

August 15, 2013

Final Independent External Peer Review Report Port Everglades Harbor Feasibility Study, Broward County, Florida



Prepared by
Battelle Memorial Institute

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

Contract No. W912HQ-10-D-0002
Task Order: 0040



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505 King Avenue
Columbus, OH 43201

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EXECUTIVE SUMMARY

Project Background and Purpose

The Port Everglades Harbor Federal Navigation Channel is located in the southeastern portion of Broward County at the adjoining city limits of Fort Lauderdale, Hollywood, and Dania Beach. It is 24 miles north of Miami and 323 miles south of Jacksonville, Florida.

The Port Everglades Harbor Feasibility Study is authorized through House Document 126, 103rd Congress, 1st Session; House Document 144, 93rd Congress, 1st Session; and other pertinent documents. The scope of the study investigates widening and deepening the channel from an existing inner harbor project depth of 42 feet to potential depths of 50 feet for the major channels and basins within the port, including expansion of the Turning Notch.

Independent External Peer Review Process

The U.S. Army Corps of Engineers (USACE) is conducting an Independent External Peer Review (IEPR) of the Port Everglades Harbor Feasibility Study, Broward County, Florida (hereinafter Port Everglades). As a 501(c)(3) non-profit science and technology organization, Battelle is independent, is free from conflicts of interest (COIs), and meets the requirements for an Outside Eligible Organization (OEO) per guidance described in USACE (2012). Battelle has experience in establishing and administering peer review panels for USACE and was engaged to coordinate the IEPR of the Port Everglades. 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 (2012) and OMB (2004). This final report describes the IEPR process, describes the panel members and their selection, and summarizes the Final Panel Comments of the IEPR Panel (the Panel).

Based on the technical content of the Port Everglades review documents and the overall scope of the project, Battelle identified candidates for the Panel in the following key technical areas: hydraulic or civil engineering; geotechnical engineering; economics; plan formulation; biology (2 panel members); and real estate. Six panel members were selected for the IEPR. USACE was given the list of candidate panel members, but Battelle made the final selection of the Panel.

The Panel received an electronic version of the 1,028-page Port Everglades IEPR document, along with a charge that solicited comments on specific sections of the documents to be reviewed. USACE prepared the charge questions following guidance provided in USACE (2012) and OMB (2004), which were included in the draft and final Work Plans. Two additional charge questions were added by Battelle that sought summary information.

The USACE Project Delivery Team briefed the Panel and Battelle during a kick-off meeting held via teleconference prior to the start of the review to provide the Panel an opportunity to ask questions of USACE and clarify uncertainties. Other than this teleconference, there was no direct communication between the Panel and USACE during the peer review process. The Panel produced individual comments in response to the 50 charge questions.

IEPR panel members reviewed the Port Everglades documents individually. The panel members then met via teleconference with Battelle 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. Each Final Panel Comment was documented using a four-part format consisting of: (1) a comment statement; (2) the basis for the comment; (3) the significance of the comment (high, medium, or low); and (4) recommendations on how to resolve the comment. Overall, 22 Final Panel Comments were identified and documented. Of these, 1 was identified as having high significance, 11 had medium significance, and 10 had low significance.

Results of the Independent External Peer Review

The panel members agreed between each other on their “assessment of the adequacy and acceptability of the economic, engineering, and environmental methods, models, and analyses used” (USACE, 2012; p. D-4) in the Port Everglades Feasibility Study. In particular, the panel members found the Feasibility Study and Environmental Impact Statement generally clear, well-organized, and easy to read and found the graphics, figures, and tables helpful. Table ES-1 lists the Final Panel Comments statements by level of significance. The full text of the Final Panel Comments is presented in Appendix A of this report. The following summarizes the Panel’s findings.

Engineering – From an engineering perspective, most aspects of the Feasibility Study are adequate and complete. However, as documented in the first four Final Panel Comments, the Panel has serious concerns about dredged material disposal, including the incomplete designation of the expanded ocean dredged material disposal site (ODMDS) and the lack of information on alternatives to open water disposal (e.g., upland, beneficial use, multiple placement). The implementation of the Tentatively Selected Plan (TSP) could be delayed or costs could increase if a confirmed plan for disposal and/or use is not identified for the material removed during construction and maintenance. In addition, the Panel believes that there may be an underestimation of projected maintenance dredging requirements (and the related costs) which could be partially resolved by conducting a more detailed analysis of past sedimentation rates. In addition, the alternatives to blasting for hard rock excavation could be more fully investigated. The Panel also encourages USACE to resolve the inconsistencies regarding the extent, cost, and schedule of bulkhead work.

Economics and Plan Formulation –The plan development and formulation was logical. From an economics standpoint, the information on existing vessel calls and sailing depths was very good, and the documentation on steamship contacts was well-done. The panel members appreciated that the approach to commodity and cargo forecasts appeared conservative and did

not over-reach. It was obvious that there was a good understanding of the inland and international markets underlying the broader analyses. The Panel believed that assumptions and growth rates of benefiting commodities could have been better documented, as could the vessel fleet forecasts, and there was concern that the underdeveloped sensitivity analysis increased the uncertainty of benefits calculations. USACE is also encouraged to better document the link between the ocean currents and vessel incidents and how the TSP would improve navigation safety.

Biology – The biologists on the Panel were impressed by the overall clarity of the Feasibility Study and the Environmental Impact Statement and the extensive interagency coordination. The two documents put substantial effort into proposing alternatives that would minimize adverse environmental impacts and developing a detailed and reasonable mitigation plan. The Panel was most concerned about the lack of clarity in the mitigation plan about the West Lake Park site; this issue could be resolved by clearly describing the site’s role and current status, including providing available monitoring information. In addition, the Panel thought that beneficial uses of dredged material needed more consideration. The Panel also noted that more detail could have been provided on the mangrove environments, especially with regard to avian populations, and that the baseline ecological information could be strengthened by compiling more recent data on seagrass, mangrove, and coral conditions. The Panel believes community resemblance should be accounted for when evaluating benthic community colonization success and the Port Everglades Reef Group (PERG) recommendations should be reconsidered for improving overall project success and reducing future project costs.

Real Estate – The documents were definitive and dove-tailed with engineering, environmental, and local sponsor requirements of the project. The combined technical studies served to minimize real estate impacts. The suggestions from the Panel to pursue additional dredged material disposal alternatives, such as beneficial use and multiple placement sites, could change real estate requirements in the future.

Table ES-1. Overview of 22 Final Panel Comments Identified by the Port Everglades IEPR Panel

No.	Final Panel Comment
Significance – High	
1	The cost, schedule, and overall implementation of the Port Everglades project will be affected if the U.S. Environmental Protection Agency’s (EPA’s) designation of an expanded ocean dredged material disposal site is not completed in time for project construction.
Significance – Medium	
2	Opportunities for upland disposal of dredged material have not been examined fully; therefore, potential costs and benefits have not necessarily been realized.
3	Opportunities for beneficial use of dredged material have not been fully examined; therefore, potential cost and environmental benefits have not been realized.

Table ES-1, continued. Overview of 22 Final Panel Comments Identified by the Port Everglades IEPR Panel

No.	Final Panel Comment
4	Opportunities for the multiple placement of dredged material have not been fully examined; therefore, potential cost and environmental benefits have not been realized.
5	Projected maintenance dredging requirements for the channels and berthing areas may be underestimated and do not appear to have been included in the life-cycle cost of the Tentatively Selected Plan (TSP).
6	The Broward County sand bypassing project's potential impact on the conditions in the Outer Entrance Channel (OEC) have not been thoroughly evaluated, despite the significant implications for littoral transport rates and maintenance costs.
7	Alternatives to blasting for hard rock excavation, as well as the project cost risks associated with blasting, have not been examined fully.
8	There is an inconsistency between the Tentatively Selected Plan (TSP) and the engineering analyses regarding the extent, cost, and schedule of bulkhead work required before fully implementing the TSP.
9	Benefiting cargoes and commodities have not been clearly identified, and assumptions and growth rates between the present and 2017 are not well documented or explained.
10	The vessel fleet forecast is not well documented and the benefiting vessels have not been identified.
11	The sensitivity analysis does not address container cargo volume, petroleum products cargo volume, or vessel fleet composition, all of which could affect the benefit-cost ratio (BCR).
12	The role of West Lake Park (WLP) with regard to the Port Everglades mitigation plan is not clearly presented, and WLP's current construction status is not well-defined.
Significance – Low	
13	The link between ocean currents, vessel accidents, and navigation safety improvements is not clear.
14	The process of identifying alternatives did not include a structural solution to reducing the strong cross-currents in the Outer Entrance Channel (OEC).
15	The description of the mangrove environments does not include enough detail on the resident and transient avian populations, which can be a good indicator of mangrove vitality.
16	The Environmental Impact Statement (EIS) is based on information compiled in 2009 and earlier for seagrass, mangrove, and coral conditions; therefore, existing status and trends may not be current.
17	The monitoring methodology for hard bottom mitigation sites is not described clearly enough to judge whether the acquired data will be useful for determining long-term trends.

Table ES-1, continued. Overview of 22 Final Panel Comments Identified by the Port Everglades IEPR Panel

No.	Final Panel Comment
18	The coral propagation alternative proposes the use of <i>Acropora cervicornis</i> , even though that coral species is not a principal component or common species in the local reef community.
19	The Feasibility Study and the Environmental Impact Statement are inconsistent with regard to the need for mitigation of benthic invertebrates.
20	The primary mitigation plan selects a non-conservative approach with minimum construction impacts to hard bottom habitats.
21	The criteria to evaluate the success of hard bottom benthic community colonization do not account for community structure-resemblance measurements.
22	The mitigation plan does not take full advantage of the draft recommendations of the Port Everglades Reef Group (PERG), even though the scientific research component would strengthen the project and likely reduce future restoration costs.

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Appendix A. Final Panel Comments on the Port Everglades Feasibility Study IEPR

Appendix B. Final Charge to the Independent External Peer Review Panel on the Port Everglades Feasibility Study IEPR

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LIST OF ACRONYMS

ANOSIM	Analysis of Similarity
ASCE	American Society of Civil Engineers
ATR	Agency Technical Review
BCR	Benefit-Cost Ratio
CAGR	Compound Annual Growth Rate
COI	Conflict of Interest
COPRI	Coastal, Ocean, Ports, and Rivers Institute
CZM	Coastal Zone Management
DMMP	Dredged Material Management Plan
DrChecks	Design Review and Checking System
EBS	Environmental Baseline Study
EC	Engineer Circular
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ERDC	Engineer Research and Development Center
HEA	Habitat Equivalency Analysis
IEPR	Independent External Peer Review
IWR	Institute for Water Resources
MPRSA	Marine, Research, Protection, and Sanctuaries Act
MSI	Maritime Strategies International, Ltd.
NED	National Economic Development
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration
ODMDS	Ocean Dredged Material Disposal Site
OEC	Outer Entrance Channel
OEO	Outside Eligible Organization
OMB	Office of Management and Budget
P&G	Principles and Guidelines
PDT	Project Delivery Team
PERG	Port Everglades Reef Group

PIANC	World Association for Waterborne Transport Infrastructure
PPX	Post-Panamax
SNWW	Sabine-Neches Waterway
TSP	Tentatively Selected Plan
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
WLP	West Lake Park
WRDA	Water Resources Development Act

1. INTRODUCTION

The Port Everglades Harbor Federal Navigation Channel is located in the southeastern portion of Broward County at the adjoining city limits of Fort Lauderdale, Hollywood, and Dania Beach. It is 24 miles north of Miami and 323 miles south of Jacksonville, Florida.

The Port Everglades Harbor Feasibility Study is authorized through House Document 126, 103rd Congress, 1st Session; House Document 144, 93rd Congress, 1st Session; and other pertinent documents. The scope of the study investigates widening and deepening the channel from an existing inner harbor project depth of 42 feet to potential depths of 50 feet for the major channels and basins within the port, including expansion of the Turning Notch.

The objective of the work described here was to conduct an Independent External Peer Review (IEPR) of the Port Everglades Harbor Feasibility Study, Broward County, Florida (hereinafter Port Everglades Feasibility Study) in accordance with procedures described in the Department of the Army, U.S. Army Corps of Engineers (USACE) Engineer Circular (EC) *Civil Works Review* (EC 1165-2-214) (USACE, 2012) and Office of Management and Budget (OMB) bulletin *Final Information Quality Bulletin for Peer Review* (OMB, 2004). 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 engineering analyses contained in the Port Everglades Feasibility Study. The full text of the Final Panel Comments is presented in Appendix A.

2. PURPOSE OF THE IEPR

To ensure that USACE documents are supported by the best scientific and technical information, USACE has implemented a peer review process that uses IEPR to complement the Agency Technical Review (ATR), as described in USACE (2012).

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

In this case, the IEPR of the Port Everglades Feasibility Study was conducted and managed using contract support from Battelle, which is an Outside Eligible Organization (OEO) (as defined by EC No. 1165-2-214) under Section 501(c)(3) of the U.S. Internal Revenue Code with experience conducting IEPRs for USACE.

3. METHODS

This section describes the method followed in selecting the members for the IEPR Panel (the Panel) and in planning and conducting the IEPR. The IEPR was conducted following procedures described by USACE (2012) and in accordance with OMB (2004) guidance. Supplemental guidance on evaluation for conflicts of interest (COIs) was obtained from the *Policy on Committee Composition and Balance and Conflicts of Interest for Committees Used in the Development of Reports* (The National Academies, 2003).

3.1 Planning and Schedule

At the beginning of the Period of Performance, Battelle held a kick-off meeting with USACE to review the preliminary/suggested schedule, discuss the IEPR process, and address any questions regarding the scope (e.g., clarify expertise areas needed for panel members). Any revisions to the schedule were submitted as part of the final Work Plan. In addition, 48 charge questions were provided by USACE and included in the draft and final Work Plans. Two additional charge questions were added by Battelle that sought summary information. The final charge also included general guidance for the Panel on the conduct of the peer review (provided in Appendix B of this final report).

Table 1 presents the schedule followed in executing the IEPR. Due dates for milestones and deliverables are based on the award/effective date of June 20, 2013. The review documents were provided by USACE on June 27, 2013. Note that the work items listed in Task 7 occur after the submission of this report. Battelle will enter the 22 Final Panel Comments developed by the Panel into USACE's Design Review and Checking System (DrChecks), a Web-based software system for documenting and sharing comments on reports and design documents, so that USACE can review and respond to them. USACE will provide responses (Evaluator Responses) to the Final Panel Comments, and the Panel will respond (BackCheck Responses) to the Evaluator Responses. All USACE and Panel responses will be documented by Battelle. Battelle will provide USACE and the Panel a pdf printout of all DrChecks entries, through comment closeout, as a final deliverable and record of the IEPR results.

Table 1. Port Everglades Feasibility Study IEPR Schedule

Task	Action	Due Date
1	Award/Effective Date	6/20/2013
	Review documents available	6/27/2013
	Battelle submits draft Work Plan ^a	7/1/2013
	USACE provides comments on draft Work Plan	7/19/2013
	Battelle submits final Work Plan	8/8/2013
2	Battelle requests input from USACE on the COI questionnaire	6/21/2013
	USACE provides comments on COI questionnaire	6/24/2013
	Battelle submits list of selected panel members ^a	6/27/2013
	USACE confirms the Panel has no COIs	6/28/2013
	Battelle completes subcontracts for panel members	7/8/2013
3	Battelle includes charge questions in final Work Plan	8/8/2013
4	Battelle convenes kick-off meeting with USACE	6/27/2013
	Battelle sends review documents to Panel	7/9/2013
	Battelle convenes Panel kick-off meeting	7/9/2013
	Battelle convenes USACE/Panel kick-off meeting	7/9/2013
	Battelle convenes mid-review teleconference for panel members to ask clarifying questions of USACE	7/19/2013
5	Panel members complete their individual reviews	7/24/2013
	Battelle provides Panel merged individual comments and talking points for Panel Review Teleconference	7/29/2013
	Battelle convenes Panel Review Teleconference	7/29/2013
	Panel members provide draft Final Panel Comments to Battelle	8/5/2013
	Battelle finalizes Final Panel Comments	8/13/2013
6	Battelle provides working draft Final Panel Comments to USACE	8/13/2013
	Battelle submits Final IEPR Report to USACE ^a	8/15/2013
7 ^b	Battelle convenes teleconference with USACE to review the Post-Final Panel Comment Response Process	8/16/2013
	USACE provides draft PDT Evaluator Responses to Battelle	8/22/2013
	Battelle convenes teleconference with Panel and USACE to discuss Final Panel Comments and draft responses	8/29/2013
	USACE inputs final PDT Evaluator Responses in DrChecks	9/4/2013
	Battelle inputs the Panel's BackCheck Responses in DrChecks	9/12/2013
	Battelle submits pdf printout of DrChecks project file ^a	9/13/2013
	Civil Works Review Board	10/22/2013
	Project Closeout	12/30/2013

^a Deliverable^b Task 7 occurs after the submission of this report.

