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# Science Reports for the Port Everglades Harbor, Florida, Feasibility Study and Environmental Impact Statement (EIS)

Prepared by
Battelle Memorial Institute

Prepared for
Department of the Army
U.S. Army Corps of Engineers
Ecosystem Restoration Planning Center of Expertise
Rock Island District

Contract No. W912HQ-10-D-0002
Task Order: 0015

August 17, 2011

# Final Independent External Peer Review Report

# Science Reports for the Port Everglades Harbor, Florida, Feasibility Study and Environmental Impact Statement (EIS)

**by**

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

**for**

**Department of the Army**
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# FINAL
# INDEPENDENT EXTERNAL PEER REVIEW REPORT
# for the

# Science Reports for the Port Everglades Harbor, Florida, Feasibility Study and Environmental Impact Statement (EIS)

## EXECUTIVE SUMMARY

### Project Background and Purpose

The Port Everglades Harbor Federal Navigation Channel is located in southeast Florida approximately 23 miles north of Miami, Florida, on the Atlantic coast. The primary issue in the Port Everglades Harbor area and the present scope of the feasibility study is widening and deepening the major channels and basins within the Port, including the potential expansion of the Dania Cutoff Canal and the Southport Channel turning basin. This Independent External Peer Review (IEPR) is a review of the science reports that have been used to develop the Feasibility Study and Environmental Impact Statement (EIS) for the project.

### Independent External Peer Review Process

USACE is conducting an IEPR of the Science Reports for the Port Everglades Harbor, Florida, Feasibility Study and EIS (hereinafter Port Everglades Science Reports). Battelle, as a 501(c)(3) non-profit science and technology organization with experience in establishing and administering peer review panels for USACE, was engaged to coordinate the IEPR of the Port Everglades Science Reports. 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 (2010), USACE (2007), 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).

Three panel members were selected for the IEPR from more than 20 identified candidates. Based on the technical content of the Port Everglades Science Reports and the overall scope of the project, the final panel members were selected for their technical expertise in the following key areas: environmental engineering or biology (seagrass); environmental engineering or biology (coral reef/hardbottom); and environmental engineering or biology (analytical modeling/Habitat Equivalency Analysis (HEA)). USACE was given the list of candidate panel members, but Battelle made the final selection of the Panel.

The Panel received electronic versions of the Port Everglades Science Reports documents, totaling more than 400 pages, along with a charge that solicited comments on specific sections of the documents to be reviewed. The charge was prepared by USACE according to guidance provided in USACE (2010) and OMB (2004). Charge questions were provided by USACE and included in the draft and final Work Plans.

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. In addition to this teleconference, a teleconference with USACE, the Panel, and Battelle was held halfway through the review period to provide the Panel an opportunity to ask questions of USACE and clarify uncertainties. The Panel produced more than 65 individual comments in response to the 15 charge questions.

IEPR panel members reviewed the Port Everglades Science Reports 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, eight Final Panel Comments were identified and documented. Of these, six had medium significance and two had low significance.

**Results of the Independent External Peer Review**

USACE guidance (2010) states the final report will contain the Panel's "assessment of the adequacy and acceptability of the economic, engineering, and environmental methods, models, and analyses used." However, for the IEPR of the Port Everglades Science Reports, the Panel focused on the environmental and modeling aspects of the review documents; no economic or engineering assessment was conducted. The Panel agreed on its assessment of the adequacy and acceptability of the environmental and modeling methods, models, and analyses used in the Port Everglades Science Report documents. Table ES-1 lists the Final Panel Comments by level of significance. The full text of the Final Panel Comments is presented in Appendix A of this report. The following statements summarize the Panel's findings.

**Environmental:** Overall, the Port Everglades Science Reports are adequate for assessing project impacts on some environmental resources in the Port Everglades Action Area (AA) and the Panel found that the recently updated seagrass and hardbottom data are generally sufficient. However, the reviewed documents do not address all the requirements of the Endangered Species Act (ESA), National Environmental Policy Act (NEPA), and Water Resources Development Act (WRDA). Specifically, a complete analysis of the indirect and cumulative impacts is not provided and neither are avoidance, minimization, and mitigation measures for unavoidable impacts to identified resources and ESA-listed species such as the federally threatened Johnson's seagrass (*Halophila johnsonii*). Moreover, since the Environmental Baseline Study is more than 10 years old, it contains outdated information and is not well integrated with the more updated reports. Finally, ocean current modeling in the vicinity of the Outer Entrance Channel (OEC) and graphics showing potential dredged sediment plumes are not presented.

**Modeling:** The use of the HEA model analysis to determine the required mitigation for the hardbottom resources and reef impacts is adequate, but the HEA analysis for hardbottom communities is incomplete and there is no similar functional analysis for seagrass and mangrove habitat impacts. The benthic community baseline for the hardbottom resources should be clearly correlated to the service levels specified in the HEA model analysis of the reef recovery at the

post-impact and mitigation sites. The Panel has also identified issues with the modeling assumptions, mitigation options, and monitoring strategy. In particular, the Panel is concerned about the unsupported assumptions used in the model analysis, the efficacy of mitigation boulders, and the lack of monitoring. The artificial reef boulders appear to be a key feature of the reef mitigation, but no monitoring program is presented to judge how they are meeting the mitigation requirements.

**Table ES-1. Overview of Eight Final Panel Comments Identified by the Port Everglades Science Reports IEPR Panel**

| | |
|---|---|
| **Significance – Medium** | |
| 1 | The direct, indirect, and cumulative impacts of the proposed project alternatives on the terrestrial and marine habitats and ESA-listed species are partially based on outdated or incomplete information. |
| 2 | The EBS and Science Reports do not include a clear discussion of the project alternatives relative to avoidance, minimization, and mitigation pursuant to NEPA and Water Resources Defense Act (WRDA) 2007 guidance. |
| 3 | Some of the assumptions made for the HEA model analysis, especially regarding recovery service levels, have not been clearly presented or justified. |
| 4 | The statement in the Hardbottom Report that sedimentation would have "insignificant" impacts on threatened corals is not supported. |
| 5 | The Mitigation Requirements Analysis for Hardbottom Resources report (Hardbottom Report) does not fully evaluate the mitigation options and does not set a clear habitat baseline for reef mitigation recovery. |
| 6 | The methods of mapping terrestrial communities such as mangroves are not well defined in the EBS and there is insufficient quantitative information on mangrove community characteristics. |
| **Significance – Low** | |
| 7 | Information on quality assurance/quality control (QA/QC) procedures and mapping methodology is too limited to assess the accuracy and reliability of the submerged aquatic vegetation (SAV) data collection and mapping efforts. |
| 8 | The project's collection of science reports is not organized, which hampers an efficient evaluation of the findings. |

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## LIST OF ACRONYMS

| | |
|---|---|
| AA | Action Area |
| ADCP | Acousitc Doppler Current Profiler |
| ATR | Agency Technical Review |
| COI | Conflict of Interest |
| DrChecks | Design Review and Checking System |
| EBS | Environmental Baseline Study |
| EIS | Environmental Impact Statement |
| EFH | Essential Fish Habitat |
| ESA | Endangered Species Ac |
| FLDEP | Florida Department of Environmental Protectiont |
| FLUCCS | Florida Land Use and Cover Classification System |
| FWCA | Fish and Wildlife Coordination Act |
| GNOME | General NOAA Oil Monitoring Environment program |
| HEA | Habitat Equivalency Analysis |
| IEPR | Independent External Peer Review |
| NEPA | National Environmental Policy Act |
| NMFS | National Marine Fisheries Service |
| NOAA | National Oceanic and Atmospheric Administrations |
| NTP | Notice to Proceed |
| O&M | Operations and Maintenance |
| OEC | Outer Entrance Channel |
| OMB | Office of Management and Budget |
| POP | period of performance |
| QA/QC | quality assurance/quality control |
| SAV | submerged aquatic vegetation |
| SFWMD | South Florida Water Management District |
| USACE | United States Army Corps of Engineers |
| USEPA | United States Environmental Protection Agency |
| WRDA | Water Resources Development Act |

# 1. INTRODUCTION

The Port Everglades Harbor Federal Navigation Channel is located in southeast Florida approximately 23 miles north of Miami, Florida on the Atlantic coast. The primary issue in the Port Everglades Harbor area and the present scope of the feasibility study is widening and deepening the major channels and basins within the Port, including the potential expansion of the Dania Cutoff Canal and the Southport Channel turning basin. This Independent External Peer Review (IEPR) is a review of the science reports that have been used to develop the Feasibility Study and Environmental Impact Statement (EIS) for the project.

