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Final Independent External Peer Review Report Western C-111 Spreader Canal (C111SC) Project Implementation Report

Prepared by
Battelle Memorial Institute

Prepared for
Department of the Army
U.S. Army Corps of Engineers
Ecosystem Restoration Planning Center of Expertise
Mississippi Valley Division

Contract No. W911NF-07-D-0001
Task Control Number: 09132
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October 30, 2009

SHORT-TERM ANALYSIS SERVICE (STAS)

on

Final Independent External Peer Review Report
Western C-111 Spreader Canal (C111SC) Project Implementation Report

by

Battelle
505 King Avenue
Columbus, OH 43201

for

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Scientific Services Program

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FINAL
INDEPENDENT EXTERNAL PEER REVIEW REPORT
for the

Western C-111 Spreader Canal (C111SC) Project Implementation Report

EXECUTIVE SUMMARY

The U.S. Army Corps of Engineers (USACE), Jacksonville District, in cooperation with its co-sponsor, the South Florida Water Management District (SFWMD), has completed a Draft Project Implementation Report (PIR) and Environmental Impact Statement (EIS) for the C-111 Spreader Canal (C111SC) Western project in Miami-Dade County.

In 1999, the USACE completed the Central and Southern Florida (C&SF) Project Comprehensive Review Study (Restudy). The purpose of the Restudy was to re-examine the C&SF project to "determine the feasibility of structural or operational modifications to the project essential to the restoration of the Everglades and the south Florida ecosystem, while providing for other water related needs such as urban and agricultural water supply and flood protection in those areas served by the project" (WRDA 1996). The intent of the study was to evaluate conditions within the south Florida ecosystem and make recommendations to modify the C&SF project to restore important functions and values of the Everglades and south Florida ecosystem and plan for the water resource needs of the people of south Florida for the next 50 years. The selected plan (Alternative D13-R) was published as the "Final Integrated Feasibility Report and Programmatic Environmental Impact Statement (PEIS) for the C&SF project," dated April 1999. The selected plan was approved by Water Resources Development Act (WRDA) of 2000 as the Comprehensive Everglades Restoration Plan (CERP).

The primary restoration purpose for the C111SC project identified in the CERP was:

> "To improve deliveries and enhance the connectivity and sheetflow in the Model Lands and Southern Glades areas, reduce wet season flows in the C-111 Canal, and decrease potential flood risk in the lower south Miami-Dade County area."

The C-111 Canal is the southernmost canal of the C&SF Flood Control project and is located in south Miami-Dade County. The C-111 Canal courses through extensive marl wetland prairie and coastal mangrove marsh before it empties into Manatee Bay. The canal serves a basin of approximately 100 square miles and functions primarily to provide flood protection and drainage for the agricultural areas to the west and south of Homestead, Florida. The canal is the final segment of the South Dade Conveyance System and provides a means to deliver water to Taylor Slough in Everglades National Park (ENP) and the eastern Panhandle. Taylor Slough is a natural drainage feature of the Everglades that flows southwest into numerous tributaries that eventually empty into Florida Bay.

In addition to ENP, the C111SC project study area includes the Model Land and the Southern Glades. The Model Land and Southern Glades areas form a contiguous habitat corridor with ENP, Biscayne National Park, Crocodile Lakes National Wildlife Refuge, the north Key Largo

Conservation and Recreational Lands (CARL) purchases, John Pennekamp State Park, and the existing National Marine Sanctuary.

The draft PIR describes the purpose and need, location, recommended plan and other alternatives considered. It also includes the data that were collected and generated, analyses, and evaluations made with regards to the alternatives that were formulated leading to the selection of a recommended plan for complementation. The report integrates plan formulation with documentation of environmental effects. It serves to satisfy documentation requirements of the National Environmental Policy (NEPA) Act of 1969, as amended.

USACE is conducting an independent external peer review (IEPR) of the Western C-111 Spreader Canal (C111SC) Project Implementation Report (PIR). Battelle, as a 501(c)(3) non-profit science and technology organization with experience in establishing and administering peer review panels for USACE, was engaged to coordinate the IEPR of the C111SC PIR. Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific analyses. The IEPR was external to the agency and conducted following USACE and Office of Management and Budget (OMB) guidance described in USACE (2008), USACE (2007) and OMB (2004). This final report describes the IEPR process, describes the panel members and their selection, and summarizes final comments of the IEPR panel members.

Five panel members were selected for the IEPR from more than 70 identified candidates. Corresponding to the technical content of the C111SC Project, the areas of technical expertise of the five selected peer reviewers included design and construction cost engineering, civil works planning, estuarine ecology, freshwater ecology, hydrogeology and hydraulics, and economics.

The panel members were provided with electronic versions of the C111SC PIR documents, along with a charge that solicited their comments on specific sections of the documents that were to be reviewed. The panel members and Battelle were briefed by the C111SC PIR Project Delivery Team during a kick-off meeting held via teleconference prior to the start of the review. More than 500 individual comments were received from the panel members in response to the 146 charge questions. There was no direct communication between the panel members and the USACE during the peer review process.

Following the individual reviews of the C111SC PIR documents by the panel members, a teleconference was conducted to review key technical comments, discuss charge questions for which there were conflicting responses, and reach agreement on the Final Panel Comments to be provided to USACE. The Final Panel Comments were documented according to a four-part format that included description of: (1) comment statement; (2) the basis for the comment; (3) significance of the comment (high, medium, and low); and (4) recommendations on how to resolve the comment. Overall, 23 Final Panel Comments were identified and documented. Of the 23 Final Panel Comments, 13 were identified as having high significance, 6 were identified as having medium significance, and 4 were identified as having low significance.

Table ES-1 summarizes the Final Panel Comments by level of significance. Detailed information on each comment is contained in Appendix A of this report.

Table ES-1. Overview of 23 Final Comments Identified by the C111SC IEPR Panel

Significance – High	
1	A map of the entire Taylor Slough should be included showing major features and flows in and out of Taylor Slough, as well as the changes in flow anticipated from the components listed in Section 1.5.1 of the PIR. This map and accompanying overlays are needed to indicate existing flow and path conditions, and to allow comparison of potential effects from the project alternatives.
2	The existing ecological conditions are unclear, which makes it difficult to assess the potential impacts of the project alternatives.
3	The specific details on the existing system, including the physical, operational and triggers, and how they will change must be provided to understand the impact of flow to the ENP.
4	The assumptions leading to the "future without project" should be clearly specified in relation to water demands and land use changes and how those impact the "future without project" water budget.
5	The rationale, criteria, weighting, and the process for selection and monitoring for adaptive management needs to be explained and further documented.
6	Without a list of detailed assumptions, the reader cannot accurately determine that the initial construction costs and amortized/annual operation and maintenance (O&M) costs are valid.
7	The overall impacts and benefits of the various alternatives are not supported by the PIR due to uncertainties in the accuracy of the model (MODBRANCH), data and assumptions used to compare the alternatives.
8	Several of the alternatives may result in increased phosphorus inputs to Taylor Slough. Their possible impacts on future vegetation (i.e., increased area of cattails), and how this increase in inputs might be controlled, needs to be addressed.
9	The PIR needs to comprehensively discuss the characterization of salinity throughout the Taylor Slough and Florida Bay area including historical changes/impacts, expected salinity changes, and negative impacts for the alternatives.
10	The PIR needs to comprehensively discuss the characteristics, possible inputs to, and releases (i.e., nutrients and contaminants) from the creation of Frog Pond Stormwater Treatment Area (STA).
11	The PIR should address the issue of climate cycles and ecological processes, recognizing that wetlands require periods of drought, even extreme drought, as well as periods of flooding, even extreme flooding, to maintain their natural composition and natural functions. This variation occurs among years as well as within years.
12	Given that this is a system driven by cycles, the monitoring program should identify and be responsive to natural environmental cycles.
13	The real estate analysis is incomplete and the relationship between land acquisition costs and flood risks for the recommended plan and the alternatives is not well-documented.
Significance – Medium	
14	More details on the spatial distribution of soil type, particularly peat and marls, need to be provided to justify the engineering design.
15	Additional information is needed on the distribution and abundance of amphibians within the project area, their habitat demands, and whether their habitats will or will not be changed by the project.
16	The discussion on rock mining operations in the project area was very limited in the PIR and did not have any details as to the potential impacts to the project functions and features.
17	The plugs alone, as proposed, are likely to cause deep holes which will develop low dissolved oxygen, high residence times, and generally an undesirable deep pond in an otherwise shallow water habitat.

18	The Recreational Benefits Analysis discusses only local recreational use benefits of the study area, but should also consider the larger benefits associated with ecosystem restoration within ENP.
19	The PIR would benefit from a description of the concerns that led to a complete redesign of the project.
Significance – Low	
20	Inclusion of Acroporids, which are Threatened not Endangered, confuses the reader and raises unnecessary concerns because it is not found in the area.
21	There is a lack of information on the precautionary measures that should be taken during construction.
22	It is unclear why the southern third of the header distribution channel was moved 200' to the east of its identified location in Figure A-2.
23	Additional information, including more detailed graphics depicting project features, potential hazards and geographic boundaries needs to be provided in Section A.4 and A.6 of the Appendix A in regards to previous geotechnical and other investigations.

The IEPR panel generally agreed on their "assessment of the adequacy and acceptability of the economic, engineering, and environmental methods, models, and analyses used" in the PIR document. The following statements provide a summary of the panel's findings, which are described in more detail in the Final Panel Comments (see Appendix A).

Plan Formulation Rationale: From a planning perspective, a lot of work has taken place and the science to backup the plan can be found if the reader searches through all of the documents and appendices. The main document should be structured such that information is presented in a logical and sequential manner leading up to the selection of the preferred alternative.

Economics: Although is it clear that a lot of work has occurred in regard to the economics analysis, the information presented in the PIR and many of its appendices is not documented adequately to audit or to formulate final determinations, and a complete evaluation of all the alternatives does not appear to have been conducted.

Engineering: The hydrology and hydraulics portion of the report relied heavily on the outcomes of the hydrologic model; however, the PIR does not provide sufficient information to convey confidence in the accuracy and uncertainty of the model or its findings. The PIR uses the hydrologic modeling to justify the different alternative and impact evaluations, but the description of the model and characterization of model parameters, water budget, level of reliability, uncertainty, etc. were not provided in detail in the PIR or the appendices. Water and mass budget, indicating the anticipated inflow to and outflow from various natural and anthropogenic components of the system, as well as the associated water quality, is one of the factors most critical to the success of the proposed project.

Environmental: Given the amount known about the Everglades, limited ecological data are presented in the PIR, and what are presented could not be used to extract final conclusions regarding the alternative analysis or potential impacts. There is a lack of information on the significant plant communities, amphibian species, and potential indicator species. Therefore, the

existing conditions cannot be assessed nor can the potential changes caused by the project be forecasted.

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LIST OF ACRONYMS

ATR	Agency Technical Review
C111 SC	Western C-111 Spreader Canal
C&SF	Central and Southern Florida
CARL	Key Largo Conservation and Recreational Lands
CE/ICA	Cost Effectiveness and Incremental Cost Analysis
CERP	Comprehensive Everglades Restoration Plan
EIS	Environmental Impact Statement
ENP	Everglades National Park
ERDC	Engineer Research and Development Center
IEPR	Independent External Peer Review
NEPA	National Environmental Policy
NTP	Notice to Proceed
PEIS	Programmatic Environmental Impact Statement
PIR	Project Implementation Report
SFWMD	South Florida Water Management District
SFWMM	South Florida Water Management Model
STA	Stormwater Treatment Area
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
WRDA	Water Resources Development Act

1. INTRODUCTION

The U.S. Army Corps of Engineers (USACE), Jacksonville District, in cooperation with its co-sponsor, the South Florida Water Management District (SFWMD), has completed a Draft Project Implementation Report (PIR) and Environmental Impact Statement (EIS) for the C-111 Spreader Canal (C111SC) Western project in Miami-Dade County.

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recommended plan for complementation. The report integrates plan formulation with documentation of environmental effects. It serves to satisfy documentation requirements of the National Environmental Policy Act (NEPA) of 1969, as amended.

The objective of the work described here was to conduct an Independent External Peer Review (IEPR) of the C111SC PIR in accordance with procedures described in the Department of the Army, U.S. Army Corps of Engineers Engineer Circular (EC) No. 1105-2-410, *Review of Decision Documents*, dated August 22, 2008 (USACE, 2008) and the Office of Management and Budget (OMB) *Final Information Quality Bulletin for Peer Review* released December 16, 2004 (OMB, 2004). Battelle, as a 501(c)(3) non-profit science and technology organization with experience in establishing and administering peer review panels for USACE, was engaged to coordinate the IEPR of the C111SC PIR. Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific analyses.

This final report details the IEPR process, describes the panel members and their selection, and summarizes the final comments of the IEPR panel members on the existing environmental, economic, and hydrologic and hydraulic engineering analyses contained in the C111SC PIR. Detailed information on the Final Panel Comments is provided in Appendix A.

2. PURPOSE OF INDEPENDENT EXTERNAL PEER REVIEW

To ensure that USACE documents are supported by the best scientific and technical information, a peer review process has been implemented by USACE that utilizes IEPR to complement the Agency Technical Review (ATR), as described in USACE (2008) and USACE CECW-CP Memorandum dated March 30, 2007 (USACE, 2007).

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

In this case, the IEPR of the C111SC PIR was conducted and managed using contract support from Battelle, which is an Outside Eligible Organization (OEO) eligible under section 501(c)(3) of the U.S. Internal Revenue Code. Battelle is an independent objective science and technology organization with experience conducting IEPRs.

3. METHODS

This section describes the methodology followed in selecting the IEPR panel members and in planning and conducting the IEPR. The IEPR was conducted following procedures described in USACE's guidance cited above (Section 2 of this report) and in accordance with OMB (2004). Supplemental guidance on evaluation for conflicts of interest used The National Academies (2003), *Policy on Committee Composition and Balance and Conflicts of Interest for Committees Used in the Development of Reports*.

3.1 Planning and Schedule

In terms of planning, one of the first actions Battelle conducted after receiving the notice to proceed (NTP) was to hold a kick-off meeting between the USACE and Battelle. The purpose of the meeting was to review the "preliminary/suggested" schedule, discuss the IEPR process, and address any questions regarding the scope (e.g., clarify expertise areas needed for panel members). Any revisions to the schedule were submitted as part of the final Work Plan. Due dates for milestones and deliverables in the table below are based on the NTP date of July 31, 2009. Table 1 defines the schedule followed in execution of the IEPR.

Table 1. C111SC PIR IEPR Schedule

TASK	ACTION	DUE DATE
1	Pre-Award Funding Approval[a]	July 21, 2009
	NTP/Review Documents Available	July 31, 2009
	Prepare Draft Work Plan[b]	August 10, 2009
	USACE Provides Comments on Draft Work Plan	August 17, 2009
2	Recruit and screen up to 12 potential panel members; prepare summary information[a]	August 17, 2009
3	Submit Draft Charge[b]	August 10, 2009
	USACE provides comments on Draft Charge	August 17, 2009
	Submit Final Work Plan including Final Charge[b]	August 24, 2009
	USACE approves final work plan, including Final Charge	August 26, 2009
4	Select no more than 6 panel members	August 17, 2009
	Submit list of selected panel members	August 18, 2009
	USACE provides comments on list of panel members	August 20, 2009
	Complete subcontracts for panel members	September 3, 2009
5	Kick-off Meeting with USACE and Battelle	July 23, 2009
	Kick-off Meeting with Battelle and the panel members	September 3, 2009
	Kick-off Meeting with USACE, Battelle and the panel members	September 3, 2009
6	Review documents and charge sent to panel members	September 1, 2009
	Panel members complete their review and provide comments to Battelle	October 6, 2009
	Merge comments from panel members	October 9, 2009
	Convene consensus conference call	October 12, 2009
7	Prepare Final Panel Comments	October 22, 2009
	Submit Final IEPR Report[b]	October 30, 2009
8[c]	Input Final Panel Comments to DrChecks	October 30, 2009

TASK	ACTION	DUE DATE
	USACE Provides Draft Evaluator Responses via e-mail (Word document)	November 6, 2009
	Conference call with USACE, Battelle and panel members to discuss Final Panel Comments	November 10, 2009
	USACE inputs Final Evaluator responses to Final Panel Comments in DrChecks	November 16, 2009
	Panel Members Respond to USACE Evaluator Responses (Backcheck responses)	November 24, 2009
	Submit pdf of DrChecks file and Closeout of DrChecks[b]	November 25, 2009
	Project Closeout	January 31, 2010

[a] Requested to start on recruitment to meet the aggressive schedule

[b] Deliverable

[c] Task occurs after the submission of this report.

