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Final Independent External Peer Review for the Biscayne Bay Coastal Wetlands 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: 09-219
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December 1, 2009

SHORT-TERM ANALYSIS SERVICE (STAS)

on

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Biscayne Bay Coastal Wetlands Project Implementation Report

by

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505 King Avenue
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Scientific Services Program

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FINAL
INDEPENDENT EXTERNAL PEER REVIEW REPORT
for the

BISCAYNE BAY COASTAL WETLANDS PROJECT IMPLEMENTATION REPORT

EXECUTIVE SUMMARY

The Biscayne Bay Coastal Wetlands (BBCW) project is one of the components of the Comprehensive Everglades Restoration Program (CERP). The BBCW Draft Integrated Project Implementation Report (PIR) and Environmental Impact Statement (EIS) (hereafter referred to as the Biscayne Bay PIR) describes the intended diversion of canal discharges to benefit coastal wetlands. The BBCW project area includes 13,600 acres in southeast Miami-Dade County from the Deering Estate in the north, to the Florida Power and Light Turkey Point power plant in the south. Work to be performed includes the installation, construction, and operation of pump stations, spreader canals, flow-ways, levees, culverts, and backfilling canals. The current estimated project cost is approximately $218 million.

The purpose of the Biscayne Bay PIR is to provide the planning, engineering, and implementation details of the recommended restoration plan. Project goals include the rehydration of wetlands and the reduction of point source freshwater discharges into Biscayne Bay by replacing lost overland flow and partially compensating for the reduction in groundwater seepage. These goals would be accomplished by using a spreader system to redistribute available surface water entering the area from regional canals. The restoration of coastal wetlands and nearshore bay habitat is also anticipated to be achieved by the re-establishment of sustained lower-than-seawater salinity levels. Diversion of canal discharges into coastal wetlands, as opposed to their direct discharge into Biscayne Bay, is expected to re-establish productive nursery habitat all along the shoreline, improve oyster habitat, and reduce the abrupt freshwater discharges that are physiologically stressful to the Bay's fish and benthic invertebrates. Target freshwater flows will be based upon the quality, quantity, timing, and distribution of flows needed to provide and maintain sustainable biological communities in Biscayne Bay National Park and the BBCW.

USACE is conducting an independent external peer review (IEPR) of the Biscayne Bay 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 Biscayne Bay 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 IEPR panel members and their selection, and summarizes the Final Panel Comments of the IEPR panel.

Five panel members were selected for the IEPR from more than 30 identified candidates. Corresponding to the technical content of the BBCW project, the areas of technical expertise of

the five selected IEPR panel members included design and construction cost engineering, civil works planning, coastal/estuarine ecology, hydraulic engineering, and economics.

The IEPR panel was provided with electronic versions of the Biscayne Bay PIR documents, along with a charge that solicited their comments on specific sections of the documents that were to be reviewed. The IEPR panel and Battelle were briefed by the Biscayne Bay PIR Project Delivery Team during a kick-off meeting held via teleconference prior to the start of the review. Other than this teleconference, there was no direct communication between the IEPR panel and the USACE during the peer review process. Approximately 400 individual comments were received from the IEPR panel in response to the 179 charge questions.

Following the individual reviews of the Biscayne Bay PIR documents by the IEPR 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, or low); and (4) recommendations on how to resolve the comment. Overall, 19 Final Panel Comments were identified and documented. Of the 19 Final Panel Comments, 2 were identified as having high significance, 15 were identified as having medium significance, and 2 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 ES1. Overview of 19 Final Comments Identified by the Biscayne Bay IEPR Panel

Significance – High	
1	The discussion of forecast and future conditions, especially with regard to sea level rise and water availability, is not comprehensive and needs to be expanded to include more quantitative analysis and graphical explanation.
2	Further clarification is needed on the relationship between the water available for diversion and the hydrologic regimes necessary to achieve the target level of wetland area/function.
Significance – Medium	
3	The habitat units for each measure need to be clarified, and it should be clear whether habitat units for a given measurement represent relative or actual magnitudes.
4	The BBCW PIR main report needs to be revised to significantly reduce the references to the Appendices and to improve the quality and clarity of the graphics.
5	The effects of the BBCW project and the resulting changes in hydrologic regime on "downstream" foundation species (*e.g.*, mangroves) should be assessed.
6	The quantification of long-term reductions in nutrient loading is unclear as it relates to benefits and changes over time.
7	The process by which the management measures were developed, screened, and combined into alternatives was not clearly described.

Significance – Medium, continued	
8	The hydrology sections do not provide sufficient information to evaluate the effects of implementing the proposed plan compared to the baseline.
9	The water quality analyses need to focus more on extreme values and ranges of salinity, dissolved oxygen, and nutrients rather than just averages.
10	The BBCW PIR needs to address how sufficient, long-term dispersion of flow will be achieved across the maximum extent of the project area, while avoiding the development of concentrated flows and short-circuiting around microtopographic features.
11	The scientific basis for categorizing "low-functioning wetlands" and "high-functioning wetlands" as a function of the Criterion Based Ecological Evaluation Matrix (CBEEM) and the aerial extent of the benefits for each of the final array need to be clarified.
12	Risk and uncertainty are not addressed in sufficient detail to meet the requirements of the CERP Program Regulations.
13	The Draft Project Monitoring Plan does not sufficiently address the stated project goals, and if implemented, would not detect changes in the ecosystem and water quality.
14	An operational response plan is necessary because there is no backup power for the pumping system.
15	The hydrologic analysis of freshwater wetland rehydration areas should be based on a more complete water balance analysis.
16	The calculations of the average annual costs and benefits cannot be reviewed for accuracy without more information.
17	Some of the uncertainties associated with possible construction activities could add significant costs to the project.
Significance – Low	
18	The Draft Project Monitoring Plan does not clearly explain which organization or agency will be responsible for monitoring and adaptive management.
19	Literature references and citations are required throughout the document to evaluate if statements are "thorough" and "accurate."

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).

The panel noted that USACE has done a good job with a complex project and has presented a very in-depth and data-rich report. The panel agreed with the use of competing hydrologic and hydraulic models and thought that USACE had made a good faith effort to scrutinize the models.

Plan Formulation: The panel generally concurred that USACE completed detailed work on a most complicated project which resulted in the selection of the Tentatively Selected Plan (TSP). However, it was difficult to fully evaluate the plan formulation process because the necessary information was spread out over multiple report sections and appendices. The planning process should be fully synthesized and presented in Section 5, in which there should be enough detailed information to be a stand-alone section without dependence upon appendices or other sections of

the report. Experts and non-experts alike should be able to read Section 5 and get the complete story, measures and alternatives evaluated, costs, and benefits. The other sections and appendices can still present the more detailed information. It was also not clear as to how comprehensive the plan formulation was in terms of combining the most effective measures into distinct alternative plans.

Economics: The economic analysis does not include some cost considerations and uses a starting year that is a few years before the first feature is constructed. Uncertainty, especially regarding any probability of worst case scenario for sea level rise, which the panel considers critical, is not addressed within the analysis, and reliability in the context of uncertainty is not addressed.

Engineering: The link between the available water and the specific seasonal hydrologic regimes of target wetland types is imperative and not emphasized. The panel is unclear as to how the weight of evidence was developed for the final interpretation of a very complex array of competing hydrologic model results, boundary conditions, and assumptions regarding hydraulic operations.

Environmental: Some aspects (e.g., sea grasses) of the BBCW monitoring are adequate, but the panel has identified several recommendations for improving the monitoring strategy. In particular, the panel is concerned about evaluating project effects on the 'downstream' foundation species (e.g., various mangrove species) and understanding ecological responses to hydrology and salinity that will occur *within* the wetlands receiving discharge. The removal of nutrients (mainly nitrates) by vegetation appears to be a key feature, but there is no monitoring of this other than the upstream and downstream water quality.

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LIST OF ACRONYMS

ATR	Agency Technical Review
BBCW	Biscayne Bay Coastal Wetlands
CBEEM	Criterion Based Ecological Evaluation Matrix
CE/ICA	Cost Effectiveness and Incremental Cost Analysis
CERP	Comprehensive Everglades Restoration Program
EC	Engineering Circular
EIS	Environmental Impact Statement
GRR	General Re-Evaluation Report
IEPR	Independent External Peer Review
NTP	Notice to Proceed
OEO	Outside Eligible Organization
OMB	Office of Management and Budget
PE	Professional Engineer
PIR	Project Implementation Report
RSLR	Relative Sea Level Rise
SAV	Submerged Aquatic Vegetation
SLR	Sea Level Rise
TSP	Tentatively Selected Plan
USACE	United States Army Corps of Engineers

1. INTRODUCTION

The Biscayne Bay Coastal Wetlands (BBCW) project is one of the components of the Comprehensive Everglades Restoration Program (CERP). The BBCW Draft Integrated Project Implementation Report (PIR) and Environmental Impact Statement (EIS) (hereafter referred to as the Biscayne Bay PIR) describes the intended diversion of canal discharges to benefit coastal wetlands. The BBCW project area includes 13,600 acres in southeast Miami-Dade County from the Deering Estate in the north, to the Florida Power and Light Turkey Point power plant in the south. Work to be performed includes the installation, construction, and operation of pump stations, spreader canals, flow-ways, levees, culverts, and backfilling canals. The current estimated project cost is approximately $218 million.

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The objective of the work described here was to conduct an Independent External Peer Review (IEPR) of the Biscayne Bay 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 Biscayne Bay 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 IEPR panel members and their selection, and summarizes the Final Panel Comments of the IEPR panel on the existing environmental, economic, and hydrologic and hydraulic engineering analyses contained in the Biscayne Bay 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 Biscayne Bay PIR's assumptions, methods, analyses, and calculations, as well as any needs for additional data or analyses to make a good decision regarding implementation of alternatives and recommendations.

In this case, the IEPR of the Biscayne Bay 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 was obtained from the *Policy on Committee Composition and Balance and Conflicts of Interest for Committees Used in the Development of Reports* (The National Academies, 2003).

3.1 Planning and Schedule

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 IEPR 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 August 12, 2009. Table 1 defines the schedule followed in execution of the IEPR.

Table 1. Biscayne Bay PIR IEPR Schedule

TASK	ACTION	DUE DATE
1	Notice to Proceed	August 12, 2009
	Review Documents Available	August 20, 2009
	Submit Draft Work Plan[a]	September 3, 2009
	USACE Provides Comments on Draft Work Plan	September 15, 2009
	Submit Final Work Plan[a]	September 15, 2009
2	Submit list of selected IEPR panel members[a]	September 1, 2009
	USACE approves list of IEPR panel members	September 8, 2009
3	Submit Draft Charge[a]	September 3, 2009

TASK	ACTION	DUE DATE
	USACE provides comments on Draft Charge	September 15, 2009
	Submit Final Charge[a]	September 15, 2009
	USACE approves Final Work Plan, including Final Charge	September 17, 2009
4	Complete subcontracts for IEPR panel members	September 25, 2009
5	Kick-off Meeting with USACE and Battelle	August 20, 2009
	Kick-off Meeting with Battelle and the IEPR panel	September 30, 2009
	Kick-off Meeting with USACE, Battelle and the IEPR panel	September 30, 2009
6	Review documents and charge sent to IEPR panel	September 25, 2009
	IEPR panel completes the review and provides comments to Battelle	October 28, 2009
	Merge comments from IEPR panel	November 6, 2009
	Convene consensus conference call	November 9, 2009
	IEPR panel prepares Final Panel Comments	November 17, 2009
	IEPR panel reviews Final IEPR Report	December 1, 2009
7	Submit Final IEPR Report[a]	December 7, 2009
8[b]	Input Final Panel Comments to DrChecks	December 9, 2009
	USACE Provides Draft Evaluator Responses via e-mail (Word document)	December 14, 2009
	Conference call with USACE, Battelle and IEPR panel to discuss Final Panel Comments	December 16, 2009
	USACE inputs Final Evaluator responses to Final Panel Comments in DrChecks	January 11, 2010
	IEPR Panel Responds to USACE Evaluator Responses (Backcheck responses)	February 1, 2010
	Submit pdf of DrChecks file and Closeout of DrChecks[a]	February 2, 2010
	Project Closeout	April 1, 2010

[a] Deliverable

[b] 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 19 Final Panel Comments will be entered in to DrChecks by Battelle for review and response by USACE and the IEPR panel. USACE will provide Evaluator Responses to the Final Panel Comments and the IEPR panel will respond to the Evaluator Responses (via Backcheck responses). All USACE and IEPR panel responses will be documented by Battelle.

3.2 Identification and Selection of Independent External Peer Reviewers

Corresponding to the technical content of the BBCW PIR and overall scope of the Biscayne Bay Coastal Wetlands project, the technical expertise areas for which the candidate panel members were evaluated focused on five key areas: design and construction cost engineering, civil works planning, coastal/estuarine ecology, hydraulic engineering, and economics.

Battelle initially identified more than 30 candidate IEPR panel members, evaluated their technical expertise and inquired about potential conflicts of interest. Of those initially contacted, Battelle chose nine of the most qualified candidates and confirmed their interest and availability. Of those nine candidates, five were proposed as the final panel and four were proposed as backup reviewers. Four of the five proposed primary reviewers constituted the final panel, while one panel member initially proposed as a backup reviewer became part of the final panel. The remaining candidate 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.

- Involvement by you or your firm in any part of the Biscayne Bay Coastal Wetlands (BBCW) Project including the Project Implementation Report.
- Current employment by the U.S. Army Corps of Engineers (USACE) or South Florida Water Management District (SFWMD).
- Current or previous employee or affiliation with members of the Project Delivery Team (PDT) (besides USACE), including the SFWMD, U.S. Fish and Wildlife Service (USFWS), Florida Department of Environmental Protection (FDEP), Miami-Dade Co. Department of Environmental Resources Management (DERM), and the National Park Service (NPS).
- Current or previous employment or affiliation with a cooperating agency for Everglades Restoration Efforts (e.g., SFWMD, Everglades NPS, U.S. Environmental Protection Agency (EPA), U.S. Geological Survey (USGS), National Oceanic and Atmospheric Administration (NOAA)) 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,

[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 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."

dates, and location (USACE district, division, Headquarters, ERDC, etc.), and position/role.