3.2 Identification and Selection of IEPR Panel Members

The candidates for the Panel were evaluated based on their technical expertise in the following key areas: hydraulic or civil engineering; geotechnical engineering; economics; plan formulation; biology (two panel members); and real estate. These areas correspond to the technical content and overall scope of the Port Everglades Feasibility Study.

To identify candidate panel members, Battelle reviewed the credentials of the experts in Battelle's Peer Reviewer Database, sought recommendations from colleagues, contacted former panel members, and conducted targeted Internet searches. Battelle evaluated these candidate panel members in terms of their technical expertise and potential COIs. Of these candidates, Battelle chose the most qualified individuals, confirmed their interest and availability, and ultimately selected seven experts for the final Panel.

The seven selected reviewers constituted the final Panel. The remaining candidates were not proposed for a variety of reasons, including lack of availability, disclosed COIs, or lack of the precise technical expertise required.

The candidates were screened for the following potential exclusion criteria or COIs.¹ These COI questions were intended to serve as a means of disclosure and to better characterize a candidate's employment history and background. Providing a positive response to a COI screening question did not automatically preclude a candidate from serving on the Panel. For example, participation in previous USACE technical peer review committees and other technical review panel experience was included as a COI screening question. A positive response to this question could be considered a benefit.

- Previous and/or current involvement by you or your firm² in the Port Everglades, Florida, Feasibility Study and Environmental Impact Statement or the Port Everglades navigation channel deepening in general.
- Previous and/or current involvement by you or your firm² in deep-draft navigation projects in Florida.
- Previous and/or current involvement by you or your firm² in the Port Everglades, Florida, Feasibility Study and Environmental Impact Statement related projects or the Port Everglades navigation channel deepening in general.
- Previous and/or current involvement by you or your firm² in the conceptual or actual design, construction, or operation and maintenance of any projects in the Port Everglades, Florida, area.

¹ Battelle evaluated whether scientists in universities and consulting firms that are receiving USACE-funding have sufficient independence from USACE to be appropriate peer reviewers. See OMB (2004, p. 18), "...when a scientist is awarded a government research grant through an investigator-initiated, peer-reviewed competition, there generally should be no question as to that scientist's ability to offer independent scientific advice to the agency on other projects. This contrasts, for example, to a situation in which a scientist has a consulting or contractual arrangement with the agency or office sponsoring a peer review. Likewise, when the agency and a researcher work together (e.g., through a cooperative agreement) to design or implement a study, there is less independence from the agency. Furthermore, if a scientist has repeatedly served as a reviewer for the same agency, some may question whether that scientist is sufficiently independent from the agency to be employed as a peer reviewer on agency-sponsored projects."

² Includes any joint ventures in which the panel member's firm is involved and if the firm serves as a prime or as a subcontractor to a prime.

- Current employment by the USACE.
- Previous and/or current involvement with paid or unpaid expert testimony related to the Port Everglades, Florida, Feasibility Study and Environmental Impact Statement or the Port Everglades navigation channel deepening in general.
- Current or previous employment or affiliation with the non-federal sponsors (Broward County, Department of Port Everglades) or any of the following cooperating federal, state, county, local and regional agencies, environmental organizations, and interested groups: National Marine Fisheries Service (NMFS), U.S. Environmental Protection Agency (EPA), Florida Department of Environmental Protection, Florida Fish and Wildlife Conservation Commission, U.S. Fish and Wildlife Service, U.S. Coast Guard, the Broward County Board of County Commissioners, or Nova Southeastern University (for pay or pro bono).
- Past, current, or future interests or involvements (financial or otherwise) by you, your spouse or children related to the Port Everglades, Florida, area.
- 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, Engineer Research and Development Center [ERDC], etc.), and position/role. Please highlight and discuss in greater detail any projects that are specifically with the Jacksonville District.
- Previous or current involvement with the development or testing of models that will be used for or in support of the Port Everglades, Florida, Feasibility Study and Environmental Impact Statement.
- Current firm² involvement with other USACE projects, specifically those projects/contracts that are with the Jacksonville District. If yes, provide title/description, dates, and location (USACE district, division, Headquarters, ERDC, etc.), and position/role. Please also clearly delineate the percentage of work you personally are currently conducting for the Jacksonville District. Please explain.
- Any previous employment by the USACE as a direct employee, notably if employment was with the Jacksonville District. If yes, provide title/description, dates employed, and place of employment (district, division, Headquarters, ERDC, etc.), and position/role.
- Any previous employment by the USACE as a contractor (either as an individual or through your firm²) within the last 10 years, notably if those projects/contracts are with the Jacksonville District. If yes, provide title/description, dates employed, and place of employment (district, division, Headquarters, ERDC, etc.), and position/role.
- Previous experience conducting technical peer reviews. If yes, please highlight and discuss any technical reviews concerning deep-draft navigation studies and include the client/agency and duration of review (approximate dates).
- Pending, current, or future financial interests in Port Everglades, Florida, Feasibility Study and Environmental Impact Statement or the Port Everglades navigation channel deepening related contracts/awards from USACE.
- A significant portion (i.e., greater than 50%) of personal or firm² revenues within the last 3 years came from USACE contracts.
- A significant portion (i.e., greater than 50%) of personal or firm² revenues within the last 3 years from contracts with the non-federal sponsor (Broward County, Department of Port Everglades).

- Any publicly documented statement (including, for example, advocating for or discouraging against) related to the Port Everglades, Florida, Feasibility Study and Environmental Impact Statement
- Participation in relevant prior federal studies relevant to the Port Everglades, Florida, Feasibility Study and Environmental Impact Statement or the Port Everglades navigation channel deepening in general.
- Previous and/or current participation in prior non-federal studies relevant to this project and/or Port Everglades, Florida, Feasibility Study and Environmental Impact Statement or the Port Everglades navigation channel deepening in general.
- Is there any past, present or future activity, relationship or interest (financial or otherwise) that could make it appear that you would be unable to provide unbiased services on this project?

In selecting the final members of the Panel, Battelle chose experts who best fit the expertise areas and had no COIs. The seven final reviewers were affiliated with either consulting companies or academic institutions. Battelle established subcontracts with the panel members when they indicated their willingness to participate and confirmed the absence of COIs through a signed COI form. USACE was given the list of candidate panel members, but Battelle made the final selection of the Panel. Section 4 of this report provides names and biographical information on the panel members.

3.3 Conduct of the IEPR

Prior to beginning their review and within one day of their subcontracts being finalized, all members of the Panel attended a kick-off meeting via teleconference planned and facilitated by Battelle in order to review the IEPR process, the schedule, communication procedures, and other pertinent information for the Panel. Battelle planned and facilitated a second kick-off meeting via teleconference during which USACE presented project details to the Panel. Before the meetings, the IEPR Panel received an electronic version of the final charge as well as the Port Everglades Feasibility Study IEPR review documents and reference materials listed below. The documents and files in bold font were provided for review; the other documents were provided for reference or supplemental information only.

- **Draft Feasibility Report (163 pages)**
 - **Appendix A Engineering (129 pages)**
 - **Appendix B Economics (82 pages)**
 - **Appendix C Real Estate (16 pages)**
 - **Appendix E DMMP (32 pages)**
- **Draft EIS (314 pages)**
 - **Appendix B 404b Eval (7 pages)**
 - **Appendix C CZM Consistency (4 pages)**
 - **Appendix E Mitigation Main (148 pages)**
 - **Appendix E1 Mitigation Bank Permits (54 pages)**
 - **Appendix E4 NOAA Mitigation Alternative (35 pages)**
 - **Appendix E5 Revised Monitoring (20 pages)**
 - **Appendix J HTRW (24 pages)**

- Feasibility Report, Appendix A, SubAppendix A (64 pages)
 - Feasibility Report, Appendix A, SubAppendix B (94 pages)
 - Feasibility Report, Appendix A, SubAppendix C (28 pages)
 - Feasibility Report, Appendix A, SubAppendix D1 (37 pages)
 - Feasibility Report, Appendix A, SubAppendix D2 (124 pages)
 - Feasibility Report, Appendix F, Cost Estimates and Cost Risk Analysis (46 pages)
 - EIS, Appendix A, Correspondence (88 pages)
 - EIS, Appendix D1, Baseline Report (103 pages)
 - EIS, Appendix D2, Benthic and Fish (143 pages)
 - EIS, Appendix D3, Acropora Coral (14 pages)
 - EIS, Appendix D4a, Seagrass 2009 (23 pages)
 - EIS, Appendix D4b, Seagrass 2006 (18 pages)
 - EIS, Appendix E2, Hardbottom (129 pages)
 - EIS, Appendix E3, Reef Bottom Recommendations (48 pages)
 - EIS, Appendix F, ESA Consultation (231 pages)
 - EIS, Appendix G, Coordination Act (110 pages)
 - EIS, Appendix H, NOAA Fisheries (47 pages)
 - EIS, Appendix I, Historic Preservation (10 pages)
 - EIS, Appendix K, Mailing List (7 pages)
- USACE guidance Civil Works Review, (EC 1165-2-214) dated 15 December 2012
 - Office of Management and Budget's *Final Information Quality Bulletin for Peer Review* released December 16, 2004.

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

- Olsen Associates Inc. (2004). Port Everglades Inlet Sand Management Phase I: Sand Bypassing Feasibility Study. Prepared for Broward County Board of County Commissioners. June 2004.
- Olsen Associates Inc. (2007). Port Everglades Inlet Sand Management Phase II: Sand Bypassing Feasibility –Addendum. Prepared for Broward County Board of County Commissioners. November 2007.
- Notes from February 2013 meeting with Port Everglades Pilots' Association
- Notes from interview with members of the Port Everglades Pilots' Association
- Port Everglades West Lake Permit and Section 2036(a) Cross Walk White paper
- USACE West Lake Park Permit Package
- Port Everglades Master Plan

About half-way through the review of the Port Everglades Feasibility Study documents, a teleconference was held with USACE, the Panel, and Battelle so that USACE could answer any questions the Panel had concerning either the review documents or the project. Prior to this

teleconference, Battelle submitted 25 panel member questions to USACE. USACE was able to provide responses to some of the questions during the teleconference; some of the remaining panel member questions that required additional coordination within USACE were addressed within a week of the mid-review teleconference. Of the 25 panel member questions, 14 were answered by USACE.

3.4 Review of Individual Comments

The Panel was instructed to address the charge questions/discussion points within a charge question response table provided by Battelle. At the end of the review period, the Panel produced individual comments in response to the charge questions/discussion points. Battelle reviewed the comments to identify overall recurring themes, areas of potential conflict, and other overall impressions. As a result of the review, Battelle summarized the individual comments into a preliminary list of 23 overall comments and discussion points. Each panel member's individual comments were shared with the full Panel in a merged individual comments table.

3.5 IEPR Panel Teleconference

Battelle facilitated a 4-hour teleconference with the Panel so that the panel members could exchange technical information. The main goal of the teleconference was to identify which issues should be carried forward as Final Panel Comments in the Final IEPR Report and decide which panel member would serve as the lead author for the development of each Final Panel Comment. This information exchange ensured that the Final IEPR Report would accurately represent the Panel's assessment of the project, including any conflicting opinions. The Panel engaged in a thorough discussion of the overall positive and negative comments, added any missing issues of high-level importance to the findings, and merged any related individual comments. In addition, Battelle confirmed each Final Panel Comment's level of significance to the Panel.

At the end of these discussions, the Panel identified 22 comments and discussion points that should be brought forward as Final Panel Comments.

3.6 Preparation of Final Panel Comments

Following the teleconference, Battelle prepared a summary memorandum for the Panel documenting each Final Panel Comment (organized by level of significance). The memorandum provided the following detailed guidance on the approach and format to be used to develop the Final Panel Comments for the Port Everglades Feasibility Study:

- **Lead Responsibility:** For each Final Panel Comment, one Panel member was identified as the lead author responsible for coordinating the development of the Final Panel Comment and submitting it to Battelle. Battelle modified lead assignments at the direction of the Panel. To assist each lead in the development of the Final Panel Comments, Battelle distributed the merged individual comments table, a summary detailing each draft final comment statement, an example Final Panel Comment following the four-part structure described below, and templates for the preparation of each Final Panel Comment.

- Directive to the Lead: Each lead was encouraged to communicate directly with the other panel members as needed and to contribute to a particular Final Panel Comment. If a significant comment was identified that was not covered by one of the original Final Panel Comments, the appropriate lead was instructed to draft a new Final Panel Comment.
- Format for Final Panel Comments: Each Final Panel Comment was presented as part of a four-part structure:
 1. Comment Statement (succinct summary statement of concern)
 2. Basis for Comment (details regarding the concern)
 3. Significance (high, medium, low; see description below)
 4. Recommendation(s) for Resolution (see description below).
- Criteria for Significance: The following were used as criteria for assigning a significance level to each Final Panel Comment:
 1. High: Describes a fundamental problem with the project that could affect the recommendation, success, or justification of the project. Comments rated as high indicate that the Panel analyzed or assessed the methods, models, and/or analyses and determined that there is a “showstopper” issue.
 2. Medium: Affects the completeness of the report in describing the project, but will not affect the recommendation or justification of the project. Comments rated as medium indicate that the Panel does not have sufficient information to analyze or assess the methods, models, or analyses.
 3. Low: Affects the understanding or accuracy of the project as described in the report, but will not affect the recommendation or justification of the project. Comments rated as low indicate that the Panel identified information (tables, figures, equations, discussions) that was mislabeled or incorrect or data or report sections that were not clearly described or presented.
- Guidance for Developing Recommendations: The recommendation section was to include specific actions that USACE should consider to resolve the Final Panel Comment (e.g., suggestions on how and where to incorporate data into the analysis, how and where to address insufficiencies, areas where additional documentation is needed).

An additional Final Panel Comment was submitted for consideration after the panel review teleconference, bringing the total from 22 to 23 Final Panel Comments. However, during the Final Panel Comment development process, the Panel felt that two of the Final Panel Comments could be merged into one; therefore, the total Final Panel Comment count was reduced back to 22.

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. At the end of this process, 22 Final Panel Comments were prepared and assembled. There was no direct communication between the Panel and USACE during the preparation of the Final Panel Comments. The Final Panel Comments are presented in Appendix A of this report.

4. PANEL DESCRIPTION

Candidates for the Panel 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 referrals. Battelle prepared a draft list of primary and backup candidate panel members (who were screened for availability, technical background, and COIs), and provided it to USACE for feedback. Battelle made the final selection of panel members.