Note that the work items listed in Task 8 occur after the submission of this report. The 23 Final Panel Comments will be entered in to DrChecks by Battelle for review and response by USACE and the panel members. USACE will provide Evaluator Responses to the Final Panel Comments and the IEPR panel members will respond to the Evaluator Responses (via Backcheck responses). All USACE and panel member responses will be documented by Battelle.

3.2 Identification and Selection of Independent External Peer Reviewers

Corresponding to the technical content of the C111SC PIR and overall scope of the C111SC project, the technical expertise areas for which the candidate panel members were evaluated focused on six key areas: design and construction cost engineering, civil works planning, estuarine ecology, freshwater ecology, hydrogeology and hydraulics, and economics.

Battelle initially identified more than 70 candidate panel members, evaluated their technical expertise and inquired about potential conflicts of interest. Of those initially contacted. Battelle chose 11 of the most qualified candidates and confirmed their interest and availability. Of those 11 candidates, five were proposed as the final panel and six were proposed as backup reviewers. The five primary reviewers constituted the final panel. The remaining panel members were not proposed for a variety of reasons, including lack of availability, disclosed conflicts of interest, or because they did not possess the precise technical expertise required.

The candidates were screened for the following *potential* exclusion criteria or conflicts of interest.[1] Participation in previous USACE technical peer review committees and other technical review panel experience was also considered.

[1]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

- Involvement of the expert or expert's firm in any part of the Central and Southern Florida Project Comprehensive Everglades Restoration Plan C-111 Spreader Canal Western Project including:
  - Draft Integrated Project Implementation Report & Draft Environmental Impact Statement (2009)
  - Design Test Draft Environmental Assessment (EA) & Draft Design Documentation Report (DDR) (2008)
  - Biscayne Bay Coastal Wetlands and C-111 Spreader Canal Conceptual Model Technical Memorandum (2004)
- Any involvement by expert or expert's firm in the conceptual or actual design, construction, or operation and maintenance of the Western C-111 Spreader Canal Project or related projects.
- Involvement in any part of the development of the MODBRANCH and/or the South Florida Water Management Model (SFWMM) hydrological models.
- Current USACE employee.
- Current or previous employment or affiliation with a cooperating agency for Everglades Restoration Efforts (e.g., South Florida Water Management District, Everglades National Park Service, U.S. Environmental Protection Agency, U.S. Geological Survey, National Oceanic and Atmospheric Administration) and currently working on Everglades Restoration Projects (for pay or *pro bono*).
  - Current member of the South Florida Ecosystem Restoration Task Force.
  - Current or future interests in the subject project or future benefits from the project.
  - Current personal involvement with other USACE projects, including whether involvement was to author any manuals or guidance documents for USACE. If yes, provide titles of documents or description of project, dates, and location (USACE district, division, Headquarters, ERDC, etc.), and position/role. Please highlight and discuss in greater detail any projects that are *specifically* with the Jacksonville District.
  - Current firm involvement with other USACE projects, *specifically* those projects/contracts that are with the Jacksonville District. If yes, provide title/description, dates, and location (USACE district, division, Headquarters, ERDC, etc.), and position/role.
  - Previous employment by the USACE as a direct employee or contractor (either as an individual or through expert's firm) within the last 10 years, notably if those projects/contracts are with the Jacksonville District. If yes, provide title/description, dates employed, and place of employment (district, division, Headquarters, ERDC, etc.), and position/role.
  - Other USACE affiliation [e.g., scientist employed by USACE (except as described in NAS criteria, see EC 1105-2-410 section 8d)].
  - Previous experience conducting technical peer reviews. If yes, please highlight and discuss any technical reviews concerning water resource development projects

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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."

involving levees, channel modifications, and pumping stations, and include the client/agency and duration of review (approximate dates).

- A significant portion (i.e., greater than 50%) of personal or firm revenues within the last three years came from USACE contracts.
- Any publicly documented statement made by the reviewer or reviewer's firm advocating for or against the Western C-111 Spreader Canal Project.
- Other possible perceived conflict of interest for consideration, e.g.,
  - Involvement in Comprehensive Everglades Restoration Program (CERP) projects.
  - Repeatedly served as USACE technical reviewer
  - Paid or unpaid participation in litigation related to the work of the USACE
  - Any other perceived COI not listed.

In selecting final panel members from the list of candidates, an effort was made to select experts who best fit the expertise areas and disclosed no conflicts of interest. Based on these considerations, five peer reviewers were selected from the potential list (see Section 4 of this report for names and biographical information on the panel members). The five reviewers selected were from academic institutions, consulting companies, or were independent engineering consultants. Battelle established subcontracts with the panel members when they indicated their willingness to participate and confirmed the absence of conflicts of interest through a signed conflict of interest form.

Prior to beginning their review and within two days of their subcontracts being finalized, all members of the IEPR panel were required to attend a kick-off meeting teleconference planned and facilitated by Battelle in order to review the IEPR process, the schedule, communication, and other pertinent information for the IEPR panel.

3.3 Preparation of the Charge and Conduct of the Peer Review

A preliminary charge document, including specific charge questions and discussion points, was drafted by Battelle, reviewed and approved by USACE, and provided to the panel members to guide their review of the C111SC PIR. The charge was prepared by Battelle to assist the USACE in the development of the charge questions that will guide the peer review, according to guidance provided in USACE (2008) and OMB (2004). The draft charge was submitted to the USACE for evaluation as part of the draft Work Plan. USACE provided minor clarifications to the final charge questions. In addition to a list of 146 charge questions/discussion points, the final charge included general guidance for the IEPR panel members on the conduct of peer review (as provided in Appendix B of this final report).

Battelle planned and facilitated a final kick-off meeting via teleconference during which USACE presented project details to the panel members. Before the kickoff meeting, the IEPR panel members were provided an electronic version of the C111SC PIR documents and the final charge. A full list of the documents that were reviewed by the IEPR panel is provided in Appendix B of this report. The IEPR panel members were instructed to address the charge questions/discussion points within a comment-response form provided by Battelle.

3.4 Review of Individual Panel Comments

In response to the charge questions/discussion points, approximately 500 individual comments were received from the IEPR panel members. Battelle reviewed these comments to identify overall recurring themes, potential areas of conflict, and other overall impressions. As a result of this review, Battelle developed a preliminary list of 69 overall comments and discussion points that emerged from the IEPR panelists' individual comments. Each panel member's individual comments were shared with the full IEPR panel in a merged individual comments table.

3.5 Independent Peer Review Panel Teleconference

Battelle facilitated a 3.5 hour teleconference with the IEPR panel members to provide for the exchange of technical information among the panel experts, many of whom are from diverse scientific backgrounds. This information exchange ensured that this final IEPR report would accurately represent the panel's assessment of the project, including any conflicting opinions. The panel review teleconference consisted of a thorough discussion of the overall negative comments, positive comments, and comments that appeared to be conflicting among panel members. In addition, Battelle used the teleconference to confirm each comment's level of significance to the panel, add any missing issues of high-level importance to the findings, resolve whether to "agree to disagree" on the conflicting comments, and to merge related individual comments into one "Final Panel Comment." The main goal of the teleconference was to identify which issues should be carried forward as Final Panel Comments and to decide which panel member would serve as the lead author for the development of each Final Panel Comment.

In addition to identifying which issues should be carried forward as Final Panel Comments, the IEPR panel discussed responses to 22 specific charge questions where there appeared to be disagreement among the panel members. The conflicting comments were resolved based on professional judgment of the panel members; each comment was either incorporated into a Final Panel Comment or determined to be a non-significant issue (i.e., either a true disagreement did not exist, or the issue was not important enough to include as a Final Panel Comment).

During the panel teleconference, the panel identified 23 comments and discussion points that should be brought forward as Final Panel Comments.

3.6 Preparation of Final Panel Comments

Following the teleconference, a summary memorandum documenting each Final Panel Comment (organized by level of significance) was prepared by Battelle and distributed to the panel members. The memorandum provided the following detailed guidance on the approach and format to be used in the development of the Final Panel Comments for the C111SC PIR:

- Lead Responsibility: For each Final Panel Comment, one of the panel members was identified as the lead author responsible for coordinating the development of the Final Panel Comment and submitting it to Battelle. Lead assignments were modified by Battelle at the direction of the IEPR panel. To assist each lead in the development of the Final Panel Comments, Battelle distributed merged individual comments in the comment-

response form table, a summary detailing each draft final comment statement, an example Final Panel Comment following the four-part structure described below, and a template for the preparation of the Final Panel Comments.

- Directive to the Lead: Each lead was encouraged to communicate directly with other panel members as needed, to contribute to a particular Final Panel Comment. If a significant comment was identified that was not covered by one of the original Final Panel Comments, the appropriate lead was instructed to draft a new Final Panel Comment.

- Format for Final Comments: Each Final Panel Comment was presented as part of a four-part structure, including:
    1. Comment Statement (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. Recommendation for resolution (see description below).

- Criteria for Significance: The following were used as criteria for assigning a significance level to each Final Panel Comment:
    1. *High*: Describes a fundamental problem with the project that could affect the recommendation or justification of the project
    2. *Medium*: Affects the completeness or understanding of the reports/project
    3. *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 Final Panel Comment (e.g., suggestions on how and where to incorporate data into the analysis, how and where to address insufficiencies, areas where additional documentation is needed).

As a result of this process, 23 Final Panel Comments were prepared. Battelle reviewed and edited the Final Panel Comments for clarity, consistency with comment statement, and adherence to guidance on the panel's overall charge, which included ensuring that there were no comments regarding either the appropriateness of the selected alternative or USACE policy. There was no direct communication between the panel members and USACE during the preparation of the Final Panel Comments. The Final Panel Comments were assembled and are presented in Appendix A of this report.

4. PANEL DESCRIPTION

Panel member candidates were identified using Battelle's Peer Reviewer Database, targeted internet searches using key words (e.g., technical area, geographic region), searches of websites of universities or other compiled expert sites, and through referrals. A draft list of primary and backup candidate panel members (which were screened for availability, technical background, and conflicts of interest) was prepared by Battelle and provided to USACE. The final list of panel members was determined by Battelle.

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

Table 2. C111SC PIR IEPR Panel: Technical Criteria and Areas of Expertise

	Fowler	Cuba	Keddy	Mok	Milon
Design and Construction Cost Engineering (one expert needed)					
5-10 years of experience in design and construction cost engineering	X				
Familiar with large, complex civil works projects with high public and interagency interests	X				
Experience performing cost engineering/construction management for all phases of above-ground water retention and seepage management systems	X				
Familiar with similar projects across the US and related cost engineering	X				
Experience in associated contracting procedures, total cost growth analysis and related cost risk analysis	X				
Familiar with construction industry and practices used in Florida or the southeastern US	X	X			
Civil Works Planner (one expert needed)					
5-10 years of experience in civil works planning	X	X			
Familiar with large, complex civil works projects with high public and interagency interests	X	X		X	
Experience in the area of hydrologic restoration to achieve ecological benefits					
Knowledge of the freshwater and estuarine wetlands of the Everglades system		X			
Estuarine and Freshwater Ecology (one expert needed)					
5-10 years of experience in estuarine ecology and freshwater ecology			X		
Familiar with large, complex civil works projects with high public and interagency interests	X		X		
Familiar with ecology of coastal wetlands and estuarine environments		X	X		
Familiar with methods for evaluating ecological benefits in coastal wetland and estuarine environments	X		X		X
Familiar with coastal wetland and estuarine ecological restoration	X		X		X
Familiar with the ecology of freshwater wetlands			X		
Familiar with methods for evaluating ecological benefits in freshwater wetlands	X		X		X
Familiar with the restoration of freshwater wetlands	X		X		X
Hydrogeology and Hydraulics (one expert needed)	X				
5-10 years of experience in hydrogeologic and hydraulic engineering				X	
Familiar with large, complex civil works projects with high public and interagency interests	X X			X	
Familiar with the construction of seepage management water detention systems				X	

	Fowler	Cuba	Keddy	Mok	Milon
for creating hydraulic ridges					
Familiar with restoring historical system hydrology using historical drainage patterns and providing solutions for associated problems				X	
Familiar with the hydrology of the Everglades system				X	X
Economics (one expert needed)					
5-10 years of experience in economics					X
Familiar with large, complex civil works projects with high public and interagency interests	X				X
Experienced with evaluating the appropriateness of cost effectiveness and incremental cost analysis (CE/ICA), as applied to dollar costs & ecosystem restoration benefits					X
Familiar with the USACE tool IWR-PLAN					X

C. Deane Fowler, P.E.

Role: This panel member was chosen primarily for his design and construction cost engineering experience and expertise.
Affiliation: HDR Engineering, Inc.

C. Deane Fowler, P.E., has 33 years of program, project, facilities, and construction contract management experience. He has held positions working every facet of engineering, including daily and long-term costing and budgeting, planning, operations, and executive level management. He has extensive experience with cost engineering and construction management including cut-off walls at projects in Maryland, the Rio Puerto Nuevo Flood Control and the Portuguese Dam Projects (combined valued of $1.2B) in the Commonwealth of Puerto Rico, and Morganza to the Gulf of Mexico Hurricane Protection project (valued at $8.5B) in Southeastern Louisiana, among many others. Mr. Fowler also served as project manager during the construction of a $50M eight-story concrete office building for the Baltimore District, U.S. Army Corps of Engineers. For this project, he assisted in the development of the work breakdown structure (WBS) through the analysis of content, scope, and cost drivers and developed a concert of measurement through a parametric analysis of various methodologies: engineering risks, available vendors, and market prices. This yielded a projection as to the cost and risk of the contractor's construction methods. For the Morganza to the Gulf Project (a 64-mile-long levee system with navigation locks, floodgates, and tidal exchange structures), Mr. Fowler is working with a different variety of cost risks, including weather (storm surge), land subsidence, politics, and available borrow material. He has analyzed cost growth from original feasibility analysis; through planning, engineering, and design; through plans and specifications; and to final construction. The costs are generated using historical models, with adjustments for the cost of money through project life and the level of uncertainty associated with cost drivers. He uses a distribution, S-curve, or other method to aid in the analysis of the cost of the project from beginning to end. He has extensive experience with construction practices in Florida. He is a Registered Professional Engineer licensed in the states of Florida and Virginia, is a Life Member and Fellow of the Society of American Military Engineers, Life Member of Chi Epsilon, a Certified Program Management Professional, and a member of Project Management Institute (PMI).

Tom Cuba, Ph.D.