- Previous employment by the USACE or SFWMD as a direct employee or contractor (either as an individual or through your firm) within the last 10 years, notably if those projects/contracts were with the Jacksonville District or SFWMD. 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 involving levees, channel/canal modifications, and pumping stations, and include the client/agency and duration of review (approximate dates).
- Current or future financial interests in Biscayne Bay Coastal Wetlands Project-related contracts/awards from USACE or SFWMD.
- A significant portion (i.e., greater than 50%) of personal or firm revenues within the last 3 years came from USACE or SFWMD contracts.
- Any publicly documented statement made advocating for or against the Comprehensive Everglades Restoration Program (CERP), including subject project.
- Any other perceived COI not listed, such as:
  - Involvement in Comprehensive Everglades Restoration Program (CERP) projects
  - Repeatedly served as USACE or SFWMD technical reviewer
  - Paid or unpaid participation in litigation related to the work of the USACE or SFWMD
  - 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 review panel members were selected from the potential list (see Section 4 of this report for names and biographical information on the panel members). The five IEPR panel members 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 three 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 IEPR panel to guide their review of the Biscayne Bay 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 179 charge questions/discussion points, the final charge included general guidance for the IEPR panel on the conduct of the peer review (see Appendix B of this final report for the full charge document).

Battelle planned and facilitated a final kick-off meeting via teleconference during which USACE presented project details to the IEPR panel. Before the kick-off meeting, the IEPR panel members were provided an electronic version of the Biscayne Bay 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 was instructed to address the charge questions/discussion points within a comment-response form provided by Battelle.

3.4 Review of Individual Comments

In response to the charge questions/discussion points, approximately 400 individual comments were received from the IEPR panel. 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 43 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 4-hour teleconference with the IEPR panel 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 IEPR 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. The main goal of the teleconference was to identify which comments/issues should be carried forward as Final Panel Comments and to decide which panel members would serve as the lead and co-author(s) 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 ten specific charge questions where there appeared to be disagreement among the panel members. The conflicting comments were resolved based on professional judgment of the IEPR panel; 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 19 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 IEPR panel. 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 Biscayne Bay PIR:

- Lead Responsibility: For each Final Panel Comment, one of the IEPR 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. Co-authors were assigned to assist the lead author on several Final Panel Comments.

- Directive to the Lead: Each lead was encouraged to communicate directly with other IEPR 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 one-sentence summary statement of concern)
    2. Basis for comment (i.e., details and background 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 could "adopt," "adopt in part," or "not adopt" 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, 19 Final Panel Comments were prepared. Battelle reviewed and edited the Final Panel Comments for clarity, consistency with the comment statement, and

adherence to guidance on the panel's overall charge, which included ensuring that there were no comments regarding either the appropriateness of the selected alternative or USACE policy. There was no direct communication between the IEPR panel and USACE during the preparation of the Final Panel Comments. The Final Panel Comments were assembled and are presented in summary in Section 5 of this report, and in full in Appendix A.

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 IEPR 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. Biscayne Bay PIR IEPR Panel: Technical Criteria and Areas of Expertise

	Bledsoe	Glagola	Mantey	Proffitt	Rogers
Hydraulic Engineering (one expert needed)					
5-10 years of experience in civil and hydraulic engineering	X	X			
Familiar with large, complex civil works projects with high public and interagency interests	X	X			
Experience with engineering analyses reducing point source freshwater discharges to estuaries	X				
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 systems		X			
Experience performing cost engineering/construction management for all phases of seepage management systems		X			
Familiar with similar projects across the U.S. and related cost engineering		X			X
Experience in associated contracting procedures		X			X
Experience in total cost growth analysis		X			
Experience on cost risk analysis		X			
Familiar with construction industry and practices used in Florida and/or the southeastern U.S.		X			X
Economics (one expert needed)					
5-10 years of experience in economics		X	X		
Familiar with large, complex civil works projects with high public and interagency interests		X	X		
Experience in evaluating the appropriateness of cost effectiveness and incremental cost analysis (CE/ICA), as applied to dollar costs and ecosystem restoration benefits			X		X
Familiar with IWR-PLAN			X		X
Coastal/Estuarine Ecology (one expert needed)					
5-10 years of experience in coastal/estuarine ecology	X			X	X
Familiar with large, complex civil works projects with high public and interagency interests	X			X	X
Knowledge of coastal wetland environments in Florida.				X	X

	Bledsoe	Glagola	Mantey	Proffitt	Rogers
Familiarity with methods for evaluating ecological benefits in coastal wetland environments.	X			X	X
Familiarity with methods for evaluating ecological benefits in estuarine environments	X			X	X
Experience developing hydrologic surrogates for ecosystem processes/characteristics.	X			X	X
Civil Works Planner (one expert needed)					
5-10 years of experience in civil works planning					X
Familiar with large, complex civil works projects with high public and interagency interests					X
Experience in the area of hydrologic restoration to achieve ecological benefits					X
Knowledge of the freshwater wetlands of the Everglades system					X
Knowledge of the estuarine wetlands of the Everglades system					X

Brian Bledsoe, P.E.

Role: This panel member was chosen primarily for his hydraulic engineering experience and expertise.
Affiliation: Colorado State University

Dr. Brian Bledsoe, P.E., is currently an Associate Professor and Borland Chair in Hydraulics in the Department of Civil and Environmental Engineering at Colorado State University. His research and teaching interests are focused on the interface between hydraulic engineering and ecology with emphasis on development of stream, river, wetland and watershed restoration practices that are effective and ecologically based. He previously worked for the North Carolina Department of Environment and Natural Resources, Division of Coastal Management to lead a statewide watershed analysis project to develop and implement a geographic information system combined with hydrologic and hydraulic models for targeting wetland/riparian area restoration strategies to address water quality problems. He also served as the state-level liaison between several environmental agencies in wetland and stream impact avoidance, long-term mitigation planning, and development of site-specific mitigation plans for USACE §404 permits associated with transportation projects. He eventually became the Nonpoint Source Program (NPS) Coordinator and served as the State's lead engineer in the development, implementation, and retrofitting of best management practices and ecosystem rehabilitation measures designed to restore water quality to NPS impaired water bodies. While serving as the NPS Coordinator, he was one of the lead authors on the Neuse River estuary Nutrient Sensitive Waters/ Total Maximum Daily Load (TMDL) plan. In that capacity, he worked on both point and nonpoint source discharges to the estuary. The focus was not freshwater discharges per se; it was primarily the nutrients in the National Pollutant Discharge Elimination System (NPDES) permitted freshwater discharges to the estuary. Previous experience also includes the analysis of the extent of wetland drainage (especially the extensive pocosin drainage) to estimate how land use changes have influenced freshwater inputs to the estuaries. In 2008, Dr. Bledsoe served as a Fulbright Scholar in Chile at the Centro EULA de Chile, Universidad de Concepción in Chile and conducted river research, lectured on watershed management, and participated in an interdisciplinary seminar focused on hydropower and environmental flows that balance ecosystem and human needs. Dr. Bledsoe is a registered Professional Engineer (CO, NC) and has authored over 50 publications related to wetlands, stream and watershed processes, restoration and water quality.

Charles Glagola, P.E.

Role: This panel member was chosen primarily for his design and construction cost engineering experience and expertise.
Affiliation: University of Florida

Dr. Charles (Chick) Glagola, P.E., is currently an associate professor in the Department of Civil Engineering at the University of Florida (UF), specializing in the area of Construction Engineering and Management. Research interests include cost engineering, value engineering, total quality management, innovative contracting methods and engineering education. Prior to joining the faculty at UF, he was the founder and owner of a general construction firm that constructed both private and governmental projects. As managing partner of a private utility company engaged in supply and distribution of natural gas and water located in Escambia,

County, Florida, he conducted economic studies for the development and growth of the company as well as studies for attracting new commercial customers, periodic systems replacement, and other economic considerations. Dr. Glagola's work outside of the university currently focuses on the design of detention/retention systems including all types of storage (above and below ground), percolation, pervious medium, vegetation contributions, and sediment handling. Other projects include innovative contracting methods and quality control for the Florida Department of Transportation. Dr. Glagola has taught graduate courses to engineers at the USACE office in Jacksonville (1998-2006). Through these positions, he has an understanding of contracting procedures, including total cost growth and cost risk analysis. He is co-author of the book "Engineering Economic and Cost Analysis" (3rd edition) and has published articles in the Journal of Construction of the American Society of Civil Engineers, Journal of Science and Engineering Ethics, and has presented papers at national meetings of the American Society of Engineering Education and the Transportation Research Board. Dr. Glagola is a member of the American Society of Civil Engineers, the American Society for Quality Control, and the American Society for Engineering Education as well as other professional organizations.

Joseph Mantey

Role: This panel member was chosen primarily for his economics experience and expertise.
Affiliation: Oakland Community College

Mr. Joe Mantey has 30 years of experience in water resource economics and has an M.S. in agricultural economics from the University of California at Davis. Before taking his current position as an adjunct economics faculty member at Oakland Community College, Mr. Mantey worked as an economist for the USACE for 25 years. His fields of expertise include economic and social impact studies, benefit-cost analyses, risk and uncertainty analyses, environmental impact assessments, and peer reviews. He is familiar with the USACE tool IWR-Planning Suite for cost effectiveness and incremental cost analyses (CE/ICA). Over the last 10 years Mr. Mantey has conducted General Re-evaluation Reports (GRRs) and Technical Reviews including several IEPRs for USACE, including the Belle Isle Piers Environmental Restoration Feasibility Study for CE/ICA. Furthermore, Mr. Mantey was responsible for review of plan formulation and economic analysis of the following projects: Hunting Bayou GRR $200 million Section 211 channelization and detention project (2002-2004); Brays Bayou GRR $250 million Section 211 bridge replacement, channel improvements, and detention project (2000-2004); and White Oak Bayou GRR $200 million Section 211 channelization and detention project (2001-2008). Additionally, he managed a multi-disciplinary GRR team that earned a national (Hammer) award for reducing construction costs of a new shipping lock at the Soo Canal by $200 million. Mr. Mantey has also reviewed the Institute of Water Resources estimate of vessel operating costs used in the reanalysis of the Delaware River Main Stem and Channel Deepening Project, PA, NJ and DE. He was called upon to review the USACE work for thoroughness and reasonableness because of the high profile nature of this project.

C. Edward Proffitt

Role: This panel member was chosen primarily for his coastal and estuarine ecology experience and expertise.
Affiliation: Florida Atlantic University

Dr. Ed Proffitt has 30 years of experience in the field of estuarine and coastal ecology. He is currently an associate professor in the Department of Biological Sciences stationed at Harbor Branch Oceanographic Institution, Ft. Pierce, Florida. Research interests include mangrove and marsh biology and ecology, estuarine ecology, plant-animal interactions, ecological genetics, and remediation and restoration ecology. He is familiar with methods for evaluating ecological benefits in coastal wetland and estuarine environments in Florida. Dr. Proffitt has been tangentially involved with a number of projects that addressed the concept of hydrologic surrogates for ecosystem processes both in Florida and Louisiana. Key restoration studies that Dr. Proffitt has been involved in include an analysis of mangroves in southwest Florida, an examination of salt marshes in Louisiana and Florida focusing on the vegetation ecology, and one in the St. Lucie Estuary focused on oysters and associated fauna. Dr. Proffitt previously served as the Chief of the Wetlands Ecology Branch for the U.S. Geological Survey in Lafayette, LA. In this capacity, he served on national teams to develop plans for specific new research, including oversight of all biological research for Hurricane Mitch program in Central America and the USGS coastal marsh dieback program. Dr. Proffitt has served as a board member of the Coastal and Estuarine Research Federation, President of the Gulf Estuarine Research Society, and is a current member of the Southeastern Estuarine Research Society. He is the Associate Editor of the journal "Wetlands."

Barton Rogers

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

Mr. Barton Rogers has an M.S. in Forestry, Wildlife, and Fisheries and 33 years of experience conducting coastal research, environmental evaluation, and planning for civil works. Mr. Rogers has knowledge and familiarity with the freshwater and estuarine wetlands of the Everglades system and the South Florida Water Management District Everglades Project through his educational background, USACE training, and peer reviewing. He has peer-reviewed related papers including "Large-scale constructed wetlands for nutrient removal from stormwater runoff; an Everglades Restoration Project" and "The impact of bait shrimp trawling on seagrass beds and fish by-catch in Tampa Bay." Mr. Rogers has experience in hydrologic restoration from his 11 years with USACE as the Environmental Manager and Project Manager for ecosystem restoration and flood damage reduction projects for the New Orleans District. Mr. Rogers is a trained Planning Associate and assisted in teaching a USACE-wide class entitled "Hydrologic and Hydraulic Considerations in Planning." Mr. Rogers has completed over 18 training courses through USACE and numerous publications and reports. Through his position at GEC, Mr. Rogers is currently assisting the State of Louisiana in developing a feasibility study for restoration of areas surrounding the Amite River Diversion Canal by restoring water flow to the fresh water habitats. He currently works on other restoration projects in the Upper Terrebonne Basin; False River, Louisiana (shoreline restoration); and Natural Stream Design restoration projects. Mr. Rogers also assisted in the development of a USACE Feasibility Study for ecosystem restoration for the Lakes District in East Baton Rouge Parish.

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 Biscayne Bay 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.

The IEPR panel noted that the USACE has done a good job with a complex project and has presented a very in-depth and data-rich report. The panel agreed with the use of competing hydrologic and hydraulic models and thought that USACE had made a good faith effort to scrutinize the models.

Plan Formulation: The Panel generally concurred that USACE completed excellent detailed work on a most complicated project which resulted in the selection of the Tentatively Selected Plan (TSP). However, it was difficult to fully evaluate the plan formulation process, and to "follow the story," because the necessary information was spread out over multiple report sections and appendices. The planning process should be fully synthesized and presented in Section 5, in which there should be enough detailed information to be a stand-alone section without dependence upon appendices or other sections of the report. The other sections or appendices should present the next level of detail. Experts and non-experts alike should be able to read Section 5 and get the complete story, measures and alternatives evaluated, costs, and benefits. The other sections and appendices can still present the more detailed information. It was also not clear as to how comprehensive the plan formulation was in terms of combining the most effective measures into distinct alternative plans.

Economics: The economic analysis does not include some cost considerations and uses a starting year that is a few years before the first feature is constructed. Uncertainty, especially regarding any probability of worst case scenario for sea level rise, which the panel considers critical, is not addressed within the analysis, and reliability in the context of uncertainty is not addressed.