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

Table 2. Port Everglades Feasibility Study IEPR Panel: Technical Criteria and Areas of Expertise

Technical Criterion	McAnally	Gilbert	Smith	Casavant	Jaap	Rein	Vann
Hydraulic or Civil Engineering	X						
Minimum 10 years of experience in hydraulic or civil engineering	X						
Demonstrated experience in channel design	X						
Demonstrated experience in channel modification	X						
Demonstrated experience in coastal currents	X						
Active participation in related professional societies	X						
Registered Professional Engineer	X						
Geotechnical Engineering		X					
Minimum 10 years of experience in geotechnical engineering		X					
Experience in upland and open-water dredged material disposal		X					
Experience in confined disposal areas		X					
Experience in erosion		X					
Active participation in related professional societies		X					
Registered Professional Engineer		X					
Economics			X				
Minimum 10 years of experience in deep-draft navigation economic analysis			X				
Project experience in evaluating and comparing alternative plans for USACE			X				
Project experience in evaluating and conducting National Economic Development (NED) analyses of deep-draft navigation or inland navigation transportation-related projects			X				
Experience directly working for or with USACE in applying Principles and Guidelines (P&G) to Civil Works project evaluations			X				
Active participation in related professional societies			X				

Table 2, continued. Port Everglades Feasibility Study IEPR Panel: Technical Criteria and Areas of Expertise

Technical Criterion	McAnally	Gilbert	Smith	Casavant	Jaap	Rein	Vann
Minimum M.A., M.S., or MBA degree			X				
Plan Formulation				X			
Minimum 10 years of experience in deep-draft navigation analysis				X			
Project experience in evaluating and comparing alternative plans for USACE				X			
Project experience in evaluating and conducting NED analyses of deep-draft navigation or inland navigation transportation-related projects				X			
Experience directly working for or with USACE in applying P&G to Civil Works project evaluations				X			
Active participation in related professional societies				X			
Minimum M.A. or M.S. degree				X			
Biology					X		
Minimum 10 years of experience on the southern Atlantic coast of the United States					X	X	
Experience with corals					X	X	
Experience with seagrasses					X	X	
Experience with mangroves (for Environmental Baseline Study [EBS])					X	X	
Knowledge of the ecological value of near-shore rock resources in coastal environments, and survey and evaluation methodologies for those habitats					X	X	
Minimum M.S. degree in an appropriate field of study					W ^a	X	
Biology						X	
Minimum 10 years of experience in environmental, estuarine, and coastal processes and an understanding of ecological responses to shoreline erosion					X	X	
Expert in NOAA's Habitat Equivalency Analysis (HEA) method					X	X	
Expert in reef impact mitigation assessment methods					X	X	

Table 2, continued. Port Everglades Feasibility Study IEPR Panel: Technical Criteria and Areas of Expertise

Technical Criterion	McAnally	Gilbert	Smith	Casavant	Jaap	Rein	Vann
Experience with corals					X	X	
Experience with seagrasses					X	X	
Experience with mangroves (for EBS)					X	X	
Knowledge of the ecological value of near-shore rock resources in coastal environments, and survey and evaluation methodologies for those habitats					X	X	
Understanding of environmental impacts associated with dredging and preparation of National Environmental Policy Act (NEPA) compliance documents						X	
Minimum M.S. degree in an appropriate field of study						X	
Real Estate							X
Minimum 10 years of experience in evaluating real estate requirements for USACE alternative plans regarding deep-draft navigation projects							X
Experience directly working for or with USACE in applying P&G to Civil Works project evaluations							X
Active participation in related professional societies							X
Minimum M.A. or M.S. degree							W ^a

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

William McAnally, P.E., Ph.D.

Role: Hydraulic and civil engineer
Affiliation: Dynamic Solutions, LLC

Dr. McAnally is a Water Resources Consultant for Dynamic Solutions, LLC, in Columbus, Mississippi, with more than 40 years of experience in the field of hydrology and hydraulics. He earned his Ph.D. in coastal and oceanographic engineering from the University of Florida in 1999. He is a registered professional engineer in Mississippi and a Diplomat of the Academy of Coastal, Oceans, Port and Navigation Engineers in both navigation engineering and coastal engineering. He has taught undergraduate and graduate courses in hydraulic engineering and navigation engineering, including deep-draft, tidal hydraulics, and sedimentation solutions. He

also teaches American Society of Civil Engineers (ASCE) webinars on navigation engineering and sedimentation engineering.

As Technical Director for Navigation Research at USACE's ERDC, he performed deep-draft navigation design studies of the Mayport Navy Basin (Florida), Columbia Estuary, Mississippi River, San Francisco Bay, Savannah Harbor, and other sites. He also performed channel modification studies for the John F. Baldwin ship channel (California), Houston ship channel (Texas), New York Harbor, Savannah Harbor (Georgia), and Charleston Harbor (South Carolina), among others.

Dr. McAnally is experienced with coastal currents for the Mississippi Sound (Alabama, Mississippi, Louisiana), the Louisiana-Texas coastline and inlets, Biscayne Bay and Matanzas Inlet (Florida), and the Pacific Northwest coastline. He led studies of dredged material placement for the Alcatraz site, Corpus Christi, Mississippi River Delta, and others, and has consulted on disposal studies for Atchafalaya Bay (Louisiana), New York Harbor, and Chesapeake Bay.

In addition, Dr. McAnally has 33 years of experience with USACE ERDC performing and leading studies in support of planning efforts by Districts and navigation analyses, including deep-draft projects in Los Angeles-Long Beach Harbors, San Francisco Bay, Galveston Bay, Savannah River, and others. These studies examined the effect of various plans on project performance and environment and recommended plan features to optimize projects; USACE Principles and Guidelines (P&G) were applied to all these evaluations.

Dr. McAnally has written or contributed to more than 120 publications, including eight book chapters/journal papers on navigation channels, five book chapters/journal papers on coastal currents, and four book chapters/journal papers on channel modifications, and co-authored the ASCE Manuals on Navigation. Dr. McAnally is an ASCE Fellow; a member of the Coastal, Ocean, Ports, and Rivers Institute (COPRI), the World Association for Waterborne Transport Infrastructure (PIANC), and the ASCE Environmental and Water Resources Institute; and chairman of the COPRI Navigation Engineering Committee, Task Committee on Nautical Depth. He served as a peer reviewer of the proposed (2009) "Principles and Requirements for Federal Investments in Water Resources," now adopted by the Council on Environmental Quality.

Dr. Robert Gilbert, P.E., Ph.D.

Role: Geotechnical engineer

Affiliation: Independent Consultant (University of Texas at Austin)

Dr. Robert Gilbert is the Brunswick-Abernathy Professor of Civil, Architectural, and Environmental Engineering at the University of Texas at Austin. He received his Ph.D. in civil engineering from the University of Illinois at Champaign-Urbana in 1993 and is a licensed professional engineer in Texas and Illinois. He has 25 years of experience as a practicing geotechnical engineer and 20 years of experience as a professor of geotechnical engineering, teaching undergraduate and graduate courses and conducting research.

Dr. Gilbert's experience in upland and open water dredged material disposal includes research and consulting on the suitability of upland and offshore storage facilities for dredged materials; the properties of contaminated sediments pertaining to their containment and disposal; ; and the properties and stability of naturally deposited sediments. He has also consulted on the design and construction of waste disposal areas, including municipal solid waste, hazardous waste, and nuclear waste.

Dr. Gilbert's experience in confined disposal areas includes research on disposal and containment of contaminated materials, including landfills, geomembranes, and clay liners. He has also consulted on the design and construction of waste disposal areas for private industry and the US Department of Energy.

Dr. Gilbert's experience in erosion and erosion control includes providing consulting expertise for covers over contaminated sediments. He also served as a member of the ASCE External Review Panel reviewing forensic analyses of levee failures, mostly due to erosion, in Hurricane Katrina. In addition, Dr. Gilbert consulted on risk analyses for levees that included assessment of erosion alternatives, failure, and risk assessment. His consulting and research on the stability of offshore sediments includes the assessment of submarine mudslides and hurricane-induced mudslides.

Dr. Gilbert is currently a member of the ASCE Task Force on Flood Risk Management; the American Petroleum Institute Resource Group 7; the International Organization for Standardization Working Group 7 on Recommended Practice for Offshore Foundations; Task Committee 29 – Offshore Foundation of the International Society of Soil Mechanics and Geotechnical Engineering; and the Reliability Subcommittee, Marine Renewable Energy Committee, ASCE Coasts, Oceans, Ports, and Rivers Institute. He has also served as chair of the Expert Review Panel, California Delta Economic Sustainability Plan.

Daniel Smith

Role: Economist

Affiliation: The Tioga Group, Inc.

Mr. Smith is a Principal and Founder of the Tioga Group, Inc., a consulting firm specializing in freight transportation and logistics, whose clients include ports, railroads, shippers, leasing companies, industry organizations, and government agencies. He holds a B.A. in mathematics and a M.A. in public policy from the University of California at Berkeley. Mr. Smith did further postgraduate work in transportation economics and policy. He is a former Adjunct Professor at Golden Gate University in San Francisco, where he taught introductory courses in transportation.

Mr. Smith has over 30 years of consulting experience in freight transportation strategy, policy, and planning, with particular emphasis on truck, rail, and marine intermodal transportation. He has performed deep-draft port studies for the Ports of Los Angeles, Long Beach, Oakland, Richmond, Stockton, Redwood City, New York and New Jersey, Seattle, and Vancouver. Mr. Smith has also led analyses of container port capacity, the maritime transportation system outlook, and the U.S. inland waterways system outlook for the USACE Institute for Water Resources. Mr. Smith has evaluated and compared alternative plans for USACE during his work

on USACE projects for the Port of Freeport, Chesapeake Bay, and Sabine-Neches Waterway. He has experience evaluating and conducting National Economic Development (NED) analyses of deep draft navigation and inland navigation transportation projects including USACE project in Delaware Bay, Port Iberia, and the Sabine-Neches Waterway (SNWW).

He has served on multiple IEPR panels between 2002 and 2011, most recently as the economics reviewer for the Freeport Harbor Channel Deepening Project. Mr. Smith has experience working with USACE in applying P&G to Civil Works projects through his participation on previous reviews, notably Port Sacramento, Port of Freeport, and Columbia River.

Mr. Smith has written numerous publications and frequently speaks at industry and public sector conferences. Recent examples include “Container Port Capacity and Utilization Metrics, Diagnosing the Marine Transportation System, USACE, June 2012”, “Estimating U.S. Container Port Capacity And Utilization, TRB 92nd Annual Meeting, Ports and Channels Committee January, 2013” and “Port Drayage, Productivity, and Capacity: Results of Three New Studies, TransPacific Maritime Conference, March 2010.” Mr. Smith participates in relevant professional societies and is currently active in Transportation Research Board projects, panels, and proceedings, and has testified before the House Judiciary Committee on the economic conditions in the world shipping industry.

Kenneth Casavant, Ph.D.

Role: Plan Formulator

Affiliation: Independent Consultant (Washington State University)

Dr. Casavant is a professor at the School of Economic Sciences at Washington State University, an adjunct professor at North Dakota State’s Upper Great Plains Transportation Institute, and director of the Freight Policy Transportation Institute. He earned his Ph.D. in economics from Washington State University in 1971 and has over 45 years of experience as an economist.

Dr. Casavant has more than 10 years of experience in plan formulation, including deep-draft navigation analysis, evaluation and comparison of alternative plans for numerous ecosystem restoration projects, navigation studies, and feasibility studies. Recent work for the IWR focused on determining procedures for the derivation of deep-draft vessel operating costs, as well as an extension into shallow-draft vessel operating costs. He has also served as an economic consultant detailing the tradeoffs necessary on several public works projects, most recently on studies of the deep draft national and international maritime industry.

Dr. Casavant has extensive experience evaluating and comparing alternative plans for USACE, either for deepening/realignment ports, harbors, or channels or for specific review of the economic feasibility of such projects. For instance, he has conducted technical reviews of the Lower Columbia River Channel Deepening Project, the Upper Mississippi and Illinois Navigation Study, the Port of Iberia Channel Deepening study, the SNWW Channel Improvement Plan feasibility study, the Barataria Basin Barrier Shoreline Restoration Study, the Savannah Harbor Improvement project, the Mississippi River Gulf Outlet Ecosystem Restoration Plan and many others. All these projects included working for or with USACE in applying P&G to Civil Works project evaluations. The plan formulation assignments were heavily focused and guided by the

P&G. Underlying these projects is examination of the plan formulation for the Civil Works projects under consideration. Recently, he was tasked by USACE to review and recommend changes in the development of Deep Draft Vessel Operating Costs and is currently working on the Shallow Draft Vessel Operating Costs review as the team leader. Many of these projects also reflect his experience in evaluating and conducting the NED analyses of deep-draft navigation or inland navigation transportation related projects, with particular attention to commodity traffic projects and the cost savings from the harbor improvement, yielding specific estimates of benefits.

Dr. Casavant has authored or co-authored almost 900 journal, bulletin, conference presentations, proceedings, and abstracts. He is a member of numerous professional associations including the Transportation Research Board - National Research Council, the International Agricultural Economics Association, and the Logistics and Physical Distribution Association.

Walter Jaap

Role: Biologist

Affiliation: Lithophyte Research LLC

Mr. Jaap is a benthic ecologist with Lithophyte Research LLC and serves on the faculty of the University of South Florida, College of Marine Science. He has 43 years of experience, 35 years of which were with State of Florida environmental agencies. Mr. Jaap received his B.S. in biology from the University of Miami. He has participated in close to 50 scientific expeditions throughout the Gulf of Mexico and in Australia and Hawaii.

Mr. Jaap has published multiple articles on reefs and corals from Dry Tortugas to Palm Beach and is recognized by the federal courts as an expert witness on corals and reefs. He was chief scientist for the Florida Fish and Wildlife Conservation Corals Program (1990-2005). His experience with seagrasses in the coastal environment includes monitoring the impact of a frac-out from a directional drilling project in and around a seagrass community, and surveys to evaluate U.S. Coast Guard facility EISs for bases along the Gulf and Atlantic coasts.

Mr. Jaap has a background in mangrove biology in conjunction with gas pipeline surveys on the west coast of Florida. In addition, he has worked on many ship-grounding cases using Habitat Equivalency Analysis (HEA) and has used the software for computing HEA. He has presented HEA in legal cases in Florida, Hawaii, Belize, and the Dominican Republic and has published a number of articles on restoration and resource values.

Mr. Jaap is a member of the International Society for Reef Studies and the Ecological Society of America, as well as a member of the Board of Directors and Past President of the American Academy of Underwater Sciences. He also serves on the Special Scientific Statistical Committee, for corals and coral reefs, of the Gulf of Mexico Fisheries Management Council and on the Diving Control Board for the University of South Florida.

Felicia Orah Rein, Ph.D.

Role: Biologist

Affiliation: Watershed Solutions, Inc.

Dr. Rein is president and senior scientist at Watershed Solutions, Inc., a Florida State certified woman-owned, small business, providing environmental consulting and restoration services. She is also an affiliate professor in the Geosciences Department at Florida Atlantic University. She earned her Ph.D. in Ecosystem Science/Restoration Ecology in 2000 from the University of California at Santa Cruz, with a focus on marine systems and environmental economics. Her expertise, garnered over a 25-year career in estuarine systems, is in understanding ecological responses to different impacts, including shoreline erosion. Dr. Rein has 10 years of experience with projects on the South Atlantic U.S. coast, most recently in Palm Beach and Broward County.

Dr. Rein's expertise in the National Oceanic and Atmospheric Administration's (NOAA's) HEA methods is demonstrated by her doctoral training, which included restoration ecology focused on marine systems and environmental economics. In 1999 she authored a paper quantifying impacts to ecosystem services using HEA and other methods ("Economic Analysis of Vegetative Buffer Strip Implementation. Case Study: Elkhorn Slough, Monterey Bay, California." Coastal Management 27: 377-390).

Dr. Rein's experience in reef impact mitigation assessments includes her certification as a scientific research diver experienced in survey methods, coral reef habitats and impacts, the evaluation methodologies for these habitats, and restoration of coral reef systems. In January 2011, she was the only consultant on the Florida Department of Environmental Protection strategic planning committee to develop regional strategies for coral reef restoration. She is familiar with the ecosystem of South Florida, has worked with seagrass surveys and mitigation, and has studied mangrove restoration.

Dr. Rein is knowledgeable about the ecological value of near-shore rock resources in coastal environments. In several recent projects, she evaluated the role of near-shore rock in coastal storm reduction, living shorelines, and habitat enhancement. She has particular expertise with the environmental effects of dredging. Dr. Rein participated in New York/New Jersey harbor projects focusing on dredging and environmental impacts associated with maintenance dredging and harbor deepening. She analyzed environmental windows for sensitive species for the New York/New Jersey harbor deepening project. She was project manager for a workshop series titled "Improving Harbor Material Maintenance Dredging Program", which addressed environmental impacts and focused on beneficial uses of dredged material. She was recently involved in water quality monitoring around a dredging beach nourishment project. She has extensive experience preparing planning documents such as Environmental Impact Reports and EISs and has experience with all National Environmental Policy Act (NEPA) documents and EIS requirements, as well as the Endangered Species Act, essential fish habitat, and the Marine Mammals Protection Act.