Role: This panel member was chosen primarily for his civil works planner experience and expertise
Affiliation: Stillwater Research Group

Dr. Tom Cuba earned a B.S. in zoology from Texas A&M University and a Ph.D. in marine science from the University of South Florida. He is currently the Chief Scientist at the consulting firm of Delta Seven, Inc. and serves as a Research Scientist for the Stillwater Research Group, a not-for-profit ecological research group. His planning experience has included developing management plans for a variety of Florida watersheds and aquatic preserves, working on waterfront infrastructure feasibility plans, and designing wetland, pond, and seagrass restoration plans. Dr. Cuba has written a prioritization report for management, recovery, and restoration planning in Pinellas County, FL and he has created conceptual plans for the recovery of Fort DeSoto Aquatic Management Area and for the restoration of several Florida

swamps and ponds. For Allen's Creek watershed, he helped develop a holistic watershed plan for a stream running from tidal (at the mouth) to small pond- and lake-fed (in the upper reaches). The watershed covers 4,600 acres in central Pinellas County, the most densely populated county in Florida. His team began with a year-long water monitoring and habitat study (which included cypress-maple wooded swamp, a small marsh, the ponds and small lakes, and the streams themselves). An integrated version of SWMM4/5 was used with a receiving water model to load and unload the stream, including additions of stormwater, septic, and street underdrain loadings, with Dr. Cuba's team eventually mapping the entire stormwater system for the first time. This entire process was repeated for the Lake Seminole, Lake Tarpon, and Alligator Creek watersheds.

Paul Keddy, Ph.D.

Role: This panel member was chosen primarily for his estuarine and freshwater ecology experience and expertise.
Affiliation: Independent Consultant

Dr. Paul Keddy has 35 years of experience in freshwater and coastal wetland ecosystems, particularly in Louisiana, the Great Lakes, and central and eastern North America. His research focuses on biotic (plant and animal) and abiotic (hydrology, nutrients, salinity, sedimentation, disturbance) factors controlling the composition, productivity, distribution, and extent of wetland plant communities and on predicting the effects and assessing the results of environmental manipulation in the context of wetland restoration and ecological benefit. Dr. Keddy worked for eight years on restoration of the Lake Pontchartrain estuary (the second largest estuarine system in the U.S.) to maximize ecological benefits. He was the co-author of the *Comprehensive Habitat Management Plan (CHMP) for the Lake Pontchartrain Basin*, which will guide restoration activities for the coming decades. Development of the CHMP involved evaluating the relative ecological benefits of different coastal wetland and estuarine management strategies as well as the establishment of quantitative restoration targets for these ecosystems. Dr. Keddy has evaluated the ecological benefits of different Mississippi River management scenarios on a variety of habitats, including swamp, fresh marsh, intermediate marsh, brackish marsh, saline wetlands, open water, and uplands. Dr. Keddy served on the Coastal Restoration and Enhancement through Science and Technology (CREST) Technical Advisory Committee until 2007, designing terms of reference and evaluating restoration project proposals with emphasis on maximizing cost effectiveness in terms of ecological benefit. He served on the review panel of the Everglades Restoration Acceleration Project and acted as an expert witness at a Special Master Hearing on Everglades water quality. Dr. Keddy recently completed a review book chapter on the measurement of ecological services and benefits from wetlands and he is familiar with the latest conceptual and technical advances in measuring benefits. Dr. Keddy has authored five books including *Wetland Ecology: Principles and Conservation*, the second edition of which is in currently in press.

Bill Mok, Ph.D., P.E., P.G., D.WRE.

Role: This panel member was chosen primarily for his hydraulic engineering experience and expertise, and his familiarity with the USACE risk and uncertainty analysis and hydrologic/ hydrodynamic computer models.
Affiliation: AMEC Geomatrix, Inc.

Dr. Chin Man (Bill) Mok has 24 years of consulting experience in hydrogeology and environmental, hydrologic, geotechnical, earthquake, and structural engineering worldwide. He is also an adjunct professor at the University of Waterloo. He has directed numerous projects supporting the design and evaluation of groundwater and surface water resources amenities, chemical containment and remediation systems, water supply and wastewater treatment plants, landfills, land development, nuclear-related facilities, locks and dams, bridges, buildings, tunnels, and underground structures. He is also a computational modeling expert with his in-depth knowledge of stochastic and numerical techniques, database/GIS, diverse engineering and geology practices, computer programming, and field testing. Some of his most relevant work has included the development of an adaptive reliability-based stochastic optimization framework for integrated management of surface water, groundwater, reservoir, and desalination in the integrated northern Tampa Bay region. The objective of this project was to minimize eco-hydrologic impacts on wetlands and seawater intrusion potential in the region subject to the constraints of physical system capacity and regulatory requirements. Dr. Mok has worked on several development projects in Washington for which he has performed hydrologic and hydrogeologic modeling to support the design and analysis of such systems (including drainage/flow and lined/unlined ponds) and to evaluate the hydrologic and hydrogeologic impact. Other projects have included several development projects in California for which he performed modeling to estimate the impact of water detention ponds/systems, including the evaluation of the potential for the mobilization of a nearby contaminant plume. In Monterey County, Dr. Mok performed modeling to support the design and analysis of stream control systems, including an inflatable dam structure that can be raised/lowered as needed to regulate flow in stream channels and to nearby lakes and ponds for balancing fish habitat and agricultural water use.

Walter Milon, Ph.D.

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

Dr. Walter Milon has 30 years of experience in natural resource and environmental economics, marine resources, and applied microeconomics. He is currently the Department Chair and a Distinguished Research Professor in the Economics Department at the University of Central Florida, where he teaches graduate level courses in benefit-cost and social impact analysis, economic theory, environmental regulation, and nonmarket goods valuation. He has been the recipient of numerous grants, including an EPA grant for developing a consistent framework for the valuation of wetland ecosystem services using discrete choice methods (2004-2008); a SFWMD grant to study the economic valuation of water storage in south Florida (2002-2003); and a USDA/USFWS grant to research the public preferences and economic valuation for alternative ecological endpoints from restoration of south Florida coastal ecosystems (1996-1999). He was a consultant on SFWMD's "Biscayne Bay Economic Study" (2003-2005) and also conducted an economic assessment of reducing hypoxia in the northern Gulf of Mexico (1997-1999). He served as an expert reviewer for USACE's report "Monetary Measurement of Environmental Goods and Services: Framework and Summary of Techniques for Corps Planners" (1996). Dr. Milon has conducted cost effectiveness/incremental cost analysis (CE/ICA) studies as part of the Everglades Restudy Technical Assistance Committee in conjunction with USACE-Jacksonville District and the Restudy Committee. He has served as a

technical consultant for USACE-Vicksburg District in development of cost effectiveness and incremental cost analysis (CE/ICA) or environmental projects. Dr. Milon has annually reviewed the Institute of Water Resources Plan and CE/ICA procedures as part of undergraduate and graduate courses taught at University of Florida and University of Central Florida. He has also served as a technical consultant for the U.S. Environmental Protection Agency in the development of evaluation guidelines for CE/ICA analysis for ecosystem services projects.

5. RESULTS — SUMMARY OF PEER REVIEW COMMENTS

The IEPR panel generally agreed on their "assessment of the adequacy and acceptability of the economic, engineering, and environmental methods, models, and analyses used" in the PIR. The following statements provide a summary of the panel's findings, which are described in more detail in the Final Panel Comments in Appendix A.

Plan Formulation Rationale: From a planning perspective, a lot of work has taken place and the science to backup the plan can be found if the reader searches through all of the documents and appendices. The main document should be structured such that information is presented in a logical and sequential manner leading up to the selection of the preferred alternative.

Economics: Although is it clear that a lot of work has occurred in regard to the economics analysis, the information presented in the PIR and many of its appendices is not documented adequately to audit or to formulate final determinations, and a complete evaluation of all the alternatives does not appear to have been conducted.

Engineering: The hydrology and hydraulics portion of the report relied heavily on the outcomes of the hydrologic model; however, the PIR does not provide sufficient information to convey confidence in the accuracy and uncertainty of the model or its findings. The PIR uses the hydrologic modeling to justify the different alternative and impact evaluations, but the description of the model and characterization of model parameters, water budget, level of reliability, uncertainty, etc. were not provided in detail in the PIR or the appendices. Water and mass budget, indicating the anticipated inflow to and outflow from various natural and anthropogenic components of the system, as well as the associated water quality, is one of the factors most critical to the success of the proposed project.

Environmental: Given the amount known about the Everglades, limited ecological data are presented in the PIR, and what are presented could not be used to extract final conclusions regarding the alternative analysis or potential impacts. There is a lack of information on the significant plant communities, amphibian species, and potential indicator species. Therefore, the existing conditions cannot be assessed nor can the potential changes caused by the project be forecasted.

As a result of the comment/review process, the IEPR panel identified 23 final comments, segmented into rankings of high, medium, and low significance. In total, as shown in Table 3, 13 were identified as having high significance, 6 were identified as having medium significance, and 4 comments were identified as having a low level of significance. The Final IEPR Panel Comments in their entirety are included in Appendix A.

Table 3. Overview of 23 Final Panel Comments Identified by C111SC PIR IEPR Panel

Significance – High	
1	A map of the entire Taylor Slough should be included showing major features and flows in and out of Taylor Slough, as well as the changes in flow anticipated from the components listed in Section 1.5.1 of the PIR. This map and accompanying overlays are needed to indicate existing flow and path conditions, and to allow comparison of potential effects from the project alternatives.
2	The existing ecological conditions are unclear, which makes it difficult to assess the potential impacts of the project alternatives.
3	The specific details on the existing system, including the physical, operational and triggers, and how they will change must be provided to understand the impact of flow to the ENP.
4	The assumptions leading to the "future without project" should be clearly specified in relation to water demands and land use changes and how those impact the "future without project" water budget.
5	The rationale, criteria, weighting, and the process for selection and monitoring for adaptive management needs to be explained and further documented.
6	Without a list of detailed assumptions, the reader cannot accurately determine that the initial construction costs and amortized/annual operation and maintenance (O&M) costs are valid.
7	The overall impacts and benefits of the various alternatives are not supported by the PIR due to uncertainties in the accuracy of the model (MODBRANCH), data and assumptions used to compare the alternatives.
8	Several of the alternatives may result in increased phosphorus inputs to Taylor Slough. Their possible impacts on future vegetation (i.e., increased area of cattails), and how this increase in inputs might be controlled, needs to be addressed.
9	The PIR needs to comprehensively discuss the characterization of salinity throughout the Taylor Slough and Florida Bay area including historical changes/impacts, expected salinity changes, and negative impacts for the alternatives.
10	The PIR needs to comprehensively discuss the characteristics, possible inputs to, and releases (i.e., nutrients and contaminants) from the creation of Frog Pond STA.
11	The PIR should address the issue of climate cycles and ecological processes, recognizing that wetlands require periods of drought, even extreme drought, as well as periods of flooding, even extreme flooding, to maintain their natural composition and natural functions. This variation occurs among years as well as within years.
12	Given that this is a system driven by cycles, the monitoring program should identify and be responsive to natural environmental cycles.
13	The real estate analysis is incomplete and the relationship between land acquisition costs and flood risks for the recommended plan and the alternatives is not well-documented.
Significance – Medium	
14	More details on the spatial distribution of soil type, particularly peat and marls, need to be provided to justify the engineering design.
15	Additional information is needed on the distribution and abundance of amphibians within the project area, their habitat demands, and whether their habitats will or will not be changed by the project.
16	The discussion on rock mining operations in the project area was very limited in the PIR and did not have any details as to the potential impacts to the project functions and features.

17	The plugs alone, as proposed, are likely to cause deep holes which will develop low dissolved oxygen, high residence times, and generally an undesirable deep pond in an otherwise shallow water habitat.
18	The Recreational Benefits Analysis discusses only local recreational use benefits of the study area, but should also consider the larger benefits associated with ecosystem restoration within ENP.
19	The PIR would benefit from a description of the concerns that led to a complete redesign of the project.
Significance – Low	
20	Inclusion of Acroporids, which are Threatened not Endangered, confuses the reader and raises unnecessary concerns because it is not found in the area.
21	There is a lack of information on the precautionary measures that should be taken during construction.
22	It is unclear why the southern third of the header distribution channel was moved 200' to the east of its identified location in Figure A-2.
23	Additional information, including more detailed graphics depicting project features, potential hazards and geographic boundaries needs to be provided in Section A.4 and A.6 of the Appendix A in regards to previous geotechnical and other investigations.

6. REFERENCES

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APPENDIX A

Final Panel Comments

on the

Western C-111 Spreader Canal Project Implementation Report

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Comment 1:

A map of the entire Taylor Slough should be included showing major features and flows in and out of Taylor Slough, as well as the changes in flow anticipated from the components listed in Section 1.5.1 of the Project Implementation Report (PIR). This map and accompanying overlays are needed to indicate existing flow and path conditions, and to allow comparison of potential effects from the project alternatives.

Basis for Comment:

Taylor Slough is an important natural feature in this project and it will serve to transport water to Florida Bay and ENP. The environment of the slough is largely controlled by sheet flow of water. The PIR proposes several changes to flows down Taylor Slough, including the selected 2DS alternative. In order to assess possible effects on Taylor Slough, the boundaries need to be clearly delineated, and the existing and proposed changes in flow quantified. In fact, it is unclear if the intent of the entire project is to add water to Taylor Slough or simply stop the losses. More details are required, as indicated below.

The main document fails to show the existing water flow and path conditions. There are no boundaries for Taylor Slough and no ecological features within the slough identified, even though some of these occur in the annexes, the flow of information to the reader is not cohesive. Further, maps within the PIR omit major anthropogenic features such as the highway between the Frog Pond and the headwaters of the slough. Some maps include structure 332 and 175; however, only in the engineering annex is it learned that 332 is to be abandoned. Structure 175, however, is not to be abandoned and its function is unknown (see Volume 3, Annex D, Figure D2). The location of structure 175 near the header implies a function which is unknown. In addition, L31 is labeled as a levee, but only deep in the annex is it learned that there is an associated borrow canal (see Volume 3, Annex B).

Along these lines of concern, here and throughout the full set of documents, the lack of explanation of the existing system creates problems in understanding the proposed system. While structures are identified as a pumping station or a pipe, there is no indication of which direction water is to be pumped or drained—for example, the direction of flows within the Aerojet canal or the L31W borrow canal are not presented. This is significant because the selected alternative proposes to pump water into the Aerojet via the connector and the fate of that water is not known.

If the south end of the Aerojet is to be allowed to flow into the Everglades then the nutrient and pollutant loads need to be assessed. The status of the L31W canal and how it interacts with the areas both east and west would alleviate concerns that all the water backed up to the west of the Aerojet would simply drain into the L31W borrow canal.

Significance – High:

Taylor Slough is an important feature in this project and water flows are key to understanding the current state of the system, and for predicting the possible impacts of the project.

Recommendations for Resolution:
To resolve these concerns, the report would need to be expanded to include: ▪ *A map of Taylor Slough showing its natural boundaries and sub regions (if any). This map should include directions of flow and directions of pumping along with major natural features (sloughs, islands) and anthropogenic features (roads, bridges, levees) including the Tamiami Trail.* ▪ *The same boundaries should be superimposed upon maps used elsewhere in the PIR such as Figure 2.2 and Figure 6.1.*

Comment 2:

The existing ecological conditions are unclear, which makes it difficult to assess the potential impacts of the project alternatives.

Basis for Comment:

The natural ecological communities and species distributions in the project area are strongly affected by hydrology and fertility. The current state (population sizes and distributions) provides information on what kinds of impacts may be expected from the project. Often the baseline conditions noted within the PIR lack sufficient detail to assess which species are at risk from population decreases (e.g., carnivorous plants, regionally rare species) or to assess the risk of invasive species spreading.