Engineering: The link between the available water and the specific seasonal hydrologic regimes of target wetland types is imperative and not emphasized. The panel is unclear as to how the weight of evidence was developed for the final interpretation of a very complex array of competing hydrologic model results, boundary conditions, and assumptions regarding hydraulic operations.

Environmental: Some aspects (e.g., sea grasses) of the BBCW monitoring are adequate, but the panel has identified several recommendations for improving the monitoring strategy. In particular, the panel is concerned about evaluating project effects on the 'downstream' foundation species (e.g., various mangrove species) and understanding ecological responses to hydrology and salinity that will occur *within* the wetlands receiving discharge. The removal of nutrients (mainly nitrates) by vegetation appears to be a key feature, but there is no monitoring of this other than the upstream and downstream water quality.

Table 3. Overview of 19 Final Panel Comments Identified by Biscayne Bay IEPR Panel

Significance – High	
1	The discussion of forecast and future conditions, especially with regard to sea level rise and water availability, is not comprehensive and needs to be expanded to include more quantitative analysis and graphical explanation.
2	Further clarification is needed on the relationship between the water available for diversion and the hydrologic regimes necessary to achieve the target level of wetland area/function.
Significance – Medium	
3	The habitat units for each measure need to be clarified, and it should be clear whether habitat units for a given measurement represent relative or actual magnitudes.
4	The BBCW PIR main report needs to be revised to significantly reduce the references to the Appendices and to improve the quality and clarity of the graphics.
5	The effects of the BBCW project and the resulting changes in hydrologic regime on "downstream" foundation species (e.g., mangroves) should be assessed.
6	The quantification of long-term reductions in nutrient loading is unclear as it relates to benefits and changes over time.
7	The process by which the management measures were developed, screened, and combined into alternatives was not clearly described.
8	The hydrology sections do not provide sufficient information to evaluate the effects of implementing the proposed plan compared to the baseline.
9	The water quality analyses need to focus more on extreme values and ranges of salinity, dissolved oxygen, and nutrients rather than just averages.
10	The BBCW PIR needs to address how sufficient, long-term dispersion of flow will be achieved across the maximum extent of the project area, while avoiding the development of concentrated flows and short-circuiting around microtopographic features.
11	The scientific basis for categorizing "low-functioning wetlands" and "high-functioning wetlands" as a function of the Criterion Based Ecological Evaluation Matrix (CBEEM) and the aerial extent of the benefits for each of the final array need to be clarified.
12	Risk and uncertainty are not addressed in sufficient detail to meet the requirements of the CERP Program Regulations.
13	The Draft Project Monitoring Plan does not sufficiently address the stated project goals, and if implemented, would not detect changes in the ecosystem and water quality.
14	An operational response plan is necessary because there is no backup power for the pumping system.
15	The hydrologic analysis of freshwater wetland rehydration areas should be based on a more complete water balance analysis.
16	The calculations of the average annual costs and benefits cannot be reviewed for accuracy without more information.
17	Some of the uncertainties associated with possible construction activities could add significant costs to the project.

Significance – Low	
18	The Draft Project Monitoring Plan does not clearly explain which organization or agency will be responsible for monitoring and adaptive management.
19	Literature references and citations are required throughout the document to evaluate if statements are “thorough” and “accurate.”

6. REFERENCES

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APPENDIX A

Final Panel Comments

on the

Biscayne Bay Coastal Wetlands Project Implementation Report

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Final Panel Comment 1:

The discussion of forecast and future conditions, especially with regard to sea level rise and water availability, is not comprehensive and needs to be expanded to include more quantitative analysis and graphical explanation.

Basis for Comment:

The BBCW Project Implementation Report (PIR) describes future conditions only for the year 2050. Future conditions are typically presented in 10-year increments, which conveys a logical progression as conditions change over time. Hence, ER 1105-2-100 calls for forecasting future conditions for selected "years."

The BBCW PIR was completed before USACE guidance on sea level rise was released (EC 1165-2-211 July 1, 2009). The guidance was effective immediately upon publication but the BBCW PIR does not comply with its requirements for a risk analysis. Regardless of the guidance, given the project area's coastal flat terrain, sea level rise should be integral to the planning and evaluation of alternatives in this study. Section 3.1.4 of the BBCW PIR indicates a projected rise of 0.8 feet, but this is only a moderate scenario. Other possibilities recognized by the Intergovernmental Panel on Climate Change (IPCC) should also be explored (e.g., high value of 1.5 ft).

It should take many years for created habitat to mature and this is not clearly addressed. Benefits in the early years of the study period are expected to dynamically increase as the habitat matures. In the later years of the project's life, sea level rise is likely to affect the survivability, productivity, and overall ecological vitality of restored habitat. The panel expects the benefits to increase and then decrease during the study period, and this is not addressed quantitatively with respect to the envelope of plausible sea level rise and water availability scenarios.

The vast majority of acres and habitat units created by the Tentatively Selected Plan (TSP) are saline or brackish habitat. It is not clear that the benefit of increased habitat is measured against a background of naturally increasing salt water habitat in the without project condition as sea levels rise.

Significance – High:

In the uncertainty analysis, the BBCW PIR acknowledges that benefits decline as sea level rises up to 1.5 feet, at which point there are essentially no habitat improvement benefits. Therefore, the benefits and justification of the project are extremely sensitive to future conditions.

Recommendations for Resolution:

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

- A description of alternative forecasted conditions during the 40-year period using snapshots of conditions in interim years. The effect of sea level rise on habitat created should be discussed for each interim snapshot.
- A detailed description of the completion time frame for each feature and associated time frames for maturing habitat.
- A description of the relation of the BBCW project in the larger context of the Comprehensive Everglades Restoration Plan (CERP). If there are synergistic effects between these projects, the future with and without conditions for the BBCW project should include construction of the CERP over a period of time.
- An addressing of the requirements of EC 1165-2-211.
- A discussion of forecasted trends in temperature (e.g., climate change), precipitation, and sea level rise over the study period.
- A discussion of future socio-economic and water use conditions, including projected water demand and its potential relationship to wetland loss.
- An explanation of how projected water demand affects the analysis, including whether a growing

demand for water will increase the rate of wetland loss over time and whether any of the alternatives provide incidental water supply benefits or costs.

- A clear and concise description of the future without project scenarios, using graphics and maps. Each alternative should be compared to the future without project scenario, with the difference being the benefits of the BBCW project.

Final Panel Comment 2:

Further clarification is needed on the relationship between the water available for diversion and the hydrologic regimes necessary to achieve the target level of wetland area/function.

Basis for Comment:

This comment is based on concerns that: (1) the BBCW PIR does not explicitly recognize and describe the hydrologic regimes required to support the target wetland plant communities; (2) the anticipated inter-annual and seasonal variability in water availability is not directly linked to the hydrologic requirements and pre-alteration hydrology of the target wetland communities; and (3) the lack of documentation regarding target water depths, hydroperiods, etc., precludes an evaluation of whether the hydrology will produce conditions in which invasive plant species cannot survive.

Wetland plant communities are adapted to particular hydrologic conditions, including ranges of flooding depth, frequency, and duration. The BBCW PIR conveys the view that if the sites are rehydrated without specific attention to the depth, frequency, and duration characteristics that can be achieved with available water, then the target plant communities will nevertheless return and be sustained. However, the objectives of the project will not be fully realized unless the available water provides hydrologic conditions that emulate the unaltered hydrologic regimes of the target wetland types within a tolerable range of variability. The water availability analyses indicate that, if past conditions are stationary, the 10%-90% range of divertible canal water is approximately 113,000-283,000 acre-feet per year. Without additional context these values seem disconnected from scientific understanding of hydrologic regime as a master variable in wetland restoration, and the hydrology of high-functioning reference wetlands. That is, it is not clear to what extent the available water can emulate pre-alteration hydrologic regimes of the project restoration areas. This consideration, although fundamental to assessing the potential benefits of the project, is not analyzed and discussed. In addition, risk and uncertainty associated with water availability are not analyzed in the context of the hydrologic requirements of the target wetland types. There appears to be a quantifiable risk that some habitat could fail due to the lack of water availability.

Monitoring can be used to establish "biological benchmarks" that relate hydrologic regime, soil type (physio-chemical properties) and wetland vegetation assemblages. Given that most of these analyses were conducted on a lumped annual basis and were not put into the context of the specific hydrologic needs of the target wetland communities, it is rather difficult to assess the potential for "success" at the scales identified. That is, the estimated lift of wetlands would best be rooted in scientific understanding of the linkage between flow regime and plant community ecology that directly addresses questions such as: How much has the historic flow regime been altered and in what ways? How do the anticipated regimes delivered through the canals and spreaders mimic the natural magnitude and variability of flows? What are the differences among alternatives with respect to their capacity to deliver water to wetlands during the dry season?

The BBCW PIR suggests that the available water is sufficient to limit invasive plant species recruitment. There is no solid evidence for this assumption in terms of specific hydrologic targets. The probable need for active removal of established invasive plants is acknowledged, but active removal of invasive species is unsustainable without establishing a sufficient hydroperiod.

Significance – High:

The lack of analyses that directly link the specific hydrologic requirements of the target wetland types with water availability affects the justification of the project, as well as completeness and understanding of the BBCW PIR and project.

Recommendations for Resolution:
To resolve these concerns, the BBCW PIR would need to be expanded to include: • A discussion of the specific hydrologic patterns that support the target wetland communities, how these patterns have been altered, and which critical elements of the hydrologic regime must be re-established to achieve the objectives of the project. This is critical to the support of the plan formulation and the selection of the Tentatively Selected Plan (TSP). • Analyses of anticipated variability (including the possibility of non-stationary behavior) in water availability and how that relates to the critical elements of the target hydrologic regimes. In particular, emphasis should be placed on the occurrence, intensity, and duration of dry conditions and whether these conditions are both compatible with the target plant communities and consistent with anticipated effects on invasive species. • A quantification of the risk that some of the habitat will fail as a result of the water availability issues mentioned above. • Additional monitoring targeted at directly assessing the linkage between hydrologic regime (within the wetlands) and ecological indicators, especially wetland vegetation.

Final Panel Comment 3:

The habitat units for each measure need to be clarified, and it should be clear whether habitat units for a given measurement represent relative or actual magnitudes.

Basis for Comment:

The panel found it difficult to understand the computation of habitat units. In the BBCW PIR main report (p. 5-9) and in Appendix C habitat units are presented as relative, dimensionless measures, but in some instances in the Executive Summary (pp. x-xi) the same values seem to be presented as actual magnitudes with units. For example, the Executive Summary states that freshwater wetland habitat is said to have a functional benefit of 340 acres, an increase of approximately 8.5 percent over the estimated 3,977 acres of existing functional freshwater wetland acreage within the project area. Appendix C states for the same measures that "it is important to note that this simple method of estimating wetland lift provides a means of discriminating between alternatives using relative comparisons. It is not meant as a method of computing absolute wetland lift as this would require a broader investigation of site conditions as well as final design conditions."

The panel could not find supporting documentation for Table 5-5. The logic and the scoring seem to be well thought out; however, the logic and scoring are too complex to follow with the limited explanation given. The habitat units are somewhat confusing without providing a summary scorecard in the main report that documents their derivation for each alternative.

As sea levels rises, the extent and relative values of habitat would seem to change over time. Without a more complete understanding of the habitat units, it is difficult to understand why they receive equal weight. This decision by the planning team may well be appropriate, but the report does not make a convincing case.

Significance – Medium:

Plan selection is driven by the effectiveness of alternatives in providing habitat and it needs to be understood what these outputs (i.e., habitat units) represent.

Recommendations for Resolution:

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

- An explanation, both narrative and tabular, of what the habitat units represent in the BBCW PIR main report.
- A clarification between relative magnitudes and actual estimated magnitudes.
- A column in Table 5-5 for the description of units for which habitat units are being determined.
- A table showing the units being measured would be very informative in reviewing and understanding Section 5.
- A definition of "nearshore indices" and "HU Lift" in the BBCW PIR main report.
- A benefits map for each of the final arrays. The map should show the existing condition (degraded system) and expected improvement.
- An explanation of why habitat units are given equal weight, regardless of the type of habitat and relative scarcity over time.

Final Panel Comment 4:

The BBCW PIR main report needs to be revised to significantly reduce the references to the Appendices and to improve the quality and clarity of the graphics.

Basis for Comment:

The BBCW PIR main report included extensive reliance on the Appendices, forcing flipping between sections of the PIR to understand the full "story" of the project. For example, in Section 5.0 the reader has to frequently refer to Appendices C, F, and G to fully comprehend the section. In addition, Section 5.0 does not comply with the PIR Outline presented in Attachment 1-C of the CERP Programmatic Regulations. Section 5.0 should begin with an explanation of evaluation criteria, performance measures, and evaluation methods and models, followed by a description of the relevant plan formulation that went into the Yellow Book alternative.

The BBCW PIR main report's graphics also made it difficult to fully comprehend the BBCW project. Even though the main report relies on maps as a major tool to describe the alternatives, benefit areas, and the existing environment, many of the maps and figures were small, slightly out-of-focus, and difficult to read and interpret. All maps should be clear as to which features already exist and which are proposed. For example, the clarity and color of symbols in Figure 6-3 make it difficult to distinguish between ditch filling, seepage ditch, and conveyance channel.

Significance – Medium:

Reorganization of the report to include appropriate information currently in the appendices in the main report will allow for a full understanding of the project, the planning process, and the justification of the Tentatively Selected Plan (TSP).

Recommendations for Resolution:

To resolve these concerns, the BBCW PIR should be expanded to include:

- A complete account of the project in the BBCW PIR main report, avoiding the dependence on the Appendices to "tell the story." The main report should be able to be a stand-alone document, with the Appendices only needing to be consulted if there is interest in more detailed and supporting information.
- A communication style that takes into account the fact that readers are likely to have a range of technical understanding and different levels of familiarity with south Florida water resource problems and projects.
- A complete evaluation of graphics to determine how each could be improved to "tell the story." Existing figures and maps should be evaluated to improve interpretation, including:
    - making some maps larger or zooming in on important areas;
    - breaking existing maps into multiple maps (e.g., Figure 2-2 might be split into three maps: one for Model Lands/Barnes; one for L-31E Flow-way; and one for Deering Estates and Cutler Wetlands/Black Point);
    - revising the maps to clearly show existing and proposed features and to include all features mentioned in the text (e.g., Figure 2-1 should show all the features mentioned in Section 2-1);
    - inserting additional maps as needed to "tell the story," such as a Study Area map;
    - preceding figures and other graphics with a simple description of how the graphic supports an understanding of the information provided in the text.
- A revision of Section 5.0 to provide a grand overview of the entire study effort. Some specific recommendations include:
    - Including a written description, table of measures, cross-sections (as appropriate), and a detailed plan view for each of the alternatives in the final array (similar to what is in Appendix F).