The objective of the work described here was to conduct an IEPR of the Science Reports for the Port Everglades Harbor, Florida, Feasibility Study and EIS (hereinafter Port Everglades Science Reports) in accordance with procedures described in the Department of the Army, U.S. Army Corps of Engineers (USACE) Engineer Circular *Civil Works Review Policy* (EC No. 1165-2-209) (USACE, 2010), USACE CECW-CP memorandum *Peer Review Process* (USACE, 2007), and Office of Management and Budget (OMB) bulletin *Final Information Quality Bulletin for Peer Review* (OMB, 2004). Battelle, as a 501(c)(3) non-profit science and technology organization with experience in establishing and administering peer review panels, was engaged to coordinate the IEPR of the Port Everglades Science Reports. 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 environmental, economic, and engineering analyses contained in the Port Everglades Science Reports. 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 (2010) and USACE (2007).

In general, the purpose of peer review is to strengthen the quality and credibility of 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 Science Reports was conducted and managed using contract support from Battelle, which is an Outside Eligible Organization 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 (2010) and in accordance with USACE (2007) and 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 (POP), 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.

Table 1 presents the schedule followed in executing the IEPR. Due dates for milestones and deliverables are based on the POP start date of June 10, 2011. Note that the work items listed in Task 7 occur after the submission of this report. Battelle will enter the eight 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.

## 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: environmental engineering or biology (seagrass); environmental engineering or biology (coral reef/hardbottom); and environmental engineering or biology (analytical modeling/Habitat Equivalency Analysis or HEA). These areas correspond to the technical content of the Port Everglades Science Reports and overall scope of the Port Everglades project.

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 initially identified more than 20 candidates for the Panel, evaluated their technical expertise, and inquired about potential COIs. Of these, Battelle chose six of the most qualified candidates and confirmed their interest and availability. Of the six candidates, three were proposed for the final Panel and three as backup reviewers. Information about the candidate panel members, including brief biographical information, highest level of education attained, and years of experience, was provided to USACE for feedback. Battelle made the final selection of panel members according to the selection criteria described in the Work Plan.

**Table 1. Port Everglades Science Reports IEPR Schedule**

| TASK | ACTION | DUE DATE |
|---|---|---|
| 1 | **POP Start Date** | June 10, 2011 |
| | **Review documents available** | June 10, 2011 |
| | Battelle submits draft Work Plan[a] | June 17, 2011 |
| | USACE provides comments on draft Work Plan | June 28, 2011 |
| | Battelle convenes teleconference (if necessary) | June 28, 2011 |
| | Battelle submits final Work Plan[a] | July 1, 2011 |
| 2 | Battelle requests input from USACE on the conflict of interest (COI) questionnaire | June 14, 2011 |
| | USACE provides comments on COI questionnaire | June 15, 2011 |
| | Battelle submits list of no more that 3 selected panel members[a] | June 24, 2011 |
| | USACE confirms panel members have no COI | June 28, 2011 |
| | Battelle completes subcontracts for panel members | July 13, 2011 |
| 3 | USACE provides Charge to be included in Work Plan | June 17, 2011 |
| 4 | USACE/Battelle hold kick-off meeting | June 17, 2011 |
| | Battelle sends review documents to IEPR Panel | July 14, 2011 |
| | USACE/Battelle/Panel hold kick-off meeting | July 15, 2011 |
| 4A | Battelle convenes mid-review teleconference for Panel to ask clarifying questions of USACE | July 21, 2011 |
| 5 | Panel members complete their individual reviews | July 26, 2011 |
| | Battelle provides Panel merged individual comments and talking points for Panel Review Teleconference | July 28, 2011 |
| | Panel members provide draft Final Panel Comments to Battelle | August 5, 2011 |
| 6 | Battelle submits Final IEPR Report to USACE[a] | August 17, 2011 |
| 7[b] | Battelle convenes teleconference with USACE to review the Comment Response Process | August 19, 2011 |
| | USACE provides draft Evaluator Responses to Battelle | August 24, 2011 |
| | Battelle convenes teleconference with Panel and USACE to discuss Final Panel Comments, and draft responses | Sept. 1, 2011 |
| | USACE inputs final Evaluator Responses in DrChecks | Sept. 8, 2011 |
| | Battelle inputs the Panel's BackCheck Responses in DrChecks | Sept. 13, 2011 |
| | Battelle submits pdf printout of DrChecks project file[a] | Sept. 14, 2011 |
| | Project Closeout | Nov. 18, 2011 |

[a] Deliverable.

[b] Task 7 occurs after the submission of this report.

The three proposed primary 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.

- Involvement by you or your firm[1] in any part of the Port Everglades, Florida Feasibility Study and Environmental Impact Statement, including the following documents/reports:
    - Environmental Baseline Study and Impact Assessment for Port Everglades Harbor (May 2001)
    - Seagrass Mapping and Assessment, Port Everglades Harbor: Final Report (October 2006)
    - Seagrass Mapping and Assessment, Port Everglades Harbor: Final Report (December 2009)
    - Benthic and Fish Community Assessment At Port Everglades Harbor Entrance Channel (December 2009)
    - Mitigation Requirements Analysis for Hardbottom Resources Associated with Port Everglades Harbor Navigation Improvements (rev. November 2010).
- Involvement by you or your firm[1] in navigation or ecosystem restoration projects in southeastern Florida.
- Involvement by you or your firm[1] in Port Everglades, Florida-related projects.
- Involvement by you or your firm[1] in the conceptual or actual design, construction, or operations and maintenance (O&M) of any projects in the Port Everglades, Florida, area.
- Current employment by USACE.
- Involvement with paid or unpaid expert testimony related to the Port Everglades, Florida Feasibility Study and Environmental Impact Statement.
- 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), Environmental Protection Agency (EPA), Florida Department of Environmental Protection (FLDEP), Florida Fish and

[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."

Wildlife Conservation Commission, U.S. Fish and Wildlife Service, U.S. Coast Guard, or the Broward County Board of County Commissioners (for pay or pro bono).

- Past, current or future interests or involvements (financial or otherwise) by you, your spouse or children related to southeast Florida.
- Current personal involvement with other USACE projects, including whether involvement was to author any manuals or guidance documents for USACE. If yes, provide titles of documents or description of project, dates, and location (USACE district, division, Headquarters, ERDC, etc.), and position/role. Please highlight and discuss in greater detail any projects that are specifically with the Jacksonville District.
- Current firm[1] 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.
- Any previous employment by USACE as a direct employee or contractor (either as an individual or through your firm[1]) 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 navigation or ecosystem restoration, 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 related contracts/awards from USACE.
- A significant portion (i.e., greater than 50%) of personal or firm[1] revenues within the last 3 years came from USACE contracts.
- 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 prior Federal studies relevant to this project, including but not limited to:
    - Final Environmental Impact Statement (EIS) for Designation of the Palm Beach Harbor Ocean Dredged Material Disposal Site and the Port Everglades Harbor Ocean Dredged Material Disposal Site. Palm Beach and Broward Counties. (EPA, July 2004)
    - Maintenance Dredging - Port Everglades Entrance Channel, Broward County, Florida. (USACE, Nov. 2003)
    - Navigation Study for Port Everglades Harbor, Florida, Feasibility Report and Environmental Assessment (USACE, 1990)
    - Final Environmental Impact Statement, Proposed Expansion Port Everglades, Broward County, Florida. (USACE, 1987).
- Participation in prior non-Federal studies relevant to this project

- Is there any past, present, or future activity, relationship, or interest (financial or otherwise) that could make it appear that you would be unable to provide unbiased services on this project? If so, please describe.