There are four areas where more information is required for assessing potential impacts of the project and choosing among project alternatives.

1. Plant community types. Taylor Slough in particular and zone 3A in general, are vast areas of wetlands. The current information on "vegetative zones" included in the PIR is only a coarse classification, and many changes could occur in the composition of these zones after altered hydrology and fertility. Additional information is needed regarding the types of plant communities that occur within this area, and their relationships to basic environmental factors including topography, hydrology and fertility. Typically this is provided in the form of a multivariate analysis of vegetation patterns and a community classification. A model example of such a study is Wiser et al. (1996).

In the short term, a skilled field botanist could provide a subjective summary, which could then be followed by the comprehensive multivariate summary.

2. Species information. A complete species list, particularly for Taylor Slough, along with annotations about each species' sensitivity to hydrology, fertility, fire and other factors that the project might affect needs to be included in the PIR.

3. Habitat information. The report needs a list of important habitat types (e.g., flatwoods, salt barrens), their existing area, and any possible changes from the project alternatives.

4. Maps. The maps of panther observations (Figure A1-7, A1-8) and manatee sightings (Figure A1-9) were very useful – more maps like these for other key species would be helpful. These maps could include regionally significant habitats such as rocklands, marl prairie, flatwoods and slat barrens. Other helpful maps would include significant species such as concentrations of carnivorous plants, oyster beds, or crocodile sightings. Such species provide important reference points for assessing current conditions, and monitoring possible changes in future environmental conditions.

Wiser, S.K., R.K. Peet and P.S. White. 1996. High-elevation rock outcrop vegetation of the southern Appalachian Mountains. Journal of Vegetation Science. 7: 703-722.

Significance – High:
Without knowledge of the existing species and habitat requirements, it is not possible to evaluate whether the project as a whole, or the individual alternatives, will impact those species or their habitats.
Recommendations for Resolution:
To resolve these concerns, the report would need to be expanded to include: ▪ *An analysis relating plant species composition of Taylor Slough to gradients such as topography, peat content, hydrology and fertility, and a map showing the occurrence of these communities within Taylor Slough.* ▪ *A list of the plant species in each community and their abundance.* ▪ *An explanation of the likely causal factors producing each community, and a statement of how the project alternatives might affect these causal factors.* ▪ *A full enumeration of the plant species in the project area, their relative abundances, and comments where appropriate on their regional significance, coefficient of conservatism, or sensitivity to project alternatives.* ▪ *Maps of significant natural habitats within the project area.* ▪ *Maps of other potential indicator species including crocodile sightings, oyster beds, and other selected species with known salinity tolerances, specific hydrological requirements, or regional ecological significance within the project area.*

Comment 3:

The specific details on the existing system, including the physical, operational and triggers, and how they will change must be provided to understand the impact of flow to the ENP.

Basis for Comment:

The success of the project hinges upon whether the selected alternative can satisfactorily create water flow (water budget) in various critical regions and cause salinity distribution (mass budget) to behave as anticipated. The existing conveyance system, as well as its current and future operations (including the triggers), is expected to affect the water budget, including the inflow to and outflow from the Taylor Slough, availability of water to sustain a desirable hydraulic ridge, and the project's ability to avoid backing up water in the system under a range of climate conditions. In addition, the conveyance system and its operations are expected to affect the mass budget, such as the water quality in the Everglades and salinity distribution in the Florida Bay. The water budget and mass budget in average and extreme conditions are variable and uncertain, depending upon climate variability.

Although some descriptions of some parts of the existing system can be found in several sections in the PIR, the panel is unable to establish a coherent understanding of the system details (and its operation criteria) and evaluate how they could affect the evaluation of the alternatives. In addition, the extent of various critical hydrologic and ecological features, such as the Taylor Slough, the mitigation area, and natural areas, were not distinctly identified in the PIR. The PIR did not address the uncertainties regarding the volumes of water available for the project, such as the amount of the water actually going down Taylor Slough and the associated water quality. This strongly affects the potential benefits for Florida Bay.

As a result, there is insufficient supporting information to justify that the proposed project would have no effect on the conveyance system ability to reduce flood damages in the project area.

Significance – High:

The existing conveyance system, as well as its current and future operations (including triggers), is expected to impact water flow and salinity distribution under various climate conditions. Creating appropriate water flow and salinity distribution is critical to the success of the project. It is important that these impacts are accounted for in the evaluation of alternatives.

Recommendations for Resolution:

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

- *Critical details of the existing system and description of the operation rules (including the triggers).*
- *Water budget (inflow and outflow) and mass budget estimation of various critical hydraulic, hydrologic, and ecologic components under average and extreme conditions.*
- *Justifications that the project would not affect the conveyance system performance.*
- *A description of how these factors were addressed in the evaluation of alternatives.*

Comment 4:

The assumptions leading to the "future without project" should be clearly specified in relation to water demands and land use changes and how those impact the "future without project" water budget.

Basis for Comment:

Section 3 of the PIR does not provide a clear indication of the future without project (FWOP) conditions as they relate to: a) the primary study area, and b) the conditions that change within the study area. On the first point, Annex A, Table A1-2 provides details on PIR Figure 2-2, describing it as the primary area being used for the benefit calculations; however, this is not evident in the main PIR. Appendix A (Engineering), describes the MODBRANCH domain for the hydrological modeling as a significantly larger area extending from the Gulf of Mexico to the Atlantic Ocean and bounded by Florida Bay on the south and areas beyond the ENP boundary on the north. These conflicting descriptions of the project area make it difficult to know which area is being described in Section 3.

Given this uncertainty about the project area, the statements concerning future land use conditions and water demands are confusing and not well-integrated with the information provided in the appendices. For example, PIR page 3-4 includes the statement, "The future without land coverage used in the hydrological modeling and benefit assessment assumed minimal loss of wetlands with new development occurring mostly on previously farmed land." Conversely, the authors have included the following statement on PIR page 3-16, "As a result of development, the existing wetland soils in the area would be altered. Wetland soils would be drained and/or displaced with fill materials to support the urban development."

For water demands, the discussion and tables in PIR Section 3.3.5 pertain to the Lower East Coast Supply Area 3 (LECSA3). This area includes all of Miami-Dade County and Monroe County, an area considerably larger than the study area described in Figure 2-2 but contained within the model domain for the MODBRANCH hydrological model. The unstated assumption is that water demands throughout the LECSA3 will impact on the C-111 study area through groundwater withdrawals so they must be included in the baseline and FWOP conditions. This assumption needs to be included in Section 3 of the PIR and assumptions about future water demands included as part of the description of hydrological model configurations in Appendix A-10. Also, the most likely demand scenario selected includes 'conservation adjusted' demands without an explanation of what type of conservation is included. Some justification for the increased water demands in the FWOP scenario should be included since the South Florida Water Management District controls consumptive use permits and withdrawals for the LECSA3 and could restrict future withdrawals if they were deemed harmful to the natural system.

Significance – High:

A clear and well-documented description of the FWOP condition is needed in Section 3 of the PIR to evaluate and compare the "with project" and "without project" impacts of the alternative plans.

Recommendations for Resolution:
For the purpose of defining the primary study area, the report should include: ▪ *A comprehensive description in Section 3 of the primary study area and its relationship to the model domain for the hydrological model.* ▪ *A description of the changes in the FWOP condition that occur within the primary study area and the effect of changes in the broader hydrological area on the primary study area. These descriptions should be a part of both Section 3 of the PIR and the hydrological modeling discussion in Appendix A.*

Comment 5:

The rationale, criteria, weighting and the process for selection and monitoring for adaptive management needs to be explained and further documented.

Basis for Comment:

Adaptive management focuses on learning and adapting, through partnerships of managers, scientists, and other stakeholders who learn together, how to create and maintain sustainable ecosystems. It helps managers maintain flexibility in their decisions, knowing that uncertainties exist and provides the latitude to change direction; further, it will improve understanding of ecological systems to achieve management objectives by taking action to improve progress towards desired outcomes.

The report addresses the purpose, problems, objectives and constraints; however, it hasn't addressed the necessary adaptive management measures before, during and after construction. Further, the Draft Monitoring Plan in many cases did not provide a clearly presented link between the causative agent of the change in the data being monitored. In plans incorporating adaptive management there must be a clear cause and effect relationship established to properly adapt to changes.

Also, additional criteria (PIR page 5-44) were added into the analysis in the final stages of the alternative comparison, which by its approach adds a weighting (whether intended or not) to the process. In the written process, it appears that the criteria and measures for evaluating wetland impacts were not weighted when considered even though the criteria are not equal nor are there produced benefits for each measure. Weighting based on importance should be considered when comparing alternatives. Specifically, when developing criteria for comparison of alternatives, the three standard regulatory concerns about avoidance, minimization and mitigation have to be taken into account. As such, a plan may be cost effective and produce great benefits; but, if it causes excessive impacts with extensive mitigation required then it may not be the best solution. Adaptive management techniques may be a useful tool to avoid those impacts and allow changes as the project matures.

As such, there are issues with pumping on a long-term basis considering the maintenance and operational requirements by the local sponsor that would be eliminated if a seepage barrier with minimum maintenance was specified as a more sustainable feature. Weighting based on importance might be considered when comparing alternatives. The average annual habitat units are a very subjective analysis that is controlled by opinion and projections more than hard science.

Further, the recommended plan is clearly a compromise between the needs of the Everglades and the wants of society (i.e., water use demands). Reductions in human consumption as an element to make more water available to the Everglades would be challenging and the plan dismisses them without much discussion. This is another area where adaptive management might play a role.

Significance – High:
The incorporation of adaptive management techniques from the beginning of the analysis has a direct bearing on the process of comparing viable alternatives and selecting the recommended plan.
Recommendations for Resolution:
To resolve these concerns, the report would need to be expanded to include: ▪ *Information on the process of selecting the recommended plan, using weighted criteria, and adaptive management measures to ensure that the alternatives area is accurately assessed.*

Comment 6:
Without a list of detailed assumptions, the reader cannot accurately determine that the initial construction costs and amortized/annual operation and maintenance (O&M) costs are valid.
Basis for Comment:
In describing the costs used to evaluate the alternatives, the PIR page 5-28 includes the statement, "Details of the data development are explained and discussed elsewhere in this report." The authors have also stated on p. 5-29 of the PIR, "The costs presented in Table 5-8 are preliminary rough order of magnitude (ROM) estimates …." However, the only detailed presentation of costs is in Appendix B of the PIR and these are described in detail only for the recommended plan. The spreadsheet estimates for the alternatives in Appendix B are very difficult to read, provide no discussion of the underlying assumptions, and appear to focus only on construction costs. There also appears to be no consideration of non-direct project costs such as construction site access and maintenance expenses. In addition, a discussion of the potential costs to surrounding developed areas due to extreme weather events, such as hurricanes, has not been included to evaluate the effectiveness of the alternatives. The 25% contingency for land and damages is simply a ballpark approach and does not lend much confidence to the estimates.
Significance – High:
Construction and O&M costs are a critical part of comparing alternatives. It is not possible to compare alternatives if the cost methodology is not clearly described.
Recommendations for Resolution:
The report would need to be expanded to include: ▪ *A more complete presentation of direct, non-direct and real estate cost components for each alternative in Section 5 of the PIR along with supporting details in Appendix B.* ▪ *A discussion and modeling analysis of the impacts of alternatives on surrounding developed areas due to extreme weather events.*

Comment 7:

The overall impacts and benefits of the various alternatives is not supported by the PIR due to uncertainties in the accuracy of the model (MODBRANCH), data and assumptions used to compare the alternatives.

Basis for Comment:

The evaluation of various alternatives relies strongly on the results of the MODBRANCH model. However, the PIR did not provide sufficient information to justify that the accuracy and uncertainty of the model is adequate for relative comparison of the alternatives (rank ordering in regards to benefits and costs).

MODBRANCH is not a widely adopted model for simulating interacting groundwater and surface water systems. The use of MODBRANCH to simulate the complex flow and mass transport in the Everglades environment involves approximations that might not be needed for other integrated hydrologic models. Furthermore, the PIR did not describe the critical elements of the model in details, such as parameter characterization and zonation, spatial and temporal variation of rainfall, evapotranspiration, boundary conditions, water and mass budgets, numerical convergence, etc. There is no description in regard to the selection of data for model calibration, the spatial and temporal distribution of mismatch errors, and the accuracy and uncertainty of model predictions (Section A-10). The accuracy and predictability of the water levels, water budget, and mass budgets in the Taylor Slough area and the areas of various proposed project components are essential. It is unclear whether potential future sea level rise and climate variations were included in the model simulations. In addition, the assumptions made for each alternative were not provided in sufficient details for evaluation.

It is also unclear where future changes in water demands (if any) were included in the simulations. Recent data in the Tampa Bay region indicate that the recent economic downturn has noticeably reduced the water demands in the region and is likely to reduce future water demands. It might happen in the project area. The PIR currently contains discrepancies within statements regarding land use impacts associated with various alternatives (Section 7.14).

It is critical that the model is able to predict the relative performance of various alternatives and that the relative benefit (in the context of wildlife, groundwater, base flows, marshlands, salinity distribution, and seawater intrusion) of the selected method is not masked by the uncertainty of the model predictions.

Significance – High:

The evaluation of alternatives relies strongly on the model results, but the predictability and uncertainty of the model was not presented. The hydro-ecologic benefits of the selected alternative cannot be reliably justified.

Recommendations for Resolution:

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

- *Description of critical elements of the model, such as parameter characterization and zonation, spatial and temporal variation of rainfall, evapotranspiration, boundary conditions, water and mass budgets, numerical convergence, etc.*

- *Presentation of spatial and temporal distribution of mismatch errors (bias and spread).*
- *Discussion of the accuracy and uncertainty of model predictions for various alternatives and justification that the model is adequate for the relative comparison of alternatives.*

Comment 8:

Several of the alternatives may result in increased phosphorus inputs to Taylor Slough. Their possible impacts on future vegetation (i.e., increased area of cattails), and how this increase in inputs might be controlled, needs to be addressed.

Basis for Comment:

The low levels of phosphorous are a critical kind of natural stress that, like drought, structures the plant communities in this area. The level of phosphorus not only controls the abundance of dominant species such as sawgrass, but likely controls the distribution of many other types of species and communities. This type of low nutrient availability is a key factor in controlling plant communities, and leads to specific types of plants, and particular kinds of plant communities. This is not only true of the Everglades, but of the New Jersey Pine barrens and even British chalk grasslands. Surveys of this topic are included in Grime (1979) and chapter 4 in Keddy (2007).

As a specific example, in Section 7.9 of the PIR, the carnivorous plants within the wetlands (e.g., *Utricularia*) should be quantified since they provide a sensitive indicator of nutrient status, which may be changed by phosphorus from the Frog Pond STA. The panel could not tell from the report if there were other carnivorous plants such as *Pinguicula*, which would be more sensitive indicators of habitat changes. Florida has six species of *Pinguicula*, some of which occur in the southern part of the state.

Other species, such as cattails, are already known to be indicators of elevated nutrient levels. If other species in this category occur in the area, they should be identified along with their location in Taylor Slough.

Concentrations and loads of phosphorous in the water sources to Taylor Slough need to be regularly monitored under differing water level and flow conditions. Levels of about 5 ppb may cause an ecological shift which may be considered undesirable. If additional water quantity can only be achieved in a manner which also increases phosphorus (fertilization) then undesired affects such as expanding cattail populations may result.

Phosphorus is transported by water and there is an incomplete understanding of existing and future water flow.