- Including maps that show the Future with Project (FWP) for each alternative, including the areal extent of the improved habitats.
- Directly correlating the areal extent of benefit with the Habitat Unit Lift for each alternative (e.g., pie charts that shows the total area of the three parcels divided into the percent of parcel covered by habitat and the percent habitat improved by Phase 1).
- Including graphs and tables related to the cost effectiveness/incremental cost analysis (CE/ICA) in order to provide the full background of the alternatives analysis.

- A review of the tables and figures in Section 6.0 to ensure consistency.
  - For example, Figure 6-1 shows three features for Deering Estate (S-D1, S-700, and CC-D3). Table 6-1, however, shows S-700 and C-110A.
  - Figure 6-3 appears to show ditch filling, but this is not listed in Table 6-1.
- Cross-sections of the spreader canals and ditch closures in Section 6.0, which would prevent having to flip back to other sections or Appendices.

Final Panel Comment 5:

The effects of the BBCW project and the resulting changes in hydrologic regime on "downstream" foundation species (e.g., mangroves) should be assessed.

Basis for Comment:

"Foundation species" (Bruno and Bertness, 2001) provide the structure, habitat, and productivity required by so many other species that foundation species are the bases for communities. The BBCW project is designed to impact one such foundation species (inland dwarf mangroves) and project discharges will possibly affect others such as downstream mangroves near the edge of Biscayne Bay, seagrass beds, oyster bars, oysters associated with roots and bases of mangroves, and live bottom habitat in the bay.

Monitoring activities are planned for oysters, seagrass, and water quality in the area of live bottom habitat. However, little if any monitoring other than minor assessments of periphyton are planned for the intertidal wetlands. The BBCW project may cause changes in hydropattern (i.e., how deep, where, for how long, in which seasons) and salinity and nutrient patterns (i.e., quantities, seasonality, nutrient x salinity interactions). All of these, and their higher order interactions, could have profound influences on community structure, productivity, tree growth, seedling recruitment (hence forest regeneration), important faunal species populations such as *Uca* sp. (fiddler crab burrows oxygenate soils) and *Melampus* sp. (snails consume/convert leaves), and soil "ecology" (below ground production, soil building and maintenance of elevation in the face of sea level rise).

The panel believes that the proposed monitoring plan (i.e., one or few water depth/quality stations in mangrove areas, no monitoring of mangroves per se), will not detect any of the aforementioned effects in mangrove forests unless there was obvious large-scale tree mortality. In addition, the proposed monitoring activities for seagrass and live bottom are not sufficient to judge impacts that could occur if the salinity and nutrient models are incorrect or if unanticipated salinity x nutrient interactions occur for some community-forming species.

Literature Cited:

Bruno, J.F. and M.D. Bertness. 2001. Habitat modification and facilitation in benthic marine communities. In: Bertness M.D., M.E. Hay, and S.D. Gaines (eds.) Marine Community Ecology. Sinauer, Sunderland, MA. pp. 201-218.

Significance – Medium:

If major communities are not monitored adequately, managers will be less likely to detect problems associated with a particular water release scenario and address these via adaptive management.

Recommendations for Resolution:

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

- Monitoring of mangrove structure, production, recruitment, reproduction, and soil ecology.
- Substantially increased water quantity, flow, and quality monitoring in the mangrove and interior wetland areas.
- Assessment of important faunal populations associated with mangrove forests (e.g., *Uca* sp. and prop root/tree base oysters).

Final Panel Comment 6:

The quantification of long-term reductions in nutrient loading is unclear as it relates to benefits and changes over time.

Basis for Comment:

This comment is based on (1) uncertainties regarding the long-term nutrient removal capacities of the sites, and (2) methodological concerns about how nutrient removal benefits are calculated.

Nutrient removal is a key feature mentioned a number of times in the BBCW PIR. Although denitrification will likely be ongoing as organic matter accumulates in rehydrated wetland areas, the nutrient removal benefits associated with plant uptake and assimilation could potentially diminish over time. In forested systems where the dominant species are relatively long-lived, nutrients can be sequestered for long periods of time in wood and below-ground root mass. However, in herbaceous-dominated grasslands that will predominate in the brackish zone after "conversion" from dwarf mangrove, the plants are not long-lived and will go through seasonal and annual (and perhaps super-annual) cycles of growth followed by senescence and decay. The latter will release the nutrients that have been sequestered during the growth phase. Moreover, at some point, one could hypothesize that the system will become saturated and will not readily sequester more nitrogen and phosphorus. It is unclear whether this possibility has been analyzed and accounted for in the project plan, the monitoring plan, or the adaptive management strategy.

There are a number of methodological concerns with respect to how nutrient removal benefits were estimated. First, it is not clear how the wetland area available for nutrient removal was estimated, i.e. whether it was based on absolute pump capacities or wetland rehydration areas using the seepage approach. If nutrient removal benefits were assigned to an area larger than the area that is ultimately rehydrated, this would result in an overestimation of removal. Second, the nitrate removal rate selected for the Kadlec k-C* equation seems higher than typical median values and values reported by Kadlec and Knight (1996) for Florida wetlands. It is unclear to what extent this parameter is intended to reflect long-term denitrification vs. sequestration in biomass. Third, Biscayne Bay is nitrogen limited and Section 7.8 portrays nitrate removal as the "primary measure" of water quality effects. However, Appendix C indicates that an equal weighting of reductions in nitrate loading and peak phosphorus reductions was determined to be the most reliable approach in the Criteria-Based Ecological Evaluation Matrix (CBEEM).

Literature Cited:

Kadlec, R.H. and R.L. Knight. 1996. Treatment Wetlands. CRC Press LLC, Boca Raton, Florida. p. 420.

Significance – Medium:

The absence of a clear exposition of the conceptual underpinnings and methodologies in the analysis of long-term nutrient removal benefits affects the completeness and understanding of the report/project.

Recommendations for Resolution:

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

- A clearer discussion and critical analysis of assumptions regarding long-term nutrient removal capacity, especially with respect to how removal benefits through plant uptake are expected to change over time;
- A clarification of the methodology used to estimate the wetland area over which nutrient removal benefits will be accrued.
- A clarification of the rationales for the selected nitrate removal rate and equal weighting of nitrate (NO_3) and total phosphorus removal benefits in the CBEEM methodology.

Final Panel Comment 7:

The process by which the management measures were developed, screened, and combined into alternatives was not clearly described**.**

Basis for Comment:

The BBCW PIR only includes a final list of management measures and does not describe the processes undertaken to identify, evaluate, and screen the measures to form the initial array of alternatives, as ER 1105-2-100 requires. When the BBCW project was congressionally approved for construction, the requirements of ER 1105-2-100 may not have applied. However, the approved Yellow Book alternative (D13R) was subsequently rejected in the BBCW PIR because it exceeded the original cost estimate presented to Congress for authorization. Therefore, because the approved project is no longer being constructed, the requirements of ER 1105-2-100 are now relevant and USACE must include information on management measure identification, evaluation, screening, and alternative development in the BBCW PIR.

The incremental cost analysis results in only one best buy plan for saltwater habitat, and only two best buy plans for freshwater, nearshore, and combined habitats. A structured and iterative planning process is likely to identify at least three best buy plans to estimated the relationship between outputs and costs, which is most likely to be non-linear.

Significance – Medium:

A clear sequence of the planning steps is critical to the completeness of the BBCW report and the understanding of how the alternative plans were developed.

Recommendations for Resolution:

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

- A description of how all management measures considered for this project were identified, evaluated, and screened. For example, a matrix table with all management measures on one axis and the alternatives on the other might be included. The intersections would show which measures were to be included in each alternative.
- A discussion of the quantification of measure effectiveness in meeting the stated objectives of the project. Additional management measures, including offsite or local storm water Best Management Practices, such as land use planning and vegetation removal, should be considered and addressed. An overall view of the civil engineering features (management measures) should be included in each of the three areas. A matrix table might be helpful to the show these intersections showing the percent planned improvement for each of the elements that are to be measured.
- A rationale that shows how these measures were assembled for the initial array of alternatives, as described in Section E-34 of ER 1105-2-100. Rationale and discussion as to why other alternatives were not reduced to meet the existing budget limit should be included. Additional maps and discussion would be helpful for the reader to understand why it is logical that only Alternative O was suitable for a reduction phase.
- Additional best buy plans, or explain why the relationship between outputs and costs is most likely linear or nearly so.

Final Panel Comment 8:

The hydrology sections do not provide sufficient information to evaluate the effects of implementing the proposed plan compared to the baseline.

Basis for Comment:

This comment is based upon concerns that (1) the introductory sections (e.g., Section 2.1.4) on hydrology do not provide enough discussion of the hydrology of major habitats and how they have been altered; (2) it is unclear whether land subsidence was considered; and (3) the BBCW PIR lacks a clear synthesis of hydrologic impacts as predicted by the diverse and complex modeling analyses. The hydrology discussion should be clearly synthesized and summarized in the body of the BBCW PIR main report in order to provide a complete understanding of the approach, rationale and conclusions.

Section 2.1.4 provides an appropriate overview of the large-scale human influences on regional hydrological processes. However, the information provided in this section does not allow for an evaluation of the potential effects of the proposed plan compared to the baseline. For example, there is no quantitative listing of how long the hydrology was in the affected region in typical vs. atypical years, and in wet and dry seasons. If no firm data are available locally, estimates from similar systems elsewhere in Florida could be used.

It is not completely clear if subsidence is of concern when considering sea level rise, and whether the sea level rise (SLR) is all relative or partially eustatic. Relative sea level rise (RSLR) would be the combination of subsidence and eustatic sea level rise. RSLR is what will have the real effect on vegetation, not just SLR. Studies of subsidence using sediment elevation table /marker horizon methods have been occurring in the Everglades National Park and other south Florida systems for years (Stephens, 1956; Stephens, 1974; Cahoon and Lynch, 1997).

USACE is to be commended for integrating a complex suite of engineering tools, data sources, and competing models (e.g., 2x2/WASH123D, TABS, MODBRANCH, HEC-RAS) to conduct their predictive scientific assessment of project effects. However, the BBCW PIR main report does not distill the many hydrologic modeling activities into clear synthetic statements regarding:

- how much water is available for rehydration;
- how the Tentatively Selected Plan (TSP) is likely to alter fluxes of groundwater, overland flow, and channel flow in the project domain;
- key uncertainties across the coupled models; and
- sensitivity of the modeled benefits to these uncertainties.

The BBCW PIR main report does not make a compelling case for confidence in the ultimate modeling decisions that were made with respect to using the actual observed data vs. 2x2 modeled boundary conditions, using calibration years in model "validation," and addressing uncertainty regarding "real world" structure operations. The BBCW PIR main report would benefit from a concise summary of the weight of evidence, as well as having all the pertinent hydrologic information provided in the main report and not solely the Appendices. As it currently stands the BBCW PIR main report somewhat undermines confidence in the forecast effects by emphasizing differences of opinion. The predictive accuracies of certain models were deemed unacceptable without clearly stating why the model outputs that were ultimately accepted provide the best available information.

Literature Cited:

Cahoon, D.R. and J.C. Lynch. 1997. Vertical accretion and shallow subsidence in a mangrove forest of southwestern Florida, U.S.A. *Mangroves and Salt Marshes,* 1(3): 173-186.

Stephens, J.C. 1974. Subsidence of organic soils in the Florida Everglades — a review and update. In: P.J. Gleason, Editor, *Environments of South Florida: Present and Past Miami Geological Society Memoir 2, Miami, Fla.*, pp. 352–361.

Stephens, J.C. 1956. Subsidence of organic soils in the Florida Everglades. *Soil Sci. Soc. Am. Proc.* 20: 78–80.

Significance – Medium:

Providing sufficient information to evaluate the effects of implementing the proposed plan compared to the baseline is critical for understanding the BBCW PIR and project.

Recommendations for Resolution:

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

- A somewhat more in-depth discussion of hydrology of the major habitats, either in Section 2.1.4 or later in the environmental or wetland sections.
- A clear statement on whether the BBCW PIR is discussing eustatic or relative sea level rise. The panel assumes that subsidence is insignificant, but this should be discussed. The distinction should be made between relative and eustatic sea level rise.
- A clear and concise summary discussion in the BBCW PIR main report that distills the many hydrologic modeling activities into clear synthetic statements linking hydrologic model forecasts and anticipated project effects. The discussion should directly address model prediction accuracies and the level of confidence they provide for both relative comparisons of effects among alternatives, and assessing whether critical ecological targets will likely be met.

Final Panel Comment 9:

The water quality analyses need to focus more on extreme values and ranges of salinity, dissolved oxygen, and nutrients rather than just averages.

Basis for Comment:

Throughout the BBCW PIR main report and Appendices, average values of various water quality parameters are presented, but without the context provided by spatial and temporal measures of variability. Species are impacted mainly by extreme values, or high (or low) values maintained over a period of time. Mean values often have little or limited effect. Measurement of, planning for, and reporting of annual means obscures the spatial variation and seasonal effects associated with water quality parameters.

For example, the average dissolved oxygen in a eutrophic system may be 7 parts per million (ppm), but it might be 12 ppm during the day and 1 ppm at night. Even though the average of 7 ppm may be ideal for a given species of fish, a low of 1 ppm even for one night would kill them. In this case, the average value does not convey the important information. For vegetation, this can differ slightly. Sometimes short-term extremes (e.g., salinity) may not affect most vegetation; longer term exposure (e.g., high salinity, increased period of inundation, etc.) may have an adverse effect and still may not be expressed well in the "average" value over a period of time. However, for very salt intolerant species, one storm-driven inundation by salt water will likely kill this vegetation. Essentially, the basic composition of the vegetative community will change substantially based on the depth, duration, and timing of the physical drivers (e.g., salinity, nutrients, and temperature). Much of this change does not result from, and cannot be projected by, assessment of average conditions.

Water quality impact can be hard to determine, under the best of monitoring programs. To plan a restoration program based mainly on mean values can lead to spurious conclusions and management actions.

