosion. The loss of 756 acres of oyster habitat in Alternative B is not addressed in the numerical evaluation, either as a mitigation cost or an environmental loss. The long-term sustainability of the alternatives beyond 20 years is potentially an important factor affecting the selection of an appropriate alternative, but this factor is not addressed in the evaluation scoring process.

Significance – Medium:

Refinement of the evaluation criteria and the use of weights to reflect the importance of particular criteria could affect the selection of a recommended alternative.

Comment Cross-referencing:

(1) *The long-term sustainability of the project, beyond a 20-year time period, needs to be considered in the comparison of project alternatives and in the assessment of project impacts.*

Recommendations for Resolution:

To resolve these concerns, the report would need to be expanded to include:

- Revise the method for developing evaluation scores to eliminate duplicative scoring of related issues.
- Incorporate sustainability into the development of evaluation scores.
- Develop explicit weights for each criterion. Alternatively, develop criteria for which equal weights may be justified, for example, by combining the three separate risk criteria into a single factor and eliminating “capacity” as an evaluation criterion. An explicit justification should be provided for the selected weighting scheme.
- Conduct the appropriate geotechnical and engineering studies that would enable the technical risk associated with Beneficial Use sites to be better evaluated.
- Expand the scoring process to address the risk that CDFs will erode and result in recycling of dredged material into the channel or loss of disposal capacity.
- Expand the scoring process to address the loss of 756 acres of oyster habitat in Alternative B, either as a mitigation cost or an environmental loss.
- Incorporate into the evaluation scoring process the long-term sustainability of the alternatives beyond 20 years.

Comment 9:**Several elements within the economic analysis are not sufficiently described.****Basis for Comment:**

The analysis of costs and benefits addresses the important threshold question of whether maintenance dredging of the channel and the cost of disposal of dredged materials is justified economically. However, certain elements of the benefit-cost analysis are incomplete or unclear.

The scope of the benefit-cost analysis is not sufficiently broad. The analysis is based on the assumption that a decrease in depth of the Calcasieu Channel will lead to a greater number of smaller-draft vessels importing a constant volume of cargo. A more complete analysis would examine the possibility of vessels diverting to other ports, or of vessels lightering cargo at other ports and then proceeding to the Calcasieu Channel with shallower draft, or the construction of offshore unloading facilities. These limitations in scope are noted in the report and may be justified, but the report does not provide sufficient justification for the limitations.

In Appendix D, the costs of disposal are presented in a condensed format without a clear description of the calculations. It is not clear in Appendix D to what the cost figures in Tables D-1, D-2, and D-3 refer, and how they were developed. The assumptions and dimensions used for rock dikes and shore protection are unclear. It is not clear whether shore protection (stone revetment) costs for Alternative B are fully included in the cost estimates (Table D-5 shows that revetment costs are the major cost item for Alternative C, but it is not clear if the revetment costs for CDFs D and E are included in the cost of Alternative B). The report does not include a presentation of cost uncertainties, such as cost variability per cubic yard for dredging, cost variability per mile of pipeline length, and cost per ton for armor stone,

Two assumptions with respect to the calculation of benefits are not well supported. First is the assumption that all crude and liquid natural gas is currently transported in vessels with 40-foot draft (Tables 12 and 13), while in fact many vessels are currently operating at lower draft and would not immediately be affected by reductions in channel depth below 40 feet (Table 10). This leads to an overestimate of the benefits of maintaining specified channel depths. Second, vessel costs at sea are likely to decline somewhat as cargo tonnage declines rather than remain constant as suggested in Table 13.

Two additional points are not clear. First, the benefit-cost ratios appearing in Table 2-10 are not well documented. It is not clear what these ratios refer to or where they are calculated in Appendix E. Second, the calculation of benefit-cost ratios appearing in Appendix E, Tables A-1 to A-7, and the interpretation of ratios calculated for alternative draft reductions, are confusing and are not clearly presented.

Significance – Medium:

A better description of these elements of the economic analysis would contribute to the completeness and clarity of the report.

Comment Cross-referencing:

NA

Recommendations for Resolution:

To resolve these concerns, the report would need to be expanded to include:

- The scope of the benefit-cost analysis should be expanded to address the diversion of vessels to other ports and the lightering of vessels prior to use of the Calcasieu Channel. Alternatively, the reasons for the limitations in scope should be more thoroughly discussed.
- A more complete description of the specific steps leading to the final cost estimates should be presented so that the calculations can be reproduced.
- The cost tables in Appendix D should be clarified by including a table comparable to Table 5-1 (Section 5.0) for each alternative.
- Figures or graphics should clarify the assumptions and dimensions used, for example, cross-sections of rock dikes and shore protection.
- The report should clarify whether shore protection (stone revetment) costs for Alternative B are fully included in the cost estimates.
- A description of cost uncertainties should be provided, such as cost variability per cubic yard for dredging, cost variability per mile of pipeline length, and cost per ton for armor stone.