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

Prior to beginning their review and within two days 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.

## 3.3 Preparation of the Charge and Conduct of the IEPR

Charge questions were provided by USACE and were included in the draft and final Work Plans. In addition to a list of 15 charge questions/discussion points, the final charge included general guidance for the Panel on the conduct of the peer review (provided in Appendix B of this report).

Battelle planned and facilitated a final kick-off meeting via teleconference during which USACE presented project details to the Panel. Before the meeting, the IEPR Panel received an electronic version of the final charge, as well as the Port Everglades Science Reports 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.

- **Environmental Baseline Study and Impact Assessment for Port Everglades Harbor**
  - **Seagrass Mapping and Assessment - 2006 – file names:**
    - **2006 Final PE Seagrass Rpt.pdf**
    - **2006_seagrass_distribution.pdf**
    - **Comparison of Seagrass Acreage 2001 to 2006.pdf**
    - **Comparison of Seagrass Acreage 2001 to 2006.xls**
    - **Final PE Seagrass Rpt.pdf**
  - **Seagrass Mapping and Assessment – 2009**
- **Benthic and Fish Community Assessment at Port Everglades Harbor Entrance Channel**
- **Mitigation Requirements Analysis for Hardbottom Resources Associated with Port Everglades Harbor Navigation Improvements**
- USACE guidance *Civil Works Review Policy* (EC 1165-2-209) dated January 31, 2010
- CECW-CP Memorandum dated March 31, 2007

- Office of Management and Budget's *Final Information Quality Bulletin for Peer Review* released December 16, 2004

About halfway through the review of the Port Everglades Science Reports 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. In addition, throughout the review period, USACE provided additional documents at the request of panel members. These additional documents were provided to Battelle and then disseminated to the Panel as supplemental information only and were not part of the official review. During the review process, the Panel requested the following supplemental information from USACE:

- A detailed bathymetric survey of the Project Action Area;
- The raw seagrass data sheets from 1999, 2006, and 2009.

## 3.4 Review of Individual Comments

The Panel was instructed to address the charge questions/discussion points on a comment-response form provided by Battelle. At the end of the review period, the Panel produced approximately 65 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 65 comments into a preliminary list of 13 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 3-hour teleconference with the Panel so that the panel members, many of whom are from diverse scientific backgrounds, 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.

The Panel also discussed responses to three specific charge questions where there appeared to be disagreement among panel members. The conflicting comments were resolved based on the professional judgment of the Panel, and all sets of comments were determined not to be conflicting. Each comment was either incorporated into a Final Panel Comment, determined to be consistent with other Final Panel Comments already developed, or determined to be a non-significant issue.

At the end of these discussions, the Panel identified eight 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 Science Reports:

- 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 other IEPR 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).

At the end of this process, eight Final Panel Comments were prepared and assembled. Battelle reviewed and edited the Final Panel Comments for clarity, consistency with the comment statement, and adherence to guidance on the Panel's overall charge, which included ensuring that there were no comments regarding either the appropriateness of the selected alternative or USACE policy. There was no direct communication between the Panel and USACE during the preparation of the Final Panel Comments. The full text of the Final Panel Comments is 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 three primary 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 Science Reports IEPR Panel: Technical Criteria and Areas of Expertise**

| Technical Criteria and Areas of Expertise | Bottone | Ogden | Lin |
|---|---|---|---|
| **Environmental Engineering or Biology (seagrass expert)** | **X** | | |
| Scientist from academia, a public agency, non-governmental entity or architect-engineer or consulting firm with a minimum of 10 years demonstrated experience with tropical and subtropical seagrass habitats and associated marine life habitats | **X** | **X** | **X** |
| Expert in seagrass impact assessment methods and mitigation requirements and methods | **X** | **X** | **X** |
| Knowledge of the ecological value of seagrass resources in coastal environments | **X** | **X** | **X** |
| Knowledge of survey and evaluation methodologies for seagrass resources in coastal environments | **X** | **X** | **X** |
| M.S. degree or higher in appropriate field of study | **Waiver received** | **X** | **X** |
| **Environmental Engineering or Biology (coral reef/hardbottomexpert)** | | **X** | |
| Scientist from academia, a public agency, non-governmental entity or architect-engineer or consulting firm with a minimum of 10 years demonstrated experience with projects on the southern Atlantic coast of the United States | | **X** | **X** |
| Expertise in coral reef/hardbottom habitats and associated marine life and habitats | | **X** | |
| Knowledge of the ecological value of near-shore rock resources in coastal environments, particularly corals | | **X** | **X** |
| Knowledge of survey and evaluation methodologies for rock resources in coastal environments, particularly corals | | **X** | **X** |
| M.S. degree or higher in appropriate field of study | | **X** | **X** |
| **Environmental Engineering, Biology, or Coastal Engineering (analytical modeling expert)** | | | **X** |
| Scientist from academia, a public agency, non-governmental entity or architect-engineer or consulting firm with a minimum of 10 years demonstrated experience in the analytical modeling of environmental mitigation in a marine environment to assess the appropriateness of assumptions, analytical methods and overall application of both | | | **X** |
| Expert in NOAA method Habitat Equivalency Analysis (HEA) and/or | | | **X** |
| Reef impact mitigation assessment methods (for HEA evaluation) | | | **X** |
| Experience in understanding of environmental impacts associated with dredging | | | **X** |
| M.S. degree or higher in an appropriate field of study | | | **X** |

### *Peter Bottone*

**Role:** This panel member was chosen primarily for his environmental biology and seagrass expertise.
**Affiliation:** King Engineering Associates, Inc.

Mr. Peter Bottone is a project manager/lead ecologist for King Engineering Associates, Inc. in Tampa, Florida. He has more than 25 years of experience in coastal environments and projects, including shallow tidal waters and subtropical seagrass habitats throughout the Southeast U.S., the Florida coastline, and the Gulf Coast region. He earned his B.A. in biology from the University of South Florida in 1982. He has extensive experience in the assessment of seagrass bottom communities, seagrass species identification, evaluation of seagrass impacts, and development of seagrass mitigation/restoration plans for a variety of projects, including bridges, utility projects involving subaqueous pipeline installations, dredging projects, Federal Department of Transportation projects, marina improvements, and port expansion projects. He also has experience in the development and implementation of seagrass transplantation and restoration techniques and has gained significant knowledge of the ecological value of seagrass resources through his extensive experience in seagrass surveys, mapping, evaluations, and development of habitat enhancement and restoration plans.

Mr. Bottone has also served as a Consultant Project Manager or Lead Ecologist on the assessment and design of more than 35 large-scale estuarine habitat restoration projects for the Southwest Florida Water Management District SWIM project. He has specific expertise related to restoration design of estuarine intertidal wetlands, salinity gradients, oligohaline fishery habitats and submerged aquatic vegetation/seagrass mapping, impact assessment, and restoration along Florida coastal areas.

Mr. Bottone has specific knowledge of survey and evaluation methodologies for seagrass resources in coastal environments, and has been involved in a variety of projects (e.g., marinas, docks, ports, and dredging) where such surveys and evaluations were necessary. He served as Seagrass Supervisor responsible for oversight of the seagrass mitigation and monitoring for Port Manatee. This project involved field data collection, analysis, aerial photographic mapping, impact assessments, compliance coordination, and development of transplanting protocols. He has conducted seagrass and marine algae mapping and characterization along the Gulf and participated in studies involving data collection and analysis, species identification, specimen preservation, shoot density, length, biomass, and productivity determinations. He has designed seagrass and submerged aquatic vegetation (SAV) survey methodologies, including development of aerial photography interpretation techniques for species identification and differentiation, and post-translocation survey methods.