Significance – Medium:

A concise assessment of seasonal and spatial water quantity and quality variations is essential to being able to respond with adaptive management and is critical to the understanding and completeness of the BBCW PIR.

Recommendations for Resolution:

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

- The use of a range of values (temporal and spatial) for water quality parameters, not just averages in model runs, describing the future without project, future with project, and support of the Tentatively Selected Plan (TSP).
- The inclusion of extremes (or other appropriate measure of variability) as well as the average when assessing environmental measures. For example, the panel recommends USACE address the issue of what will happen in drought years where there is not enough water to hydrate the wetlands and maintain a desired salinity regime.
- Use likely salinity, dissolved oxygen, and nutrient ranges in model runs.

Final Panel Comment 10:

The BBCW PIR needs to address how sufficient, long-term dispersion of flow will be achieved across the maximum extent of the project area, while avoiding the development of concentrated flows and short-circuiting around microtopographic features.

Basis for Comment:

This comment is based upon concerns that (1) existing microtopography will result in non-uniform dispersion and concentrated flow of water inputs through rehydrated wetland areas; (2) channelized flow could eventually "short circuit" portions of the sites and reduce the rehydrated wetland area below current projections; and (3) there is insufficient monitoring to test the implicit hypothesis that flow spreading structures will effectively disperse flow throughout the sites and achieve the projected rehydration areas. There is concern that the flows are being concentrated in the microtopographic lows, eventually creating a deeper conveyance channel and reducing the amount of sheetflow.

Effectively spreading available water is critical for achieving the wetland lift projected by the BBCW PIR. Proximity to flow spreading features and subtle elevational differences will undoubtedly create heterogeneous moisture conditions, ponding, and, eventually, preferential flow paths across the rehydrated wetland areas. These flow paths could eventually become concentrated to the point that remedial actions involving additional spreading and flow blockage features would be warranted. This potential outcome is quite likely, yet it is not addressed directly in the BBCW PIR. Moreover, having a total of only four monitoring points located directly within the three large wetland complexes does not provide confidence that the rehydration "footprint" can be adequately assessed. An adaptive strategy for ensuring effective dispersion of available water over time is lacking as are the monitoring data to support it.

Significance – Medium:

The absence of a clear discussion regarding the importance of effective dispersion and a strategy for ensuring that available water is spread in a manner that maximizes desired ecological outcomes affects the completeness and understanding of the BBCW PIR and project.

Recommendations for Resolution:

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

- An acknowledgement of the critical role of flow spreading in controlling the actual rehydration area.
- A clear recognition of the causal link between flow dispersion, microtopography, and the hydrologic conditions specifically required by the target wetland plant communities.
- Additional hydrologic monitoring locations within the rehydrated wetland areas to provide the spatial resolution necessary for assessing the areal extent of appropriate hydrologic conditions.
- An adaptive management strategy component that triggers remedial actions in the absence of effective dispersion and the hydrologic conditions specifically required by the target wetland plant communities.

Final Panel Comment 11:

The scientific basis for categorizing "low-functioning wetlands" and "high-functioning wetlands" as a function of the Criterion Based Ecological Evaluation Matrix (CBEEM) and the aerial extent of the benefits for each of the final array need to be clarified.

Basis for Comment:

The Panel believes that a clear and concise explanation of how CBEEM is used to determine the functioning of the existing, future without project, and future with project scenarios would be helpful. The CBEEM discussion in the BBCW PIR main report is not clear and detailed enough for a full comprehension of how it is being used. The write-up in Appendix C is detailed; however, the main function of the model is still difficult to follow, particularly for an outside reader.

It is unclear what defines low- and high-functioning wetlands. It is assumed, based upon the CBEEM discussion on page 5-9, that a CBEEM rating at the lower end of the 0 to 100 spectrum, such as 30-50, is low functioning, and something on the higher end, such as 60-90 percent, is high functioning. However, this is not clearly stated.

Significance – Medium:

The unclear relationship between CBEEM and wetland function impacts the understanding and completeness of the evaluation process and the recommendation of the Tentatively Selected Plan (TSP).

Recommendations for Resolution:

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

- A clear definition of "low-functioning wetland" and "high functioning wetland." This definition might also indicate if the wetlands are in a static or dynamic state. Perhaps a "low-functioning wetland" may be in a dynamic state of decline while a "high-functioning wetland" might, conversely, be in a dynamic state of improvement. These considerations might be significant if compared to only static systems.
- Maps that reflect the five major areas of vegetation: submerged aquatic vegetation, mangroves, saline emergent, freshwater wetlands, and non-native dominated wetlands. This may help to simplify the vegetative change analysis and show the lift. Figure 2-8 might be moved to an appendix and a map with the five major vegetative types could replace it.
- Maps of the alternatives to show the spatial extent of the habitat lift.
- An executive summary-style write-up of Appendix C for inclusion in the BBCW PIR main report. This summary should be developed for a reader unfamiliar with the south Florida environment and should include the major inputs into CBEEM and how it is sensitive to changes.
- A description of the CBEEM output, coupled with maps, for the future without project scenario. Low-functioning wetland systems could be defined, showing the spatial extent of the project site in the terms described on page 5-9. The areal extent (with acreages) and percent functionality of existing and future without project conditions could be included.

Final Panel Comment 12:

Risk and uncertainty are not addressed in sufficient detail to meet the requirements of the CERP Program Regulations.

Basis for Comment:

Uncertainty is addressed qualitatively, not quantitatively, as required in Section 1.4 of CERP Program Regulations

There are three main concerns related to risk and uncertainty: (1) availability of fresh water; (2) sea level rise; and (3) ecosystem response.

The CERP Program Regulations seem to specifically require an uncertainty analysis of hydrologic performance. The Tentatively Selected Plan (TSP) and its benefits are based on the availability of water and water demand projections are based on future assumptions that may or may not be true.

A fundamental premise of the hydrologic analyses is that future water availability can be adequately assessed using a historical distribution of flows to simulate the future behavior of the system. This assumption, that the system fluctuates within an unchanging envelope of variability, i.e., stationarity, is highly questionable. For example, Milly et al. (2008) argue that stationarity should not be relied on in practical applications.

The CERP Program Regulations also refer to the potential for including uncertainties about ecosystem response. The panel considers ecosystem response to be linked to, but not limited to, the uncertainty associated with rising sea level.

Existing hydrological and ecological monitoring may not be sufficient to assess the actual ecosystem response of such a major restoration program. This is one of the first restoration projects of an extremely ambitious and expensive ecosystem restoration program. The monitoring program should be studying numerous aspects of the hydrology and associated changes in ecosystem structure and function. If this were done, then future restoration projects in the Everglades could benefit from these studies. Hence, some of the cost of an extensive monitoring program may be identified as program costs instead of project costs.

Literature Cited:

Milly, P.C.D., J. Betancourt, M. Falkenmark, R. M. Hirsch, Z. W. Kundzewicz, D. P. Lettenmaier, and R. J. Stouffer. 2008. Climate Change: Stationarity is Dead: Whither Water Management? *Science* 319: 573-574.

Significance – Medium:

The quantification of risks and uncertainty is incomplete. This is of special concern because the TSP's ability to function throughout the planning period seems to have much more risk and uncertainty than a typical water resource project.

Recommendations for Resolution:

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

- Available information on uncertainty and the appropriateness of incorporating a quantifiable risk assessment for each of the three concerns listed in the Basis for Comment.
- Quantitative, risk-based estimates of the relationships between project benefits and plausible ranges of the key forcing variables, including future water availability and potential sea level rise.
- A discussion of the results of risk and uncertainty analysis in the BBCW PIR conclusion.

Final Panel Comment 13:

The Draft Project Monitoring Plan does not sufficiently address the stated project goals, and if implemented, would not detect changes in the ecosystem and water quality.

Basis for Comment:

The Draft Project Monitoring Plan (Annex E) requires changes and additions in order for it to be comprehensive. In Part 1 of the monitoring plan (Hydrology), a small number of new monitoring stations are planned for each sub-project. Their positions, which are mainly upstream and downstream of structures, are not placed properly to evaluate the hydrologic changes (e.g., water depth, periodicity of flooding, flow rates) that will occur in the wetlands receiving discharge. Without an understanding of how the hydrology will change in different parts of the receiving wetlands, ecological change will be difficult to assess. More properly located monitoring stations will be needed to gage stage and flow rates throughout the wetlands.

Part 3 of the Draft Project Monitoring Plan (Ecologic Monitoring) includes the following statements (p. 447): "the recommended ecological monitoring will determine if restoring beneficial patterns of freshwater flow, salinity, and water quality to nearshore waters and adjacent wetlands of southwestern Biscayne Bay will achieve the expected community structure, distribution, abundance, and viability of oyster bars, submerged aquatic vegetation (SAV), wetland vegetation, and associated biota… Because the recommended plan… is the first phase of the larger Biscayne Bay Coastal Wetlands project, the ecological monitoring information will not only be used to manage the first phase of the project, but it will provide critical information for planning and constructing subsequent phases."

Oyster monitoring: A number of existing CERP-MAP stations and several new stations would be evaluated for spat settlement, oyster reef development, and oyster condition. However, the major populations of oysters existing in the area (and likely to be affected by the restoration) are those on mangrove prop roots and around their base. These oysters are not addressed in the Draft Project Monitoring Plan, aside from the determination that they are labor intensive and expensive to study; however, they need to be monitored to adequately understand oyster response to restoration. Without evaluating these, it seems unlikely that the BBCW can adequately assess oyster response to restoration. For example, if sediment conditions do not favor development of benthic reefs but conditions do favor expanded development of oysters in and around mangroves, then this aspect of the project would be declared a failure, because those associated with mangroves will not be evaluated by either CERP or BBCW. Since CERP-MAP is already evaluating oyster reef development at the site, BBCW project monitoring might better focus on the mangrove-associated oysters. The oyster monitoring plan provides a good power analysis for adult oyster density, but not for the other three components. Sufficient background data should exist from the state-wide oyster monitoring program to do similar power analyses for the other components.

SAV monitoring: In Section E.3.2 of the Draft Project Monitoring Plan, the following is stated: "Temporally, sea grass colonization response is in the order of one to three years in Biscayne Bay. Therefore, annual assessments should be adequate." There needs to be a literature citation here, and a presentation of the data on which it is based to determine if annual sampling is truly adequate, or if greater frequency is needed to capture seasonal shifts (if any).

The monitoring plan for SAV includes using divers or aerial photo interpretation (p. E-17). While using divers is a good method for monitoring SAV, aerial photo interpretation will not work. Aerial imagery does not distinguish among SAV species. Shifts in SAV species composition because of changes in salinity regime is one of the main changes that the BBCW project will hypothetically produce. The BBCW project needs to have ample spatial and temporal resolution to assess project-level changes, and

that will require quantitative, in-the-water assessments by trained SAV experts.

Furthermore, no quantitative criteria have been established for success, and no power analysis using pre-existing data from the area has been done to gage adequacy of proposed SAV sampling (10 points per 1 x 1 km). For example, is a 20% increase in overall SAV cover a metric of success? Is a shift of 50% dominance by one species to another species a metric of success (i.e., how will the hypothesis of change in species composition be evaluated)? More scientific rigor is needed here.

Coastal wetlands monitoring: Annex E states (p. E-44): "Assessment of change in both compositional and structural data will incorporate the most recent developments in temporal data analysis, while building on methods used previously in south Florida (Armentano et al., 2006; Trexler et al., 2005). Emphasis will be on the dynamics of brackish and fresh water graminoids, mangroves, and invasive exotic species along the coastal gradient, especially with reference to observed changes in physical variables (e.g., hydrology, salinity, water quality) associated with other components of the monitoring plan."

The monitoring of the vegetation per se appears to be adequate. However, it will be difficult to link the vegetation changes to changes in the physical variables mentioned above because (with the exception of a few locations) the physical variable monitoring is not happening at the same locations as the vegetation monitoring. For example, knowing the stage at the inland side of a vegetation transect and salinity at the downstream end at Biscayne Bay will not provide any information on water hydroperiod and groundwater or surface water salinities at any other point along the vegetation transect. Therefore, it will not be possible to apply the 'recent developments in temporal data analysis' mentioned above with any degree of accuracy. USACE will know that vegetation changed (or not) but will not be able to accurately link it either to changes in hydroperiod or salinity.

There has been no criteria established for judging success or what rate of conversion from dwarf mangrove to fresh herbaceous plant species is desired or acceptable. This needs to be done in order to make adaptive management decisions (e.g., if the water delivery is not adequate to cause a 30% decline in dominance by dwarf mangroves in five years, then more water will be delivered).

Monitoring is scheduled for every three years, which is probably adequate to gage changes in the tree species. However, every three years is not frequent enough to evaluate the increase in the herbaceous species (the prime focus of the project).

Significance – Medium:

Inadequate monitoring will impair the project's ability to judge success and to perform adaptive management.

Recommendations for Resolution:

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

- Additional monitoring stations, including gage stage and flow rate stations, throughout the wetlands.
- A revision of the oyster monitoring plan to focus on the prop root and mangrove base-associated oysters.
- A staged approach for vegetation monitoring. The entire plot should be evaluated every three years for tree species and annually for herbaceous species.
- A literature review for the SAV section and additional data analysis to determine if annual sampling is adequate, or if greater frequency is needed to capture seasonal shifts.
- A more rigorous and scientifically based monitoring plan that relates the vegetation changes (or lack thereof) to changes in hydroperiod or salinity. The plan should be sufficient to detect and relate these changes.

- Criteria for judging success or what rate of conversion (e.g., from dwarf mangrove to fresh herbaceous species) is desired or acceptable.