Comment 10:

The selection, use and assumptions used for the Wetland Value Assessment functional assessment procedure and the details for how the measures of wetland services and functions are translated into Habitat Suitability Index are poorly described.

Basis for Comment:

There is a general vagueness throughout the document with respect to living resources and habitat value. This is not to be confused with the actual data presented, which appears to be adequate, but on the assigned values. For example, it is not clear what the last sentence in the Aquatic Consequences section refers to. If it were referring to Table ES-1, it may not be appropriate to characterize the difference between Alternative B and C as generally minor relative to habitat and the “other environmental resources and conditions” as they are not described. Another example would be in the section on Affected Environments, where the commercial fishing for the entire state is discussed but not the contribution from the project area.

The most pronounced mismatch between habitat suitability and the actual habitats, in term of mitigation, comes from the less than one to one equating of oyster reef to marsh. The importance of oyster habitat is being overlooked both ecologically and economically. It is clear in the published literature (much of it summarized in: Richard F. Dame, 1996. Ecology of Marine Bivalves, An Ecosystem Approach, CRC Press) that oysters and the habitat they create is one of the most productive habitat in estuaries. While a detailed study of oyster reefs was conducted, it does not appear to have been incorporated into the overall evaluation of Alternatives. It is not clear as to how much interaction there was between the Corps and resource agencies. One letter from LA DWF is a waiver for the “project area you’ve described” for oyster seed ground mitigation. Are there other opinions, from US FWS?

Much of the vagueness relative to habitat may come from the use of the Wetland Value Assessment (WVA) method. It has not been widely applied and may be too generalistic in assigning value. Consideration needs to be given to why WVA was used and if there would be a better wetland functional assessment procedure for the project area. WVA is actually insensitive to the habitat needs on individual species. An evaluation of wetland loss by the National Academy titled “Compensating for Wetland Losses Under the Clean Water Act” (http://books.nap.edu/openbook.php?record_id=10134&page=R1) summarized 40 procedures (including WVA). Reasoning as to why WVA was selected from the many would be helpful.

Significance – High:

The way habitat for living resources is valued will affect future cost/benefit ratios, determine which habitats will be created/destroyed, and recreational/commercial utilization of these resources.

Comment Cross-referencing:

NA

Recommendations for Resolution:

To resolve these concerns, the report would need to be expanded to:

- Provide a better summary and representation of habitats lost and gained in the Executive Summary section.
- Provide justification for use of WVA.
- Provide interpretation of the WVA conducted by Gulf Engineers Consultants, Inc. Currently there is no interpretation.
- Provide the reasoning that led to the project having a less than one to one mitigation for oyster reef to marsh area.

Comment 11:

The hydrodynamic modeling did not fully support the alternative analysis. It is not clear that the lateral extents of the model are sufficient to fully model the system.

Basis for Comment:

The modeling has only a limited bearing on the alternatives analysis, by coarsely addressing the effects on currents and sediment transport associated with CDF expansion for Alternative B. The model did not include tributary wetlands, and did not provide information to evaluate alternatives other than Alternative B. The study objective (pg 2 “The primary goal of the combined hydrodynamic and sediment transport modeling effort was to identify sediment sources and sinks, as well as associated sediment pathways.”) is generally not achieved.

The modeling effort was a good one, but was hampered by the size and complexity of the system and limited data. The accuracy and utility of the model are over-stated by the authors. Other analyses (sediment budget, additional field data, geomorphic changes, simplified sedimentation model) could have supported a better modeling and overall assessment of the shoaling problem and alternatives.

The hydrodynamic and sediment transport models do not answer the question: why does the highest sedimentation occur in the channel where the highest flow velocities occur? It seems evident that the un-naturally deep channel itself induces high shoaling rates - but why does it shoal most rapidly precisely in the location of highest flow velocities? The modeling does not shed light on these questions. This has significant importance to the project because Alternative B calls for narrowing the channel by moving dikes (with revetment) back to a historic location closer to the channel.

The study of vessels effects lacks a conclusion regarding how important the vessel wake effects really are. Data and analysis do not give an indication of bed changes or erosion caused by vessel wakes. Results also do not give an indication of how important the vessel-related sediment transport is compared to natural tidal or wind-wave transport.