### *John Ogden*

**Role:** This panel member was chosen primarily for his environmental biology and coral reef/hardbottom expertise.
**Affiliation:** University of South Florida

Dr. John Ogden is an Emeritus Professor of Integrative Biology at the University of South Florida and Adjunct Professor, Division of Marine Biology and Fisheries, Rosenstiel School,

University of Miami. He earned his Ph.D. in biological sciences from Stanford University in 1968 and has more than 30 years of experience in the study of coral reefs and reef ecosystems in the southern Atlantic coast of the U.S., Caribbean, Pacific, and Australia. Dr. Ogden is an expert in coral reef hardbottom habitats and associated marine life habits, has conducted extensive research in the field, and has numerous publications on the subject.[a,b]

Dr. Ogden has knowledge of the ecological value of near-shore rock resources in coastal environments, particularly corals, and has conducted research in the interconnection of coral reefs, seagrasses, and mangroves through the movements of fishes and invertebrates.[c] He has directed work on ecological and economic assessment of these conditions.[d] Dr. Ogden has a strong knowledge of survey and evaluation methodologies for rock resources in coastal environments, particularly corals. He helped design the seagrass and coral reef monitoring for the Florida Keys National Marine Sanctuary and he helped write the CARICOMP assessment manual of methods for the study of coral reef, seagrass, and mangrove ecosystem structure and functioning.

He is a Florida Department of Environmental Protection (DEP) Appointee to the Technical Advisory Committee for the Florida Keys National Marine Sanctuary, is a board member for the Florida Ocean Alliance, on the Scientific Advisory Board for Seacology, on the Board of Advisors for The Ocean Foundation, and a DEP-appointed member of the Florida Oceans and Coastal Council.

### *Paul Lin*

**Role:** This panel member was chosen primarily for his analytical modeling expertise.
**Affiliation:** Paul Lin and Associates, Inc.

Dr. Paul Lin is a coastal engineer and president of Paul Lin and Associates, Inc. in Miami, Florida. He earned his Ph.D. in coastal engineering from the University of Florida in 1987 and is a licensed professional engineer in Florida with more than 25 years of experience in the coastal and civil engineering field. He specializes in the tropical and subtropical coastal environments and is familiar with seagrass habitats in South Florida and Florida Keys, which are characterized by coral reef/hardbottoms. Dr. Lin is familiar with analytical modeling of environmental mitigation in a marine environment because many of his coastal projects involve benthic surveys of seagrass, coral reef/hardbottom habitats, and the associated mitigation. Dr. Lin specializes in coastal processes, and has written numerous publications on the subject.[e]

He is familiar with the NOAA method HEA and has reviewed reports using HEA for damage assessment and restoration programs e.g. “Coral Reef Metrics and HEA” in 2009 and

[a] Ogden, J.C. and J.C. Zieman. 1977. Ecological aspects of coral reef seagrass bed contacts in the Caribbean. Proceedings, Third International Coral Reef Symposium: 377 382.
[b] Ogden J.C. 1988. The influence of adjacent systems on the structure and function of coral reefs (Status Review). Proc. Sixth International Coral Reef Symp., Townsville, Australia. Vol. 1: Plenary Addresses and Status Reviews: 123-130.
[c] Ogden, J.C. and E.H. Gladfelter (eds.). 1983. Coral reefs, seagrass beds and mangroves. Their interaction in the coastal zones of the Caribbean: A report of a Workshop. UNESCO Spec. Publ. 23: 133 p.
[d] Rogers, C. et al (25 authors including J. Ogden). 2008. Ecology of the coral reefs of the U.S. Virgin Islands. In: Reigl, B. and R.E. Dodge (eds.) Coral Reefs of the USA. Springer.
[e] Influence of Nearshore Hardbottom on Regional Sediment Transport,” Paul C.-P. Lin and R. Harvey Sasso, 25th International Conference on Coastal Engineering, Orlando, Florida,1996, pp. 250-251.

"Restoration Economics: HEA" by NOAA in 2002. He is expert in reef impact mitigation assessment methods, and many of his coastal projects in the Florida Keys have involved benthic surveys providing coral habitat inventory and reef impact mitigation assessments. For the Conch Key marina project in Monroe County, Florida, he conducted an impact assessment of seagrass and coral habitats and developed mitigation using the Uniform Mitigation Assessment Method. He has participated in several reef stability analyses for various types of reef modules including reef balls, Spiegel Grove, Ocean Freeze, and Adolthis Busch I projects.[a]

Dr. Lin is thoroughly familiar with the environmental impacts associated with dredging. For the La Sieta Resort and Marina project in Islamorada, Florida, he identified impacts associated with seagrass and coral habitats and provided mitigation plans. He has been involved with numerous coastal projects including channel dredging, marina construction, artificial reef creation, and reef relocation plans within the Florida Keys National Marine Sanctuary. Dr Lin is a member of the American Society of Civil Engineers, Florida Engineer Society, and Florida Shore and Beach Preservation Association.

# 5. SUMMARY OF FINAL PANEL COMMENTS

USACE guidance (2010) states the final report will contain the Panel's "assessment of the adequacy and acceptability of the economic, engineering, and environmental methods, models, and analyses used." However, for the IEPR of the Port Everglades Science Reports, the Panel focused on the environmental and modeling aspects of the review documents; no economic or engineering assessment was conducted. The Panel agreed on its assessment of the adequacy and acceptability of the environmental methods, models, and analyses used in the Port Everglades Science Report documents. 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 statements summarize the Panel's findings.

**Environmental:** Overall, the Port Everglades Science Reports are adequate for assessing project impacts on some environmental resources in the Port Everglades Action Area (AA) and the Panel found that the recently updated seagrass and hardbottom data are generally sufficient. However, the reviewed documents do not address all the requirements of the Endangered Species Act (ESA), National Environmental Policy Act (NEPA), and Water Resources Development Act (WRDA). Specifically, a complete analysis of the indirect and cumulative impacts is not provided and neither are avoidance, minimization, and mitigation measures for unavoidable impacts to identified resources and ESA-listed species such as the federally threatened Johnson's seagrass (*Halophila johnsonii*). Moreover, since the Environmental Baseline Study is more than 10 years old, it contains outdated information and is not well integrated with the more updated reports. Finally, ocean current modeling in the vicinity of the OEC and graphics showing potential dredged sediment plumes are not presented.

**Modeling:** The use of the HEA model analysis to determine the required mitigation for the hardbottom resources and reef impacts is adequate, but the HEA analysis for hardbottom

[a] Stability Analysis of Artificial Reefs, Paul C.-P. Lin, Proceeding of the 1998 Artificial Reef Summit (in press), Florida Department of Environmental Protection, West Palm Beach, 1998.

communities is incomplete and there is no similar functional analysis for seagrass and mangrove habitat impacts. The benthic community baseline for the hardbottom resources should be clearly correlated to the service levels specified in the HEA model analysis of the reef recovery at the post-impact and mitigation sites. The Panel has also identified issues with the modeling assumptions, mitigation options, and monitoring strategy. In particular, the Panel is concerned about the unsupported assumptions used in the model analysis, the efficacy of mitigation boulders, and the lack of monitoring. The artificial reef boulders appear to be a key feature of the reef mitigation, but no monitoring program is presented to judge how they are meeting the mitigation requirements.