Dr. Rein is experienced with the IEPR process, and has participated in several project reviews. Dr. Rein is a member of Sigma Xi National Scientific Research Society.

Ronald Vann, P.E.

Role: Real Estate

Affiliation: OAS, Waterways Surveys and Engineering, RMG

Mr. Vann is a private consultant with OAS, Waterways Surveys and Engineering, RMG, specializing in environmental analysis and navigation improvement studies. He received his B.S. in Civil Engineering from Virginia Polytechnic Institute in 1965. He is a licensed professional civil engineer in Virginia and has more than 45 years of experience. For more than 38 years, he worked as a civil and environmental engineer with the USACE Norfolk District, holding positions as Chief of Survey Branch, Chief Special Projects, Military Section, Chief of Regulatory Functions, Assistant Chief of Engineering Division, Chief of Dredging Management Branch, Chief of Civil Programs Branch, and Chief of Operations Branch.

As Chief of Operations Branch, Mr. Vann held full responsibility for all aspects of dredging and channel design, particularly defining technical real estate requirements for alternative plans for major USACE deep-draft navigation projects. He oversaw the budget, engineering, environmental analysis, and scheduling for the District's complex Civil Works dredging and operations program. As Chief of Planning and Chief of Operations, Mr. Vann developed an understanding of the environmental analysis and real estate requirements associated with USACE navigation improvement studies. He was responsible for defining all real estate requirements for more than 60 of the District's major navigation projects such as the Craney Island and Port Expansion Project and the Dam Neck Ocean Placement Site for Norfolk District USACE.

Mr. Vann has been a U.S. delegate to two U.S./Japan meetings and one U.S./Netherlands meeting of the Experts on Management of Toxic Bottom Sediments; a U.S. Representative of Environmental Commission of PIANC; and a Field Review Group member for both the Coastal Engineering and Dredging Research Centers. He is a member of the Western Dredging Association and the Hampton Roads Maritime Association.

5. SUMMARY OF FINAL PANEL COMMENTS

The panel members agreed between each other on their "assessment of the adequacy and acceptability of the economic, engineering, and environmental methods, models, and analyses used" (USACE, 2012; p. D-4) in the Port Everglades Feasibility Study. In particular, the panel members found the Feasibility Study and Environmental Impact Statement generally clear, well-organized, and easy to read and found the graphics, figures, and tables helpful. Table 3 lists the Final Panel Comments statements by level of significance. The full text of the Final Panel Comments is presented in Appendix A of this report. The following summarizes the Panel's findings.

Engineering – From an engineering perspective, most aspects of the Feasibility Study are adequate and complete. However, as documented in the first four Final Panel Comments, the Panel has serious concerns about dredged material disposal, including the incomplete designation of the expanded ocean dredged material disposal site (ODMDS) and the lack of information on al-

ternatives to open water disposal (e.g., upland, beneficial use, multiple placement). The implementation of the Tentatively Selected Plan (TSP) could be delayed or costs could increase if a confirmed plan for disposal and/or use is not identified for the material removed during construction and maintenance. In addition, the Panel believes that there may be an underestimation of projected maintenance dredging requirements (and the related costs) which could be partially resolved by conducting a more detailed analysis of past sedimentation rates. In addition, the alternatives to blasting for hard rock excavation could be more fully investigated. The Panel also encourages USACE to resolve the inconsistencies regarding the extent, cost, and schedule of bulkhead work.

Economics and Plan Formulation –The plan development and formulation was logical. From an economics standpoint, the information on existing vessel calls and sailing depths was very good, and the documentation on steamship contacts was well-done. The panel members appreciated that the approach to commodity and cargo forecasts appeared conservative and did not over-reach. It was obvious that there was a good understanding of the inland and international markets underlying the broader analyses. The Panel believed that assumptions and growth rates of benefiting commodities could have been better documented, as could the vessel fleet forecasts, and there was concern that the underdeveloped sensitivity analysis increased the uncertainty of benefits calculations. USACE is also encouraged to better document the link between the ocean currents and vessel incidents and how the TSP would improve navigation safety.

Biology – The biologists on the Panel were impressed by the overall clarity of the Feasibility Study and the Environmental Impact Statement and the extensive interagency coordination. The two documents put substantial effort into proposing alternatives that would minimize adverse environmental impacts and developing a detailed and reasonable mitigation plan. The Panel was most concerned about the lack of clarity in the mitigation plan about the West Lake Park site; this issue could be resolved by clearly describing the site’s role and current status, including providing available monitoring information. In addition, the Panel thought that beneficial uses of dredged material needed more consideration. The Panel also noted that more detail could have been provided on the mangrove environments, especially with regard to avian populations, and that the baseline ecological information could be strengthened by compiling more recent data on seagrass, mangrove, and coral conditions. The Panel believes community resemblance should be accounted for when evaluating benthic community colonization success and the Port Everglades Reef Group (PERG) recommendations should be reconsidered for improving overall project success and reducing future project costs.

Real Estate – The documents were definitive and dove-tailed with engineering, environmental, and local sponsor requirements of the project. The combined technical studies served to minimize real estate impacts. The suggestions from the Panel to pursue additional dredged material disposal alternatives, such as beneficial use and multiple placement sites, could change real estate requirements in the future.

Table 3. Overview of 22 Final Panel Comments Identified by the Port Everglades IEPR Panel

No.	Final Panel Comment
Significance – High	
1	The cost, schedule, and overall implementation of the Port Everglades project will be affected if the U.S. Environmental Protection Agency’s (EPA’s) designation of an expanded ocean dredged material disposal site is not completed in time for project construction.
Significance – Medium	
2	Opportunities for upland disposal of dredged material have not been examined fully; therefore, potential costs and benefits have not necessarily been realized.
3	Opportunities for beneficial use of dredged material have not been fully examined; therefore, potential cost and environmental benefits have not been realized.
4	Opportunities for the multiple placement of dredged material have not been fully examined; therefore, potential cost and environmental benefits have not been realized.
5	Projected maintenance dredging requirements for the channels and berthing areas may be underestimated and do not appear to have been included in the life-cycle cost of the Tentatively Selected Plan (TSP).
6	The Broward County sand bypassing project’s potential impact on the conditions in the Outer Entrance Channel (OEC) have not been thoroughly evaluated, despite the significant implications for littoral transport rates and maintenance costs.
7	Alternatives to blasting for hard rock excavation, as well as the project cost risks associated with blasting, have not been examined fully.
8	There is an inconsistency between the Tentatively Selected Plan (TSP) and the engineering analyses regarding the extent, cost, and schedule of bulkhead work required before fully implementing the TSP.
9	Benefiting cargoes and commodities have not been clearly identified, and assumptions and growth rates between the present and 2017 are not well documented or explained.
10	The vessel fleet forecast is not well documented and the benefiting vessels have not been identified.
11	The sensitivity analysis does not address container cargo volume, petroleum products cargo volume, or vessel fleet composition, all of which could affect the benefit-cost ratio (BCR).
12	The role of West Lake Park (WLP) with regard to the Port Everglades mitigation plan is not clearly presented, and WLP’s current construction status is not well-defined.
Significance – Low	
13	The link between ocean currents, vessel accidents, and navigation safety improvements is not clear.

Table 3. continued. Overview of 22 Final Panel Comments Identified by the Port Everglades IEPR Panel

No.	Final Panel Comment
14	The process of identifying alternatives did not include a structural solution to reducing the strong cross-currents in the Outer Entrance Channel (OEC).
15	The description of the mangrove environments does not include enough detail on the resident and transient avian populations, which can be a good indicator of mangrove vitality.
16	The Environmental Impact Statement (EIS) is based on information compiled in 2009 and earlier for seagrass, mangrove, and coral conditions; therefore, existing status and trends may not be current.
17	The monitoring methodology for hard bottom mitigation sites is not described clearly enough to judge whether the acquired data will be useful for determining long-term trends.
18	The coral propagation alternative proposes the use of <i>Acropora cervicornis</i> , even though that coral species is not a principal component or common species in the local reef community.
19	The Feasibility Study and the Environmental Impact Statement are inconsistent with regard to the need for mitigation of benthic invertebrates.
20	The primary mitigation plan selects a non-conservative approach with minimum construction impacts to hard bottom habitats.
21	The criteria to evaluate the success of hard bottom benthic community colonization do not account for community structure-resemblance measurements.
22	The mitigation plan does not take full advantage of the draft recommendations of the Port Everglades Reef Group (PERG), even though the scientific research component would strengthen the project and likely reduce future restoration costs.

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APPENDIX A

Final Panel Comments

on the

Port Everglades Feasibility Study IEPR

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Final Panel Comment 1

The cost, schedule, and overall implementation of the Port Everglades project will be affected if the U.S. Environmental Protection Agency's (EPA's) designation of an expanded ocean dredged material disposal site is not completed in time for project construction.

Basis for Comment

The Tentatively Selected Plan (TSP) assumes that the dredged materials from expanding the port will be disposed in the ocean at the Port Everglades Offshore Dredged Material Disposal Site (ODMDS). The availability and adequate capacity of the Port Everglades ODMDS is not certain because it relies on the designation of an expanded ODMDS that has not yet been completed by the EPA. In addition, the 'back-up plan' if the ODMDS expansion designation is not ready by the time project construction begins is for an "emergency one time designation of a site" (Appendix E, p. 28) by the U.S. Army Corps of Engineers (USACE) under Section 103(b) of the Marine, Research, Protection, and Sanctuaries Act (MPRSA).

The Dredged Material Management Plan (DMMP) (Appendix E) is not clear as to whether (1) this EPA site designation will absolutely occur without doubt and without delaying the project; and (2) a "one time" emergency disposal designation would be for the life of the project (i.e., through construction and maintenance) or if it is truly a "one time" occurrence based on a specific dredging volume consideration.

Furthermore, the Environmental Impact Statement (EIS) indicates that additional testing and evaluation will be conducted to determine the suitability of the dredged materials for ocean disposal. Should it be determined that some or all of the material is unsuitable for ocean disposal, alternative disposal options would need to be pursued, which are the topics of Final Panel Comments 2, 3, and 4.

Significance – High

If an ODMDS with adequate capacity is not designated, the TSP cannot be implemented.

Recommendations for Resolution

1. Provide complete information and clarity about the status of the ODMDS expansion designation and the feasibility of invoking an emergency one-time designation under Section 103(b) of the MPRSA.
2. Document how any dredged materials determined to be unsuitable for ocean disposal will be managed, including the costs and environmental impacts.

Final Panel Comment 2

Opportunities for upland disposal of dredged material have not been examined fully; therefore, potential costs and benefits have not necessarily been realized.

Basis for Comment

The limited capacity of the Ocean Dredged Material Disposal Site (ODMDS) is a concern that potentially threatens the success of the project (Final Panel Comment 1); however, the Feasibility Study did not explore in depth the other options for dredged material placement, including beneficial use (Final Panel Comment 3) and multiple placement (Final Panel Comment 4).

The Tentatively Selected Plan (TSP) assumes that the dredged materials from expanding the port will be disposed in the ocean at the Port Everglades Offshore Dredged Material Disposal Site (ODMDS). However, given the issues presented in Final Panel Comment 1, viable alternatives to ocean disposal (including upland disposal) have not been provided. Upland disposal is eliminated based on a relatively old (1994) study that identified 22 possible sites in the project vicinity and based on the present unavailability of the two upland disposal sites most recently identified for this project (designated Site 1 at the Port and Site 2 at the Airport in the Feasibility Study) (Feasibility Study, Appendix E, pg. 20).

No detailed engineering, economic, and environmental analyses for viable alternatives for upland disposal are provided. Economic and environmental benefits of upland disposal that may compensate for additional costs have not been explored.

Significance – Medium

Considering viable upland disposal alternatives for the dredged material may change costs or benefits (possibly both) of the project.

Recommendations for Resolution

1. Provide a comprehensive engineering, economic, and environmental analysis for viable alternatives for upland disposal of dredged materials.

Final Panel Comment 3

Opportunities for beneficial use of dredged material have not been fully examined; therefore, potential cost and environmental benefits have not been realized.

Basis for Comment

The limited capacity of the Ocean Dredged Material Disposal Site (ODMDS) is a concern that potentially threatens the success of the project (Final Panel Comment 1); however, the Feasibility Study did not explore in depth the other options for dredged material placement, including upland disposal (Final Panel Comment 2) and multiple placement (Final Panel Comment 4).

Beneficial use of dredged material is a U.S. Army Corps of Engineers (USACE) priority and offers the potential for environmental benefits and sometimes even cost savings (USACE, 1987). Section 207 of the Water Resources Development Act of 1996 encourages incorporating beneficial uses of dredged material into Civil Works navigation projects. At Port Everglades, rock removed during construction can be used to build mitigation reefs, and sand dredged during construction and maintenance can be used to mitigate shoreline erosion south of the inlet. Both would provide environmental benefits and create sustainable solutions.

The Port Everglades Feasibility Study documents either peremptorily exclude beneficial uses or fail to fully explore the opportunities available for beneficial uses of dredged rock and sand. For example:

- Main Text, p. 81, states that the cost of processing dredged material to render it suitable for beach disposal caused it to be rejected as an option, but supporting cost estimates are not provided.
- Appendix A, paragraphs 30 and 31, state that while shoreline erosion and surge flooding may increase when sea level rise is accounted for, the affected regions are not “within the scope” of this study. Since shoreline protection can be achieved with beach nourishment, beneficial uses should be a carefully considered option.
- Dredged Material Management Plan, p. 17, states that sediment processing for beach fill material is not possible at Port Everglades because of space limitations. No mention is made of other options. One possibility not discussed is temporary nearshore placement such that waves and currents can process the material naturally, resulting in minimal processing costs. Other processing options include temporary or permanent designation of an area at the state park for that purpose and use of a segmented basin disposal site.
- Environmental Impact Statement (EIS), lines 14-17 on p. iv, state that if the Ocean Dredged Material Disposal Site is not approved for expansion, “alternatives will be explored for the deposition of remaining material”, but no alternatives, such as beneficial uses, are identified.

Offshore disposal may have the lowest first cost for this project; however, it will not provide long-term cumulative benefits compared to a beneficial use such as shoreline protection, which also counters predicted sea level rise-induced erosion and flooding. A cost analysis that includes indirect future benefits will strengthen the cost analysis and environmental considerations and satisfy the USACE Environmental Operating Principles (USACE, 2013a).

Significance – Medium

Adopting beneficial uses of dredged material may change costs or benefits (possibly both) of the project.

Recommendations for Resolution

1. Perform a comprehensive analysis of methods, costs, and direct plus indirect benefits of dredged material beneficial uses from both construction and maintenance of the improved channels.

Literature Cited:

USACE (1987). Beneficial Uses of Dredged Material. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. Engineer Manual (EM) No. 1110-2-5026. June 30.

USACE (2013a). Environmental Operating Principles.
<http://www.usace.army.mil/Missions/Environmental/EnvironmentalOperatingPrinciples.aspx>

Final Panel Comment 4

Opportunities for the multiple placement of dredged material have not been fully examined; therefore, potential cost and environmental benefits have not been realized.

Basis for Comment

The limited capacity of the Ocean Dredged Material Disposal Site (ODMDS) is a concern that potentially threatens the success of the project (Final Panel Comment 1); however, the Feasibility Study did not explore in depth the other options for dredged material placement, including upland disposal (Final Panel Comment 2) and beneficial use (Final Panel Comment 3).

The Feasibility Study reports that due to the expected need for material processing, important beneficial use options such as beach nourishment and reef creation were dismissed.

One placement option warranting additional investigation is the ‘isolation’ of individual project components and the utilization of the dredged material generated in each area based on the material’s individual characteristics. Based on the Feasibility Study (Table 23) and Appendix A (pp. 87-89), data collected during geotechnical investigations were limited and indicate that the dredged material is of different sediment classes, varying by depth. Obtaining more detailed sediment characteristics by depth may enable individual dredged material layers within one component to be directed for different disposal options. This has the potential of optimizing opportunities for beneficial uses based on the site-specific sediment characteristics within each project area and even by individual depth intervals. For example, some channels have a higher percentage of sand and material dredged from them may be suitable for beach nourishment with minimal or no processing.