(a) The area referred to as Frog Pond is labeled in various places as the N,C,S Cell of the FPDA (Frog Pond Detention Area, engineering annex) and the EIS refers to the entire area east of the L31W as the FPDA. The placement of weirs and header canals in the engineering annex seems to indicate that the cells may in fact be intended for use as a polishing pond. Still, the ultimate fate of the waters in these cells is unclear. There is no apparent outfall, but the geological report indicates that subterranean transport may be a possibility.

(b) The fate of waters pumped into the Aerojet is unclear. The Engineering Annex, Volume 3 Figure A3 shows a box culvert at the southern end of the Aerojet extension, but it is not clear where this leads or what direction the water will flow. If these waters

discharge to the south into the Everglades, they may be expected to carry nutrient loads which may influence the plant assemblage.

Grime, J.P. 1979. *Plant Strategies and Vegetation Processes.* John Wiley and Sons, Chichester, UK.

Keddy, P.A. 2007. *Plants and Vegetation: Origins, Processes, Consequences*. Cambridge University Press, Cambridge, UK.

Significance – High:

The impacts of the project and the different project alternatives could be underestimated. Ecological communities created by low phosphorus levels have species and communities that are very sensitive to phosphorus inputs, and any additional phosphorous inputs to Taylor Slough may have significant impacts upon species composition and abundance.

Recommendations for Resolution:

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

- *A figure and table showing how wetland species in Taylor Slough are distributed along a phosphorus gradient, and identify the thresholds at which composition and function change.*
- *An estimate of phosphorus inputs to Taylor Slough from each alternative.*
- *A summary of existing information on low phosphorus levels as a controlling factor in Taylor Slough communities and species, using the existing scientific information available on management of communities with low nutrient status.*
- *A list of indicator species associated with the lowest phosphorus levels (e.g., carnivorous plants).*

Comment 9:

The PIR needs to comprehensively discuss the characterization of salinity throughout the Taylor Slough and Florida Bay area including historical changes/impacts, expected salinity changes, and negative impacts for the alternatives.

Basis for Comment:

Salinity is an over-riding factor that controls coastal ecosystems. One criterion for comparing alternative projects in the PIR is salinity in coastal bays, yet there is little specific information on the salinity tolerances of species and communities throughout the project area to assess the full impacts of the alternatives.

Some examples to illustrate this concern are described below. Section 2 of the PIR provides only a limited overview and background on Florida Bay and the coastal bays impacted by the project. Section 2.5 is very general and provides no specific information on the location of essential fish habitat for individual species. Similarly, Section 2.10.4 is very general and states, "The SFWMD is currently performing monitoring of salinity levels in Florida Bay." Annex A on Fish and Wildlife Coordination Act and Endangered Species Act compliance contains a few comments on salinity levels, but the bulk of the discussion and analysis focuses on terrestrial habitat and species. Even Appendix C on Environmental Information has a short Section C.6.6 that gives a few general statements about salinity problems in coastal areas and a trend analysis based on monitoring data for one site (Highway Creek, which is not identified in any of the maps in the report). However, there is no discussion of the high variability in salinity levels shown in Figures C-11 and C-12 or whether the data collection occurred during wet, dry or average rainfall years.

There is also no indication of where the current time period is within the 80 year climate cycle of south Florida set by the Atlantic Multidecadal Oscillation, whether the region is entering a dry or wet era, and how this will affect salinity projections.

Significance – High:

Reducing salinity levels and restoring the estuarine habitat of Florida Bay has been cited as one of the primary objectives of the CERP and one justification for the C-111 SC project redesign.

Recommendations for Resolution:

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

- *A more detailed discussion of historic salinity changes in Florida Bay and the consequences of salinity changes and nutrient levels on the current ecological communities. This would draw upon existing literature dealing with both changes in salinity (e.g., Kelble, et al., 2006) and consequences (e.g., Rudnick, et al., 2006).*
- *More discussion on the existing and potential changes in salinity means and variability in each of the coastal bays as a consequence of each alternative, particularly the impacts on essential fish habitat.*
- *The potential impacts of the Atlantic Multidecadal Oscillation on the project.*

- *A table showing the salinity tolerance ranges for key estuarine and freshwater species likely to be affected by the project.*

Kelble, C.R. et al. 2006. *Salinity Patterns of Florida Bay.* Elsevier.

Rudnick D. et al. 2006. *Report on Algae Blooms in Eastern Florida Bay and Southern Biscayne Bay,* South Florida Water Management District, Coastal Ecosystems Division, July 28, 2006.

Comment 10:

The PIR needs to comprehensively discuss the characteristics, possible inputs to and releases (i.e., nutrients and contaminants) from the creation of Frog Pond Stormwater Treatment Area (STA).

Basis for Comment:

The Frog Pond STA is a facility that is critical for building the hydraulic ridge, but it might also be a source for nutrients and invasive species. More information is needed to assess the potential negative impacts of the STA upon Taylor Slough. Three issues in particular need more information.

1. Design and operation of STA. A more comprehensive description of the proposed Frog Pond STA, including (1) layout, (2) anticipated vegetation types, and (3) predicted phosphorous budget is needed within the PIR. The PIR suggests only three cells, and it is possible that added cells, or added internal barriers, will affect phosphorus removal efficiencies. The species in the STA will determine how much phosphorus is removed, and what the potential is for invasive species to spread into Taylor Slough.

2. Cumulative effects of STA. The construction of STA's has cumulative impacts. These might include changes in evapotranspiration, changes in phosphorus distribution, changes in wading bird use patterns, changes in amphibian breeding patterns, and new avenues for invasion of exotic plants and animals. The PIR should assess how the addition of STA's could affect the area, and to what extent these effects could be minimized.

3. Critical habitats within the proposed STA. The Alternative 20 description (p. F-43) mentions critical natural areas within the proposed Frog Pond STA: "Frog pond natural areas (pineland, hammock, pinnacle rock glades) to be preserved." The geographic extent of these habitats, their significance, and the options available for their protection may affect the choice of project alternatives and the design options for the STA.

Significance – High:

The Frog Pond STA will be a potential source of water, nutrients and invasive species for adjoining Taylor Slough, therefore, the potential impacts need to be identified.

Recommendations for Resolution:

To resolve these concerns, the report would need to be expanded to include a section on Frog Pond STA addressing points such as:

- *Sketch and general operating procedures.*
- *Inputs of phosphorus anticipated.*
- *Mechanisms proposed for removal of phosphorus.*
- *Projected outputs of phosphorus into Taylor Slough.*
- *Anticipated vegetation in STA – e.g., native plants or source for exotic plants*
- *Anticipated wildlife in STA – e.g., native frogs or source for exotic frogs*
- *Cumulative effects of STA construction and lessons learned from nearby STA's already in operation.*

Comment 11:

The PIR should address the issue of climate cycles and ecological processes, recognizing that wetlands require periods of drought, even extreme drought, as well as periods of flooding, even extreme flooding, to maintain their natural composition and natural functions. This variation occurs among years as well as within years.

Basis for Comment:

The distinct wet and dry climate variations characterizing the hydroperiods in the Everglades region is critical to the sustainability of the ecological habitat. Most wetlands depend upon extremes of flooding and drought that occur not only *within* one year, but *among* many years. The PIR only provided a short description of the annually averaged rainfall and temperature and average rainfall in the rainfall period (Section 2.6). The PIR did not describe the existing climate variability and the potential average and variability of future climate condition in the region. The PIR did not present the characteristics of current hydroperiods and their potential variability in the future.

Longer-term (among year) cycles of flooding and drought occur across most wetlands, including Great Lakes marshes, prairie potholes, wet flatwoods, and floodplains. It is the extremes of drought and flooding that typically control species composition. These extremes may allow regeneration from buried seeds, may kill competitive dominants (particularly shrubs) and may allow periodic fire to create new gaps for colonization (Keddy, 2000, pp. 177-239).

Extremely wet years may allow freshwater species to germinate in more saline conditions (Zedler and Beare, 1986).

If the frequency and distribution of these natural extremes are reduced, undesirable changes in composition and function will occur.

In the Southern Everglades specifically, wetlands are controlled by a climate cycle operating over about 80 years (e.g., Kelly and Gore, 2008) This means that any water control structures will have to simulate not only within year variation, but a natural 80-year cycle with high and low water periods. This also means that when instructions are written for water control structures, they will have to be calibrated based upon where the wetlands are within this natural cycle.

Keddy, P.A. 2000. *Wetland Ecology: Principles and Conservation*. Cambridge University Press, UK

Kelly, M.H. and J.A. Gore. 2008. Florida River Flow Patterns and the Atlantic Multidecadal Oscillation. River. Res. Applic. 24: 598–616.

Zedler, J.B. and Beare, P. A. 1986.Temporal variability of salt marsh vegetation: the role of low-salinity gaps and environmental stress. In *Estuarine Variability*, ed. D. A. Wolfe, pp. 295–306. San Diego: Academic Press.)

Significance – High:
The project has the potential to reduce the frequency of the occurrence of the extreme conditions that naturally produce the wetland communities in the area, leading to major changes in species composition and loss of natural diversity.
Recommendations for Resolution:
To resolve these concerns, the report would need to be expanded to include: ▪ *Description of existing climate cycles of various scales), including their variability and hydroperiod characteristics.* ▪ *A review of how such climate cycles affect the plant and animal communities within the project area.* ▪ *Specifics on where the system is currently within the natural 80-year climatic cycle of southern Florida.* ▪ *Descriptions of how the management of the project will simulate this natural cycle.* ▪ *Specifics on how extremes of flooding and drought will be included in the operating instructions for the water control structures.* ▪ *Specifics on how these extremes will be maintained to simulate a natural 80-year cycle.*

Comment 12:

Given that this is a system driven by cycles, the monitoring program should identify and be responsive to natural environmental cycles.

Basis for Comment:

The system is driven by cycles occurring along a spectrum from predictable and short term, which are either local (as in tides) or widespread (migrations, day length), to long term, which are much less predictable. Examples of the latter may include the 25 to 35 or approximately 80-year cycles of annual rainfall levels, cycles associated with El Nino related oscillations, or the frequency of hurricanes. Within these cycles are less predictable cycles usually of moderate term such as population levels, local rainfall amounts, hurricanes actually making landfall, fire, and disease of both plants and animals. Some of these cycles may be cyclic around means or levels of long term cycles and even around the cyclic mean (moving average mean) of other cycles.

The potential arises for monitoring data to be interpreted in the absence of natural rhythms. Such an interpretation within a program dedicated to adaptive management leads to the probability that an adaptive change in management may occur as a result of a perfectly natural data set interpreted as a deviation from the desired target instead of a data set known to be within the cycle or statistical variance. The latter would therefore be interpreted as a positive indication of having met project goals instead of a cause for program adjustment.

The proposed monitoring program does not appear to link field data to cyclic data and does not appear to be scheduled frequently enough to allow for inter data set normalization.

Significance – High:

Adaptation to management in operations or future design needs to be based in data known to be normalized against natural rhythms and variance or at least interpreted with these factors in mind. Failure to do so may result in an adaptation which will be contrary to the needs of the system. Sequential errors in adaptation will serve to exacerbate the false relationship between data and adaptation.

Recommendations for Resolution:

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

- *A monitoring plan designed with substantive awareness of where the system and its components lie within the complex set of natural rhythms and by which the results are interpreted.*

Comment 13:

The real estate analysis is incomplete and the relationship between land acquisition costs and flood risks for the recommended plan and the alternatives is not well-documented.

Basis for Comment:

The information on real estate costs for private land acquisition to a) construct the project facilities and, b) compensate for induced flooding, does not provide sufficient information to evaluate the alternatives. Section 3.3.3 in the PIR provides very general statements about flood risks in South Florida and notes that these risks may increase in the future. This section also includes the statement, "The C-111 SC Western project may create opportunities to explore the improvement of the water management system and level of service in south Miami-Dade County." No further details on the statement are provided in the remainder of the PIR. Section 6.11 states, "The project team has determined that there would be no effect on the Central and Southern Florida (C&SF) system ability to reduce flood damages in the project area." These two statements are essentially repeated in Section 7.7 with the additional statement that, "…hydrologic modeling shows no project induced damages." Throughout the PIR and Annex C, details relating to land acquisition costs are referenced to Appendix D (Real Estate).

Appendix D, however, is incomplete and contradicts many of the above statements in the PIR. The opening section states, "The information presented in this report is tentative in nature and will be addressed more fully in the final PIR upon receipt of the final engineering design drawings." In Section D.13 the authors note that WRDA 2000 requires a 'Takings Analysis' to determine the extent of lands impacted by flooding from the project. The remainder of this section provides three criteria used to determine impacts from elevated hydroperiods. Statements on page D-13 indicate that the evaluation team worked with GIS specialists, "…to produce a formula to be applied to alternative 2DS which would provide an initial determination of the impacted lands." Based on this analysis, it is reported in Table D-1 that 11,565 acres would be impacted with 776 acres of the total in private ownership. The estimated private land acquisition costs are reported in Table D-2 to be $30.7 million or approximately 26% of the total investment cost for alternative 2DS reported in Table 5-8 of the PIR. Figure D-3 shows a map with the legend "Project Map and Impacted Lands" but this figure in not referenced in the text and there is no explanation of the image.

No details are provided in Appendix D to document: a) how the hydrological modeling was conducted, b) how the formula was implemented in GIS, c) the spatial resolution of the model, and d) the potential flooding impacts under extreme weather events such as a hurricane. Most importantly, it is not clear whether other alternatives were evaluated for potential flooding impacts and the associated costs of land acquisition. Therefore, the real estate costs for the other alternatives reported in Table 5-8 of the PIR are not documented. This raises important questions about the cost-effectiveness analysis reported in the PIR if only a partial analysis of the land acquisition costs of other alternatives was conducted.

Significance – High:
Real estate costs are a significant component of total project costs and the alternatives should be evaluated in relationship to total project costs to determine cost-effectiveness.
Recommendations for Resolution:
Appendix D needs to be expanded to include: ▪ *A description of the hydrological modeling used to support the flooding impacts analysis and the spatial resolution of the model.* ▪ *A description of the process used to convert hydrological model results to GIS maps of land parcels in the study area.* ▪ *An analysis of the potential flooding impacts and land acquisition costs associated with each alternative.* Other recommendations include: ▪ *Based on the results of the potential flooding impact analysis for each alternative, the cost effectiveness analysis in the PIR should be revised to reflect the more detailed assessment of land acquisition costs.* ▪ *In light of the limitations of MODBRANCH and uncertainty about ground water movement after the Modified Water Deliveries project is implemented, it should be acknowledged that the estimated land acquisition costs could be significantly higher or lower. Some discussion of funding alternatives and problems, if future damages are significantly higher, should be included.*

Comment 14:
More details on the spatial distribution of soil type, particularly peat and marls, need to be provided to justify the engineering design.
Basis for Comment:
The PIR gave a representative discussion of the soil types in the project area; however, there was insufficient discussion as to their impact on the project function and performance (engineering design) especially when there are rapid fluctuations in water depth from wet/dry season, subsistence issues compared to sea rise, and subsurface water flow. The sections on peats and marls are tied into hydroperiods and vegetation; however, the discussion lacks details on their spatial distribution. Specifically, the soil information mentions spatial heterogeneity (13 soil types) without showing it. A map of the project area, including Taylor Sough, with soil types would be useful for assessing potential vegetation responses to the project, since soil types and small changes in topography will be tightly connected to changes in sheet flow. Also, providing an overview of the hydrogeologic properties (such as hydraulic conductivity/infiltration capacity/storage characteristics) would assist in understanding the interactions of the soil types to the changing in water elevations. A discussion on the salt barren soils being hyposaline should also be presented in the report.
Significance – Medium:
The interaction of natural soils with a recommended plan consisting of a hydraulic ridge with earthen levees would be important to understanding the hydraulics and engineering parameters of the project.
Recommendations for Resolution:
To resolve these concerns, the report would need to be expanded to include: ▪ *Additional graphics of the soil distribution in the project area tied to vegetation type.* ▪ *Additional discussion on the impacts of varying hydroperiods as compared to the wet/dry season water elevations.*

Comment 15:

Additional information is needed on the distribution and abundance of amphibians within the project area, their habitat demands, and whether their habitats will or will not be changed by the project.