An area of concern with regard to TSS and bed changes would be in the open water areas of Lake Calcasieu. It is not clear from results shown whether proposed modifications might have a subtle effect on TSS or bed change in the lake or, for example, over existing oyster beds. Results for predicted bed change pre-and post project should be presented.

The effects of the stone revetment on sediment erosion/deposition, bed change, and future dredging are unclear. Results show some increases in bed shear stress caused by channel constriction compared to the existing conditions, but there are no results showing differences in bed changes from existing conditions. As a result, possible bed changes resulting from proposed modifications cannot be assessed.

Significance – High:

The hydrodynamic modeling in Appendix C does not support the alternatives analysis and is not well integrated into the SEIS. It is not clear that hydrodynamics have been addressed sufficiently and whether the SEIS is adequate.

Comment Cross-referencing:

- (1) *The long-term sustainability of the project, beyond a 20-year time period, needs to be considered in the comparison of project alternatives and in the assessment of project impacts.*
- (3) *A Sediment Budget Analysis is needed to diagnose the causes of the very high shoaling rates, and to improve the DMMP.*
- (4) *Several appendices were written primarily to support Alternative B and thus, do not evaluate Alternative C.*
- (5) *Technical analyses do not sufficiently establish the required dike cross sections, placement locations, or stability.*
- (14) *There is little discussion of risk or uncertainty, and limitations of the data or analysis methods may impact the credibility of some conclusions.*

Recommendations for Resolution:

To resolve these concerns, the report would need to be expanded to include:

- Extend model limits to include wetlands tributary to the main channel, or explain why this is not done.
- Explain hydraulic and sediment connections to Sabine and other wetland areas, if any.
- Focus analysis to address the effects of the alternatives on sedimentation and maintenance dredging requirement. In particular, recycling of dredged material from the CDFs should be addressed.
- Address effect on dredging requirement due to CDF erosion.
- Validate the model using a different data set and assess model accuracy in the validation, and appropriate uses / interpretations.
- Use suspended sediment concentration data for calibration and verification
- Analysis of estuarine deposition using a 1-D model.
- Analysis of marine sand deposition using inlet geomorphology / hydrodynamic analysis.
- Consideration of shoaling and erosion patterns, including wetlands.
- Assess importance of vessel wake to sediment transport vs tidal and wind-wave transport.
- Address wind waves and erosion of CDFs and sediment influx to channel.
- Assess utility of fundamental project assumption that CDFs adjacent to channel reduce sediment deposition in channel.
- Explain model limitations and implications
- Correct errors / explain inconsistencies / unclear items:
 - State how vertical control was established for each of the measurement locations, and how certain the investigators are of a common vertical datum without bias. Figure III-6 appears to have datum error. Checks graphs for consistent datum.
 - Page 30 says Lake Calcasieu depth data from 1930s but Section 3.2.1 says 1996 NOAA chart 11347 is available.
 - (100) Text refers to data plots of vessel wakes in Appendix 1, but this appendix is not included.
 - Many references not included.
 - Figures III-7 through III-11 have unit of both meters or feet – select one.
 - Figure V-13 indicates high suspended solids and Figure V-18 indicates high deposition in Lake Calcasieu, similar to channel. However, the model indicates the channel is depositional but does not adequately explain the lake

Comment 12:
A more thorough summary of prior studies, and of public and agency input, is needed.
Basis for Comment:
<p>The DMMP is termed a “Supplemental” EIS and it builds on a considerable volume of prior work. But the limited reviews presented of two prior EISs are inadequate, and the reader gets no real sense of what major issues were raised in previous environmental studies. Similarly, it is not clear what critical issues were identified in previous design studies for channel dredging or CDF construction. A more thorough treatment of prior studies, identifying critical or key issues, is needed to ensure that the DMMP addresses these concerns.</p> <p>The report is surprisingly short on public comments and, as written, very little public input is documented. Minutes or summaries of public meetings should be included to summarize the sense of public input. The text refers to the public comments in Appendices N and Q, but Appendix N contains just one comment letter, while Appendix Q contains no public comments at all. Appendix Q refers to a table of comments but this table is missing.</p> <p>The use of “brainstorming sessions” to evaluate alternatives is mentioned and is appropriate. However, there are no indications among the 78 alternatives identified as to how strongly they were suggested or recommended by interested groups. Some indication of the degree of consensus for the many options would be useful.</p> <p>As for other agency comments, there are limited comments from USFWS in Appendix M and from NMFS in Appendix P, but no other comments. It seems odd that there are no official comments from other federal agencies like EPA or USGS, from State of Louisiana agencies like LDWF and LDNR, or from the Cameron Parish local government.</p>
Significance – Low:
It is stated in the report that selection of Alternative B over C may be controversial. As a result, a complete documentation of public and agency input is crucial.
Comment Cross-referencing:
<i>(4) Several appendices were written primarily to support Alternative B and thus, do not evaluate Alternative C.</i>
Recommendations for Resolution:
<p>To resolve these concerns, the report would need to be expanded to include:</p> <ul style="list-style-type: none"> ▪ Provide documentation of public and agency input. ▪ Provide better summary of critical issues from past studies and note how these have been addressed.