In addition, the material generated during blasting will likely be more suitable for reef construction, unlike the first few feet of dredged material, which has high sand content. It may be possible and cost effective to identify material by layer per dredged load and designate different applications accordingly. Additional analyses of the components, even during dredging, may reduce the amount of material required to be disposed of in the ODMDS and allow some material to be used for beneficial uses. While this level of dredged material management may increase cost, improving placement options will better satisfy the U.S. Army Corps of Engineers’ (USACE’s) Environmental Operating Principles (USACE, 2013a), increase environmental benefits, and provide an option if the ODMDS is unavailable. In the end, it may ultimately lower costs (e.g., the quarrying of new limestone for reef creation may become unnecessary). A benefits and cost analysis for this option may be warranted. The benefits of eliminating future beach nourishment costs or quarrying new limestone for reef creation should be included in the recalculated cost analysis as potential benefits, which may offset the costs of processing the material. This may change the cost analysis and make previously dismissed disposal

options viable. Although the cost may prevent actual implementation, the Dredged Material Management Plan and the Feasibility Study would be strengthened by including these options, even if they are ultimately rejected for economic reasons.

The benefits of eliminating future beach nourishment costs or quarrying new limestone for reef creation should be included in the cost analysis as potential benefits, which may offset the costs of processing the material. This may change the cost analysis and make previously dismissed disposal options viable.

Significance – Medium

The possibility of identifying multiple disposal options based on isolating project components or on the characteristics of the project's dredged material by depth intervals may substantially reduce the volume of material designated for the ODMDS and possibly generate future cost benefits.

Recommendations for Resolution

1. Explore opportunities for refining sediment size analyses by project component and by dredged depth.
2. Determine whether beneficial use opportunities exist if dredged material is analyzed by individual project component or layer (depth), and calculate the cost for this level of dredged material management.
3. Recalculate cost-benefit analyses to include any cost savings from future beach nourishment projects or reduction of limestone quarrying costs, and include these benefits in the project cost analysis.

Literature Cited

USACE (2013a). Environmental Operating Principles.
<http://www.usace.army.mil/Missions/Environmental/EnvironmentalOperatingPrinciples.aspx>

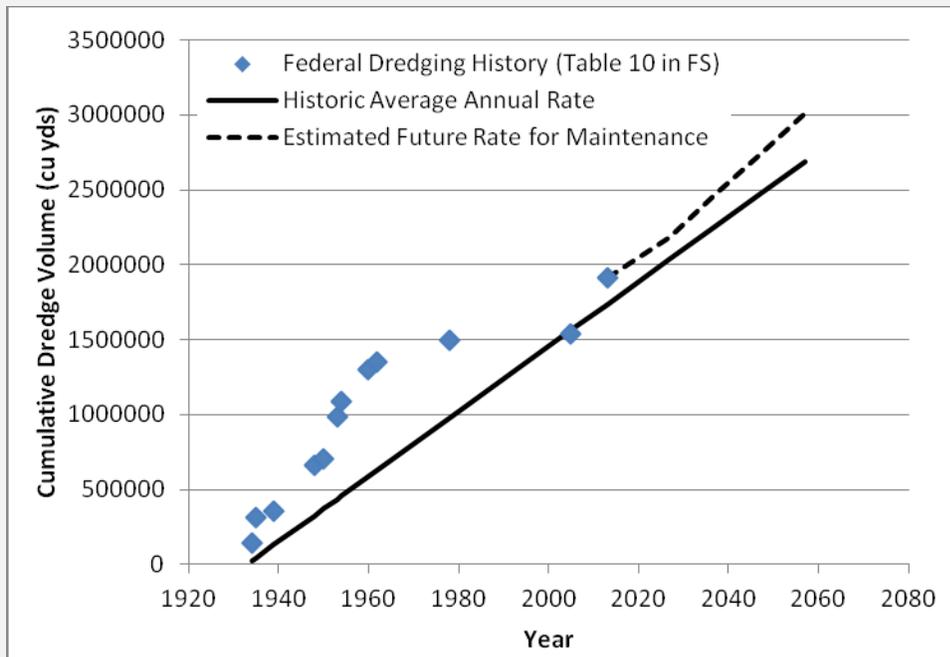
Final Panel Comment 5

Projected maintenance dredging requirements for the channels and berthing areas may be underestimated and do not appear to have been included in the life-cycle cost of the Tentatively Selected Plan (TSP).

Basis for Comment

Appendix A, p. A-122, describes the calculation of future maintenance dredging requirements: multiplying the historical dredging volume per unit area by the footprint area of the TSP. That approach underestimates the actual dredging volume requirements, perhaps severely so, for these reasons:

1. Extending the Outer Entrance Channel (OEC) by 2,200 feet (a feature of the TSP) will expose it to a new source of sediment moving along that contour, which cannot be characterized by past dredging volumes.
2. Deeper channels are more efficient sediment traps and, unless 100 percent of the sediment in transport is already being trapped, the rate per unit area will increase in every segment of the channels.
3. The shoaling rate for Port Everglades has not been constant since 1934 because the area and depth of the Port have increased over the years. See the figure below, which was generated by the Panel using data from Table A-8 in Appendix A).



The Olsen Engineering sediment budget figures suggest a gross longshore transport rate of about 100,000 cubic yards per year, much of which would be trapped by a deepened and lengthened OEC, thereby, increasing the amount of sediment needing to be dredged.

A single hurricane can deposit 10 to 100 times the normal annual sediment accumulation in a coastal channel. Dredged Material Management Plans (DMMP) can account for those extreme situations occurring at least once during the project life; however, the Port Everglades DMMP does not present an extreme storm event of this nature.

A complete benefit-cost analysis will consider life-cycle costs of the project, including future maintenance dredging costs and benefits, in selection of the TSP.

Significance – Medium

Future maintenance dredging costs affect the total life-cycle cost of the TSP and thus can alter the benefit-cost ratio.

Recommendations for Resolution

1. Perform a more robust estimation of future maintenance dredging requirements using:
 - a. A more detailed analysis of past sedimentation rates
 - b. Gross longshore transport from Olsen (2004, 2007) as a normal upper limit on the OEC sedimentation rate.
 - c. At least one storm event in which sedimentation is greatly increased.
2. Express future maintenance dredging requirements as a range of probable outcomes.

Literature Cited:

Olsen Associates Inc. (2004). Port Everglades Inlet Sand Management Phase I: Sand Bypassing Feasibility Study. Prepared for Broward County Board of County Commissioners. June 2004.

Olsen Associates Inc. (2007). Port Everglades Inlet Sand Management Phase II: Sand Bypassing Feasibility –Addendum. Prepared for Broward County Board of County Commissioners. November 2007.

Final Panel Comment 6

The Broward County sand bypassing project's potential impact on the conditions in the Outer Entrance Channel (OEC) have not been thoroughly evaluated, despite the significant implications for littoral transport rates and maintenance costs.

Basis for Comment

Broward County's proposed sand bypassing project, as described by Olsen (2004, 2007) and the Feasibility Study, includes several features that may have significant effects on the OEC. For example:

1. Proposed removal of the spoil shoal and creation of a sand trap can be expected to increase wave heights in the channel.
2. Proposed removal of the spoil shoal and exposure of the north jetty notch might move currents adverse to navigation closer to the north jetty, requiring adjustments to the OEC flare to maintain safety.
3. Proposed extension of the north jetty might reduce adverse currents in the OEC, allowing a reduction of the channel flare at no reduction in safety.
4. Proposed operation of sand bypassing will intercept material entering the OEC from the north, reducing sedimentation in the channels.
5. Proposed placement of sand on the coast south of the inlet will make more material available for reversing littoral transport, potentially increasing sedimentation in the channels and resulting maintenance costs.
6. If the sand bypassing project is not constructed, beach erosion south of the inlet is likely to increase, given that a deepened, lengthened, and widened OEC will be a more efficient sediment trap than the existing channel.

The Dredged Material Management Plan (DMMP), p. 17, states

“In addition, a sand bypassing operation currently in development by the County at this location is expected to restrict beach quality sand from entering the channel that otherwise might have been available.”

Elsewhere in the document (Feasibility Study, p. 20) the sand bypassing project is described as being deactivated. Given the uncertainty concerning the sand bypassing, channel sedimentation can be justifiably estimated two ways: one with the sand bypassing plan in operation and one without it.

The effects listed above may alter the selection of elements in the Tentatively Selected Plan (TSP). If Broward County has decided on a specific sand bypassing plan, that plan can be evaluated for probable effects on the Port Everglades project's TSP. If Broward County has not decided, then the plan elements recommended by Olsen (2007) can be evaluated and contrasted to the “no sand bypassing” scenario in order to identify

potential cumulative effects and their impact on the plan.

Significance – Medium

The Broward County sand bypassing plan will affect maintenance dredging costs and could influence which project measures are included in the TSP.

Recommendations for Resolution

1. Evaluate a selected Broward County sand bypassing plan for its potential effects on adverse currents in the OEC and maintenance dredging requirements.

Literature Cited:

Olsen Associates Inc. (2004). Port Everglades Inlet Sand Management Phase I: Sand Bypassing Feasibility Study. Prepared for Broward County Board of County Commissioners. June 2004.

Olsen Associates Inc. (2007). Port Everglades Inlet Sand Management Phase II: Sand Bypassing Feasibility –Addendum. Prepared for Broward County Board of County Commissioners. November 2007.

Final Panel Comment 7

Alternatives to blasting for hard rock excavation, as well as the project cost risks associated with blasting, have not been examined fully.

Basis for Comment

The Tentatively Selected Plan (TSP) assumes that materials designated as “hard rock” will require drilling and blasting before dredging. The estimated volume of hard rock is about 500,000 cubic yards (Appendix F – Cost, Section G3, Project Cost Summary Report, Page 1). Drilling and blasting increase the cost of dredging by a factor of more than four, impacts the environment, and requires extensive monitoring. The justification for using drilling and blasting is that a punch barge was unable to excavate hard rock in Port Everglades in the early 1980s and that blasting was used recently in the Port of Miami. In Appendix F (Section G.5.2, table summarizing Abbreviated Risk Analysis, Risk Element Q3), the cost risk associated with underestimating the volume of rock requiring drilling and blasting is assessed to be of “significant consequence”, but the appendix also states that underestimating the rock volume would be very unlikely because it is assumed that additional geotechnical investigations before dredging will minimize this uncertainty.

A large cutterhead dredge is a potential alternative to drilling and blasting given the type of rock (limestone) and its strength (Figure A-57), which is noted to be a biased sampling of the hardest rock encountered). The possible advantages of this approach could be lower cost, less impact to the environment, and less cost risk associated with estimating the volume of hard rock. There will likely be significant uncertainty in the volume of hard rock even after conducting additional geotechnical investigations.

Significance – Medium

A more comprehensive assessment of possible alternatives to blasting, including project cost and environmental risks, will improve the completeness of the analyses supporting the TSP.

Recommendations for Resolution

1. Provide additional information about the method used to estimate the volume of hard rock. Include two plan views: one showing contours of depth to hard rock overlain by boring and probe locations, and another showing the thickness of hard rock to be excavated for the TSP.
2. Quantitatively assess the cost risk associated with underestimating the volume of hard rock, and explain how this risk has been addressed in estimating the project cost.
3. Provide additional information about recent experiences in dredging for the Port of Miami concerning the estimated versus actual quantities and costs for drilling and blasting.
4. Assess effects on costs and benefits to the environment if blasting were not used.

Final Panel Comment 8

There is an inconsistency between the Tentatively Selected Plan (TSP) and the engineering analyses regarding the extent, cost, and schedule of bulkhead work required before fully implementing the TSP.

Basis for Comment

The TSP includes:

- the construction of approximately 10,000 feet of new (environmentally friendly) bulkheads,
- the replacement of an unknown length of existing older (greater than 40 years) bulkheads in Berths 7 to 10 and 16 to 19 by constructing deeper bulkheads, and
- the reinforcement of an unknown length of existing newer (less than 40 years) bulkheads in Berths 30, 31, and 32 by constructing toe walls.

The estimated cost for this work is \$29 million to Port Everglades, which corresponds to a unit cost less than \$3,000 per foot of bulkhead construction. In addition, the TSP assumes that all existing bulkheads older than 40 years will be replaced by the Port before construction begins on the Federal Project in 2015 (according to the schedule in Appendix F, Section G4).

In contrast, Appendix A (Engineering), Sub-Appendix D (Structural Reports – Attachments A and B) includes the following recommendations for bulkheads:

- Replace instead of reinforce all existing bulkheads where stability is affected by channel deepening at an estimated unit cost of \$12,000 per foot;
- Use a unit cost of \$5,000 per foot to estimate the cost of reinforcing existing bulkheads with toe walls (although this approach is not recommended); and
- Replace all existing bulkheads at an estimated cost of \$12,000 per foot, or a total cost of about \$300 million over a period of 30 years (note that all existing bulkheads will be older than 40 years within this 30-year window).

Therefore, the extent of bulkhead work, the cost and schedule for performing this work, and the approach used to stabilize existing bulkheads affected by channel deepening are not consistent between the TSP and the engineering analyses. In addition, the probability and time required for the Port to complete substantial construction before the TSP is implemented are not addressed.

Significance – Medium

Replacement of existing bulkheads and construction of new bulkheads by the Port could delay implementation of the TSP and affect the project costs and benefits.

Recommendations for Resolution

1. Provide more information, including figures and graphics, for the lengths and lo-

cations of existing bulkheads that will either be replaced or reinforced before channel deepening.

2. Reconcile the apparent discrepancies between the TSP and the engineering analyses concerning the approach for reinforcing existing bulkheads and the costs and schedule for replacing and reinforcing existing bulkheads and constructing new bulkheads.
3. Address the feasibility and time required for the Port to complete the bulkhead work necessary to begin implementation of the TSP.

Final Panel Comment 9

Benefiting cargoes and commodities have not been clearly identified, and assumptions and growth rates between the present and 2017 are not well documented or explained.

Basis for Comment

The commodity forecasts (Feasibility Study and Appendix B) cover the period 2017-2067, but rely on assumptions regarding commodity and cargo growth between the present and 2017. Although the commodity and cargo forecasts appear reasonable, there is insufficient documentation to verify their reliability or the related reliability of project benefit estimates.

There is no clear identification of benefitting cargoes or commodities. It is therefore not possible to link the benefitting commodities and cargo flows to the benefitting vessels and cost savings.

Assumptions and growth rates for commodities and cargoes between the present (2010 or 2012) and 2017 are not well documented. Assumptions used in developing the growth rates need to be stated and explained in more detail. There is insufficient information on the 2010/2012 commodity volumes in the same format as the 2017-2067 forecasts. In Appendix B, Tables 11 (p. 24), 23 (p. 41), and 24 (p. 42) show the commodity tonnage records, growth rates, and forecasts in three different formats. A single table showing calendar year 2010, 2017, and 2067 tonnages for the benefitting commodities and cargoes with accompanying compound annual growth rates (CAGRs) would make the commodity and cargo forecasts more understandable.

The container cargo forecast is linked to, and is dependent on, an IHS Global Insight forecast (Appendix B, p. 40). Solid information on that forecast and its development and assumptions is not available in the text. Also, the Appendix B text states that the Global Insight projections are modified somewhat in this study; it is unclear what the original projections were, what they are based on, or how they were modified.

Significance – Medium

Undocumented and unverifiable commodity forecasts directly affect the reliability of the claimed benefits.

Recommendations for Resolution

1. Identify the benefitting commodities and the amounts and shares of benefits attributable to each.
2. Provide a single table showing CY 2010, 2017, and 2067 tonnages for the benefitting commodities with accompanying CAGRs.
3. Provide a detailed explanation, including sources, of expected 2010-2017 commodity growth.
4. Discuss the development of the commodity growth rates and any related assump-

tions in greater detail.

5. Provide in an appendix a copy of the IHS Global Insight forecast and discuss any IHS forecast modifications in Appendix B.

Final Panel Comment 10

The vessel fleet forecast is not well documented and the benefiting vessels have not been identified.