**Table 3. Overview of Eight Final Panel Comments Identified by the Port Everglades Science Reports IEPR Panel**

| | |
|---|---|
| **Significance – Medium** | |
| 1 | The direct, indirect, and cumulative impacts of the proposed project alternatives on the terrestrial and marine habitats and ESA-listed species are partially based on outdated or incomplete information. |
| 2 | The EBS and Science Reports do not include clear discussion of the project alternatives relative to avoidance, minimization, and mitigation pursuant to NEPA and Water Resources Defense Act (WRDA) 2007 guidance. |
| 3 | Some of the assumptions made for the HEA model analysis, especially regarding recovery service levels, have not been clearly presented or justified. |
| 4 | The statement in the Hardbottom Report that sedimentation would have "insignificant" impacts on threatened corals is not supported. |
| 5 | The Mitigation Requirements Analysis for Hardbottom Resources report (Hardbottom Report) does not fully evaluate the mitigation options and does not set a clear habitat baseline for reef mitigation recovery. |
| 6 | The methods of mapping terrestrial communities such as mangroves are not well defined in the EBS and there is insufficient quantitative information on mangrove community characteristics. |
| **Significance – Low** | |
| 7 | Information on quality assurance/quality control (QA/QC) procedures and mapping methodology is too limited to assess the accuracy and reliability of the submerged aquatic vegetation (SAV) data collection and mapping efforts. |
| 8 | The project's collection of science reports is not organized, which an efficient evaluation of the findings. |

# 6. REFERENCES


Bak, R.P.M. (1978). Lethal and sub-lethal effects of dredging on coral reefs. Marine Pollution Bulletin 9(1):14-16.

CSA International , Inc. (CSA) (1981). Environmental Monitoring Associated with the Port Everglades Harbor Deepening Project of 1980. Written for Port Everglades Authority.

CSA (2007). During-Dredging Resource Health and Sedimentation Surveys Report for May through August 2007. Hopper Dredging Activities for the Key West Harbor Dredging Project. Prepared for Department of the Navy, Southern Division Facilities Engineering Command.

Fabricius, K.E. (2005). Effects of terrestrial runoff on the ecology of corals and coral reefs: Review and synthesis. Marine Pollution Bulletin 50: 125-146.

Fonseca, M.S., W.J. Kenworthy, and G.W. Thayer (1998). Guidelines for the Conservation and Restoration of Seagrasses in the United States and Adjacent Waters. NOAA Coastal Ocean Program Decision Analysis Series, No. 12. NOAA Coastal Ocean Office, Silver Spring, MD.

Fonseca M.S. (2011). Addy revisited: what has changed with seagrass restoration in 64 years? Ecological Rest. 29:73-81.

Maragos, J.E. (1993). Impact of coastal construction on coral reefs in the U.S.-Affiliated Pacific Islands. Coastal Management 21(4):235-269.

National Marine Fisheries Service (NMFS) (2009). Endangered Species Act - Section 7 Consultation Biological Opinion. Dade County Beach Erosion Control Project, Contract "E," located in Dade County, Florida (Consultation Number F/SERl2009/00879). October 24, 2009.

National Marine Fisheries Service (2007). Endangered Species Act 5- year Review for Johnson's Seagrass (*Halophila johnsonii*). Prepared by the Status Review Team for the National Marine Fisheries Service, Silver Spring, Maryland. 59 pages.

National Oceanic and Atmospheric Administration (NOAA) GNOME: http://ocean.floridamarine.org/ACP/STPACP/Help/GNOME_Factsheet.pdf

Office of Management and Budget (2004). Final Information Quality Bulletin for Peer Review. Executive Office of the President, Office of Management and Budget, Washington, D.C. Memorandum M-05-03. December 16.

Phillips, R.C. (1982). Seagrass meadows. In: Lewis, R.R. (ed.). Creation and Restoration of Coastal Plant Communities. CRC Press, Boca Raton, FL, pp. 173-202.

Race, M.S. and M.S. Fonseca (1996). Fixing compensatory mitigation; what will it take? Ecological Applications. 6:94-101.

Rogers, C.S. (1990). Responses of coral reefs and reef organisms to sedimentation. Marine Ecology Progress Series 62:185-202.

The National Academies (2003). Policy on Committee Composition and Balance and Conflicts of Interest for Committees Used in the Development of Reports. The National Academies (National Academy of Science, National Academy of Engineering, Institute of Medicine, National Research Council). May 12.

USACE (2007). Peer Review Process. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. CECW-CP Memorandum. March 30.

USACE (2010). Water Resources Policies and Authorities: Civil Works Review Policy. Department of the Army, US Army Corps of Engineers, Washington, D.C. Engineer Circular (EC) No. 1165-2-209. January 31.

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# APPENDIX A

## Final Panel Comments

## on the

## Port Everglades Science Reports

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**Final Panel Comment 1:**

**The direct, indirect, and cumulative impacts of the proposed project alternatives on the terrestrial and marine habitats and ESA-listed species are partially based on outdated or incomplete information.**

**Basis for Comment:**

ER 1105-2-100 guides how USACE Civil Works projects are formulated, evaluated, and selected for implementation, including compliance with the National Environmental Policy Act (NEPA) and applicable Federal environmental statutes, acts, and regulations, such as the Endangered Species Act (ESA), the Fish and Wildlife Coordination Act (FWCA), and the Essential Fish Habitat (EFH) provisions of the Magnuson-Stevens Fishery Conservation and Management Act. Under these provisions and guidelines, USACE is required to determine the location of all resources and to evaluate those resources that would be directly, indirectly, or cumulatively affected by the alternative plans in the project study area.

The data and analysis in the Environmental Baseline Study (EBS) and Science Reports are too limited to assess the direct, indirect, and cumulative impacts to terrestrial and marine habitats and some ESA-listed species. The Panel could not get a complete understanding of the effects of project alternatives (including the Future Without Project condition) in the study area under NEPA and ESA guidelines. Specifically:

- A cumulative impact assessment on the aggregate effects of the various project alternatives within the project Action Area (AA) is not provided for any of the identified resources;
- The baseline description for terrestrial (mangrove) habitats (EBS, p. 16) provides only a generic Florida Land Use and Cover Classification System (FLUCCS)-based description. It uses outdated 1995 mapping and field verification in 1999-2000, which does not provide sufficient characterization (i.e., stand age, species distribution and habitat variability, faunal and listed species use) to assess the functional outputs and therefore the impacts (EBS, pp. 41, 55) on this resource.
- A review of signatures contained in 2011 true-color aerial images (Google Earth 2011) suggests that submerged aquatic vegetation (SAV) coverage may currently be present in areas that were previously mapped in the 2009 Seagrass Mapping and Assessment update as unvegetated.
- Occurrences of listed species within the AA are noted on a single graphic (Figure. 12) in the EBS, which is now 10 years old. In addition, this information is not well correlated with the discussion of potential impacts on some ESA-listed species such as the manatee. For example, while it is noted that a large population of manatees (±234 individuals) occurs within Port Everglades (EBS, p. 35) and that more than 22 watercraft fatalities (Figure 12) were recorded for this species between 1974 and 2000, there is no discussion of the project's potential for increasing watercraft-related manatee mortalities. There are similar concerns about potential indirect impacts to manatees and EFH-managed species from project implementation that may result in direct loss/reduction of available food and cover resources (marine algae and seagrass communities).
- Discussions of indirect impacts tend to address mostly temporal impacts, rather than long-term or operational impacts (i.e., maintenance dredging, increased vessel size, traffic, landings, and erosion) on remaining marine resources and ESA-listed species such as *Halophila johnsonii* and manatees.

| **Significance – Medium:** |
| --- |
| The limited assessment of potential detrimental effects presented in the EBS and Science Reports, including indirect/cumulative impacts as required by ER 1105-2-100 and NEPA, affects the completeness and understanding of the project. |
| **Recommendations for Resolution:** |
| 1. Update baseline information, data, and maps to allow accurate assessment of impacts to current terrestrial, marine, and EFH resources and ESA-listed species;<br>2. Include a more complete discussion of direct, indirect (including long-term effects), and cumulative impacts to environmental resources and ESA-listed species for all alternatives, including the Future Without Project condition;<br>3. Conduct an updated SAV mapping effort due to the ephemeral nature of seagrasses (*Halophila* spp.). |

**Final Panel Comment 2:**

**The EBS and Science Reports do not include clear discussion of the project alternatives relative to avoidance, minimization, and mitigation pursuant to NEPA and Water Resources Defense Act (WRDA) 2007 guidance.**

**Basis for Comment:**

For Federal projects, NEPA documents shall use data and incorporate findings from analysis required by other environmental laws (e.g., ESA and the Clean Water Act) to assess the project's effects on listed species and wetland resources and to evaluate avoidance or minimization measures. Similarly, pursuant to WRDA 2007 (Section 2036), projects under the USACE Civil Works program need to ensure that "all significant impacts to ecological resources have been avoided and minimized …and, unavoidable impacts compensated to the extent practicable." Since the track record for successful mitigation of impacts to seagrass beds remains variable (Phillips, 1982; Race and Fonseca, 1996; Fonseca, 2011) and highly dependent on site selection, planting design, and care (Fonseca, 1998), a thorough assessment is needed of any compensatory mitigation program proposed for seagrass impacts. This need is further accentuated by the proposed project impacts to the Federally Threatened seagrass *Halophila johnsonii*. Given the lack of a proven track record for the successful, long-term mitigation of *H. johnsonii* and the reproductive strategies of this species where the extent of regrowth/ reestablishment is uncertain (NMFS 2007), there is a potential for losing a unique phenotypic/genotypic sub-population of this ESA-listed species.