Final Panel Comment 14:
An operational response plan is necessary because there is no backup power for the pumping system.
Basis for Comment:
Appendix A (Section A.6.1.1.1.1) states that the pumping stations will be used for environmental restoration and have no flood-control functions. Section A.6.1.1.1.3 states that the pumping stations will have back-up power for the building service equipment, but not for the pumping systems. Although the pumping system is not designed to be used in flood control, that does not necessarily mean that it can't function in that capacity if needed to support or supplement other flood control measures. The project area is subject to tropical storms and hurricanes, which are often accompanied by long-term power outages. Additionally, these storms also have the potential to deliver substantial precipitation to the mainland and drive sea water onto land. These conditions would necessitate perhaps more pumping than usual to move the excess freshwater to the restored wetlands and to push the salt water back to the Bay. It does not appear that the possibility of detrimental consequences to the restoration areas due to a lack of pumping capability over a protracted period (due to power outages) was evaluated. The ability to flush the system after a high-saline event could provide significant benefits.
Significance – Medium:
Protracted power outages would jeopardize the ability to utilize the project pumping systems and this loss of pumping capability could have potentially detrimental consequences for the BBCW project.
Recommendations for Resolution:
To resolve these concerns, the BBCW PIR would need to be expanded to include: • An analysis of the impact on project goals (including worst case scenarios and associated risk) of the loss of pumping capabilities caused by protracted electrical outage. • An evaluation of the possible opportunity to provide supplemental pumping support for existing flood control measures. • An action plan to restore full power or standby power if the analysis shows that possible detrimental consequences due to loss of pumping capabilities warrant this action.

Final Panel Comment 15:

The hydrologic analysis of freshwater wetland rehydration areas should be based on a more complete water balance analysis.

Basis for Comment:

This comment is based upon concerns that (1) the hydrologic analysis used to estimate the areal extent of rehydrated freshwater wetlands does not explicitly quantify inputs and outputs of water other than canal discharge and seepage; (2) seasonal variability and uncertainty in the mass balance of water are not adequately assessed in the context of wetland ecosystem needs; and (3) the discussion and justification of crucial seepage rates is difficult to follow.

After a critical examination of the WASH123D/SFWMM2x2 model outputs, the areal extent of rehydrated freshwater wetlands was estimated using a simplified approach based primarily on two factors: estimates of diverted canal water (including reuse water) and seepage rates (wet season = 0.6 ft/day and dry season = 1.2 ft/day). Reuse water is assumed to be a constant daily volume. In reality, monthly variations in canal inflows, precipitation, evapotranspiration, seepage, and other potential outputs (e.g., lateral fluxes and concentrated flows) will determine rehydration extent. Without a monthly mass balance, it is difficult to ascertain seasonal fluctuations in rehydration areas, dry spells, and potential opportunities for transfer / storage to meet dry season needs. Although there are some important points made regarding the difficulty of modeling groundwater stage influences on seepage and the relatively small effects of precipitation and evapotranspiration on a net annual basis when seepage rates are 0.6-1.2 ft/day, the current analysis nevertheless seems overly simplistic and disconnected from the TABS modeling approach used for adjacent saltwater wetlands. A simple monthly water balance that makes simplifying assumptions about groundwater stage like the current approach while accounting for monthly variations in inflows and outflows would provide insight regarding seasonal fluctuations in rehydration area and dry spells. A sensitivity analysis could also be performed using some reasonable probabilistic envelope of available water as affected by future land uses, and by varying seepage rates over a reasonable range. Such analyses would not necessarily supplant the current simplified approach, but would provide additional information that addresses one of the central uncertainties of the project.

Seepage rate is central to the estimates of wetland hydration area, and is therefore central to a general understanding of the magnitude of the project. As such, the discussion of this key variable should be clear and understandable. The seepage rate discussion seems to state at one point that a value of 0.14 ft/day is an appropriate value (Appendix C-3), then states that the value is 0.6 ft/day (Appendix. C-5), and then ultimately clarifies that there were two values used (Appendix C-49). This is difficult to follow. In addition, Appendix C states that seepage rates "were selected based on the desire to maintain the depth of inundation between 1.0 and 1.5 ft." Seepage rates should be selected to reflect site conditions, not to provide a particular result.

Significance – Medium:

The lack of a monthly water mass balance makes it difficult to assess the likely areal extent and seasonal patterns of wetland rehydration and affects the understanding of the overall effect of the project.

Recommendations for Resolution:

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

- Additional physically-based explanations of assumptions used in the water mass balance used to estimate the wetland area that is sufficiently rehydrated.
- A monthly water balance analysis that provides insight into seasonal fluctuations in rehydration area and the severity of dry spells as compared to reference wetlands.
- An assessment of how uncertainty in available water and seepage rates affects the capacity of the project to provide sufficient dry season hydration.

Final Panel Comment 16:
The calculations of the average annual costs and benefits cannot be reviewed for accuracy without more information.
Basis for Comment:
There are serious issues with a number of important cost-benefit-related considerations. For example: • It appears that about $10 million of the costs for CERP features are excluded from the cost-benefit analysis. • The cost-benefit analysis period appears to start a few years before the first feature is constructed. The habitat created should take a few years to mature and this is not clearly accounted for. It is implied that habitat created will degrade and even fail as sea level rises. It would also seem that operating and maintenance costs might vary as sea level rises. Taken together, these factors should make the annualization of costs and benefits unusually complex. • For both saltwater and freshwater habitat, average annual habitat unit lift is about 92.3% of 2050 lift. However, average annual nearshore habitat lift is actually greater than the 2050 lift. This discrepancy needs to be explained. • The panel anticipates a significant change in benefits over time as sea level rises. However, that does not appear to have been considered based on the similarity between 2050 and average annual habitat units.
Significance – Medium:
The documentation of costs and benefits throughout the BBCW PIR is incomplete, which affects the understanding of the report.
Recommendations for Resolution:
To resolve these concerns, the BBCW PIR would need to be expanded to include: • The details of annualization of both benefits and costs changing over the study period (e.g., a table showing how benefits change over time). • An explanation of excluded CERP feature costs.

Final Panel Comment 17:

Some of the uncertainties associated with possible construction activities could add significant costs to the project.

Basis for Comment:

In Appendix A (Section A.2.1) there are a number of condition-dependent construction activities that appear to be possibilities at this stage of project development, but that may be needed for successful construction of the pumping stations. These activities may be needed for successful construction of the pumping stations although they don't appear to be included in the construction cost estimate as a risk or contingency. For example, the construction of the pumping station foundations may involve blasting if the rock encountered cannot be removed mechanically. Blasting is more costly and time-consuming. Additionally, if cofferdams are required for the Deering Estates and Cutler Wetlands stations, then this could also significantly increase the cost and construction time.

Dewatering may be necessary in many of the locations. The construction procedures indicate that the "excavations should be completed in the wet without dewatering or alternatively, the contractor may attempt to dewater with large surface stationed pumps." Construction "in the wet" would be quite difficult for a pump station foundation excavation although canal excavation can easily be done using this method. The procedures in Appendix A (Section A.2.1) also state that "site retention of dewatering effluent or offsite discharge to adjacent stormwater discharge systems may be problematic." If not considered in the estimated cost, the "problematic" possibilities could represent significant cost additions to the original estimate.

Because of the possibility of "quick or unstable bottom conditions" as was mentioned, the current foundation design could possibly require that a more substantial pile foundation be considered. If a pile foundation is determined to be the best structural method, then this too could add significant costs to the construction.

Significance – Medium:

If some of the construction procedures become a requirement rather than only a possibility, then the costs of construction for the pumping stations could be significantly increased and require re-evaluation of project costs.

Recommendations for Resolution:

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

- The inclusion of a geotechnical survey of the pumping station sites to assess the possible need for the additional construction measures outlined in Appendix A.
- A statement indicating that the contingencies used in the current estimate have included added costs if an acceptable number of these possible additions become a requirement. This contingency should not be part of the general contingency that should only address completely unknown issues. This contingency should be specific and address the risk associated with the possibilities outlined in these comments. This added contingency should provide a more accurate estimate of the final cost of the pumping stations.

Final Panel Comment 18:

The Draft Project Monitoring Plan does not clearly explain which organization or agency will be responsible for monitoring and adaptive management.

Basis for Comment:

System-wide monitoring and evaluation are the responsibility of CERP-RESTORE but as pointed out in the BBCW PIR, the large spatial scale of CERP monitoring may be inadequate to resolve smaller-scale issues and adaptive management needs of individual projects. Thus, the BBCW project will be doing additional monitoring to evaluate the benefits and detect any unintended consequences of the project.

The BBCW PIR main report (p. 18) states: "The TSP incorporates monitoring, and the CERP has an adaptive assessment and management program in place to ensure that projects, including the Biscayne Bay Coastal Wetlands project, are achieving their intended purposes." This statement appears to assign the responsibility of evaluating BBCW monitoring data and making management decisions to another entity within CERP. However, this CERP program is not described and neither is the timeframe and process by which adaptive management decisions will be made.

The BBCW PIR main report (p. 171) also states: "The Ecological Monitoring plan (*Annex E*) includes recommendations to detect ecological and water quality changes resulting from project-level implementation in order to adaptively manage the project and to evaluate project success. The plan has been recommended to Restoration Coordination and Verification (RECOVER) for funding as part of the Monitoring and Assessment Plan (MAP)." Based on this statement and the one discussed above, it is unclear who is funding the monitoring plan, who is implementing which part of the monitoring plan, and who is evaluating success and making management decisions. In Annex E, this is better described and it appears that the USACE Project Delivery Team is tasked with making these determinations. However, this should be made clear in the BBCW PIR main report.

Significance – Low:

An unclear description of what entity is in charge of gathering which data in the main document affects the completeness and understanding of the BBCW PIR and project.

Recommendations for Resolution:

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

- Information on who is in charge of gathering different sets of data.
- Information on how these datasets will be analyzed and/or merged for analysis.
- Information on how and by whom the datasets will be interpreted and management decisions made, including how adaptive management will be done in a timely manner.

Final Panel Comment 19:

Literature references and citations are required throughout the document to evaluate if statements are "thorough" and "accurate."

Basis for Comment:

In the main report and appendices, literature citations are included in some, but not all, of the necessary locations. There are a number of places throughout the main report where statements about habitats, species, etc. are made without any literature citation. Some examples include:

a) Main report (p. 2-15): The conclusion that water quality standards are met within the project area was made based on 2006 FDEP Impaired Water Rule analysis. However, there is no citation supplied to the Impaired Water Rule.
b) Main report (p. 2-18): The statement "By comparison, only the Apalachicola River and the C-43 Canal (Caloosahatchee River) contribute larger loads of inorganic nitrogen to a Florida estuary." needs a literature citation.
c) Main report (p. 2-22): Literature citations should be supplied for these statements: "There are tens of thousands of acres of seagrass beds and hard bottom communities in the bay that are at risk from degraded water quality. Fragmentation and scarring of seagrass beds caused by boat propellers is an increasing problem in Biscayne Bay. Approximately six percent of the seagrass beds in Miami-Dade County have moderate to severe scarring."
d) Main report (p. 2-28): The conclusion that hydrologic alterations have caused a break in the aquatic food web at the intermediate trophic level would be more compelling if supported with citations of studies documenting the decline of marsh fishes, macroinvertebrates and herpetofauna.
e) Main report (p. 3-2): Citations should be provided for a range of sea level rise scenarios.
f) Main report (p. 4-3): "The unnatural canal flows that are composed of many more peak flows during the wet season and often no flow in the dry season do not support a habitat that is suitable for the Eastern oyster. Once abundant at the mouths of creeks, oyster reefs no longer exist near the outlets of the canals" This statement is a key feature of why oysters are included in the monitoring plan. However, no scientific citations are provided to back either the flow effects or distribution.
g) Main report (p. 4-3): "In addition, modeling of these high flows shows that the zone of influence extends much further into Biscayne Bay than it did historically." The model results described in this statement should be cited.
h) Main report (p. 4-4): "absence of continuous low to moderate salinity habitats has impacted life stages of many estuarine species such as blue crabs that depend on these zones for portions of their life cycles." The scientific literature should be cited for at least a few of the dominant species using the area.

Significance – Low:

The missing citations affect the technical quality, readability, and scientific credibility of the document.

Recommendations for Resolution:

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

- A careful re-reading and check of citations throughout.

APPENDIX B

Final Charge to the Independent External Peer Review Panel

on the

Biscayne Bay Coastal Wetlands Project Implementation Report

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BACKGROUND

The Biscayne Bay Coastal Wetlands (BBCW) project is one of the components of the Comprehensive Everglades Restoration Program (CERP). The BBCW Draft Integrated Project Implementation Report (PIR) and Environmental Impact Statement (EIS) describes the intended diversion of canal discharges to benefit tidal wetlands. The BBCW Project area includes 13,600 acres in southeast Miami-Dade County from the Deering Estate at C-100C in the north, to the Florida Power and Light Turkey Point power plant in the south. Work to be performed includes the installation, construction, and operation of pump stations, spreader canals, flow-ways, levees, culverts, and backfilling canals. The current estimated project cost is approximately $218 million.

The purpose of the BBCW Draft Integrated PIR/EIS is to provide the planning, engineering, and implementation details of the recommended restoration plan. Project goals include the rehydration of wetlands and the reduction of point source freshwater discharges into Biscayne Bay by replacing lost overland flow and partially compensating for the reduction in groundwater seepage. These goals would be accomplished by using a spreader system to redistribute available surface water entering the area from regional canals. The restoration of tidal wetlands and nearshore bay habitat is also anticipated to be achieved by the return of sustained lower-than-seawater salinity levels. Diversion of canal discharges into coastal wetlands, as opposed to their direct discharge into Biscayne Bay, is expected to re-establish productive nursery habitat all along the shoreline, create conditions conducive to healthy oyster habitat, and reduce the abrupt freshwater discharges that are physiologically stressful to the Bay's fish and benthic invertebrates. Target freshwater flows will be based upon the quality, quantity, timing, and distribution of flows needed to provide and maintain sustainable biological communities in Biscayne Bay National Park and the coastal wetlands.

OBJECTIVES

The objective of this work is to conduct an independent external peer review (IEPR) of the BBCW Draft Integrated PIR and Draft Environmental Impact Statement (EIS) in accordance with the Department of the Army, U.S. Army Corps of Engineers, Peer Review of Decision Documents (EC 1105-2-410) and the Office of Management and Budget Final Information Quality Bulletin for Peer Review (16 December 2004). The scope of IEPR should include:

- General review of the draft report for completeness and adequate telling of the story
- Completeness and appropriateness of environmental analyses
- Completeness and appropriateness of economic analyses
- Completeness and appropriateness of engineering analyses

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 IEPR to analyze the adequacy and acceptability of economic, engineering, and environmental methods, models, data, and analyses. The IEPR will be limited to technical review and will not involve policy review. The IEPR will be conducted by subject matter experts (*i.e.*, panel members) with extensive experience in engineering, economics, and environmental issues relevant to the BBCW project. The panel members 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 panel members will identify, recommend, and comment on assumptions that underlie the analyses as well as evaluate 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, model usage, analyses, assumptions, and other scientific and engineering tools/methodologies used to inform decision-making.