Basis for Comment

2010-2017 Changes in Vessel Fleet and Calls. The Appendix B analysis of project benefits (including Tables 28-30) focuses on the 2017-2067 period, without a clear explanation of the changes in vessel fleets, sailing drafts, and calls expected between 2010 and 2017. For example, Appendix B, Table 25, shows substantial increases in calls by Post-Panamax (PPX) container vessels (PPX1 and PPX2) without the project, which is counterintuitive. It is not clear if these increases assume significant light loading of the new deeper draft vessels; however, if this is the assumption, it could affect benefits realized by the project. Similarly, Appendix B, Table 33, shows a range of underkeel clearances (between 2 and 3.5 feet) of the vessels that are expected to call at Port Everglades in the future with- and without-project conditions. However, the text does not explain how those clearances are determined. These clearances do affect vessel type and loading factors.

Future With-Project Fleet Forecast. The text in Appendix B, pp. 47-50, does not support or explain the critical issue of vessel fleet, call, and draft forecasts. For example, no information is provided on distances traveled or comparative costs of different vessel sizes. The 2009 Market Assessment (Broward County, 2009) contains some helpful information, but does not include these specifics on vessel configuration and usage. The vessel forecast is linked to a Maritime Strategies International, Ltd. (MSI) study performed for Jacksonville (Appendix B, p. 48). No summary of those findings is provided to explain what was done, what conclusions were drawn, and how it applies to the specifics of Port Everglades.

Benefiting Vessels and Commodities. Additional information is needed to support the vessel cost savings analysis. Specifically, the analysis does not explain which vessels and vessel types and markets benefit from deepening versus widening, nor does it explain what portions of the benefits are attributable to each benefiting cargo type within those vessels.

Significance – Medium

A more detailed analysis of the vessel fleet, operation, and cost savings for Port Everglades will more clearly determine the extent of project benefits and verify the benefit-cost ratio.

Recommendations for Resolution

1. Explain the basis for anticipated changes in benefiting vessel fleet, sailing drafts, and calls between 2010 and 2017, including the application of the MSI study.
2. Explain the basis of the underkeel clearances used. It is unclear whether they

were based on historical/institutional fixed distance or perhaps a percent of draft. (Appendix B, Table 33)

3. Add text explaining the cost assumptions used, distances traveled, and cost differentials between smaller and larger vessels.
4. Add text comparing the with-project and without-project vessel fleet, call, and draft forecasts (Appendix B, Tables 28-30).
5. Indicate which vessels in the 2017-2067 forecast period would benefit from deepening and widening.
6. Explain the increase in future without project calls of PPX2 vessels (Appendix B, Tables 28-30, per July 19, 2013 mid-review conference call between Battelle, USACE, and the panel members).

Literature Cited

Broward County. (2009). 2009 Master/Vision Plan Report
<http://www.broward.org/Port/MasterPlan/Pages/2009Elements.aspx>

Final Panel Comment 11

The sensitivity analysis does not address container cargo volume, petroleum products cargo volume, or vessel fleet composition, all of which could affect the benefit-cost ratio (BCR).

Basis for Comment

During planning, the core of the risk and uncertainty process is to use sensitivity analysis to determine which variables and which assumptions are critical. The sensitivity analysis in the Feasibility Study, especially for the fleet and commodity growth over time, needs more explanation or more development. Generally, sensitivity analyses on variables such as fleet configuration and commodity projections would instill confidence in the selection of the Tentatively Selected Plan (TSP).

During the July 19, 2013, mid-review teleconference with the Panel, facilitated by Battelle, USACE indicated that sensitivity analysis was not done on discount rates other than 7%. The 7% rate drove the BCR well below unity; however, the results of running the analysis using rates between 3.75% and 7% are not included in the Feasibility Study. Conducting sensitivity analyses using these other rates is appropriate, especially since discount rates can be reasonably expected to increase by the time the components of the TSP will be implemented.

In addition, the sensitivity analysis does not provide sufficient detail. The “No Growth after Base Year” scenario assumes cargo growth between 2012 and 2017, and results in a 1.01 BCR – very close to a negative finding. The sensitivity analysis would be improved significantly if assumed cargo growth and changes in vessel movements between 2010/2012 and 2017 were included, as well as assumptions regarding projected container cargo, petroleum products cargo, and vessel fleet composition. For example, there is no information on how the BCR would change if there were no cargo growth between 2012 and 2017, or if cargo grew more slowly than forecasted. Further, there is no indication of how the BCR would change if ocean carriers did not shift to larger vessels to the extent or in the timeframe predicted.

Significance – Medium

Underdeveloped sensitivity analyses increase the uncertainty in the various projections that are critical to the benefits calculation and the BCR.

Recommendations for Resolution

1. Review all sensitivity analyses that have been done on the assumptions and major projections during the course of the Feasibility Study, and describe those sensitivity analyses and results in the project documentation.
2. If additional sensitivity analyses were not done, inventory the major assumptions of the analyses and sub-analyses, such as cargo growth and vessel fleet composition, and explain in the Feasibility Study why sensitivity analyses were not done.
3. Conduct sensitivity analyses on the critical variables identified in the previous

recommendation, detailing potential impacts on the BCR.

Final Panel Comment 12

The role of West Lake Park (WLP) with regard to the Port Everglades mitigation plan is not clearly presented, and WLP's current construction status is not well-defined.

Basis for Comment

A significant component of the Port Everglades mitigation plan, as defined in the Tentatively Selected Plan (TSP), involves WLP. Regional improvements that extend beyond the Port Everglades expansion requirements are intended to address ecosystem-level improvements through a comprehensive plan for the entire WLP area and the region. The relationship between WLP and the Port Everglades navigation improvement project is not clearly presented.

The Port Everglades mitigation plan (Section 4.4, p. 14) states that “unavoidable impacts to mangrove wetlands [from the Port Everglades project] will be mitigated by using credits (functional units) generated by habitat improvements at West Lake Park.” However, other sections of the plan state that the WLP project was not permitted as a “mitigation bank.” Therefore, no “credits” will be available for purchase by other public or private entities to offset impacts from other projects. The language of mitigation versus restoration and functional units versus credit is unclear. The limited discussion of WLP in the Feasibility Study leads to some confusion.

Including additional information regarding WLP would strengthen the Port Everglades project description. For example, incorporating the paragraph below, found in the EIS Appendix E Main Mitigation Memorandum of Record, would clarify the project objectives and provide important background information.

The WLP was designed to “provide up-front compensation to be used for wetland impacts associated with future Broward County projects. The County has proposed a mitigation plan for upland, wetland, and seagrass creation, restoration, enhancement and preservation of mangroves and seagrasses within West Lake Park in Broward County. The intention of the WLP project was so that ecological benefits generated from the proposed improvement may be used as mitigation to offset future estuarine wetland impacts associated, if appropriate, with projects conducted by or for Broward County. The Corps has determined that mitigation credits for this project was warranted and appropriate for use as mitigation on the Port Everglades Navigation Improvement project.”

In addition, the current status of WLP is not clearly described in the Feasibility Study. The Environmental Impact Statement (EIS) (p. 253) states that mitigation would be provided at WLP. According to websites identified by the Panel, the WLP construction is nearly complete. However, an e-mail from the U.S. Army Corps of Engineers (USACE) (USACE, 2013b) states that the project is still under construction. The EIS, Appendix E1 (pg.8) states “However, because mitigation construction has already been initiated,

revised UMAM calculations during the upcoming Preconstruction Engineering and Design (PED) phase of the project will likely indicate that fewer functional units will be required. This is because the time lag factor (time to which mitigation reaches full function) in UMAM will be reduced or nearly eliminated by the time impacts occur.” This suggests that the construction of the WLP is under way and that WLP will be functional by the time construction of the Port Everglades project begins. This assumption should be justified by providing the current status of the WLP project.

The TSP for the Port Everglades project provides clearly defined mitigation. The details of these mitigation efforts and monitoring plan are almost identical to components of the WLP mitigation plan. Including information on the status of WLP (and perhaps any available information that demonstrated the success of proposed methods and mitigation efforts implemented at WLP) would improve the Port Everglades Feasibility Study. If this information is not currently available, including this information as it becomes available would improve the Feasibility Study and enable adaptive management. For example, if a planting method is not successful in WLP, the method could be re-evaluated for use in the Port Everglades project.

The Feasibility Study’s discussion of long-term maintenance is limited to establishing success criteria and contingencies if these criteria are not met. The EIS (p. 268), states that

“A maintenance program shall be implemented in accordance with Attachment 5 for the enhancement/creation areas on a regular basis to ensure the integrity and viability of those areas as permitted. Maintenance shall be conducted in perpetuity to ensure that the enhancement/creation areas are maintained free from...exotic vegetation...immediately following a maintenance activity.”

Adding this sentence to the Feasibility Study would strengthen the Port Everglades project by providing assurance that the non-federal sponsor has agreed to finance maintenance of the restored system in perpetuity. This will also increase the likelihood of long-term success of the mitigation efforts.

Significance – Medium

A better description of the role and current status of the WLP project would improve the Port Everglades project documentation, especially the Port Everglades proposed mitigation plan.

Recommendations for Resolution

1. Clearly describe the WLP project’s role with regard to Port Everglades mitigation, and explain how the Port Everglades mitigation plan could be affected.
2. Define the current status of the WLP project.
3. Provide any monitoring information (from either the WLP project or the Port Everglades project) that demonstrates the success (or failure) of the proposed meth-

ods and/or mitigation efforts that apply to both projects.

4. Include adaptive management for the Port Everglades project, based on immediate results of the WLP project, if methods proved unsuccessful.
5. Add a sentence to Appendix E that obligates Broward County to long-term maintenance activities.

Literature Cited:

USACE (2013b). Port Everglades IEPR: Request for document. E-mail from Candida Bronson, U.S. Army Corps of Engineers, to Corey Wisneski, Battelle, dated August 2, 2013.

Final Panel Comment 13

The link between ocean currents, vessel accidents, and navigation safety improvements is not clear.

Basis for Comment

Increased safety is one of the stated objectives of the Port Everglades project. U.S. Coast Guard (USCG) collision/accident data (p. 56 of the Feasibility Study) for all areas of the port are provided. However, these data are not put into context by comparing them to other ports, normalizing them by vessel calls per year, or providing cause and magnitude information. In addition, the connection is not made between the Tentatively Selected Plan (TSP) and the elimination or minimization of collisions or accidents which would indicate if there are any safety benefits from the project.

Although the TSP did not provide evidence of maritime accidents (i.e., involving large ships) at the Port Everglades channel and associated waters, there is a body of anecdotal information on ships running aground, multiple small craft incidents (sinkings, collisions, near-misses, and other operator short comings) in the greater Broward County nearshore waters. Such anecdotal evidence is not part of the text of the report. Chronic small craft and yacht traffic in the Port Everglades channel and harbor is a difficult navigation problem facing large ships using the Port and this is not discussed in the Feasibility Study.

Significance – Low

Since safety is one of the objectives of the proposed project, the Feasibility Study needs to clearly document the current safety concerns and the potential benefits of the project.

Recommendations for Resolution

1. Examine and discuss the frequency and magnitude of Port Everglades accidents relative to the collision and accident data in other ports made available by the USCG, especially those in the southeastern United States.
2. Describe in detail the relationship between past incidents and how the TSP would reduce those incidents.
3. Relate the findings of the first two recommendations to the benefits claimed for safety improvements.

Final Panel Comment 14

The process of identifying alternatives did not include a structural solution to reducing the strong cross-currents in the Outer Entrance Channel (OEC).

Basis for Comment

The Feasibility Study (p. 62) lists unpredictable cross-currents in the OEC as a planning constraint rather than one of the problems to be solved. If the cross-current issue were framed as a problem, solutions (including at least one more structural solution) could be considered.

Structural solutions, such as extension of the north jetty or expansion of the spoil shoal on the north side of the OEC, could prevent adverse cross-currents, reduce northwest waves in the channel, and limit adverse conditions to deeper water where vessels have more maneuvering room.

A north-side protective structure may not be cost-effective, but including it in the project documentation will complete the analysis and clarify why the Tentatively Selected Plan was chosen.

Significance – Low

Including other structural options will improve the technical quality and completeness of the report.

Recommendations for Resolution

1. Include a structural option to reduce adverse cross-currents to the list of elements considered.

Final Panel Comment 15

The description of the mangrove environments does not include enough detail on the resident and transient avian populations, which can be a good indicator of mangrove vitality.

Basis for Comment

The Environmental Impact Statement (EIS) does not emphasize the importance of mangroves for bird rookeries and temporary roosting sites. If thriving colonies of nesting birds are found in the mangrove canopy, this is generally recognized as an indication that the ecosystem is in good status. For example, the Tampa Bay Estuary Program uses the mangrove nesting birds as one of many indicators for the environmental health of Tampa Bay (TBEP, 2013).

In addition, the baseline data provided for mangrove habitats is from 2008 and 2009 (EIS, pp. 93-99). The description of the project area's existing condition would be remarkably improved with more-current information on the status and trends of the mangrove waterfowl.

A number of environmental groups pay special attention to egrets, herons, bitterns, ibis, spoonbills, limpkins, curlews, willets, and other species that are obligate or facultative mangrove users. These groups might be good sources of more-recent data. For example, the Audubon Society's local chapter should have current bird count information.

Significance – Low

Additional information about the mangrove avian populations would improve the baseline information.

Recommendations for Resolution

1. Collect/compile more information about the local mangrove bird populations from the local Audubon Society; local, state, or federal resource agencies; and academic institutions.
2. Incorporate new information on avian populations into the EIS.
3. Consider adding mangrove avian fauna monitoring to the Port Everglades project.

Literature Cited:

TBEP (2013). A Portrait of the Tampa Bay Estuary. Tampa Bay Estuary Program website: <http://www.tbep.org/portrait/birds.html>. Accessed August 15, 2013.

Final Panel Comment 16

The Environmental Impact Statement (EIS) is based on information compiled in 2009 and earlier for seagrass, mangrove, and coral conditions; therefore, existing status and trends may not be current.

Basis for Comment

Baseline data for biological communities impacted by the Port Everglades project are important components for recovery and restoration (Likens, 1988; Kenchington, 1990; Magnuson, 1990; Jackson et al., 2012). Evaluating the recovery requires relatively recent baseline information to compare with the condition of the mitigated and impacted areas because the southeast Florida coastal ecosystem is prone to rapid change from natural perturbations.

The baseline data being used for the mangrove surveys date to 2007 and 2008; for seagrasses, the baseline data are from 2009; and for the hard bottom-reef, the data are from 2006 and 2009. The baseline for seagrass reported a trend showing increased coverage from 8.7 acres in 1999 to 12.0 acres in 2009; however, there appears to be a lack of information after 2009. Trends for mangroves or corals (hard bottom-reef) were not provided.

Baseline data will be problematic because the mangrove information is five and six years old, the seagrass information is four years old, and the hard bottom-reef information is four and seven years old. In addition, the start date for the Port Everglades project is a few years in the future, making the older baseline data even more dated. Natural events that occurred after the acquisition of the baseline data have resulted in changes to the system. For example, a severe polar air mass in 2010 had a major influence on the local area and resulted in mortalities in the reef system (sponges, octocorals, scleractinian corals) and other coastal elements (Lirman et al., 2011; Colella et al., 2012). Between 2009 and the present, the National Hurricane Center has documented multiple tropical storms and hurricanes that have passed near southeast Florida, resulting in disturbances to the mangrove, seagrass, and hard bottom-reef system (NOAA, 2013).

Significance – Low

The absence of accurate and current status and trends for the mangroves, seagrasses, and hard bottom-reef communities affects the completeness of the project and has implications for the future success of adaptive management and recovery.

Recommendations for Resolution

1. Acquire and compile more-recent information on mangrove, seagrass, and hard bottom-reef communities' status and trends. For the hard bottom-reef status and trends, data are available for Broward County from the Southeast Florida Coral Reef Evaluation and Monitoring Project.
2. Alternatively, require that baseline information be collected six months before the

Port Everglades project is initiated.

Literature Cited:

Colella, M.A., R.R. Ruzicka, J.A. Kidney, J.M. Morrison, and V.B. Brinkhuis. (2012). Cold-water event of January 2010 results in catastrophic benthic mortality on patch reefs in the Florida Keys. *Coral Reefs*, 31: 621-632. February.

Jackson, J.B.C. K. Alexander, and E. Sala (editors). (2012). *Shifting baselines: the past and the future of ocean fisheries*. Island Press, Washington, 482 pp.