Basis for Comment:

Amphibians are known to be sensitive to environmental changes, and therefore useful as indicator species. Amphibians also provide an important source of food for higher trophic levels including fish, alligators and wading birds.

The current report does not list the species present, nor provide information on habitats and population sizes for the native species. Therefore, it is not possible for the panel to assess the current state of the system or what potential changes might occur. Some of these species may require more than one habitat to complete their life cycle. Others may be particularly sensitive to changes in salinity.

Since exotic species are also mentioned, it is important to know (1) which species they are, (2) how they are currently distributed, (3) how they might respond to the project, particularly to the STA's and canal plugs, and (4) whether any of them will be included in the monitoring program.

There is also some lack of consistency in the information about amphibians within the PIR. Section 2.4.2 says the South Dade Wetlands (SDW) contains 60 species of amphibians. According to page 2.1, SDW refers only to the Southern Glades and Model Lands. In the same section the PIR says that there are "twelve surveyed amphibian species." Section 2.4.2 says that 9 of the 12 species are exotics. The PIR then mentions five species by name without indicating whether they are native or exotic.

Significance – Medium:

Amphibians are known to be sensitive to environmental changes, and also may be useful as indicator species for assessing potential impacts associated with the project.

Recommendations for Resolution:

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

- *A complete list of native and exotic species.*
- *The subset of species that occur within Taylor Slough.*
- *A brief statement for each species documenting current population size, preferred habitat, distribution, and possible sensitivity to changes in hydrology.*
- *A suggested short list of indicator species for monitoring.*

Comment 16:

The discussion on rock mining operations in the project area was very limited in the PIR and did not have any details as to the potential impacts to the project functions and features.

Basis for Comment:

This comment relates to potential contamination from the mining operations and underground seepage into the project area.

In light of the subsurface flows described elsewhere and the suspected need to dewater rock pits during mining operations, the term "returned after use" is confusing. Further, the idea that the mining operational dewatering could provide an alternative source of water for the hydraulic barrier is not proven.

It would be useful to know whether the contiguous rock mining operation will (1) lower the water table (i.e., is it pumped dry for mining?) and (2) to what extent will this feature serve as (a) an obstacle to sheet flow, (b) a source of nutrient enriched water, or (c) a source of contamination.

Significance – Medium:

Mining operations and their impacts to the project functions and features can have significant environmental effects if not addressed thoroughly.

Recommendations for Resolution:

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

- *Additional information on the potential impacts of the local mining operation and whether the reuse of the dewatering process would aid in the project functions.*

Comment 17:
The plugs alone, as proposed, are likely to cause deep holes which will develop low dissolved oxygen, high residence times, and generally an undesirable deep pond in an otherwise shallow water habitat.
Basis for Comment:
The panel understands that the canals are generally deep (15-20 ft). Plugs installed as planned would isolate segments of canals into deep linear ponds. Wind driven and flow driven circulation would become even more restricted than under existing conditions and residence time of both pollutants and nutrients would be greater. Nutrients derived from runoff, atmospheric deposition, decaying plant material from adjacent marshes, and autochthonous sources would be expected to create eutrophic conditions, low dissolved oxygen content, extreme stratification, and an otherwise undesirable and uninhabitable environment. Geotechnical information in the plan implies that some of the waters from these deeper zones may be entrained into the subterranean flows and may be a potential threat to down gradient water quality.
Significance – Medium:
Restorative measures should not create undesirable habitat, even if at small scales.
Recommendations for Resolution:
To resolve these concerns, the report would need to be expanded to include: ▪ *A detailed assessment of the circulation, stratification, and residence times of pollutants, along with the expected levels of oxygen and potential impacts to down-gradient groundwaters which may result, culminating with a statement balancing the undesirable habitat and the need for the plugs.*

Comment 18:

The Recreational Benefits Analysis discusses only local recreational use benefits of the study area, but should also consider the larger benefits associated with ecosystem restoration within ENP.

Basis for Comment:

Recreational uses of the study area are adequately described, although too much of the information in Appendix G of the PIR is at the county or state level and the discussion does not directly relate it to the project. The plan focuses principally on the facilities that would be constructed near impoundments and adjacent trails to provide recreational opportunities. The potential benefits from public access to levees and other project areas should be considered in the context of potential losses for current uses such as recreational fishing in the C-111. Better integration of the information in Section 2.20 and Appendices G.5 and H is needed.

The potentially larger benefits of the project associated with wetlands restoration in Taylor Slough and improvements in salinity in Florida Bay and other coastal waters are not discussed. These benefits could accrue from out-of-state visitors to ENP who experience an enhanced natural system and wildlife as a result of the project. Also, enhanced habitat for birds and other migratory species would contribute to wildlife populations outside the immediate project area.

Significance – Medium:

Recreation benefits and costs are part of the National Economic Development (NED) account. Complete estimation of monetary benefits on environmental projects is difficult, but a complete evaluation of the different beneficiary groups should be included.

Recommendations for Resolution:

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

- *A discussion of the broader nature study and nonconsumptive benefits that may result from the project and the beneficiary groups outside the local area.*
- *At a minimum, some visitor count and origin data for ENP and the Royal Palm Visitor Center should be included since the latter is located directly in the Taylor Slough basin.*

Comment 19:
The PIR would benefit from a description of the concerns that led to a complete redesign of the project.
Basis for Comment:
Section 1.4 of the PIR reviews the origins of the C-111 project and inclusion in the Comprehensive Everglades Restoration Plan (CERP) as part of the Water Resources Development Act of 2000. This section includes a comment from the U.S. Department of Interior (DOI) that, "…the project as proposed would distribute high volumes of water east of the C-111 canal, while no water would be re-directed to the west of the canal." Also included in this section is a statement that the project would not "…provide enough ecological lift to reduce hypersalinities found in central Florida Bay." There is no discussion of the hydrological modeling or other supporting information that led to DOI's comment. There is also no discussion of differences between the analysis conducted for CERP and the current PIR.
Significance – Medium:
The C-111 project was an element of the original CERP and was evaluated once before to determine its impact on parts of the current study area. A discussion of potential errors and uncertainty in the original analysis would provide a better understanding of the purpose for the redesign and may be helpful to avoid modeling and judgment errors in the current analysis.
Recommendations for Resolution:
To resolve these concerns, the report would need to be expanded to include: ▪ *A comprehensive review of the DOI comments in Section 2 of the PIR and a discussion of the differences between the original hydrological modeling and the current modeling in Appendix A. Differences in the scale, resolution, or other features on the models should be noted.*

Comment 20:
Inclusion of Acroporids, which are Threatened not Endangered, confuses the reader and raises unnecessary concerns because it is not found in the area.
Basis for Comment:
Acroporid corals (*Acropora palmata* and *Acropora cervicornis*) are listed under the Endangered Species Act as Threatened, not Endangered as in the reviewed text. These animals are not known to occur within the project area either now or within the recent past. Including a discussion of these organisms may raise unnecessary concerns which, although ultimately shown in the plan to be unfounded, may lead to an overall negative perspective.
Significance – Low:
The mention of these species does not affect the plan or the selected alternative but may affect the perception of, and support for, the project.
Recommendations for Resolution:
To resolve these concerns, the report would need to be expanded to: • *Remove references to Acroporids.*

Comment 21:

There is a lack of information on the precautionary measures that should be taken during construction.

Basis for Comment:

As part of the precautionary measures during and after construction:

1. The contractor should be required to include pre-construction and periodic (monthly) inspection video recordings of the environment conditions surrounding the project site. This should include a related monthly narrative describing the measures being taken by the contractor to protect the environment that includes water quality in the project area and control of contractor debris on public roads supporting access to the project site. Access and haul roads should be clearly delineated and an equipment park established prior to award. This should not be left to the contractor's discretion. Further, the contractor should include results from monitoring wells surrounding the project site into his periodic reports.

2. The PIR should note that construction equipment can serve as a vector for spreading invasive species. Also, comments on the use of erosion and turbidity control barriers are of considerable importance given the risk of suspending (and re-suspending) phosphorus. If small areas of artificially-enriched soil are encountered, the contractor should be directed to remove the material to an off-site location.

3. The contractor should perform daily inspections of their equipment and operational rules need to be established for control of the movement of equipment in and out of the area. Also, language should be included in the PIR that will direct the contractor to minimize transportation of invasive species since invasive species often enter during soil disturbance, and take years to establish. As such, monitoring of the construction areas for several years along with immediate spot control of invasive species should be part of the contractor requirement.

Significance – Low:

Preventive measures by the contractor during the construction process can have a significant effect on reducing the negative effects of construction equipment moving around in the sensitive ecosystem.

Recommendations for Resolution:

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

- *Incorporate specific instructions and preventive measures in the PIR for implementation by a contractor when constructing the project features.*

Comment 22:
It is unclear why the southern third of the header distribution channel was moved 200' to the east of its identified location in Figure A-2.
Basis for Comment:
Section A.2.4 on the Frog Pond Header Distribution Channel contained a statement that the "...final location of the southern third of the header distribution channel could move approximately 200 ft east of the location shown in Figure A-2, and the overall size of the southern cell size reduced to accommodate this change, in order to provide additional buffer" to the ENP. There was no further explanation as to the rationale, justification or impact of potentially moving a project critical feature. Changing the flow patterns into ENP is a critical task for the project and any change in the style, location, or consequences of water flow distribution should be documented and thoroughly explained.
Significance – Low:
Inclusion of additional information explaining the reasoning behind moving the southern third header distribution channel would aid the reader in understanding the project features.
Recommendations for Resolution:
To resolve these concerns, the report would need to be expanded to include: ▪ *A more detailed discussion as to the analysis of the cause and affects of moving the distribution channel to include size changes since the purpose of the project is to increase fresh water flow to ENP*.

Comment 23:

Additional information, including more detailed graphics depicting project features, potential hazards, and geographic boundaries, needs to be provided in Section A.4 and A.6 of the Appendix A in regards to previous geotechnical and other investigations.

Basis for Comment:

There was minimal information provided in Section A.4 of PIR Appendix A concerning previous geotechnical investigations. The material presented was insufficient to understand the quality, completeness and utility of the previous investigations as it relates to water flow patterns.

The information presented in Section A.6, Geotechnical Engineering Evaluation appeared to have presented the minimum amount of information to identify potential geotechnical hazards; although, a graphic depicting general boring site locations and outlining hazards would have aided in the determination of areas of concern across the entire project site.

Overall, the PIR should include more detailed graphics depicting soil distribution related to vegetative cover, project features/boundaries, hazards (e.g., urban areas, mines, contaminated areas), water flow patterns, construction limits and previous investigations for a more thorough coverage of the project area.

Significance – Low:

Incorporation of additional information regardless of format will improve the technical quality of the report.

Recommendations for Resolution:

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

- *Include more detailed explanations and graphics depicting known geologic hazards to the specific facts and features of the project.*

APPENDIX B

Final Charge to the Independent External Peer Review Panel

on the

Western C-111 Spreader Canal Project Implementation Report

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Final Charge Guidance and Questions to the Peer Reviewers
for the
Independent External Peer Review of the Western C-111 Spreader Canal (C111SC)
Project Implementation Report (PIR)

BACKGROUND

The Western C-111 Spreader Canal (C111SC) Project is part of the overall Comprehensive Everglades Restoration Plan (CERP). The project is located in the southeastern portion of Miami-Dade County, Florida. Natural sheet flow through the lower Everglades into Florida Bay has been detrimentally altered through a series of flood control projects that began with the Central and South Florida Project of 1948. These man-induced disturbances have seriously harmed the environment and the restoration of a more natural hydrologic regime is necessary to improve the ecological health of the Everglades system.

The purpose of the Western C111SC PIR is to provide the planning, engineering, and implementation details of the recommended restoration plan to allow final design and construction to proceed subsequent to plan approval. Also included in the report are a Cost Effectiveness Analysis and all pertinent National Environmental Policy Act (NEPA) documentation. The scope of IEPR should include:

- General review of the draft report for completeness and accuracy.
- Completeness and appropriateness of ecosystem restoration analyses
- Completeness and appropriateness of economic analyses
- Completeness and appropriateness of engineering analyses

The project will focus on improving the quantity, timing, and distribution (QTD) of water delivered to central Florida Bay via Taylor Slough. All targets have been based on historical flows calculated from the Natural System Model (NSM). The NSM is the standard that is utilized throughout Everglades Restoration as the overall restoration goal.

Modeling for the Selected Plan was accomplished using MODBRANCH and the South Florida Water Management Model (SFWMM). MODBRANCH is a certified United States Geological Survey (USGS) model that has been utilized for prior hydrological studies that require a complex surface water and groundwater model. The SFWMM is also a certified, peer-reviewed model that has been used historically to manage water management operations in south Florida.

The purpose of the MODBRANCH modeling is to simulate the complex interactions between the ground water aquifers and the numerous canals within the South Dade Conveyance System in order to evaluate alternatives for the Western C111SC project.

Upon receiving direction to formulate alternatives intended to restore more natural freshwater inputs to Florida Bay using the western features of the C111SC Project, it was decided that three performance measures (PMs) most closely associated with project objectives would be used to quantify project-related lift. The referenced performance measures, collectively referred to as the C111SC Ecological Model, include:

- PM 1.5 – Flow Timing and Distribution
- PM 2.1 – Hydroperiods
- PM 2.4 – Stage-Based Estuarine Salinity Estimates

OBJECTIVES

The objectives of this work are to: conduct an IEPR of the Western C111SC PIR in accordance with the Department of the Army, U.S. Army Corps of Engineers, Peer Review of Decision Documents (E.C. 1105-2-408) and the Office of Management and Budget Final Information Quality Bulletin for Peer Review (16 December 2004)

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

This work is conducting an independent technical peer review to analyze the adequacy and acceptability of economic, engineering and environmental methods, models, data and analyses. The independent review will be limited to technical review and will not be involved in policy review. The peer review will be conducted by subject matter experts with extensive experience in engineering, economics and environmental issues associated with commercial navigation channel modification. The subject matter experts will be "charged" with responding to specific technical questions as well as providing a broad technical (engineering, economic, and environmental) evaluation of the overall project.

The subject matter experts (i.e., peer review panel members) will identify, recommend, and comment upon assumptions that underlie the analyses as well as evaluate the soundness of models and planning methods. The panel members will evaluate whether the interpretations of analyses and conclusions are technically sound and reasonable, provide effective review in terms of both usefulness of results and of credibility, and have the flexibility to bring important issues to the attention of decision makers. The panel members may offer opinions as to whether there are sufficient technical analyses upon which to base the ability to implement the project. The panel members will address factual inputs, data, the use geotechnical, hydrologic, and hydraulic models, analyses, assumptions, and other scientific and engineering tools/methodologies to inform decision-making.

DOCUMENTS PROVIDED

The following is a list of documents and reference materials that will be provided for the review. **The documents and files presented in bold font are those which are to be reviewed.** All other documents are provided for reference.