Comment 13:**Report needs to eliminate inconsistencies between appendices and the main body of the report.****Basis for Comment:**

It appears that different appendices were authored by different organizations, written at different times, and were not re-written or edited by the MVN to ensure consistency with the main body of the report, or among the various appendices.

Some examples (not all inclusive) include the following:

(1) Beneficial Use sites discussed and shown in Appendix J (404 Evaluation) are not the same as those shown in main report Figure 2-20. Some sites shown in main report are not evaluated in the Section 404 study.

(2) Sediment grain size information is inconsistent. Appendices C and J show different sediment grain size information. References to these are incomplete and cannot be cross-verified. The high sand fractions in Appendices C and J are not considered in other appendices.

(3) The main report cites wind-waves as a significant factor in dike erosion, but appendices do not include any analysis of wind waves or related erosion. Without a wind-wave study, it is not clear why the many miles of lake-side stone revetment are required.

(4) The report attributes bank erosion to vessel effects, but this is not fully established in Appendix C and it is not proven that vessel effects are more significant than tidal currents. Bank erosion rates in the main report are not presented or analyzed in any appendix.

(5) The report states that salinity regimes would not be altered, but this has not been evaluated in appendices and may be an issue for Beneficial Use sites, especially if side-cast borrow ditches are dredged (which were not analyzed for their hydrodynamic effect).

(6) The main report states that it is feasible to raise dikes. As noted in Comment 5, Appendix B did not consider the most critical dike cross sections as described in the main report so that the feasibility of dike construction has not been fully established.

(7) Benefit to cost ratios of 5.5:1 or 5.9:1 cited in the main report cannot be found in Appendix E. Appendix E appears to present incremental B/C analysis but not the total of overall B/C ratios for the project alternatives.

(8) Some conclusions in appendices are not evaluated and are not listed in the main report. For example, the conclusion in Appendix A that "Areas of the ship channel could be mined to ... provide advanced maintenance to lessen the maintenance dredging burden in areas of high accumulation" is not specifically analyzed. This should therefore be removed as a conclusion from the Appendix.

(9) As noted in Comment 12, the main report cites public comment in Appendices N and Q, but no substantive public comments are included in these appendices.

As noted in Comment 4, most appendices focus almost exclusively on issues related to Alternative B and do not evaluate Alternative C. This indicates that Alternative B was likely the preferred plan at the time the appendices were prepared. If Alternative C was to be ultimately selected as the preferred plan in the main report, many appendices would be inconsistent with, and would not support, the main report.

Significance – Low:

The appendices should support the main report and should be consistent with the main report.

Comment Cross-referencing:

- (4) Several appendices were written primarily to support Alternative B and thus, do not evaluate Alternative C.*
- (5) Technical analyses do not sufficiently establish the required dike cross sections, placement locations, or stability. The feasibility of many dike sections is not established.*
- (6) The impacts to the aquatic ecosystems in the vicinity need to be better addressed. Impacts to the Gulf shore are not mentioned.*
- (9) Several elements within the economic analysis are not sufficiently described.*
- (11) The hydrodynamic modeling did not fully support the alternative analysis. It is not clear that the lateral extents of the model are sufficient to fully model the system.*

Recommendations for Resolution:

To resolve these concerns, the report would need to be expanded to include:

- Issues noted in Basis for Comment above should be addressed. The report should be edited to resolve conflicts between the appendices and the main report.

Comment 14:

There is little discussion of risk or uncertainty, and limitations of the data or analysis methods may impact the credibility of some conclusions.

Basis for Comment:

The effects of uncertainties in either the data or analysis methods are not sufficiently discussed in the report. Some parts of the report do a good job in including uncertainty (economic analysis of future LNG imports) while other parts of the report (engineering evaluations) do not consider uncertainties. These uncertainties may influence selection of alternatives and impact some conclusions.

In many parts of the report, only mean values are presented without any indication of the range or variability in the parameters. One example is the use of mean values to assess potential for toxicity without indications of variability. Another example is the use of mean dissolved oxygen values, where mean DO values are acceptable but minimum DO values indicate possible hypoxic conditions below state standards. This is an example of why min/max or standard deviations would be helpful in assessing impacts.