Kenchington, R.A. (1990). *Managing marine environments*. Taylor and Francis Group. 248 pp.

Likens, G.E. (editor) (1988). *Long-term studies in ecology: approaches and alternatives*. Springer-Verlag. 214 pp.

Lirman, D.S., S. Schopmeyer, D. Manzello, L.J. Grammer, W.F. Precht, F. Muller-Karger, K. Banks, E. Bartels, A. Bourque, J. Byrne, S. Donahue, J. Duquesnel, L. Fisher, D. Gilliam, J. Hendee, M. Johnson, J. Maxwell, E. McDevitt, J. Monty, D. Rueda, R. Ruzicka, and S. Thanner. (2011). Severe 2010 cold-water event caused unprecedented mortality to corals of the Florida Reef Tract and reversed previous survivorship patterns. *PLoS One* 6(8): e23047.

Magnuson, J.J. (1990). Long-term ecological research and the invisible present. *BioScience*, 40(7): 495-501.

NOAA (2013). NHC Data Archive. National Weather Service, National Hurricane Center website. Last modified July 3, 2013. Accessed August 8, 2103. Available at <http://www.nhc.noaa.gov/data/>.

Final Panel Comment 17

The monitoring methodology for hard bottom mitigation sites is not described clearly enough to judge whether the acquired data will be useful for determining long-term trends.

Basis for Comment

Appendix E-1, p. 40, of the Environmental Impact Statement (EIS) states that the degree of settling and/or sand covering in hard bottom habitat

“...will be assessed by measuring the relief at each of the permanent quadrat stations established. Measurements will be taken with a weighted flexible tape from a point one meter shoreward of the quadrat benchmark to the surface of the water and from the top of the reef structure at the benchmark to the surface of the water, with the difference being the relief. The mean of five such measurements will be used to assess the degree of settling and/or sand covering of the materials.”

First, it is not clear if these five measurements will be collected as five subsamples in each permanent quadrat location or if they will be collected in five random quadrat locations across the general area. The variability of littoral processes results in site-specific transport and deposition of sand, which is generally very variable, due to changing currents and benthic microtopographic differences. There will likely be several areas with high deposition and several areas with little deposition. Therefore, in addition to analyzing these data to determine the mean, each independent quadrat site should be subsampled to determine a mean per quadrat. The variability in between each measurement may render the overall data insignificant if a general mean is calculated.

Second, using a weighted tape measure to assess benthic deposition does not appear to be a robust method, given wave action, varying tides, and strong currents. There are alternative methods that may provide more rigorous data sets—for example, drilling a stainless steel pin into the bottom next to the colony and measuring sediment accumulation, in conjunction with the use of sediment blocks. Although this is a standard method, it is not necessarily the best available method, but additional research to determine the best method for this site would strengthen the data generated for this project.

There are risks for the divers making ascents in a strong current. It is difficult to remain in position directly above a point on the sea floor. The ascent is the most complex and risky portion of the dive. Risks include but are not limited to entanglement in the tape measure, ascending too rapidly, leading to an arterial gas embolism, and being hit by a boat (NOAA, 2001). Using a steel rod driven into the sea floor and monitoring sediment level relative to the stake is a more accurate and safer method to study sedimentation (English and Baker, 1994; Rogers et al., 1994; Heine, 1999).

Significance – Low

The proposed method to obtain settlement and/or sand covering data may not enable analysts to accurately determine the sedimentation characteristics of hard bottom habitats; therefore, the true potential impacts may not be ascertained.

Recommendations for Resolution

1. Clearly describe whether the intent of the monitoring methodology is to obtain five subsamples at each quadrat location or to sample five discrete locations across the general area.
2. Adopt the more conservative approach of subsampling by collecting five such measurements at each quadrat.
3. Research and identify more robust methods to determine sedimentation impacts besides a weighted tape measure, given the nature of the environment.

Literature Cited:

English et al. (1994). Survey manual for tropical marine resources. S. English, C. Wilkinson, and V. Baker (editors), Australian Institute of Marine Science. 368 pp.

Heine, J.N. (1999). Scientific diving techniques: A practical guide for the research diver. Best Publishing, Flagstaff, Arizona. 224 pp.

NOAA (2001). NOAA Diving Manual: Diving for Science and Technology, fourth edition. U.S. Department of Commerce, National Oceanic and Atmospheric Administration. Best Publishing, Flagstaff, Arizona.

Rogers et al. (1994). Coral reef monitoring manual for the Caribbean and western Atlantic. C.S. Rogers, G. Garrison, R. Grober, Z-M Hillis, and M.A. Franke. U.S. National Park Service, St. John, U.S. Virgin Islands. 107 pp.

Final Panel Comment 18

The coral propagation alternative proposes the use of *Acropora cervicornis*, even though that coral species is not a principal component or common species in the local reef community.

Basis for Comment

The Tentatively Selected Plan (TSP) was unclear when designating which hard bottom-reef mitigation alternative was the preferred option. Surveys conducted in 2008 and 2010 found colonies of *Acropora cervicornis* in two locations that were beyond the expected indirect assessment area for the Port Everglades project (Environmental Impact Statement [EIS], p. 138). The species is spatially and temporally uncommon to rare in the Broward County hard bottom-reef communities (Jaap, 1998; Boulon et al., 2005). *A. cervicornis* is a poor candidate to use for compensatory restoration in this location.

Other scleractinian coral species are under experimental development for propagation from fragments in coral nurseries; however, currently there are no mass cultured species except *A. cervicornis*. Mass culture of *A. cervicornis* and other scleractinian coral species is discussed in detail (including availability) (EIS, Appendix E-4).

The goal of the hard bottom-reef mitigation is to replace the ecological services that were lost due to construction during the Port Everglades project. The replacement habitat should be closely similar to that which was lost. The use of limestone mitigation structures with multiple-species of coral colonies transplanted to the structures is a better and proven method that has been used successfully for two decades in Broward and Miami-Dade counties (Continental Shelf Associates, 2004, Jaap, 2000, ENSR, 2005; Jaap, 2002; Jaap et al., 2006; Sathe and Thanner, 2009; Thanner et al., 2006).

In addition, using a single species to compensate for loss of a multi-species complex is questionable. The Port Everglades project will result in injuries and losses to a suite of species, not just *A. cervicornis*. However, *A. cervicornis* cannot supply the ecological services that would be lost by damage to the local multi-species group: *Stephanocenia intersepta*, *Montastraea* spp., *Colpophyllia natans*, *Diploria* spp., *Solenastrea* spp., *Siderastrea siderea*, *Porites astreoides*, and others.

Significance – Low

The completeness of the mitigation would not be realized using *A. cervicornis* to mitigate for injuries.

Recommendations for Resolution

1. Implement the limestone boulder and coral transplanting mitigation-restoration option presented in the EIS.

Literature Cited:

- Boulon et al. (2005). Atlantic *Acropora* Status Review. R. Boulon, M. Chiappone, R. Halley, W.C. Jaap, B. Keller, W. Kruczynski, M. Miller, and C. Rogers. National Marine Fisheries Service, St. Petersburg, Florida. 202 pp.
- Collier et al. (2007). Rapid response and restoration for coral reefs injuries in southeast Florida: Guidelines and recommendations. C. Collier, R.E. Dodge, D. Gilliam, K. Gracie, L. Gregg, W.C. Jaap, M. Mastry, and N. Poulos. Southeast Florida Coral Reef Initiative, Florida Department of Environmental Protection, 57 pp.
- Continental Shelf Associates (2004). Monitoring reattached corals at the M/V *Firat* grounding site, surveys 1-4. Technical report to Polaris Applied Sciences and the Florida Marine Research Institute. CSA, Juno, Florida. 230 pp.
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- Jaap et al. (2006). Coral reef restoration with case studies from Florida, *in* Coral Reef Conservation, pp. 478-514. W.C. Jaap, J.H. Hudson, R.E. Dodge, D. Gilliam, and R. Shaul (authors). M. Cote and D. Reynolds (editors). Univ. Cambridge Press, Cambridge, United Kingdom.
- Sathe and Thanner (2009). Spatial array and depth study of Miami-Dade artificial reef modules. M. Sathe and S. Thanner. Report submitted to Florida Fish and Wildlife Conservation Commission, Fulfillment of Grant Agreement FWCC-08253 by Miami-Dade County Department of Environmental Resources Management. 39 pp.
- Thanner et al. (2006). Development of benthic and fish assemblages on artificial reefs materials compared to adjacent natural reef assemblages in Miami-Dade, Florida. S.E. Thanner, T.L. McIntosh, and S.M. Blair. B. Mar. Sci. 78(1): 57-70.

Final Panel Comment 19

The Feasibility Study and the Environmental Impact Statement are inconsistent with regard to the need for mitigation of benthic invertebrates.

Basis for Comment

The Feasibility Study and the Environmental Impact Statement (EIS) do not agree on the need for mitigation of benthic invertebrates. No mitigation is provided for benthic invertebrates in the Feasibility Study; for example, pg. ii. states “Compensatory mitigation is planned for unavoidable impacts to mangroves, sea grasses, hardbottom and coral reef habitats.” The explanation given for why mitigation is not included for benthic communities is that previous dredging-related studies have demonstrated a fairly rapid natural recovery; therefore, no additional mitigation is proposed.

In the EIS, Appendix E, the U.S. Army Corps of Engineers (USACE) guidance on mitigation states that mitigation will be conducted for “significant” ecological resources compared to the future-without-project condition. The habitat types noted in Table 1 classified as “Resources for which mitigation is proposed” are jurisdictional mangrove wetlands, seagrass beds, and hardbottom/reef habitats that have not been previously dredged. For areas within the Tentatively Selected Plan’s footprint that were previously dredged and which will return to their current state in a relatively short time period, such as silt/sand bottom and channel walls, mitigation will not be provided.

However, the Coastal Zone Management (CZM) Consistency Statement #10 in the EIS (Appendix C, pg. 2) states the following:

“Marine crustacean, shell and anadromous fishery resources will be temporarily impacted. Temporary and permanent impacts will occur within the marine and estuarine environment. These impacts will be mitigated.”

This inconsistency results in uncertainty about whether benthic invertebrates are included in the mitigation plan.

Significance – Low

The need for mitigation of benthic invertebrates has not been presented clearly; therefore, it is not clear if potential impacts will be mitigated.

Recommendations for Resolution

1. Resolve the inconsistencies between the Feasibility Study and Appendices C and E of the EIS regarding mitigation for benthic communities.
2. Define mitigation efforts, if any, for the benthic invertebrates in the proposed mitigation plan.

Final Panel Comment 20

The primary mitigation plan selects a non-conservative approach with minimum construction impacts to hard bottom habitats.

Basis for Comment

For the Habitat Equivalency Analysis (HEA), two impact scenarios were developed and considered: one in which impacts due to anchors/cables used for dredging occur in addition to the dredging “footprint” in the channel (Scenario 1), and another in which those impacts do *not* occur in addition to the dredging “footprint” in the channel (Scenario 2). Under Scenario 1, 32.30 acres of direct impacts would occur; under Scenario 2, 15.17 acres of direct impacts would occur.

The direct impacts and resulting mitigation requirements associated with Scenario 2 (i.e., approximately 19.5 acres created during mitigation) have been adopted to represent the primary mitigation plan. Mitigation for Scenario 1 is considered a contingency (given evidence that anchor/cable impacts are typically minimal and temporary) and would be carried out only if actual damages to reefs occurred due to anchor and cable impacts (and if such damages are verified by post-construction surveys).

While there is no technical difference in selecting Scenario 2 over Scenario 1, there is some concern with the selection of Scenario 2 because the onus is on the post-construction survey to demonstrate damage to obtain adequate mitigation. Under Scenario 1, full mitigation is planned from the outset, but if fewer impacts are demonstrated to have occurred, mitigation would not be required.

In addition, the post-construction survey schedule is not clearly stated. A conservative approach to assessing potential construction impacts in this sensitive ecosystem is warranted. Therefore, initially adopting Scenario 1 (and expecting construction impacts to occur) would be more conservative than adopting Scenario 2. The costs in the end would be the same, as the final need for mitigation would be determined by the post-construction survey.

Significance – Low

A more conservative approach to assessing potential construction impacts would demonstrate that the ecologically sensitive nature of the area is recognized, but overall mitigation costs would not be affected.

Recommendations for Resolution

1. Consider adopting Scenario 1 for the proposed impact determination.
2. If Scenario 1 is adopted, define the timeline for the post-construction survey.

Final Panel Comment 21

The criteria to evaluate the success of hard bottom benthic community colonization do not account for community structure-resemblance measurements.

Basis for Comment

The proposed standard for mitigation success is stated as follows: “75% of species found in the impact site shall be present in the mitigation site.” (Environmental Impact Statement [EIS], Appendix E5, p. 19). The precedent is that other mitigation projects in the region have used community resemblance as the basis for determining if the mitigation-restoration was successful (ENSR, 2005; Thanner et al., 2006; Sathe and Thanner, 2009).

The nominal approach based on marine community structure includes utilizing multivariate analyses and computing Bray Curtis similarities to compare reference and mitigation sites (Bloom, 1981; Field et al., 1982; Clarke et al., 2005). Bray Curtis coefficient triangular matrices are exhibited using non-metric multidimensional scaling ordination (MDS) and analysis of similarity (ANOSIM) tests for establishing similarities and dissimilarities between reference and mitigation sampling sites (Bray and Curtis, 1957; Kruskal, 1964; Clarke, 1993; Clarke et al., 2005; Clarke and Gorley, 2006). If the Bray-Curtis coefficient(s) for the mitigation is 75% similar to the reference site(s) and the ANOSIM test corroborates this finding (critical R value is within the 95% confidence histogram), the restoration-recovery is deemed successful. This method has precedence: it was used for the Bal Harbor (1999-2009) and the Gulfstream Natural Gas Pipeline (2001-2005) mitigation projects (ENSR, 2005; Thanner et al., 2006; Sathe and Thanner, 2009). Both projects had successful outcomes.

Significance – Low

The technical quality of the project and the mitigation evaluation would be improved by implementing the multivariate marine community approach.

Recommendations for Resolution

1. Redesign the success criteria for mitigation using the community resemblance multivariate approach.

Literature Cited

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Final Panel Comment 22

The mitigation plan does not take full advantage of the draft recommendations of the Port Everglades Reef Group (PERG), even though the scientific research component would strengthen the project and likely reduce future restoration costs.

Basis for Comment

The planning process for the Port Everglades project involved extensive coordination with multiple resource agencies to identify and minimize environmental impacts. The PERG was established in June 2002, as explained in EIS, Appendix E-1 (pg. 23) “to provide scientific, technical, and logistical guidance and expert advice regarding provision of mitigation for impacts to hardgrounds and reefs due to navigation improvements at Port Everglades.” PERG includes members from the Port, the United States Navy, Nova Southeastern University, the National Marine Fisheries Service, the Florida Keys National Marine Sanctuary, the Florida Department of Environmental Protection, Broward County, the U.S. Fish and Wildlife Service, and the Florida Fish and Wildlife Conservation Commission. The PERG has spent many hours meeting as needed, and the Feasibility Study (pg. 14) states that “to date PERG has made several good recommendations regarding potential mitigation options.”

The PERG recommendations included working with a variety of reef construction alternatives or even geometric placement options that would enable scientific research to determine optimal designs for reef development. These recommendations were eliminated from consideration in the mitigation plan because they were “out of scope.” However, in terms of present and future cumulative impacts, alternative reef construction and placement options may be a cost-effective investment to reduce future mitigation costs and optimize ecosystem services, target species recovery, and functionality in the Port Everglades project, increasing the likelihood of the project’s success.

The mitigation plan does not include many of the draft recommendations of PERG, although they could be reconsidered. Because the purpose of PERG was to provide recommendations, and because these recommendations would benefit future mitigation efforts, more of PERG’s recommendations warrant consideration. Although installation of artificial reefs meets this requirement, and research does not specifically and directly replace lost habitat function, research results may help resource managers better assess impacts and improve creation of viable habitats for this project and future projects. Indirect benefits like these are difficult to quantify but would strengthen the project.

Significance – Low

Implementing additional recommendations from PERG may reduce future project costs and improve the likelihood of successful restoration efforts for this project, and future projects, at little to no additional cost.