- **Central and Southern Florida Project Comprehensive Everglades Restoration Plan, C-111 Spreader Canal Western Project Draft Integrated Project Implementation Report and Environmental Impact Statement**
  - **Volume 1 – Main Report**
- **Volume 2 – Annex A: FWCA and Endangered Species Act Compliance**
  - **Volume 3 – Annex B: NEPA Information**
    - **Annex C: Analyses Required by WRDA 2000 and State Law**
    - **Annex D: Draft Project Operating Manual**
    - **Annex E: Project Monitoring Plan**
    - **Annex F: Reports Provided by RECOVER to Support the PIR**
  - **Volume 4 – Appendix A: Engineering**
  - **Volume 5 – Appendix B: Appendix B – Cost Estimates**
    - **Appendix C: Environmental Information**
    - **Appendix D: Real Estate**
    - **Appendix E: Agency / Public Coordination**
    - **Appendix F: Plan Formulation and Evaluation**
    - **Appendix G: Economic and Social Considerations**
    - **Appendix H: Draft Recreation Plan**
- USACE guidance *Peer Review of Decision Documents* (EC 1105-2-410) dated August 22, 2008;
- CECW-CP Memorandum dated March 31, 2007; and the Office of Management and Budget's *Final Information Quality Bulletin for Peer Review* released December 16, 2004.

SCHEDULE

IEPR Task	Activity	Due Date	Projected Date
5	Kick-off Meeting	Pending subcontractor authorizations	September 8, 2009
6	Review documents and charge sent to panel members	Within 1 day of panel members being under contract	September 7, 2009
	Panel members complete their review and provide comments to contractor	Within 20 days of kick off conference call	October 6, 2009
	Collate comments from panel members	Within 3 days of receipt of panel members' comments	October 9, 2009
	Convene consensus conference call	Within 6 days of receipt of panel members' comments	October 14, 2009
7	Prepare final comments	Within 6 days of consensus conference call	October 22, 2009
	Submit final peer review report	Within 6 days of receipt of final comments	October 30, 2009
8	Input Final comments to DrChecks	Within 0 days of submitting final peer review report	October 30, 2009
	USACE Provides Draft Evaluator Responses via e-mail (Word document)	Within 5 days of receiving final peer review report	November 6, 2009
	Conference call with contractor to discuss final panel comments and USACE clarifying questions	Within 3 days of receipt of Draft Evaluator Responses	November 10, 2009 (2-5 pm)
	USACE inputs Final Evaluator responses to Final Comments in DrChecks	Within 3 days of conference call to discuss clarifying questions	November 16, 2009
	External Peer Reviewers Respond to USACE evaluator responses	Within 8 days of written notification that USACE Evaluator responses have been posted in DrChecks and the project site is accessible	November 24, 2009
	Submit pdf of DrChecks file and Closeout of DrChecks	Within 1 day of input of Backcheck responses	November 25, 2009

CHARGE FOR PEER REVIEW

Members of this peer review panel are asked to determine whether the technical approach and scientific rationale presented in the Western C-111 Spreader Canal Project Implementation Report are credible and whether the conclusions are valid. The reviewers are asked to determine whether the technical work is adequate, competently performed, properly documented, satisfies established quality requirements, and yields scientifically credible conclusions. The panel is being asked to provide feedback on the economic, engineering, environmental resources, and plan formulation. The reviewers are not being asked whether they would have conducted the work in a similar manner.

Specific questions for the panel members, by report section, Annex, or Appendix, are included in the general charge guidance, which is provided below.

General Charge Guidance

Please answer the scientific and technical questions listed below and conduct a broad overview of the Western C-111 Spreader Canal Project Implementation Report. Please focus on your areas of expertise and technical knowledge. Even though there are some sections with no questions associated with them, that does not mean that you cannot comment on them. Please feel free to make any relevant and appropriate comment on any of the sections and appendices you were asked to review. In addition, please adhere to the following guidance, and note that the panel will be asked to provide an overall statement related to 1 and 2 below per USACE guidance (EC 1105-2-410; Appendix D).

1. Assess the adequacy and acceptability of the economic, engineering, and environmental methods, models, and analysis used
2. If appropriate, offer opinions as to whether there are sufficient analyses upon which to base a recommendation for construction, authorization, or funding.
3. Identify, explain, and comment on assumptions that underlie economic, engineering, ecological, hydrological, plan formulation, or environmental analyses.
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. 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.
7. If desired, panel members can contact one other. However, panel members **should not** contact anyone who is or was involved in the project, prepared the subject documents, or was part of the USACE Agency Technical Review.

8. Please contact the Battelle deputy project manager (Lynn McLeod, mcleod@battelle.org) or project manager (Karen Johnson-Young, johnson-youngk@battelle.org) for requests or additional information.
9. In case of media contact, notify the Battelle project manager immediately.

Your name will appear as one of the panel members in the peer review. Your comments will be included in the Final IEPR Report, but will remain anonymous.

Please submit your comments in electronic form to Lynn McLeod, mcleod@battelle.org, no later than October 6, 2009, 10 pm EDT.

Western C-111 Spreader Canal Project Implementation Report
Independent External Peer Review

Final Charge Questions

SECTION 1.0 – INTRODUCTION

Section 1.1. Comprehensive Everglades Restoration Plan-Background Information

No questions.

Section 1.2. Report Authority

No questions.

Section 1.3. Project Area

No questions.

Section 1.4. Purpose and Scope

No questions.

Section 1.5. Relationship to Other U.S. Army Corps of Engineers/Non-Federal Sponsor Efforts, Studies, Documents, and Reports

1. Are any potential influences from these other projects on the proposed project that were omitted from the discussion in this section?

Section 1.6. Comprehensive Everglades Restoration Plan – Master Implementation Sequencing Plan

No questions.

SECTION 2.0 – EXISTING CONDITIONS / AFFECTED ENVIRONMENT

Section 2.1. General Description

2. Please comment on the accuracy and comprehensiveness of the general description of the proposed project area. What, if anything, is missing?

3. Please comment on whether the Ecological Zones in the proposed project area have been accurately and comprehensively described.

Section 2.2. Current Ecological Description

4. Please comment on the accuracy and comprehensiveness of the current ecological description of the proposed project area.

Section 2.3. Vegetation Communities

5. Please comment on whether the plant communities and common vegetation species in the proposed project area have been accurately and comprehensively listed.

6. Please comment on whether the invasive vegetation species have been accurately described.

Section 2.4. Fish and Wildlife Resources

7. Comment on the list of fish and wildlife resources present under existing conditions.
   a. Is the list sufficiently descriptive to effectively characterize site-specific current conditions?
   b. Does the description of fish and wildlife resources effectively capture spatial heterogeneity and its effects on ecological diversity?

Section 2.5. Essential Fish Habitat

8. Does this section adequately characterize existing EFH for the purposes of the project? If not, what additional information should be included?

9. Based on your experience, will the project affect EFH? If so, please describe how.

Section 2.6. Climate

10. Is the climate of this study area described accurately in this section? If not, what is missing?

Section 2.7. Landscape: Geology and Soils

11. Comment on whether the information provided in the soils discussion is sufficient for evaluating the proposed plan.

Section 2.8. Water Management (Operations)

12. Please comment on whether the discussion of the existing conveyance system and operations provides adequate detail.

Section 2.9. Hydrology-Post-Central and Southern Florida Project

13. Does this Section adequately discuss hydrology in the study area subsequent to the construction of the C&SF project?

Section 2.10. Water Quality

14. Please comment on whether the water quality in the project area been accurately described? What, if any, additional information should be included? (Also see Sections 3.4 Affected Environment and Appendix C)

Section 2.11. Air Quality

15. Please comment on whether the current air quality in the proposed project area has been accurately described.

Section 2.12. Hazardous, Toxic, or Radioactive Waste

16. Please comment on whether the discussion about hazardous, toxic, or radioactive waste in the proposed project area is accurate and comprehensive.

Section 2.13. Cultural Resources

No questions.

Section 2.14. Socioeconomics

17. Please comment on the adequacy of the population and economy data in terms of data quality, timeliness of the data, breadth of information covered, and consistency with Section 7.17 and Appendix G2.5 and Appendix G2.6.

Section 2.15. Agriculture

18. Please comment on whether the current agricultural situation in and around the proposed project area has been accurately described.

Section 2.16. Study Area Land Use

19. Comment on whether additional discussion of the rock mining operation is necessary to determine whether its impact could affect the study area.

Section 2.17. Public Land Management

No questions.

Section 2.18. Roads and Other Barriers to Sheetflow

20. Comment on the completeness of the sheetflow barrier discussion in a comparative sense.

Section 2.19. Mitigation Projects

21. Please comment on the potential project effects on the ecology of existing and planned FP&L and FDOT mitigation projects.

22. Please comment on the ability of the proposed mitigation projects to address adverse impacts from the recommended alternative.

Section 2.20. Recreation

23. Please comment on the description of recreational uses for future with and without project conditions here and in Appendices G.5 and H.

Section 2.21. Noise

No questions.

Section 2.22. Aesthetics

No questions.

SECTION 3.0 – FUTURE "WITHOUT PROJECT" CONDITIONS

Section 3.1. "With and Without" Comparisons

No questions

Section 3.2. "With and Without" Versus "Before and After"

No questions

Section 3.3. Planning Horizon

24. Comment on the viability of the methods used in forecasting the ecological description.

25. Comment on the completeness of the hydrologic forecasting evaluation.

26. Please discuss the accuracy and comprehensiveness of water supply predictions and its applicability for accurately predicting future demands.

Section 3.4. Affected Environment

27. Please comment on the accuracy and comprehensiveness of the forecasted without project conditions presented for the various environmental parameters in Table 3-3.

SECTION 4.0 – IDENTIFICATION OF PROBLEMS AND OPPORTUNITIES

Section 4.1. Public Concerns

No questions

Section 4.2. Problems and Opportunities

28. Based on your area of expertise, are there any additional problems that should be considered when applying or designing seepage management technologies that have not been identified for this project? If so, what and why?

29. Can you identify any other opportunities that may arise from the execution of the project? What and why?

Section 4.3. Objectives and Constraints

30. Are there any other objectives or constraints that should be considered as part of the project that will be important to reaching the projects final goal?

SECTION 5.0 – FORMULATION AND EVALUATION OF ALTERNATIVE PLANS

Section 5.1. Project Evaluation Criteria, Performance Measures, and Evaluation Methods and Models

No questions

Section 5.2. Prior Formulation from the Yellow Book

No questions

Section 5.3. Plan Formulation Rationale

31. Please comment on the management measures used to determine the alternatives. Should others be considered?

32. Do the results of the engineering and design evaluations adequately support the recommended plan (see Appendix A)?

Section 5.4. Cost Effective/Incremental Cost Analysis

No questions

Section 5.5. Comparison of Alternatives

33. Comment on the completeness of the criteria used in the comparison of alternatives.

34. Discuss whether the conclusions drawn on the viability of each alternative are supported by the analysis.

Section 5.6. Summary of Outputs of The Four Accounts

35. Discuss whether the beneficial and adverse effects of each account were adequately presented and supported.

Section 5.7. Identification of the NER Plan

No questions

Section 5.8. Plan Selection

36. Does the recommended plan address the purpose and authority of the project as well as the problems, objectives, constraints, and criteria outlined for the project?

37. Please comment on the estimated average annual habitat units expected to be produced due to implementation of the proposed project.

Section 5.9. Risk and Uncertainty

38. Comment on whether the possible negative effects of the project are complete. Are there additional negative effects that should be considered?

39. Comment on the validity of the ecological response time and its use in estimating project benefits.

Section 5.10. Collaborative Planning

40. Comment on the concerns and recommendations of the Planning Workshop and how they would affect the recommended plan.

SECTION 6.0 – THE RECOMMENDED PLAN

Section 6.1. Description of Plan Components

41. Based on your expertise, will the design of the proposed plan components be able to meet the objectives of the recommended plan?

Section 6.2. Operational and Monitoring Plan

No questions.

Section 6.3. Recreation Components

No questions.

Section 6.4. Cost Estimate

42. Have the project costs completely and accurately covered all necessary costs and are the costs estimated sufficient for completing the project?

Section 6.5. MCACES Cost Estimate

No questions.

Section 6.6. Design and Construction Considerations

43. Please comment on whether contingency measures should be considered and adopted in the event of adverse weather during construction.

Section 6.7. Lands, Easements, Rights of Way, Relocations and Disposal Considerations

No questions.

Section 6.8. Operations and Maintenance Considerations

No questions.

Section 6.9. Plan Accomplishments

No questions.

Section 6.10. Next Added Incremental Analysis

No questions.

Section 6.11. Implications to Central and Southern Florida System Operation

44. Explain whether you agree that no disruptions to the existing C&SF project will occur as the result of project implementation.

Section 6.12. Environmental Operating Principles

45. Comment on whether you agree with the assessment that the recommended plan is consistent with the six USACE Environmental Operating Principles.

Section 6.13. Contribution to Achievement of Interim Goals and Targets

No questions.

SECTION 7.0 – ENVIRONMENTAL EFFECTS

Section 7.1. Summary of Final Array of Alternatives

46. Please comment on any ecological implications of the alternative configurations described.

47. Please comment on the adequacy of the proposed Additional Techniques to compensate, individually or in aggregate, for impacts to the C111 SC mid-season fish rearing habitat due to project implementation.

Section 7.2. Summary of Affected Resources

48. Please comment on the assumption that under the No Action Alternative freshwater wetlands in the project area would be subject to urban and commercial development.

49. Please comment on the assumption that the alternatives differ from each other only in the magnitude of impact rather than in the types of impacts on freshwater wetlands.

50. Please comment on the ecological risk posed by Alternative 6 on wetlands located east of the structure.

51. Please comment on the assumption that the restoration area will improve a wide ranging regional landscape for wildlife and conserve infiltration areas to benefit groundwater resources, effecting base flows to sloughs and marshlands, as well as helping to maintain barriers to salt-water intrusion.

52. Please comment on the viability of the alternatives to improve freshwater flow regimes that will lead to an increase in the forage base of wood storks and state-listed wading birds.

53. Please comment on the scope and detail of the potential adverse effects that may arise as a result of project implementation.

54. Please comment on whether the risks and uncertainties associated with the benefits, costs, and impacts to affected resources (including endangered species) for each alternative are adequately addressed and described.

Section 7.3. Physical Landscape: Geology, Topography, and Soils

55. Comment on whether additional geologic and soils changes could be expected due to implementation of the recommended alternatives.

Section 7.4. Climate

No questions.

Section 7.5. Hydrology (Sea Level Rise)

56. Do the model results and alternatives analysis support the notion that none of the project features will significantly alter the impacts of sea level rise in most regions of the project features?

Section 7.6. Water Management (Operations)

57. Based on your expertise, are the water management operations for each alternative consistent with the design?

Section 7.7. Flood Control

No questions.

Section 7.8. Water Quality

58. Please comment on whether the water quality impacts associated with each alternative have been accurately and comprehensively described. What, if any, additional information should be included?

Section 7.9. Vegetative Communities

59. Please comment on whether the impacts to the vegetative communities associated with each alternative have been accurately and comprehensively described. What, if any, additional information should be included?

Section 7.10. Fish and Wildlife Resources

60. Comment on how the effects of the various alternatives and No-Action alternative on fish and wildlife are characterized?

61. Does this characterization provide sufficient information and detail to provide a basis for decision and alternative selection?

Section 7.11. Threatened and Endangered Species

62. Please comment on whether the threats and impacts to the threatened and endangered species in the areas are accurately and comprehensively described. What, if any, additional information should be included?

Section 7.12. Non-Native Vegetation

63. Please comment on whether the impacts to non-native vegetation associated with each alternative have been accurately and comprehensively described. What, if any, additional information should be included?

Section 7.13. Essential Fish Habitat

64. Comment on how the effects of the various alternatives and No-Action alternative on EFH are characterized.

65. Does this characterization provide sufficient information and detail to provide a basis for decision and alternative selection?

Section 7.14. Land Use

66. Please comment on whether the impacts to land use associated with each alternative have been accurately and comprehensively described. What, if any, additional information should be included?