The objectives of this task are to: a) prepare a work plan that will describe the process for conducting the IEPR of the draft Integrated PIR/EIS, b) identify potential panel members, and c) execute the work plan to conduct the IEPR.

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.

- **Biscayne Bay Coastal Wetlands Draft Integrated Project Implementation Report and Environmental Impact Statement**
  - **Volume 1 – Main Report**
  - **Volume 2 – Annex A: FWCA and Endangered Species Coordination Act Compliance**
    - **Annex B: NEPA Information**
  - **Volume 3 – 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: 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: Recreation**
  - **Appendix I: Pertinent Correspondence**
- Certification Review, Criteria-Based Ecological Evaluation Matrix, Biscayne Bay Coastal Wetlands Project (dated May 6, 2009)
- Model Documentation for the Criteria-Based Ecological Evaluation Matrix
- Workbook Documentation for the Criteria-Based Ecological Evaluation Matrix (dated June 16, 2008)
- Criteria-Based Ecological Evaluation Matrix, Output (Version 7)
- Criteria-Based Ecological Evaluation Matrix, Output (Version 7.0.2)
- Criteria-Based Ecological Evaluation Matrix, Output (Version 8.5)
- 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

TASK	ACTION	DAYS TO COMPLETE ACTION	DUE DATE
1	NTP		August 12, 2009
	Review documents available		August 20, 2009
	*Submit Draft Work Plan	Within 10 days of NTP (assuming review documents are available at NTP)	September 3, 2009
	USACE provides comments on Draft Work Plan	Within 5 days of receipt of Draft Work Plan	September 10, 2009
	Conference Call, if necessary	Within 2 days of receipt of comments	September 11, 2009
	*Submit Final Work Plan	Within 5 days of conference call	September 15, 2009
	USACE approves Final Work Plan	Within 2 days of receipt	September 17,2009
2 & 4	Battelle requests input from USACE for the COI for recruiting panel members	Within 5 days of NTP	August 19, 2009
	Recruit and screen up to 5 candidate panel members; prepare summary information	Within 13 days of NTP	August 29, 2009
	*Submit list of selected panel members	Within 15 days of NTP	September 1, 2009
	USACE comments on conflicts of interest (COI)	Within 19 days of NTP	September 8, 2009
	Complete subcontracts for panel members	Within 10 days of USACE COI comments	September 22, 2009
3	*Submit Draft Charge (combine with Draft Work Plan – Task 1)	Within 10 days of receipt of review documents	September 3, 2009
	USACE provides comments on draft charge	Within 5 days of receipt of draft charge	September 10, 2009
	*Submit Final Charge (combined with Final Work Plan – Task 1)	Within 5 days of receipt of comments	September 15, 2009
	USACE approves Final Charge	Within 2 days of receipt of final charge	September 17, 2009
5	USACE/Battelle Kick-off Meeting	Within 5 days of NTP	August 20, 2009
	Battelle/panel Kick-off Meeting	Within 3 days of panel members being under subcontract	September 25, 2009 (pending panel availability)
	USACE/Battelle/panel Kick-off Meeting with peer reviewers	Within 3 days of panel members being under subcontract	September 25, 2009 (pending panel availability)
6	Review documents sent to panel members	Within 1 day of panel members being under subcontract	September 23, 2009
	Panel members complete their review	Within 20 days of Kick off meeting	October 23, 2009
	Collate comments from panel members	Within 5 days of receipt of panel member comments	October 30, 2009
	Convene panel review conference call	Within 3 days of collating panel member comments	November 4, 2009
7	*Submit Final IEPR Report	Within 20 days of panel review conference call	December 2, 2009

TASK	ACTION	DAYS TO COMPLETE ACTION	DUE DATE
8	*Input final comments to DrChecks	Within 2 days of submittal of final report	December 4, 2009
	USACE PDT provides draft Evaluator responses and clarifying questions to Battelle	Within 5 days of receipt of final report	December 9, 2009
	Battelle provides panel members the draft Evaluator responses and clarifying questions	Within 1 day of receipt of draft Evaluator comments and clarifying questions from USACE PDT	December 10, 2009
	Teleconference between Battelle, panel members, and PDT to discuss Final Panel Comments, draft responses & clarifying	Within 5 days of receipt of draft Evaluator comments	December 17, 2009
	USACE input final Evaluator responses in DrChecks	Within 15 days of Teleconference to clarify questions & concern	January 7, 2010
	Battelle inputs BackCheck responses in DrChecks	Within 15 days of notification that USACE responses have been posted in DrChecks	January 28, 2010
	*Battelle submits pdf printout of DrChecks Phase I project file	Within 1 day of DrChecks closeout	January 29, 2010
	Project Closeout	Within 43 days of DrChecks closeout	March 31, 2010

* - denotes a deliverable

Note: This schedule is not identical to the schedule provided in Section 3.1 of this Final IEPR Report. The schedule above is the estimated schedule provided to the panel members received with their charge. The schedule in Section 3.1 is the actual schedule used in implementing this project.

CHARGE FOR PEER REVIEW

Members of this peer review panel are asked to determine whether the technical approach and scientific rationale presented in the Biscayne Bay Coastal Wetlands (BBCW) Draft Integrated Project Implementation Report (PIR) and Environmental Impact Statement (EIS) 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 BBCW Draft Integrated PIR/EIS. 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 not the following guidance. Note that the panel will be asked to provide a 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, geotechnical, hydrological, 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. However, there are several questions relating to the National Environmental Policy Act that will require comment. Comments should be provided based on your professional judgment, **not** the legality of the document.
7. Please **do not** evaluate the CBEEM model in Appendix C, as it is being reviewed for a separate project. However, please comment on how the model was interpreted, if appropriate.

8. If desired, IEPR reviewers can contact one another. However, IEPR reviewers **should not** contact anyone who is or was involved in the project, prepared the subject documents, or was part of the USACE Independent Technical Review.
9. Please contact the Battelle deputy project manager (Corey Wisneski, wisneskic@battelle.org) or project manager (Karen Johnson-Young, johnson-youngk@battelle.org) for requests or additional information.
10. In case of media contact, notify the Battelle project manager immediately.
11. Your name will appear as one of the panelists in the peer review. Your comments will be included in the Final IEPR Report, but will remain anonymous.

Please submit your comments in electronic form to Corey Wisneski, wisneskic@battelle.org, no later than October 23, 2009, 10 pm EDT.

Independent External Peer Review
Biscayne Bay Coastal Wetlands (BBCW) Draft Integrated Project Implementation Report (PIR) and Environmental Impact Statement (EIS)

Draft Charge Questions

GENERAL QUESTIONS

1. Are the assumptions that underlie the economic, engineering and environmental analyses sound?
2. Comment on the adequacy and acceptability of the economic, engineering, and environmental methods, models and analyses used.
3. In general terms, are the planning methods sound?
4. Are the interpretations of analysis and conclusions based on the analysis reasonable?

SECTION 1.0 – INTRODUCTION

1.1. Purpose and Need

No questions.

1.2. Report Authority

No questions.

1.3. Project Area

No questions.

1.4. Study Sponsor and Participants

No questions.

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

5. Please comment on whether the list of related projects is comprehensive.

1.6. Programmatic Regulations Guidance Memoranda

No questions.

1.7. Relevant Documents and Reports

No questions.

1.8. Comprehensive Everglades Restoration Plan – Master Implementation Sequencing Plan

No questions.

1.9. State of Florida Expedited Construction

No questions.

1.10. Land Acquisition Activities

No questions.

SECTION 2.0 – EXISTING CONDITIONS / AFFECTED ENVIRONMENT

2.1. Overview of Existing Conditions

2.1.1: Affected Environment: Study Area

6. Please comment on the accuracy and comprehensiveness of the general description of the proposed project area.

2.1.2: Climate

7. Is the climate of this study area described accurately in this section?

2.1.3: Physical Landscape: Geology and Soils

8. Please comment on whether the information provided in the soils discussion is sufficient for evaluating the proposed plan.

2.1.4: Hydrology

9. Please comment on whether the hydrology discussion is sufficient to allow for an evaluation of the effects of implementation of the proposed plan compared to current baseline conditions.
10. Please comment on the completeness of the discussion on the relationship between subsurface hydrology and the hydrodynamics of Biscayne Bay.

2.1.5: Water Management

11. Are there other conditions that should be evaluated when discussing water management in the project area?
12. Please comment on the usefulness and applicability of Figure 2-8.

2.1.6: Water Quality

13. Please comment on the conclusion that water quality standards are met within the project area.
14. Please comment on the portions of the bay and watershed area utilized to calculate baseline water quality concentrations for this project.
15. Please comment on the suite of water quality parameters used for the baseline assessment and the concentrations recorded for these parameters.
16. Please comment on the spatial distribution of the water quality sampling stations.
17. Please comment on the difference in composition of sediment cores taken from southern and central regions of the bay.
18. Please comment on the findings of 2002 microfaunal survey of benthic forams.

2.1.7: Vegetative Communities

19. Please comment on the thoroughness and accuracy of the information presented for the varied vegetative communities.
20. Please comment on the ecological significance of the "white zone" found within the project area.

2.1.8: Groundwater

21. Please comment on the completeness of the saltwater intrusion discussion.

2.1.9: Fish and Wildlife Resources

22. Please comment on the selection and relevance of the faunal groups and ecological linkages described in this section.
23. Please comment on the conclusion that hydrologic alterations have caused a break in the aquatic food web at the intermediate trophic level.
24. Please comment on the thoroughness and accuracy used to detail the occurrence and habitat utilization of the project area by the five major classes of vertebrates.
25. Please comment on the two qualifiers related to the number of fish species that may utilize the project area.
26. Please comment on the robustness of the threatened and endangered species which may utilize the habitat located within the project area.

2.1.10: Air Quality

27. Please comment on the relevance of atmospheric deposition of mercury to the project area.

2.1.11: Hazardous, Toxic, or Radioactive Waste

No questions.

2.1.12: Cultural Resources

No questions.

2.1.13: Existing Land Use

[Note: Section 2.1.13, 3.1.13, and 7.16 should be considered together.]

28. Please comment on the clarity and adequacy of the description of existing land use.

2.1.14: Noise

No questions.

2.1.15: Recreational Resources

[Note: Section 2.1.15, 3.1.15, 6.2, 7.18, and Appendix H should be considered together.]

29. Please comment on the adequacy of the summary of the recreational resources and consistency with Section 3.1.15 and Appendix H.

2.1.16: Socio-economic Conditions

[Note: Section 2.1.16, 3.1.12, 7.14, and 7.15 should be considered together.]

30. Please comment on the adequacy of the socio-economic data summary in terms of data quality, timeliness of the data, and breadth of information covered.

SECTION 3.0 – FUTURE "WITHOUT PROJECT" CONDITIONS

3.1 Study Area

3.1.1: Forecasted Ecological Description/Setting

31. Please comment on the accuracy and comprehensiveness of the forecasted without project conditions general description of the proposed project area.

3.1.2: Climate

32. Please comment on the accuracy and comprehensiveness of the forecasted without project conditions presented for climate.

3.1.3: Physical Landscape: Geology, Topography, and Soils

No questions

3.1.4: Hydrology

33. Based on your experience, should additional hydrologic changes to the system be expected under without project conditions?

3.1.5: Water Management

34. Comment on whether additional water management details should be provided to allow for more comprehensive evaluation of alternative plans.

3.1.6: Water Quality

35. Please comment on the water quality forecasted for the project area in the without project scenario.

3.1.7: Vegetative Communities

36. Please comment on the accuracy of the described primary and secondary effects of the without project scenario.

3.1.8: Fish and Wildlife Resources

37. Please comment on the conclusion that the effects of the disrupted natural hydrology will worsen the negative population trend for native, and threatened and endangered species within the project area over the next 50 years.

3.1.9: Air Quality

38. Please comment on the conclusion that air quality for the project area is not expected to change significantly over the next 50 years.

3.1.10: Hazardous, Toxic, and Radioactive Waste

39. Please comment on the implications of the forecasted increase in non-point contamination to the project area over the next 50 years.

3.1.11: Cultural Resources

40. Given the cultural resources background in Section 2.1.12, comment on the adequacy of the discussion of future without-project conditions.

3.1.12: Socio-economic Conditions

[Note: Section 2.1.16, 3.1.12, 7.14, and 7.15 should be considered together.]

41. Please comment on the adequacy and clarity of the summary of the future socio-economic and water use conditions without the project.

3.1.13: Existing Land Use

[Note: Section 2.1.13, 3.1.13, and 7.16 should be considered together.]

42. Please comment on the clarity and adequacy of the description of land use projections without the project.

3.1.14: Noise

No questions.

3.1.15: Recreational Resources

[Note: Section 2.1.15, 3.1.15, 6.2, 7.18, and Appendix H should be considered together.]

43. Please comment on the extent to which recreational resources in the project area (existing and future) are adequately summarized here and consistent with Appendix H.

SECTION 4.0 – IDENTIFICATION OF PROBLEMS AND OPPORTUNITIES

4.1 Study Area Description

44. Please comment on the accuracy and comprehensiveness of the general description of the proposed project area.
45. Was the information provided in the Study Area Description section consistent with that presented in earlier sections?

4.2 Problems and Opportunities

46. Please comment on whether the existing conditions suggest additional ecosystem problems.
    a. If so, what and why?
47. Is the list of opportunities that may arise from the execution of the project comprehensive?
    a. If not, why?

4.3 Planning Objectives

48. Discuss whether the planning objectives are sufficient for achieving the CERP programmatic goals.

4.4 Planning Constraints

49. Based on your understanding of current conditions and the planning process, should additional study-specific planning constraints be considered?

SECTION 5.0 – FORMULATION OF ALTERNATIVE PLANS

5.1 Prior Formulation

No questions

5.2 Plan Formulation Rationale

No questions

5.3 Management Measures and Preliminary Plans

50. Please comment on the procedures used to screen and evaluate listed project alternatives.
51. Please comment on the detail given to describe each project alternative.
52. Please comment on the scope and definition of the listed management measures.
53. Do the management measures provide a comprehensive set of features to help address the plan objectives?
54. Based on your knowledge, are scores assigned to the Total Habitat Units reasonable and well justified?