In some parts of the report, large amounts of environmental data are presented in tables and appendices, but there is insufficient interpretation. For example, Appendix P Wetland Value Assessment is 142 pages long and has less than half a page discussion of results and no indication of uncertainty or variability of results.

Large uncertainties may be inferred from the geotechnical analysis of dike stability. Only one hypothetical dike cross section was analyzed. As noted in Comment 5, this cross section does not appear to be representative or the most critical for dike stability. Geotechnical analysis appears to be based on a single sediment sample, so it cannot be determined if this is representative of all project areas.

Based on historical evidence (erosion rates and photos of eroding CDF dikes) there is some risk of increased maintenance dredging requirements due to increased CDF erosion following construction of higher dikes and higher placement thicknesses. These risks should be addressed, as these may affect Alternative B negatively.

Similarly, uncertainties in dredge volumes are not quantified or factored into the selection of the alternatives. Prior studies have indicated future dredge volumes 30 percent higher or 30 percent lower than those adopted in this study. This range of estimates may influence the selection of alternatives as one alternative may be more adoptable, or have excess capacity to handle higher dredge volumes.

The shoaling analysis in Appendix A does not remove uncertainties in dredge volume predictions. Conclusions are based on a subset of the historical dredging data. Data from before 1994 was not used and there was no indication as to why older dredging records were not used. The data subset (1994-2005) has several limitations as, for example, there has been only one dredging event in the time period in some reaches, and volumes dredged per year are highly variable. These factors make the 96 mcyr projection highly uncertain. Estimates

of future dredging should be based on the full data record, and should be cast in term of ranges or expected variability (min-max-mean or mean plus/minus standard deviation).

With regard to modeling, the hydrodynamic model in Appendix C computes depth-averaged 2D horizontal flows, not realistic 3-D flows. This is probably sufficient in all shallow water areas, but current measurements show that flows in the navigation channel are strongly three-dimensional. Logic also suggests that the flow would have salinity stratification. The hydrodynamic and sediment transport models employed in this study are not capable of replicating these processes, and some discussions of these limitations should be included.

The sediment transport model only represents the physics of suspended fine-grained sediment (silt and clay). Sediment grain size data show a surprisingly high percentage of sand in sediment samples (30 to 80 percent in places) yet the sediment model adopts only 5 percent sand. The study should include some discussion of why the simulated sand fraction is so low and how this influences model results and conclusions.

Real estate uncertainties are highlighted in the main report as critical issue for Alternative C, yet these are not explored in Appendix T. These uncertainties are listed as a factor in two of the six criteria used to evaluate and select the preferred alternative. More should be done to quantify and these uncertainties.

Significance – Low:

Limitations on data and lack of uncertainty analysis are not “show stoppers” but should be part of any modern study of this type. Some alternatives may adapt to uncertainty better than others.

Comment Cross-referencing:

- (1) *The long-term sustainability of the project, beyond a 20-year time period, needs to be considered in the comparison of project alternatives and in the assessment of project impacts.*
- (3) *A Sediment Budget Analysis is needed to diagnose the causes of the very high shoaling rates, and to improve the DMMP.*
- (4) *Several appendices were written primarily to support Alternative B and thus, do not evaluate Alternative C.*
- (5) *Technical analyses do not sufficiently establish the required dike cross sections, placement locations, or stability. The feasibility of many dike sections is not established.*
- (6) *The impacts to the aquatic ecosystems in the vicinity need to be better addressed. Impacts to the Gulf shore are not mentioned.*
- (7) *The report does not provide sufficient detail about the proposals and the selection process for Beneficial Use (BU) sites.*
- (8) *The method for combining evaluation criteria to determine evaluation scores is not sufficiently supported.*
- (11) *The hydrodynamic modeling did not fully support the alternative analysis. It is not clear that the lateral extents of the model are sufficient to fully model the system.*

Recommendations for Resolution:

To resolve these concerns, the report would need to be expanded to include:

- Issues noted in Basis for Comment above should be addressed. The intent is that issues should be addressed through additional text and not through new calculations or lengthy technical analysis.