Section 7.15. Recreational Resources

67. Please comment on the adequacy of this summary of the recreational resources described in Appendices G.5 and Appendix H.

Section 7.16. Aesthetics

68. Please comment on whether the aesthetic impacts associated with each alternative have been accurately and comprehensively described. What, if any, additional information should be included?

Section 7.17. Socio-Economic Conditions: Population

69. Please comment on the adequacy of the population and economy data in terms of data quality, timeliness of the data, breadth of information covered, and consistency with Section 2.14 and Appendix G2.5 and Appendix G2.6.

70. Please comment on the extent to which the observation is supported that the impact of the project on the population is insignificant.

Section 7.18. Socio-Economic Conditions: Water Supply Demands

71. Please comment on the extent to which the impact of the project on the water supply needs of the population is addressed and supported, and consistency with Appendix G3.

Section 7.19. Hazardous, Toxic, and Radioactive Waste

72. Please comment on whether the impacts to hazardous, toxic, and radioactive waste associated with each alternative have been accurately and comprehensively described. What, if any, additional information should be included?

Section 7.20. Cultural Resources

73. Please comment on the extent to which the impact of the project on the cultural resources is addressed and supported.

Section 7.21. Air Quality

74. Please comment on whether the impacts to air quality associated with each alternative have been accurately and comprehensively described. What, if any, additional information should be included?

Section 7.22. Noise

75. Please comment on whether the impacts to noise levels associated with each alternative have been accurately and comprehensively described. What, if any, additional information should be included?

Section 7.23. Unavoidable Adverse Impacts

76. Please comment on the categorization of the existing wetlands located within the project area.

77. Please comment on whether the amount of wetlands restored by the described alternatives offsets the amount lost due to project implementation.

78. Please comment on whether the conversion of farmland to rehydrated wetlands will be significant and irretrievable.

79. Please comment on the comprehensiveness of the evaluation of impacted resources both across and within resource categories

80. Please comment on whether the conclusions regarding the type and projected magnitude of adverse impacts are reasonable.

Section 7.24. Irreversible and Irretrievable Commitments of Resources

81. Please comment on whether the evaluation of the permanent and irreversible features of the proposed project was comprehensive. What, if any, additional information should be added?

Section 7.25. Cumulative Effects

82. Please comment on whether the cumulative effects of the project and other previous and future projects in the area have been accurately described. What, if any, additional information should be included?

83. Please comment on the assumption that many of the "low-functioning" wetlands will be ultimately restored to "higher-functioning" wetlands due to project implementation.

84. Please comment on the assumption that the realized benefits to the natural system due to project implementation will be significantly greater that any localized wetland loss.

85. Please comment on whether the restoration of historic drainage and inundation periods will enhance the wetland habitat available for federal/state listed species.

Section 7.26. Relationship Between Short-Term Use and Long-Term Productivity

86. Please comment on whether you agree with the assessment that the transition period may adversely affect wading bird populations.

87. Please comment on whether you agree that the wading bird populations would recover.

Section 7.27. Compatibility with Federal, State, and Local Objectives

No questions.

SECTION 8.0 – PLAN IMPLEMENTATION

Section 8.1. Division of Implementation Responsibilities

No questions.

Section 8.2. Cost Sharing

No questions

Section 8.3. Project Design

88. Please comment on the completeness of the general codes, standards, and design criteria memorandums listed in Sections 8.3.1.1 and 8.3.1.2.

89. Please comment on whether the summary provided in this section is consistent with the various engineering investigations conducted for the proposed project and detailed in the referenced technical appendix (Appendix A).

Section 8.4. Project Operations

90. Please comment on whether the summary provided in this section consistent with the operating procedures detailed in the referenced annex (Annex D).

Section 8.5. Project Assurances

91. Please comment on the stated project assurances and the justifying assumptions.

Section 8.6. Project Monitoring Plan

See Annex E

Section 8.7. Compliance with Environmental Laws, Statutes, and Executive Orders

No questions.

Section 8.8. Compliance with Florida Statutes

No question.

Section 8.9. Environmental Commitments

92. Please comment on the adequacy and completeness of the proposed actions for avoiding, minimizing, or mitigating for adverse effects during construction activities. What, if anything, is missing?

Section 8.10. Views of Non-Federal Sponsor

No questions

SECTION 9.0 – PROJECT COORDINATION

93. Based on your experience with similar projects, has adequate public, stakeholder, and agency involvement occurred to determine all issues of interest and to ensure that the issues have been adequately addressed to the satisfaction of those interested parties?

94. If not, what additional public outreach and coordination activities should be conducted?

SECTION 10.0 – DISTRICT ENGINEER'S RECOMMENDATION

95. Please comment on the extent to which the recommendations are consistent with and justified by the environmental impact analysis.

SECTION 11.0 – LIST OF PREPARERS

No questions

SECTION 12.0 – INDEX

No questions

SECTION 13.0 – GLOSSARY OF TERMS

No questions

SECTION 14.0 – ACRONYMS

No questions

SECTION 15.0 - REFERENCES

No questions

ANNEX A. FWCA REPORT AND ENDANGERED SPECIES ACT COMPLIANCE

No questions.

ANNEX B. NEPA INFORMATION

Section B.1. Summary of Environmental Compliance

See Sections 8.7, 8.8 and 9.0

Section B.2. Clean Water Act Section 404(b)(1) Evaluation

96. Please comment on whether the proposed plan is in compliance with Section 404(b)(1) concerning discharge of dredged or fill material into the waters of the United States.

Section B.3. Coastal Zone Consistency Evaluation

97. Please comment on whether all applicable Coastal Zone Management policies have been identified. What, if anything, is missing?

Section B.4. Pertinent Correspondence/ Compliance Letters

No questions

ANNEX C. ANALYSES REQUIRED BY WRDA 2000 AND STATE LAW

No questions

ANNEX D. DRAFT PROJECT OPERATING MANUAL

Section D.1. Introduction

No questions

Section D.2. General Project Purposes, Goals, Objectives and Benefits

No questions

Section D.3. Project Features

No questions

Section D.4. Project Relationships

98. Please comment on the 11 projects listed and their stated impact/relationship to the C-111 project.

Section D.5. Major Constraints

No questions

Section D.6. Standing Instructions to Project Operators

No questions

Section D.7. Operational Strategy to Meet Project Objectives

99. Please comment on the ability of the operational strategy's ability to meet the project goals and objectives.

100. Please comment on the completeness and soundness of the operational procedures for Hurricanes or Tropical Storm conditions.

Section D.8. Pre-Storm/Storm Operations

No questions

Section D.9. Consistency with the Identification of Water and Reservations or Allocations of Water for the Natural System

No questions

Section D.10. Consistency with Savings Clause and State Assurances Provisions

No questions

Section D.11. Drought Contingency Plan

101. Please comment on the completeness and soundness of the drought contingency plan actions.

Section D.12. Flood Emergency Action Plan

102. Please comment on the completeness and soundness of the flood emergency action plan.

Section D.13. Deviation from Normal Operating Criteria

No questions

Section D.14. Rate of Release Change

No questions

Section D.15. Seepage Control

No questions

Section D.16. Initial Reservoir/Storage/Treatment Area Filling Plan

No questions

Section D.17. Non-Typical Operations for Reservoir/Storage/ Treatment Area Performance

No questions

Section D.18. Aquifer Storage and Recovery System Plan

No questions

Section D.19. Water Control Data Acquisition System Plan

No questions

Section D.20. Consistency with the Adaptive Management Program and Periodic CERP Updates

No questions

Section D.21. Interim Operations During Construction

No questions

Section D.22. Preliminary Operations During Operational Testing and Monitoring Phase

No questions

Section D.23. Conceptual Description of Project Operations for Transition from the Initial Operating Regime to the Next-added Increment Condition

No questions

ANNEX E. PROJECT MONITORING PLAN

103. Please comment on whether the Draft Monitoring Plan has been adequately described. What, if any, additional information should be included?

104. Please comment on whether the appropriate parameters and scales were considered to meet the goals of the Draft Monitoring Plan. What, if any, additional parameters or scales should be considered?

105. Based on the proposed water quality impacts, is the amount of water quality monitoring sufficient to evaluate effects on water quality?

ANNEX F. REPORTS PROVIDED BY RECOVER TO SUPPORT THE PIR

No questions

APPENDIX A. ENGINEERING

Section A.1. Project Background

No questions.

Section A.2. Summary of Project Components

106. Please comment on the capacity of S-200 pump station and the conveyance channel velocities to effectively achieve the project's objectives.

107. Please comment on the worst case conditions used to size the Frog Pond Detention area and Aerojet Canal Extension.

108. Please comment on the possible final location of the southern third of the header distribution channel.

109. Please comment on whether the design concept for the Aerojet Canal helps fulfill the C-111 project objectives.

Section A.3. Topographic and Boundary Surveys

110. Please comment of the completeness of the recent project specific surveys.

Section A.4. Geotechnical Studies

111. Please comment on the quality, completeness, and utility of the currently available data from previous geotechnical investigations.

112. Please comment on whether sufficient information has been collected to identify and mitigate potential geotechnical hazards (e.g. slides, slumps, springs, faults, etc.) within the project footprint.

Section A.5. Geology

113. Please comment on whether the report adequately addresses all potential natural hazards, such as the simultaneous or sequential occurrence of interactive climatic and geologic hazards that produce cumulative effects (for example, seismic movements during a period of heavy rainfall leading to landslides) that might impact the project.

Section A.6. Geotechnical Engineering Evaluation

114. Please comment on whether sufficient information has been collected to identify and mitigate potential geotechnical hazards (e.g. slides, slumps, springs, faults, etc.) within the project footprint.

115. Please comment on the three seepage case scenarios for Frog Pond Detention Area.

116. Please comment on whether slope stability has been sufficiently evaluated for all possible conditions.

117. Please comment on the completeness of the recommended seepage control measures.

Section A.7. Engineering of Embankments and Canals

118. Please comment on the proposed levee height for Frog Pond Detention Area and Conveyance Channel based upon a Low Hazard Potential (LHP) designation.

Section A.8. Pump Stations S-200 and S-199

119. Please comment on this section's completeness and the ability of the design to meet the stated design objectives (section A.8.1.1).

Section A.9. S-198 Structure

120. Please comment on this section's completeness and the ability of the design to meet the stated design objectives (section A.9.1.1)

Section A.10 through A.12. Hydrologic and Hydraulic Modeling

121. Please comment on the approach taken and the results of the hydrologic modeling used for the Alternative Analysis, Frog pond Detention Area, and the Aerojet Canal.

Section A.13. Instrumentation and Control Analysis and Design

No questions

APPENDIX B. COST ESTIMATES

Section B.1. General Information

No questions

Section B.1.1. Recommended Plan

122. Please discuss the extent to which the construction and non-construction cost categories are sufficient to address significant project costs.

Section B.1.2. Plan Formulation Cost Estimates

123. Please discuss the extent to which the cost estimates are complete and adequately supported.

124. Please comment on the major assumptions used in the cost estimates.

Section B.1.3. Project Schedule

No questions

Section B.1.4. Total Project Cost Summary

125. Please discuss the extent to which the cost summary is complete and adequately supported.

Section B.2. Plan Formulation Cost Estimates

No questions

Section B.3. MCACES Cost Estimate

126. Please discuss the appropriateness of the explicit or implicit assumptions that are included in the cost estimates.

127. Please discuss the extent to which uncertainty and sensitivity associated with the costs is addressed.

Section B.4. Schedule

No questions

Section B.5. Risk and Uncertainty Analysis

No questions

Section B.6. Total Project Cost Summary

No questions

APPENDIX C. ENVIRONMENTAL INFORMATION

128. Please comment on the thoroughness, robustness, and accuracy of the ecological information presented.

129. Please comment on the suitability of the assumptions made for the future status of the various ecological parameters under the without project scenario.

130. Please comment on the potential effects of sea level rise on the ecological components within the project area.

131. Please comment on the conclusions and soundness of the ecosystem benefits estimation methodology.

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

APPENDIX D. REAL ESTATE

133. Does the real estate plan adequately address all issues and requirements related to real estate? If not, what is missing?

134. Are the cost estimates for real estate accurate and do those estimates cover everything that should be addressed? If not, please explain.

Section D.1. Scope of this Report

No questions.

Section D.2. Statement of Purpose of the Real Estate Plan

No questions.

Section D.3. Description of Prior Report Prepared for the Project

No questions.

Section D.4. Project Authorization

No questions.

Section D.5. Project Location and Description of the Recommended Plan Elements

No questions.

Section D.6. Description of Real Estate Required For Project LERRD

No questions.

Section D.7. Existing Federal Projects

No questions.

Section D.8. Federally Owned Lands

No questions.

Section D.9. Non-Federal Sponsor Owned Lands and Crediting

No questions.

Section D.10. Crediting Considerations

No questions.

Section D.11. Uniform Relocation Assistance Act, Public Law 91-646

No questions.

Section D.12. Navigational Servitude and Other Lands

No questions.

Section D.13. Induced Flooding

No questions.

Section D.14. Mineral and Timber Activities

No questions.

Section D.15. Non-Federal Authority to Participate in the Project

No questions.

Section D.16. Estate Analysis

No questions.

Section D.17. Proposed Estates

No questions.

Section D.18. Zoning Ordinances

No questions.

Section D.19. Acquisition Schedules

No questions.

Section D.20. Hazardous, Toxic or Radiological Waste (HTRW)

No questions.

Section D.21. Cultural Resources

No questions.

Section D.22. Project Support

No questions.

Section D.23. Baseline Cost Estimate

135. Please discuss the extent to which the costs included in Table D-2 are appropriate and sufficient, and both the requirement and costs associated with the land adequately justified.

Section D.24. Real Estate Maps

No questions.

Section D.25. Exhibits

No questions.

APPENDIX E. AGENCY/PUBLIC COORDINATION

No questions.

APPENDIX F. PLAN FORMULATION AND EVALUATION

136. Comment on whether the figures adequately depict the respective alternative.

APPENDIX G. ECONOMIC AND SOCIAL CONSIDERATIONS

Section G.1. Economic and Social Considerations

137. Please comment on the adequacy and appropriateness of the approach used to analyze the without and with project alternatives.

Section G.2. Population and Economy

No questions

Section G.3. Municipal and Industrial Water Demand

No questions

Section G.4. Flood Damage Reduction Impacts

No questions

Section G.5. Recreation

138. Please comment on the extent to which the changes in the value of recreation arising from the project, along with uncertainty in the valuation, are adequately addressed here, in Section 2.20, and in Appendix H.

Section G.6 Cost Effective/Incremental Cost Analysis

139. Please comment on the clarity of the analytic approach used.

140. Please comment on the extent to which the costs used are necessary and sufficient, adequately justified, and uncertainty is addressed.

141. Please comment on whether the results and conclusions of the cost effective/ incremental cost analysis are consistent with the data and analysis used and adequately justified.

142. Please comment on the approach and credibility and uncertainty of results from the Regional Economic Development effects analysis.

143. Please comment on the extent to which all significant economic impacts have been adequately included and addressed in the analysis.

Section G.7. Regional Economic Impacts

No questions

Section G.8. Other Social Effects

No questions

Section G.9. Environmental Justice

No questions

Section G.10. References

No questions

APPENDIX H. DRAFT RECREATION PLAN

144. Please comment on the extent to which the recreational benefits are sufficiently identified and clearly linked to the project.

145. Please comment on the adequacy and appropriateness of the methods and assumptions used to quantify and analyze the recreational benefits, including addressing uncertainty.

146. Please comment on the extent to which the value of recreation, along with uncertainty in the valuation, is adequately addressed.