5.4 Final Array of Alternative Plans

55. Please comment on the use of CBEEM to evaluate the ecological benefits of the project alternatives.
56. Please discuss the relationship between the original 5 project objectives and the 8 CBEEM performance measures.
57. Please comment on whether the summary of costs and benefits in this section consistent with and adequately supported by the analysis in Appendix G.
58. Please comment on the completeness of the criteria used in the comparison of alternatives.
59. Please comment on the estimated average annual habitat units expected to be produced due to implementation of the proposed project.

5.5 Plan Selection

60. Please comment on the conclusions of the CE/ICA.
61. Please comment on the significance of the assumptions used for the NAI analysis of Alternative O Phase-1.
62. Please discuss whether the conclusions drawn on the viability of each alternative are supported by the analysis.

63. 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?

5.6 Next Added Increment

No questions

SECTION 6.0 – TENTATIVELY SELECTED PLAN

6.1. Description of Plan Components

64. In your opinion, are the component features adequately designed and sufficient for satisfying the study objectives?

6.2. Recreational Features

[Note: Section 2.1.15, 3.1.15, 6.2, 7.18, and Appendix H should be considered together.]

65. Please comment on the extent to which the costs and benefits of recreational features are adequately summarized in this section and consistent with Appendix H.

6.3. Cost Estimates

[Note: Section 6.3 and Appendix B should be considered together.]

66. Please comment on the adequacy of the summary of costs and consistency with Appendix B.
67. Are the cost estimates for construction accurate and do those estimates cover everything that should be addressed?
    a. If not, please explain.
68. Are the cost estimates for operations and maintenance accurate and do those estimates cover everything that should be addressed?
    a. If not, please explain.

6.4. Design and Construction Considerations

69. Should contingency measures be considered and adopted the event of adverse weather during construction (e.g. effect of rain on soils being placed or excavated)?
70. Please comment on the completeness of the outstanding design issues identified for the project.
71. Is the summary provided in this section consistent with the various engineering investigations conducted for the proposed project and detailed in the referenced technical appendix (Appendix A)?

6.5 Lands, Easements, Rights of Way, Relocations, and Disposal Considerations.

[Note: Section 6.5 and Appendix D should be considered together.]

72. Comment on the extent to which land acquisition plans and concerns associated with proposed land acquisitions have been adequately summarized, assumptions made explicit, facts and assumptions supported, and consistent with Appendix D.

6.6 Operations and Maintenance Considerations

No questions.

6.7 Plan Accomplishments

73. Please comment on the conclusions of the plan accomplishments regarding wetland rehydration, saltwater wetlands acreage increase, and salinity concentrations.
74. Please explain whether the plan accomplishments are realistic outcomes of implementation of the Tentatively Selected Plan (TSP).

6.8 Contribution to Achievement of Interim Goals and Interim Targets

75. Please comment on the project's ability to achieve the interim goals and targets.
76. Based on your experience, do the contributions of the TSP meet a reasonable percentage of interim goals and targets?

6.9 Discussion of Major Risk and Uncertainty

77. Please comment on whether the possible negative effects of the project are complete. Are there additional negative effects that should be considered?
78. Please comment on the potential effects of sea level rise on the ecological components within the project area.
79. In your opinion, is the degree of risk and uncertainty associated with the TSP acceptable?

6.10 Summary of Outputs of the Four Accounts

80. Please comment on the completeness of the benefits and adverse effects detailed in the four accounts (National Economic Development, Environment Quality, Regional Economic Development, and Other Social Effects).
81. Please comment on the TSP-specific completeness of the summary of the outputs of the four accounts.
82. Please discuss whether the beneficial and adverse effects of each account were adequately presented and supported.

6.11 Additional Considerations

83. Please comment on whether the TSP is consistent with the seven Environmental Operating Principles.

SECTION 7.0 – ENVIRONMENTAL EFFECTS

7.1 Summary of Final Array of Alternatives

84. Please comment on the descriptions of the summary for each project alternative.

7.2 Summary of Affected Resources

85. 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.

86. Please comment on the scope and detail of the potential adverse effects that may arise as a result of project implementation.
87. Please comment on the conclusion that the alternatives differ only in the magnitude rather than type of their impact.

7.3 Climate

88. Please comment on whether sea level rise and other climate change-related impacts have been considered thoroughly.

7.4 Physical Landscape: Geology, Topography, and Soils

89. Please comment on whether additional geologic and soil changes could be expected due to implementation of the recommended alternatives.

7.5 Hydrology

90. Please discuss whether the environment effects of changes to nearshore hydrology are sufficiently evaluated.

7.6 Water Management

91. Please discuss whether the description of water management is comprehensive enough to adequately describe the environmental effects associated with each alternative.

7.7 Flood Risk Management

92. Please discuss whether the description of flood risk management is comprehensive enough to adequately describe the environmental effects associated with each alternative.

7.8 Water Quality

93. Please comment on the use of nitrogen loading as the primary measure of water quality effects of the project.
94. Please comment on the forecasted increase in trace metal and phosphorus inputs into the project area.
95. Please comment on whether all appropriate and necessary variables have been incorporated into the water quality prediction of the project area under each alternative.

7.9 Vegetative Communities

96. Has sufficient detail been provided to describe the existing vegetation community of the project area?
97. Please comment on the assumption that the combination of exotic plant removal coupled with the redistribution of freshwater flows described for each alternative will retard the spread of invasive and non-native vegetation, and allow for the successful return of native plant species.
98. Please comment on whether all appropriate and necessary variables have been incorporated into the predicted vegetative communities of the project area under each alternative.

7.10 Fish and Wildlife Resources

99. Please comment on the methods used to evaluate the impacts on the fish and wildlife resources of the project area under each alternative.
100. Please comment on the predicted impacts of each alternative on the fish and wildlife resources of the project area.

7.11 Air Quality

101. Please comment on the predicted impacts of each alternative on the air quality of the project area.

7.12 Hazardous, Toxic, and Radioactive Waste

102. Please comment on the assumption that environmental and ecological conditions will improve as the Biscayne Bay Coastal Wetlands project comes online and provides natural wetland treatment areas.
103. Please comment on the predicted impacts of each alternative on the future contamination levels within the project area.

7.13 Cultural Resources

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

7.14 Socio-Economic Conditions: Population

[Note: Section 2.1.16, 3.1.12, 7.14, and 7.15 should be considered together.]

105. Please comment on the extent to which the finding of no project impact on population is justified.

7.15 Socio-Economic Conditions: Water Supply Demands

[Note: Section 2.1.16, 3.1.12, 7.14, and 7.15 should be considered together.]

106. Please comment on the extent to which the water demand and availability will be impacted by the alternative projects, compared to the no action alternative.

7.16 Land Use

[Note: Section 2.1.13, 3.1.13, and 7.16 should be considered together.]

107. Please comment on the clarity and adequacy of the description of the impact of project alternatives on land use.

7.17 Noise

No questions.

7.18 Recreational Resources

[Note: Section 2.1.15, 3.1.15, 6.2, 7.18, and Appendix H should be considered together.]

108. Please comment on the extent to which the impact of project alternatives on recreation resources is clearly and adequately described.

7.19 Aesthetics

No questions.

7.21 Irreversible and Irretrievable Commitments of Resources

109. 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?

7.22 Cumulative Effects

110. 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?

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

112. 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.

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

114. Please comment on the assumption that the loss of wetlands due to project implantation would be more than offset due to the nature of the higher functioning wetlands expected to be created by the project.

7.23 Relationship between Short-Term Use and Long-Term Productivity

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

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

117. Please comment on the statement that proper sequencing of project features should mitigate impacts to existing wildlife resources within the vicinity of the project area.

7.24 Compatibility with Federal, State, and Local Objectives

No questions

SECTION 8.0 – PLAN IMPLEMENTATION

8.1 Division of Implementation Responsibilities

No questions

8.2 Cost Sharing

118. Please discuss the extent to which the overview of sources, uses, and coordination of funding is clearly and sufficiently addressed.

8.3 Project Assurances

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

8.4 Project Monitoring Plan

120. Please comment on the ecological performance measures selected for project monitoring.

8.5 Subsequent Project Implementation Plan

No questions

8.6 Compliance with Environmental Laws Statutes and Executive Orders

No questions

8.7 Compliance with Florida Statutes

No questions

8.8 Environmental Commitments

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

8.9 Views of Non-Federal Sponsor

No questions

SECTION 9.0 – PROJECT COORDINATION

122. 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?
    a. If not, what additional public outreach and coordination activities should be conducted?

SECTION 10.0 – DISTRICT ENGINEER'S RECOMMENDATION

No questions

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: FWC and ESA Compliance

No questions

Annex B: NEPA Information

No questions

Annex C: Analysis Required by WRDA 2000 and State Law

No questions

Annex D: Draft Project Operating Manual

123. Please comment on whether the Draft Project Operating Manual accurately and comprehensively describes the operations necessary to achieve project benefits.
    a. What, if anything, is missing?

Annex E: Draft Project Monitoring Plan

124. Please comment on whether the Draft Monitoring Plan has been adequately described.
    a. What, if any, additional information should be included?
125. Please comment on whether the appropriate parameters and scales were considered to meet the goals of the Draft Monitoring Plan.
    a. What, if any, additional parameters or scales should be considered?
126. Based on the proposed changes, is the amount of monitoring sufficient to evaluate the effects of those changes on water quality, hydrology, and Biscayne Bay's ecosystems?
127. Are the objectives of the monitoring plan consistent with the project goals?
128. Are the number, location, and sampling frequency of hydrometeorological monitoring data points sufficient for evaluating progress toward meeting project goals?
129. Please comment on the thoroughness and scope of the monitoring plan in relation to the stated project goals?
130. Please comment on the definition and agreement of the performance measures discussed in the monitoring plan.

131. Please discuss the ability of the monitoring program to detect project specific changes.
132. Please comment on the location and spatial array of monitoring stations.
133. Please comment on the frequency of monitoring activities.
134. Please comment on the sampling parameters and criteria selected.
135. Please comment on the duration of the monitoring plan.
136. Please comment on the data QA/QC plan.
137. Please comment on the allotted budgets for activities stated within the monitoring plan.

Annex F: Reports Provided by RECOVER

No questions

Appendix A: Engineering

138. Please comment on the accuracy and comprehensiveness of the geological information provided in Section A.1.1, including existing site conditions and geotechnical analyses.
    a. What, if anything, is missing?
139. Please comment on the appropriateness of the construction procedures.
140. Please comment on the appropriateness of the water control plan.
141. Please comment on the accuracy and comprehensiveness of the hydrology and hydraulics discussion.
142. Please comment on the accuracy and comprehensiveness of the civil engineering discussion.
143. Please comment on the accuracy and comprehensiveness of the structural engineering discussion.
144. Please comment on the accuracy and comprehensiveness of the mechanical and electrical design discussion.
145. Please comment on whether the "Project Features" discussion is complete and accurate to the best of your knowledge.
146. Please comment on the accuracy and comprehensiveness of the cost estimating discussion.
147. Please comment on the accuracy and comprehensiveness of the value engineering discussion.
148. Please comment on the accuracy and comprehensiveness of the operation and maintenance discussion.
149. Please comment on the accuracy and comprehensiveness of the access discussion.

Appendix B: Cost Estimates

150. Please discuss the extent to which the construction and non-construction cost categories are sufficient to address significant project costs.
151. Please discuss the clarity of the description and the appropriateness of the approach used to estimate pump station project costs.
152. Please comment on the appropriateness of the assumptions in this section.
153. Please comment on the extent to which the cost summary is complete and consistent with the detailed analyses shown in the tables.

154. Please discuss the appropriateness of the explicit or implicit assumptions that are included in the cost estimates.
155. Please comment on the adequacy and the reasonableness of the detailed cost estimates.
156. Please discuss the extent to which risk and uncertainty associated with the costs are addressed. Comment on the assumptions used in the risk and uncertainty analysis.

Appendix C: Environmental Information

157. Please comment on the robustness of the CBEEM evaluation tool.
158. Please comment on the assumptions of the CBEEM evaluation tool.
159. Please comment on the performance of the CBEEM evaluation tool.

Appendix D: Real Estate

160. Please discuss the extent to which land, easements, rights of way, relocations, borrow, and disposal issues, and status of real estate are adequately addressed.
161. Please comment on any concerns or issues identified in Appendix D that should be addressed.
162. Please discuss the extent to which land acquisitions is adequately described and justified.
163. Please discuss the extent to which the costs included in Table D-3 are appropriate and sufficient, and both the requirement and costs associated with the land adequately justified.

Appendix E: Agency/Public Coordination

No questions

Appendix F: Plan Formulation

164. Please comment on the completeness of the criteria used in the comparison of alternatives.
165. Please discuss whether the conclusions drawn on the viability of each alternative are supported by the analysis.

Appendix G: Economic and Social Considerations

166. Please comment on the extent to which existing and projected economic and social conditions, including assumptions and uncertainty, are adequately addressed for the without project scenario.
167. Please comment on any concerns or issues identified in Appendix G that should be addressed.
168. Please comment on the adequacy and appropriateness of the approach used to analyze the without and with project alternatives.
169. Please comment on the extent to which the cost estimates are complete, reasonable, and justified, both in terms of need for the cost and the estimate used for the cost.
170. Please comment on the extent to which the cost effectiveness/incremental cost analysis is performed in an appropriate manner, is complete, assumptions and uncertainty are addressed, and the results/conclusions are reasonable and justified.
171. Please comment on the adequacy and appropriateness of the approach used to

analyze the regional economic impacts and the reasonableness of the calculated regional economic impacts of the alternative plans.

Appendix H: Recreation

[Note: Section 2.11.15, 3.1.15, 6.2, 7.18, and Appendix H should be considered together.]

172. Please comment on the sufficiency of the recreation benefit categories.
173. Please comment on the extent to which the recreational benefits are sufficiently identified and clearly linked to the project area.
174. Please comment on the extent to which the existing recreational benefits are sufficiently identified and clearly linked to the project.
175. Please comment on the extent to which the costs of the project associated with enhanced recreation have been identified.
176. Please comment on the reasonableness of the costs.
177. Please comment on the extent to which the benefit analysis uses appropriate methods with clear and reasonable assumptions specified.
178. Please comment on whether the cost to benefit analysis uses data consistent with NED benefits and costs identified in prior sections of the document.
179. Please comment on the extent to which sources of uncertainty are identified and the adequacy with which uncertainty is addressed.