The EBS and Science Reports do not provide any discussion of avoidance and minimization measures in assessing ecological resource impacts for any of the project alternatives. In addition, the review documents lack the required details on mitigation, including the methodology and rationale for the proposed seagrass/mangrove mitigation options. Specifically:

- A habitat functional analysis is not provided for seagrass and mangrove habitat impacts or proposed mitigation associated with those resources. Only an unsupported statement regarding the conceptual validity of a 2:1 mitigation ratio for seagrass impacts is referenced in the EBS (p. 76).
- Detailed information on the mitigation site selection process, mitigation design/implementation and costs, monitoring, success criteria, and contingencies (e.g., adaptive management) for the required mitigation of unavoidable impacts to seagrasses and mangroves is not included in the reviewed documentation.
- There is limited discussion of the significance of proposed impacts to and mitigation strategies for the threatened seagrass, *H. johnsonii*. Under the ESA, a determination of whether a Federal action is likely to jeopardize the continued existence of a threatened species is required; therefore the EBS should address this in more detail.

**Significance – Medium:**

The exclusion of pertinent avoidance/minimization information, including habitat functional analysis and mitigation plans to offset proposed seagrass and mangrove impacts, affects the compliance of the EBS and Science Reports with ESA, NEPA, and WRDA.

**Recommendations for Resolution:**

1. Include a more complete description of avoidance and minimization of impacts to environmental resources for all alternatives, including the Future Without Project condition;
2. Discuss the habitat functional analysis and mitigation plan, including monitoring provisions proposed to offset unavoidable impacts to seagrass and mangrove habitat;
3. Discuss the significance of impacts and mitigation to *H. johnsonii* needed to address requirements of the ESA.

**Literature Cited:**

Fonseca, M.S., W.J. Kenworthy, and G.W. Thayer (1998). Guidelines for the Conservation and Restoration of Seagrasses in the United States and Adjacent Waters. NOAA Coastal Ocean Program Decision Analysis Series, No. 12. NOAA Coastal Ocean Office, Silver Spring, MD.

Fonseca M.S. (2011). Addy revisited: what has changed with seagrass restoration in 64 years? Ecological Rest. 29:73-81.

National Marine Fisheries Service (2007). Endangered Species Act 5- year Review for Johnson's Seagrass (*Halophila johnsonii*). Prepared by the Status Review Team for the National Marine Fisheries Service, Silver Spring, Maryland. 59 pages.

Phillips, R.C. (1982). Seagrass meadows. In: Lewis, R.R. (ed.). Creation and Restoration of Coastal Plant Communities. CRC Press, Boca Raton, FL, pp. 173-202.

Race, M.S. and M.S. Fonseca (1996). Fixing compensatory mitigation; what will it take? Ecological Applications. 6:94-101.

**Final Panel Comment 3:**

**Some of the assumptions made for the HEA model analysis, especially regarding recovery service levels, have not been clearly presented or justified.**

**Basis for Comment:**

The assumptions used in the HEA model analysis play an important role in determining appropriate acreage of compensation for the hardbottom resources and reef impacts. The values of many assumptions used in the HEA model analysis are not discussed in enough detail.

- The assumptions of the initial service lost and recovery service level at three injury categories (Middle and Outer Reef Direct Impacts, Middle Reef Channel Wall and Direct Anchor and Cable Impacts) listed in Tables 8 and 9 (p. 23) of the Mitigation Requirements Analysis for Harbottom Resources report (2010) are not justified.
- The assumptions of the values presented under the initial service gained (10%) and recovery service level at maturity (100%) in Table 10 (p. 24) for both categories of Restoration/ Replacement are not discussed in detail. The assumed 100% recovery service level could be overly optimistic. These values are critical to the HEA model analysis and would significantly affect the outcomes for the required reef mitigation.
- The coral growth rate of *Siderastrea radians* listed in Table 6 (p. 19) does not support the assumption of the 50-year reef recovery projection. With the given 1.5 mm/year growth rate, it will take 167 years, rather than 50 years, for this coral specie to reach 25 cm.

**Significance – Medium:**

Any unsupported assumptions of the recovery service levels adopted in the HEA model analysis could significantly affect the determination of compensatory mitigation required for the hardbottom resources and reef impacts.

**Recommendations for Resolution:**

1. Include a detailed monitoring program to ensure the assumptions of the recovery service levels adopted using the HEA model analysis are meeting the requirements.
2. Provide a detailed discussion justifying the HEA model's lost initial service level assumptions for the pre-impact site.
3. Provide a detailed discussion justifying the HEA model's recovery service level assumptions for both the post-impact and mitigation sites.
4. Revise the description in the Benthic and Fish Community Assessment Report of "average growth rates and measured sizes (25 cm) of the five most comment species" (p. 18) using the average diameter of the five most common reef species (not maximum 25 cm) to assess the coral's growth rate.
5. Conduct a sensitivity analysis for the HEA model using various assumed values for those uncertain recovery service levels to determine the optimum compensatory quantity required for the reef mitigation.

**Final Panel Comment 4:**

The statement in the Hardbottom Report that sedimentation would have "insignificant" impacts on threatened corals is not supported.

**Basis for Comment:**

Sedimentation from dredging and other sources is well-known to have negative effects on the growth, reproduction, and recruitment of corals and reef-associated benthic organisms (Bak, 1978; Fabricius, 2005; Maragos, 1993; Rogers, 1990). The Hardbottom Report states (p. 16) that "in a recent consultation under Section 7 of the Endangered Species Act the NMFS concluded that the effects of sedimentation on the adjacent threatened coral, Acropora cervicornis, to be insignificant, as the rates of sedimentation documented in a similar offshore dredging project were within the bounds of sedimentation documented to occur naturally" (NMFS, 2009). This statement is based upon prior studies in Key West Harbor (CSA, 2007), which may not be applicable, and unattributed NOAA comments, whose sources should be identified and expanded.

Peer-reviewed literature citations on ocean currents in the immediate area of the OEC and modeling of water circulation patterns with projected sediment plumes are not included in the EBS or in the Hardbottom and Mitigation reports. For example, it is known that ships entering the OEC must "crab" to the north to balance a strong current to the south, likely a counter-current driven by the Gulf Stream offshore. This implies that sediment impacts from the OEC project and routine ship traffic could possibly occur disproportionately to the south.

**Significance – Medium:**

The use of ocean circulation data and models showing the direction and potential extent of sedimentation from the dredging operations is important to evaluate dredging impact, help determine required mitigation, and evaluate sites for dredge spoil disposal.

**Recommendations for Resolution:**

1. Include information on ocean currents in and around the OEC, either through peer-reviewed literature, agency reports, or contemporary modeling. For example, if available, more details to support the "insignificant sedimentation impacts" statement might come from the 1981 environmental monitoring for the Port Everglades deepening project (CSA, 1981). Soloviev (unpubl. Nova Southeastern University) has >10 years of Acoustic Doppler Current Profiler (ADCP) data on ocean currents in the vicinity of the Port. Finally, the General NOAA Oil Monitoring Environment (GNOME) program states that oil spill response trajectory models based on local currents have been developed for Port Everglades.
2. Include appropriate graphics showing the direction, speed, and extent of ocean currents in the OES area and trajectories of sediment plumes from dredging.
3. Set up turbidity monitoring stations and deploy turbidity curtains to control sedimentation during the OEC dredging.