Appendix B

Charge to the Calcasieu River and Pass, Louisiana EPR Panel

FINAL CHARGE TO THE PEER REVIEWERS
for
CALCASIEU RIVER AND PASS, LOUISIANA
DREDGED MATERIAL MANAGEMENT PLAN AND
SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT

BACKGROUND

The Calcasieu River and Pass, Louisiana, project spans 36 miles from Lake Charles, Louisiana, to the Gulf of Mexico and 32 miles offshore. The project handles about 50 million tons of cargo through deep-draft and shallow-draft vessels and barges every year. Unfortunately, dredged material disposal capacity is not adequate for maintaining the channel to federally authorized dimensions over the long term. Existing disposal sites are at or near capacity, and past maintenance deficiencies have resulted in substantial erosion of disposal facilities into adjacent water bodies. Other disposal sites have been lost to commercial development.

This Dredged Material Management Plan/Supplemental Environmental Impact Statement (DMMP/SEIS) identifies areas for the placement of dredged material for the 20-year life of the Calcasieu River and Pass, Louisiana project. Dredged material management alternatives have been evaluated and screened so that recommended dredge placement operations are conducted in a timely, environmentally sensitive, and cost-effective manner. The local sponsor is the State of Louisiana through the Lake Charles Harbor and Terminal District.

Four alternatives for managing and placing dredged material for maintenance operations were evaluated. The alternative chosen as the Recommended Plan maximizes the use of the Federal and local sponsors' investments in lands, easements, and costs for real estate improvements and involves the rehabilitation and maximum use of existing confined dredged material placement areas. The beneficial use sites proposed in this alternative have a high level of certainty regarding their availability for dredge placement over the life of the DMMP.

Because of the importance of this project, an external peer review (EPR) of the Calcasieu River and Pass, Louisiana DMMP and SEIS will be conducted. Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific analyses. The EPR will follow the procedures described in the Department of the Army, USACE, guidance *Peer Review of Decision Documents* (EC 1105-2-408) dated May 31, 2005, CECW-CP Memorandum dated March 30, 2007, and the Office of Management and Budget's *Final Information Quality Bulletin for Peer Review* released December 16, 2004.

DOCUMENTS PROVIDED

The following documents will be provided to the peer reviewers:

- Draft Dredged Material Management Plan and Supplemental Environmental Impact Statement (including all supporting Appendices A through T)
- EC 1105-2-408, Peer Review of Decision Documents

SCHEDULE

- | | |
|---|--------------------|
| 1. Battelle confirms final selection of candidates | July 9, 2008 |
| 2. Calcasieu River and Pass review documents distributed to EPR Panel with charge [15 business days for review] | July 24, 2008 |
| 3. EPR Panel submits technical review comments to Battelle | August 14, 2008 |
| 4. Battelle identifies key issues/themes in comments and distributes to EPR panel | August 18, 2008 |
| 5. Facilitated teleconference to confirm key issues, determine final comments, and assign responsibility for final comments | *August 19, 2008 |
| 6. EPR Panel prepares formatted final comments focused on key issues using formatted structure and submits to Battelle | August 26, 2008 |
| 7. Battelle provides final formatted comments and Final Report to USACE | August 29, 2008 |
| 8. USACE provides clarifying questions to Battelle | September 5, 2008 |
| 9. Battelle and EPR Panel respond to any clarifying questions | September 12, 2008 |

*Tentative dates.

CHARGE FOR PEER REVIEW

Members of this peer review were asked to determine whether the technical approach and scientific rationale presented in the Calcasieu River and Pass, Louisiana DMMP and SEIS are credible and whether the conclusions are valid. The reviewers were asked to determine whether the technical work is adequate, competently performed, properly documented, satisfies established quality requirements, and yields scientifically credible conclusions. The peer reviewers were not being asked whether they would have conducted the work in a similar manner. In addition, the reviewers were asked to determine whether the findings are appropriate to help answer the following principal study questions that USACE will consider in its decision-making process for the project:

Specific questions for the peer reviewers, by report section, are included following the general charge guidance, which is provided below.

General Charge Guidance

1. Please answer the scientific and technical questions listed below and conduct a broad overview of the Calcasieu River and Pass, Louisiana DMMP and SEIS. Please focus on your areas of expertise and technical knowledge.
2. Identify, explain, and comment on assumptions that underlie economic, engineering, or environmental analyses.
3. Evaluate the soundness of models and planning methods as applicable and relevant to your area of expertise. Comment on whether models explain past events and how models will be validated.
4. Evaluate whether the interpretations of analysis and conclusions are reasonable.
5. Please focus the review on scientific information, including factual inputs, data, the use and soundness of models, analyses, assumptions, and other scientific and engineering matters that inform decision makers.
6. If appropriate, you can offer opinions as to whether there are sufficient analyses upon which to base a recommendation for construction, authorization, or funding.
7. 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.
8. If desired, EPR panel members can contact each other. However, EPR panel members **should not** contact anyone who is or was involved in the project, prepared the subject documents, or was part of the USACE Independent Technical Review.
9. Please contact the Battelle project manager (Karen Foster, foster@battelle.org) for requests or additional information.
10. In case of media contact, notify the Battelle project manager immediately.
11. Your name will appear as one of the panelists in the peer review. Your comments will be included in the Final EPR Report, but will remain anonymous.