Recommendations for Resolution

1. Adopt additional PERG recommendations that have no initial costs, while increasing scientific knowledge of project restoration methods.
2. Consider potential indirect cost benefits on future projects that may result from adopting PERG recommendations that involve small increases in project costs.

APPENDIX B

**Final Charge to the Independent External Peer Review Panel
as Submitted to USACE on August 8, 2013**

on the

Port Everglades Feasibility Study IEPR

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**Charge Questions and Guidance to the Peer Reviewers
for the
Independent External Peer Review of the Port Everglades Harbor Feasibility Study,
Broward County, Florida**

BACKGROUND

The Port Everglades Harbor Federal Navigation Channel is located in the southeastern portion of Broward County at the adjoining city limits of Fort Lauderdale, Hollywood, and Dania Beach. It is 24 miles north of Miami and 323 miles south of Jacksonville, Florida.

The Port Everglades Harbor Feasibility Study is authorized through House Document 126, 103rd Congress, 1st Session, and House Document 144, 93rd Congress, 1st Session and other pertinent documents. The scope of the study investigates widening and deepening the channel from an existing inner harbor project depth of 42 feet to potential depths of 50 feet for the major channels and basins within the port including expansion of the Turning Notch.

OBJECTIVES

The objective of this work is to conduct an independent external peer review (IEPR) of the Port Everglades Harbor Feasibility Study, Broward County, Florida (hereinafter: Port Everglades IEPR) in accordance with the Department of the Army, USACE, Water Resources Policies and Authorities' *Civil Works Review* (EC 1165-2-214, dated December 15, 2012), and the Office of Management and Budget's *Final Information Quality Bulletin for Peer Review* (December 16, 2004).

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

The purpose of the IEPR is to assess the “adequacy and acceptability of the economic, engineering, and environmental methods, models, and analyses used” (EC 1165-2-214; p. D-4) for the Port Everglades IEPR documents. The IEPR will be limited to technical review and will not involve policy review. The IEPR will be conducted by subject matter experts (i.e., IEPR panel members) with extensive experience in hydraulic or civil engineering, geotechnical engineering, economics, plan formulation, biology, and real estate issues relevant to the project. They will also have experience applying their subject matter expertise to deep-draft navigation.

The Panel will be “charged” with responding to specific technical questions as well as providing a broad technical evaluation of the overall project. Per EC 1165-2-214, Appendix D, review panels should identify, explain, and comment upon assumptions that underlie all the analyses, as well as evaluate the soundness of models, surveys, investigations, and methods. Review panels should be able to evaluate whether the interpretations of analysis and the conclusions based on

analysis are reasonable. Reviews should focus on assumptions, data, methods, and models. The panel members may offer their opinions as to whether there are sufficient analyses upon which to base a recommendation.

DOCUMENTS PROVIDED

The following is a list of documents, supporting information, and reference materials that will be provided for the review.

Documents for Review

The following documents are to be reviewed by designated discipline:

Table 1. Documents to Be Reviewed

Title	Approx. No. of Pages	Required Disciplines
Draft Feasibility Report	163	All disciplines
Appendix A Engineering	129	Hydraulic or civil engineering; geotechnical engineering
Appendix B Economics	82	Economics; plan formulation, real estate
Appendix C Real Estate	16	Economics; plan formulation, real estate
Appendix E DMMP	32	All disciplines
Draft EIS	314	All disciplines
Appendix B 404b Eval	7	Biology (2)
Appendix C CZM Consistency	4	Biology (2)
Appendix E Mitigation Main	148	Biology (2)
Appendix E1 Mitigation Bank Permits	54	Biology (2)
Appendix E4 NOAA Mitigation Alternative	35	Biology (2)
Appendix E5 Revised Monitoring	20	Biology (2)
Appendix J HTRW	24	Biology (2); plan formulation; real estate
Total Page Count		1,028

Supporting Information

Table 2. Supplemental Documents

Title	Approx. No. of Pages	Required Disciplines
Feasibility Report, Appendix A, SubAppendix A	64	Hydraulic or civil engineering; geotechnical engineering
Feasibility Report, Appendix A, SubAppendix B	94	Hydraulic or civil engineering; geotechnical engineering
Feasibility Report, Appendix A, SubAppendix C	28	Hydraulic or civil engineering; geotechnical engineering
Feasibility Report, Appendix A, SubAppendix D1	37	Hydraulic or civil engineering; geotechnical engineering
Feasibility Report, Appendix A, SubAppendix D2	124	Hydraulic or civil engineering; geotechnical engineering
EIS, Appendix A, Correspondence	88	All disciplines
EIS, Appendix D1, Baseline Report	103	Biology (2)
EIS, Appendix D2, Benthic and Fish	143	Biology (2)
EIS, Appendix D3, Acropora Coral	14	Biology (2)
EIS, Appendix D4a, Seagrass 2009	23	Biology (2)
EIS, Appendix D4b, Seagrass 2006	18	Biology (2)
EIS, Appendix E2, Hardbottom	129	Biology (2)
EIS, Appendix E3, Reef Bottom Recommendations	48	Biology (2)
EIS, Appendix F, ESA Consultation	231	Biology (2)
EIS, Appendix G, Coordination Act	110	Biology (2)
EIS, Appendix H, NOAA Fisheries	47	Biology (2)
EIS, Appendix I, Historic Preservation	10	Economics; plan formulation, real estate
EIS, Appendix K, Mailing List	7	Economics; plan formulation, real estate
Total Page Count	1,318	

Documents for Reference

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

SCHEDULE

This final schedule is based on the June 21, 2013 receipt of the final review documents. The schedule will be revised upon receipt of final review documents.

Task	Action	Due Date
Conduct Peer Review	Battelle sends review documents to panel members	7/9/2013
	Battelle convenes kick-off meeting with panel members	7/10/2013
	Battelle convenes kick-off meeting with USACE and panel members	7/10/2013
	Battelle convenes mid-review teleconference for panel members to ask clarifying questions of USACE	7/17/2013
	Panel members complete their individual reviews	7/24/2013
Prepare Final Panel Comments and Final IEPR Report	Battelle provides panel members with talking points for Panel Review Teleconference	7/25/2013
	Battelle convenes Panel Review Teleconference	7/29/2013
	Battelle provides Final Panel Comment templates and instructions to panel members	7/29/2013
	Panel members provide draft Final Panel Comments to Battelle	8/2/2013
	Battelle provides feedback to panel members on draft Final Panel Comments; panel members revise Final Panel Comments	8/2-8/8/2013
	Battelle finalizes Final Panel Comments	8/8/2013
	Battelle provides Final IEPR Report to panel members for review	8/12/2013
	Panel members provide comments on Final IEPR Report	8/13/2013
	*Battelle submits Final IEPR Report to USACE	8/15/2013
Comment/Response Process	Battelle inputs Final Panel Comments to DrChecks and provides Final Panel Comment response template to USACE	8/16/2013
	Battelle convenes teleconference with Panel to review the Post-Final Panel Comment Response Process (if necessary)	8/16/2013
	USACE provides draft PDT Evaluator Responses to Battelle	8/22/2013
	Battelle provides the panel members the draft PDT Evaluator Responses	8/23/2013
	Panel members provide Battelle with draft BackCheck Responses	8/28/2013
	Battelle convenes teleconference with panel members to discuss draft BackCheck Responses	8/29/2013
	Battelle convenes Comment-Response Teleconference with panel members and USACE	8/30/2013
	USACE inputs final PDT final Evaluator Responses to DrChecks	9/5/2013
	Battelle provides PDT final Evaluator Responses to panel members	9/5/2013
	Panel members provide Battelle with final BackCheck Responses	9/10/2013

Task	Action	Due Date
	Battelle inputs the panel members' final BackCheck Responses to DrChecks	9/13/2013
	*Battelle submits pdf printout of DrChecks project file	9/16/2013
Civil Works Review Board (CWRB)	Panel prepares and/or reviews slides for CWRB	9/16-10/16
	Civil Works Review Board	10/22/2013

CHARGE FOR PEER REVIEW

Members of this IEPR Panel are asked to determine whether the technical approach and scientific rationale presented in the Port Everglades IEPR documents are credible and whether the conclusions are valid. The Panel is asked to determine whether the technical work is adequate, competently performed, properly documented, satisfies established quality requirements, and yields scientifically credible conclusions. The Panel is being asked to provide feedback on the economic, engineering, environmental resources, and plan formulation. The panel members are not being asked whether they would have conducted the work in a similar manner.

Specific questions for the Panel (by report section or Appendix) are included in the general charge guidance, which is provided below.

General Charge Guidance

Please answer the scientific and technical questions listed below and conduct a broad overview of the Port Everglades IEPR documents. Please focus your review on the review materials assigned to your discipline/area of expertise and technical knowledge. Even though there are some sections with no questions associated with them, that does not mean that you cannot comment on them. Please feel free to make any relevant and appropriate comment on any of the sections and appendices you were asked to review. In addition, please note the following guidance. Note that the Panel will be asked to provide an overall statement related to 2 and 3 below per USACE guidance (EC 1165-2-214; Appendix D).

1. Your response to the charge questions should not be limited to a “yes” or “no.” Please provide complete answers to fully explain your response.
2. Assess the adequacy and acceptability of the economic and environmental assumptions and projections, project evaluation data, and any biological opinions of the project study.
3. Assess the adequacy and acceptability of the economic analyses, environmental analyses, engineering analyses, formulation of alternative plans, methods for integrating risk and uncertainty, and models used in evaluating economic or environmental impacts of the proposed project.
4. If appropriate, offer opinions as to whether there are sufficient analyses upon which to base a recommendation.
5. Identify, explain, and comment upon assumptions that underlie all the analyses, as well as evaluate the soundness of models, surveys, investigations, and methods.

6. Evaluate whether the interpretations of analysis and the conclusions based on analysis are reasonable
7. Please focus the review on assumptions, data, methods, and models.

Please **do not** make recommendations on whether a particular alternative should be implemented, or whether you would have conducted the work in a similar manner. Also please **do not** comment on or make recommendations on policy issues and decision making. Comments should be provided based on your professional judgment, **not** the legality of the document.

1. If desired, panel members can contact one another. However, panel members **should not** contact anyone who is or was involved in the project, prepared the subject documents, or was part of the USACE Agency Technical Review (ATR).
2. Please contact the Battelle Project Manager (Corey Wisneski, wisneskic@battelle.org) or Program Manager (Karen Johnson-Young (johnson-youngk@battelle.org)) for requests or additional information.
3. In case of media contact, notify the Battelle Program Manager, Karen Johnson-Young (johnson-youngk@battelle.org) immediately.
4. Your name will appear as one of the panel members in the peer review. Your comments will be included in the Final IEPR Report, but will remain anonymous.

Please submit your comments in electronic form to Corey Wisneski, wisneskic@battelle.org, no later than July 24, 2013, 10 pm ET.

**Independent External Peer Review
of the
Port Everglades Harbor Feasibility Study, Broward County, Florida**

Charge Questions and Relevant Sections as Supplied by USACE

General Charge Questions

1. Are the assumptions that underlie the economic, engineering, environmental, and plan formulation 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 in the analyses used in the appropriate manner?
4. In your opinion, are there sufficient analyses upon which to base the recommendation?

Specific Charge Questions

Introduction, Purpose, and Scope

5. Is the discussion on the project's introduction, purpose and scope adequate?
6. Should any additional information be included in this section?
7. Does the information provided clearly describe the project and fully explain the navigation-related conditions at the project site? What other information, if any, should be included in this section?

Existing and Future Without Project Conditions

8. Do you agree with the general analyses of the economic, navigation, and natural environments of the port?
9. For your particular area of expertise, provide an in-depth review of whether the analyses of the economic, navigation, and natural environments within the project area are sufficient to support the estimate of impacts for the alternatives.
10. Given your area of expertise, does this section appropriately discuss the existing conditions of all resources pertinent to the study?
11. Was the discussion of the economic and navigation sufficient to characterize current baseline conditions and to allow for evaluation of forecasted conditions (with and without the recommended plan)?

12. Do the existing and historical conditions accurately describe the current commodity movements through the study area?
13. Are the assumptions regarding future commodity and ship movements through the study area reasonable and supported?

Plan Formulation

14. Comment on the Planning Process. Has the USACE 6-Step Planning Process been followed?
15. Are there any additional problems, opportunities, constraints, or objectives that should be considered to ensure that the project's goals are reached?
16. Was a reasonably complete array of possible management measures considered in the development of alternatives?
17. Did the formulation process follow the requirement to avoid, minimize, and then mitigate adverse impacts on resources?
18. Does each alternative meet the formulation criteria of being effective, efficient, complete, and acceptable?

Tentatively Selected Plan (Recommended Plan)

19. Discuss the Selected Plan and whether the level of detail is sufficient to identify a TSP.
20. Discuss the extent to which need for land, easements, rights of way, relocations, borrow, disposal, and mitigation are clearly and adequately explained and costs justified.

Tentatively Selected Plan Implementation (Recommended Plan)

21. Are the changes between the without and with project conditions adequately described for the Tentative Selected Plan?
22. Are the uncertainties inherent in the evaluation of the impacts to the economic, navigation, and natural environment and any risks associated with those uncertainties, adequately addressed and described for the Tentatively Selected Plan?

Recommendations

23. Comment on the extent to which the recommendations are consistent with and justified by the Feasibility Report/Environmental Impact Statement.

References

No specific questions.

Appendix A: Engineering

24. Comment on the adequacy and accuracy of the assumptions, models, and data used in the hydrodynamic modeling.
25. Comment on the adequacy and accuracy of the assumptions, models, and data used in the geotechnical investigations.

Appendix B: Economics

26. Comment on the adequacy and accuracy of the assumptions, models, and scenarios used to calculate benefits.
27. Comment on the accuracy of the description of expected future conditions.
28. Comment on the method used to calculate the National Economic Development (NED) benefits.
29. Comment on whether the range of commodity growth scenarios is adequate to account for uncertainty in the estimates.

Appendix C: Real Estate

30. Have the need for any land, easements, rights-of-way, relocations, disposal areas, and mitigation been clearly and adequately explained?
31. Have all real estate requirements for Corps projects been satisfied by this study documentation?

Appendix D: Pertinent Correspondence

No specific questions.

Appendix E: Dredge Material Management Plan

32. Does the DMMP provide appropriate analysis to demonstrate that the operations and maintenance project would be dredged in a economic, engineering and environmentally acceptable manner?
33. Does the DMMP demonstrate that adequate dredged material disposal capacity exists for a 20-year project life?

Appendix F: Cost Engineering

34. Was the methodology used to develop the Total Project Cost estimate adequate and val-

id?

35. Is the final cost estimate reliable, accurate, and justified?
36. Were the methods used in the risk and uncertainty analysis adequate and valid?
37. Are the results of the risk and uncertainty analysis reliable and accurate?
38. To what extent have significant project construction costs been adequately identified and described?

Draft EIS

39. Do you agree with the general analyses of the natural environments of the port?
40. For your particular area of expertise, provide an in-depth review of whether the analyses of the natural environments within the project area are sufficient to support the estimate of impacts for the alternatives.
41. Given your area of expertise, does this section appropriately address the existing conditions of all resources pertinent to the study?
42. Was the discussion of the natural environment sufficient to characterize current baseline conditions and to allow for evaluation of forecasted conditions (with and without the recommended plan)?
43. Did the evaluation process follow the requirement to avoid, minimize, and then mitigate adverse impacts on resources?
44. Did the study address those resources identified during the scoping process as important in making decisions relating to the study?
45. 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?
46. Given your area of expertise, does this section appropriately address the potential impacts of the Tentative Selected Plan on all resources pertinent to the study?
47. Comment on the ability of the proposed mitigation plan to address adverse impacts from the project.
48. Have all NEPA requirements been met for his project?

Overview Questions

49. What is the most important concern you have with the document or its appendices that was not covered in your answers to the questions above?

50. Please provide positive feedback on the project and/or review documents.

Appendix B: 404b Evaluation

No specific questions

Appendix C: CZM Consistency

No specific questions

Appendix E: Mitigation Main Report

No specific questions

Appendix E1: Mitigation Bank Permits

No specific questions

Appendix E4: NOAA Mitigation Alternatives

No specific questions

Appendix E5: Revised Monitoring

No specific questions

Appendix J: HTRW

No specific questions