**Literature Cited:**

Bak, R.P.M. (1978). Lethal and sub-lethal effects of dredging on coral reefs. Marine Pollution Bulletin 9(1):14-16.

CSA International , Inc. (CSA) (1981). Environmental Monitoring Associated with the Port Everglades Harbor Deepening Project of 1980. Written for Port Everglades Authority.

CSA (2007). During-Dredging Resource Health and Sedimentation Surveys Report for May through August 2007. Hopper Dredging Activities for the Key West Harbor Dredging Project. Prepared for Department of the Navy, Southern Division Facilities Engineering Command.

Fabricius, K.E. 2005. Effects of terrestrial runoff on the ecology of corals and coral reefs: Review and synthesis. Marine Pollution Bulletin 50: 125-146.

Maragos, J.E. (1993). Impact of coastal construction on coral reefs in the U.S.-Affiliated Pacific Islands. Coastal Management 21(4):235-269.

National Marine Fisheries Service (NMFS) (2009). Endangered Species Act - Section 7 Consultation Biological Opinion. Dade County Beach Erosion Control Project, Contract "E," located in Dade County, Florida (Consultation Number F/SERl2009/00879). October 24, 2009.

National Oceanic and Atmospheric Administration (NOAA) GNOME: http://ocean.floridamarine.org/ACP/STPACP/Help/GNOME_Factsheet.pdf

Rogers, C.S. (1990). Responses of coral reefs and reef organisms to sedimentation. Marine Ecology Progress Series 62:185-202.

**Final Panel Comment 5:**

**The Mitigation Requirements Analysis for Hardbottom Resources report (Hardbottom Report) does not fully evaluate the mitigation options and does not set a clear habitat baseline for reef mitigation recovery.**

**Basis for Comment:**

The proposed use of artificial reef boulders for reef mitigation associated with this project needs to be thoroughly evaluated. In addition, the benthic community baseline should be clearly established and correlated to the specified service levels for the reef recovery at the post-impact and mitigation sites.

The artificial reef boulders proposed for mitigation are expected to naturally recover to 100% full reef service in 50 years (Hardbottom Report, p. 22). There was no study conducted to evaluate if the proposed mitigation boulders would remain stable under a 50-year storm event. The Bal Harbour Reef Boulder Mitigation project cited (Hardbottom Report, p. 22) could not support this expectation with its only 5-year project experience. Storm waves from a 50-year storm would most likely devastate the mitigation boulders to be deployed at the existing Broward County artificial reef mitigation sites. As a result, the reef mitigation would fail and not meet the requirements as specified for this project.

The Hardbottom Report does not specifically address how the reef colonies that are expected to be lost would be compensated in the mitigative measures. The reef colony density at the pre-impact site delineated in the Benthic and Fish Community Assessment report (2009) should be used as a baseline when monitoring the reef recovery service levels at both the post-impact and mitigation sites. For instance, the reef colony density at the mitigation site should achieve, at minimum, the same reef densities (100%) as documented in the Hardbottom Report (pp. 13 and 14) at the pre-impact conditions.

**Significance – Medium:**

The proposed artificial reef boulders to be deployed at the Broward County Artificial Reef Mitigation Sites may become unstable under a 50-year storm event, diminishing the effectiveness of the proposed reef mitigation in quantity and quality.

**Recommendations for Resolution:**

1. Conduct a stability analysis of the proposed artificial reef boulders for a 50-year storm to ensure the reef mitigation reaches the 100% recovery level as intended.
2. Include a clear and precise description of how the delineated reef colony densities at the pre-impact site are to be correlated to the specified recovery service levels at both the post-impact and mitigation sites.

**Final Panel Comment 6:**

**The methods of mapping terrestrial communities such as mangroves are not well defined in the EBS and there is insufficient quantitative information on mangrove community characteristics.**

**Basis for Comment:**

Precise information on mangrove location and community characteristics (e.g., habitat quality, size, species distributions) is necessary to assess the impacts to mangrove and other terrestrial resources more accurately and to evaluate mitigation options,. However, the EBS does not provide enough information on these factors.

- The methods used to map terrestrial communities and mangroves are not well-defined. For example, while it is stated that two days of surveys to evaluate field conditions were conducted using the 1987 USACE Wetlands Delineation Manual and the Florida Wetlands Delineation Manual, the mapping of terrestrial communities appears to be directly from 1995 SFWMD FLUCCS Maps. Aerial interpretation and mapping of resources such as mangroves may be acceptable for quantifying impacts in early planning documents, but the limitations of this methodology should be made clear.
- The qualitative descriptions of mangrove community characteristics in the EBS should be expanded to include a quantitative assessment of the geographic area of potential mangrove destruction and disturbance so that habitat function loss and mitigation requirements can be accurately determined.
- In the 10 years since the EBS was written, repeated surveys have documented changes in seagrasses and to a certain extent in hardbottom communities. The Panel expects that changes have occurred in mangrove distribution patterns, terrestrial vegetation, and bird populations, but these have not been updated.

**Significance – Medium:**

The absence of updated terrestrial resource mapping information and mangrove community characteristic assessments makes it difficult to accurately evaluate the potential impacts of the project.

**Recommendations for Resolution:**

1. Use recent aerial photography combined with ground-truth observations to quantify the aerial coverage of mangroves and their community characteristics and to assess the potential impact of the dredging project on mangroves within the Port.
2. Update the distribution and abundance of other significant terrestrial resources in the EBS including vegetation, birds, and manatee distributions..

**Final Panel Comment 7:**

**Information on quality assurance/quality control (QA/QC) procedures and mapping methodology was too limited to assess the accuracy and reliability of the submerged aquatic vegetation (SAV) data collection and mapping efforts.**

**Basis for Comment:**

While data collection methodologies contained in the EBS and the Seagrass Mapping and Assessment Report updates were followed in general conformance with NOAA seagrass survey and assessment protocols, additional information on QA/QC procedures is desirable to make the reports, and therefore the reliability of the data used for impact assessment, more complete. Additional QA/QC information should include:

- A description of the average spatial accuracy of dGPS mapping equipment (i.e., ±0.5, 1 meter) used in delineating the SAV limits and whether the use of post-mapping ground-truthing techniques (i.e., field verification of randomly selected GPS data points representing the mapped SAV limits and unvegetated substrate within suitable SAV depths) was conducted;
- A description of any aerial mapping products and/or remote sensing techniques used in performing the SAV mapping efforts
- Whether an assessment of sampling variability (e.g., standard error and deviation) was conducted or the calculation of confidence intervals (i.e., ± 95%) was used, establishing the accuracy of mapped SAV basal area coverage
- A bathymetric survey identifying the extent of potentially suitable SAV habitat (-6 to 0.0 ft NGVD) within the project AA was not included in the reports. The use of bathymetry would provide a more complete assessment of SAV habitat vs. SAV acreage that could then be used as a QA/QC baseline reference for future SAV mapping and permitting activities since SAV bed distribution can vary greatly at any point of time (Fonseca 1998).

**Significance – Low:**

The accuracy and reliability of the SAV data and mapping products and therefore, impact assessments to SAV resources in the project area, cannot be fully assessed due to an incomplete description of the QA/QC procedures and mapping methodologies.

**Recommendations for Resolution:**

1. Include a complete description of all remote sensing and mapping techniques/products used and how they were applied in the sampling design and in preparing the final SAV maps;
2. Include a complete description of all QA/QC field and data analysis procedures used in preparing the reports;
3. As an appendix to the report, provide a detailed bathymetric survey as a basis for quantifying the extent (acres) of potentially suitable SAV habitat within the project AA and as a QA/QC baseline reference in the report.