Please submit your comments in electronic form to Karen Foster, foster@battelle.org, no later than Thursday, August 14, 2008 12:00 PM EDT.

CALCASIEU DMMP AND SUPPLEMENTAL EIS

FINAL CHARGE QUESTIONS

EXECUTIVE SUMMARY

1.0 INTRODUCTION

Please comment on the purpose and need of the DMMP and SEIS. Is it adequately described? What additional information, if any, should be discussed?

Are the planning objectives reasonable and complete?

2.0 ALTERNATIVES

Was the use of the 20 year life of the project appropriate for the screening of alternatives? Why or why not?

Please comment on the identification and screening of potential sites. Were the process and criteria used in the screening analysis adequate? Should other factors have been included in the analysis?

Are the alternatives adequately described? What additional information, if any, should be included?

Is the process and criteria used to compare alternatives reasonable and technically sound? What other factors should be considered in comparison on alternatives?

Does the proposed alternative meet the stated needs and objectives of the project to develop an implementable plan that is engineering, economically and environmentally sound. Please describe.

3.0 AFFECTED ENVIRONMENT

Are the physical conditions of the project area (i.e., bathymetry, water levels, wind, waves, tides, currents geology, soils surface water, groundwater and sediment) adequately described and complete? What other information, if any, should be included?

Is the toxicological characterization of surface water and sediment reasonable and complete? (See also Appendix S)

Have the results of the bioassays and bioaccumulation tests been adequately described?

Is the information presented for hazardous, toxic, and Radioactive Waste reasonable and complete? What additional information, if any, should be reported? (See also Appendix G)

Has the air quality in the project area been accurately described? What, if any, additional information should be included?

Have the habitats (aquatic, wetlands, uplands, CDFs) and biota (as well as protected species) within the study area been accurately described with the appropriate level of detail? (See also Appendix F)

Have all of the pertinent National Wildlife Refuges (NWRs) located in the area been identified and properly described? Have the resources of the NWRs and interactions between the NWRs and the Calcasieu Ship Channel been accurately described? To the best of your knowledge, what, if anything is missing?

Are the historical and archaeological resources accurately described? To the best of your knowledge, what, if anything is missing?

Please address whether the economic and demographic characteristics of the project area have been adequately described. What information, if any, is lacking?

Has the commercial navigation industry been adequately described? What other information, if any, should be included?

4.0 ENVIRONMENTAL CONSEQUENCES

For each alternative, have the potential impacts to the abiotic environment (water, sediment, soils, air etc.) been adequately addressed? Are there other impacts that need to be described?

The effects of each alternative on water quality only focus on suspended solids. Does this sufficiently address the potential environmental consequences considering the waterbody impairments due to chemical contaminants (as discussed in Section 3.4.1)?

Have all of the potential environmental effects from suspended solids been adequately addressed for each alternative? If not, why?

From the description of contaminants in sediments at the site in Section 3.4, is there sufficient data to support the conclusion that “conditions at existing and future sites would be contamination-free or of low levels that would not present a material risk of harm to public health or the environment?” Why or why not?

Have all potential project impacts been adequately described for habitats and biota within the project area? What, if any, additional impacts are missing?

Is the benefit cost analysis clear and consistent with the results of the analysis presented in Appendix E?

Have cumulative impacts been addressed appropriately for each alternative?

Are the proposed mitigation measures adequate to compensate for impacts due to project implementation? Why or why not? Should additional measures be included?

Please comment on whether you agree with the indirect impacts that have been presented. What other indirect impacts should be considered?

Were any irreversible or irretrievable commitments of resources omitted? If so, please describe.

In your professional opinion, are there other environmental impacts (other than those stated in the document) that cannot be avoided if this project were to be implemented? If so, please describe.

Please comment on whether you agree with the trade-offs between the short term uses and long term stability and productivity of the environment if the project is implemented.

5.0 IMPLEMENTATION

In developing a schedule for implementation, were the appropriate factors evaluated? Should other factors be considered?

Is the recommended plan adequate relative to the purpose and need for the project?

Are there sufficient data and information presented to support the recommended plan?

Are the protocols presented for the acquisition of land, easements and right-of-ways reasonable and appropriate? What additional information, if any, should be included?

Were the technical assumptions used to recommend dredged material placement valid? What other assumptions should be included in the Engineering Design discussion?

Are the methods presented for CDF rehabilitation reasonable and sound? What additional information, if any should be included?

Is the Disposal Area Management Program adequately described? What, if any, additional information should be included?

Are the assumptions used for construction of the various CDFs, beneficial use sites and site expansions reasonable and sound? What additional information should be considered?

DMMP AND SUPPLEMENTAL EIS APPENDICES (Vol II)

Appendix A. Shoaling

Were the methods used to evaluate shoaling and dredging technically adequate? Please describe.

Are the conclusions reasonable and supported by the information presented? Why or why not?

Appendix B. Geotechnical Studies

Were the analytical procedures used to evaluate fill reasonable and technically sound? If not, why?

Were the methods used to evaluate dike stability reasonable and technically sound? If not, why?

Appendix C. Hydrodynamic Studies

Were the data collected appropriate for the calibration of the hydrodynamic and sediment model? Why or why not?

Was the development, calibration and validation of the hydrodynamic model scientifically defensible and technically sound? Please describe.

Were the parameters used for the sediment transport model appropriate? What additional information, if any, should be considered?

Please comment on whether the results of both the hydrodynamic and sediment transport model are an adequate representation of the Calcasieu River System?

In your opinion, is the evaluation of the ship wake processes and their contribution to sediment transport within the Calcasieu Ship Channel appropriate? Why or why not?

Appendix D. Cost Estimation

Section 1:

Please comment on the clarity of the alternative cost estimate data tables including the clarity of the headings and units.

Section 2:

Please comment on the clarity, sufficiency, and justification for assumptions in the general basis of estimate and for costs that are included as well as costs that are excluded from the analysis.

Appendix E. Economics

Please comment on the forecast calculation method for commerce and fleet size; include comments on whether necessary, sufficient, and justified assumptions are used in the calculations.

Please comment on whether uncertainty in the assumptions and sensitivity of benefit/cost analysis to such uncertainty is adequately addressed.

Please comment on the clarity and sufficiency of the benefit/cost analysis; specifically address any element of the analysis that may be inadequate, inappropriate, or incorrect.

Appendix F. Biological Resources

Are the biological resources (habitats, vegetation, animal species) adequately described for the project area? What additional information, if any, should be included?

Are the threats to the biological resources of the project area adequately described? What additional information, if any, should be presented?

Is the Essential Fish Habitat Assessment complete and accurate? What additional information, if any, should be included?

Appendix G. HRTW

Were the appropriate Environmental Databases Reviewed? Is the interpretation of the findings complete and accurate?

Were the methods used to evaluate “additional information” and the historical records adequate? Do you know of other studies and historical information that should be considered?

Were the methods used for site reconnaissance appropriate?

Are the conclusions drawn from the review of the HTRW information presented in the appendix reasonable and informative for the project objectives? Why or why not?

Appendix H. Cultural Resources

No Questions

Appendix I. Oyster Resources

Is the methodology used to assess the oyster resources within the study area appropriate and technically sound?

Are the study conclusions scientifically reasonable and adequately supported by the data collected during this study?

Appendix J. 404(b)(1) Report

Please comment on whether the proposed plan meets the requirements and guidelines of the Section 404(b)(1) concerning discharge of dredged or fill material into the waters of the United States.

Appendix K. CZMA Consistency Determination

Have all applicable Coastal Zone Management policies been identified? What, if anything, is missing?

Appendix L. Endangered Species Coordination

Please comment on whether the potential impacts to threatened and endangered species have been adequately addressed.

Appendix M. FWCA Report

No Questions

Appendix N. Agency and Public Coordination

No Questions

Appendix O. Compliance with Environmental Laws, Regulations, and Executive Orders

Have all applicable laws, regulations and executive orders addressed?

Appendix P. Wetland Value Assessment Community Model

Are the assumptions of the Wetland Value Assessment and Community Model technically sound? Please describe.

Were the methods used to calculate the average annual habitat units (AAHU) as part of the wetland value assessment reasonable and technically sound?

Appendix Q: Scoping Report

No Questions

Appendix R. Habitats of Confined Disposal Facilities (CDFs)

Please comment on the adequacy of the methods used to assess and evaluate the CDF habitats.

Appendix S. Water Quality Tables

Do the data presented provide enough detail to assess the potential chemical toxicity of the water and sediments to human health and aquatic/ecological receptors?

Appendix T. Real Estate Plan

To the best of your knowledge, is the information presented in the Real Estate Plan reasonable to support the comparison and selection of alternatives for the project?