**Literature Cited:**

Fonseca, M.S., W.J. Kenworthy, and G.W. Thayer (1998). Guidelines for the Conservation and Restoration of Seagrasses in the United States and Adjacent Waters. NOAA Coastal Ocean Program Decision Analysis Series, No. 12. NOAA Coastal Ocean Office, Silver Spring, MD.

| **Final Panel Comment 8:** |
|---|
| **The project's collection of science reports is not organized, which hampers an efficient evaluation of the findings.** |
| **Basis for Comment:** |
| Before these reports are distributed more widely, they should be better integrated and organized, with a more logical flow, eliminating overlap and repetition. The EBS is more than 10 years old and contains data and information that must be updated to show the present distribution and community characteristics of mangroves, terrestrial resources, and land uses in the Port project area. Information on seagrasses (2006 and 2009) and hardbottom communities (2006) have been updated, but the updates have not been integrated into the EBS, requiring the reader to move back and forth between documents. |
| **Significance – Low:** |
| The organization of the review documents makes it difficult to evaluate the potential impact of the project and to assess the report's conclusions. |
| **Recommendations for Resolution:** |
| 1. Integrate the currently separated elements of the report into a single EBS with a table of contents, chapters, subheading, and a logical flow to allow better navigation of this complex study. |

# APPENDIX B

## Final Charge to the Independent External Peer Review Panel
## As Submitted to USACE on July 1, 2011

## on the

## Port Everglades Science Reports

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**Charge Questions and Guidance to the Peer Reviewers for the Independent External Peer Review of the Phase 1, Review of Science Reports for the Port Everglades Harbor, Florida, Feasibility Study and Environmental Impact Statement (EIS)**

## BACKGROUND

The Port Everglades 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 original feasibility study has now been amended twice. The present scope investigates widening and deepening the major channels and basins within the port, expanding the port into the Dania Cutoff Canal, and including a turning basin at the end of the Southport Channel.

The Port Everglades Harbor Federal Navigation Channel (unrelated to the Everglades Ecosystem) is located in southeast Florida in Broward County approximately 23 miles north of Miami, Florida, and 350 miles south of Jacksonville, Florida on the Atlantic coast. The Port's facilities are partly located in the City of Fort Lauderdale, City of Hollywood, and City of Dania Beach, as well as a part of unincorporated Broward County. The Port is located east of the Fort Lauderdale International Airport and the City of Dania Beach. The shallow draft Dania Cut Off Canal marks the southern boundary of the Port. West Palm Beach is 48 miles and Orlando 215 miles to the north.

## OBJECTIVES

The objective of this work is to conduct an independent external peer review (IEPR) of the Phase 1, Review of Science Reports for the Port Everglades Harbor, Florida Feasibility Study and Environmental Impact Statement (EIS) (hereinafter: Port Everglades IEPR) in accordance with the Department of the Army, USACE, Water Resources Policies and Authorities' *Civil Works Review Policy* (EC 1165-2-209) dated January 31, 2010, and the Office of Management and Budget's *Final Information Quality Bulletin for Peer Review* released 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 1165-2-209; p. D-4) for the Port Everglades 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 environmental engineering or biology (seagrass expert), environmental engineering or biology (coral reef/hardbottom expert), and environmental engineering or biology (analytical modeling/Habitat Equivalency Analysis (HEA) expert). They

will also have experience applying their subject matter expertise to ecosystem restoration management.

The Panel will be "charged" with responding to specific technical questions as well as providing a broad technical evaluation of the overall project. Per EC 1165-2-209, 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 and reference materials that are to be reviewed.

- Environmental Baseline Study and Impact Assessment for Port Everglades Harbor
  - Seagrass Mapping and Assessment - 2006 – file names:
    - 2006 Final PE Seagrass Rpt.pdf
    - 2006_seagrass_distribution.pdf
    - Comparison of Seagrass Acreage 2001 to 2006.pdf
    - Comparison of Seagrass Acreage 2001 to 2006.xls
    - Final PE Seagrass Rpt.pdf
  - Seagrass Mapping and Assessment – 2009
- Benthic and Fish Community Assessment at Port Everglades Harbor Entrance Channel
- Mitigation Requirements Analysis for Hardbottom Resources Associated with Port Everglades Harbor Navigation Improvements

The following documents are to be reviewed by each of the panel members:

| Title | Approximate Number of Pages |
|---|---|
| Environmental Baseline Study and Impact Assessment for Port Everglades Harbor | 105 |
| Seagrass Mapping and Assessment – 2006 | 41 |
| Seagrass Mapping and Assessment – 2009 | 23 |
| Benthic and Fish Community Assessment at Port Everglades Harbor Entrance Channel | 143 |
| Mitigation Requirements Analysis for Hardbottom Resources Associated with Port Everglades Harbor Navigation Improvements | 92 |

## SCHEDULE

The review schedule is based on a June 10, 2011 Notice to Proceed (NTP). Note that dates presented in the schedule below could change due to panel member and USACE availability.

| TASK | ACTION | DUE DATE |
|---|---|---|
| **Conduct Peer Review** | Battelle sends review documents to IEPR Panel | 7/14/2011 |
| | Battelle/Panel hold kick-off meeting | 7/15/2011 |
| | USACE/Battelle/Panel hold kick-off meeting | 7/15/2011 |
| | Battelle convenes mid-review teleconference for Panel to ask clarifying questions of USACE | 7/21/2011 |
| | Panel members complete their individual reviews | 7/26/2011 |
| **Prepare Final Panel Comments and Final IEPR Report** | Battelle provides Panel merged individual comments and talking points for Panel Review Teleconference | 7/28/2011 |
| | Battelle convenes Panel Review Teleconference | 7/29/2011 |
| | Final Panel Comments finalized | 8/11/2011 |
| | Battelle provides Final IEPR Report to Panel for review | 8/12/2011 |
| | Panel provides comments on Final IEPR Report | 8/15/2011 |
| | *Battelle submits Final IEPR Report to USACE | 8/17/2011 |
| **Comment/ Response Process** | Battelle convenes teleconference with Panel to review the Comment Response Process (if necessary) | 8/19/2011 |
| | USACE provides draft Evaluator Responses to Battelle | 8/24/2011 |
| | Battelle provides the Panel the draft Evaluator Responses | 8/25/2011 |
| | Panel members provide Battelle with draft comments on draft Evaluator Responses (i.e., draft BackCheck Responses) | 8/29/2011 |
| | Battelle convenes teleconference with Panel to discuss draft BackCheck Responses | 8/30/2011 |
| | Battelle convenes teleconference with Panel and USACE to discuss Final Panel Comments, and draft responses | 9/1/2011 |
| | USACE inputs final Evaluator Responses in DrChecks | 9/8/2011 |
| | Battelle provides Evaluator Responses to Panel | 9/8/2011 |
| | Panel members provide Battelle with final BackCheck Responses | 9/12/2011 |
| | Battelle inputs the Panel's BackCheck Responses in DrChecks | 9/13/2011 |
| | *Battelle submits pdf printout of DrChecks project file | 9/14/2011 |

## 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 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 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: the Panel will be asked to provide an overall statement related to items 2 and 3 below per USACE guidance (EC 1165-2-209; 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 Independent Technical Review.
2. Please contact the Battelle Project Manager (Corey Wisneski, wisneskic@battelle.org) or Program Manager (Karen Johnson-Young (johnsonyoungk@battelle.org) for requests or additional information.
3. In case of media contact, notify the Battelle Program Manager, Karen Johnson-Young (johnsonyoungk@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 26, 2011, 10 pm EDT.**

**Independent External Peer Review of the Phase 1, Review of Science Reports for the Port Everglades Harbor, Florida, Feasibility Study and Environmental Impact Statement (EIS)**

**Final Charge Questions as Supplied by USACE**

1. In light of the fact that this project includes controversial features, as perceived by natural resource agencies, was the environmental baseline survey, and accompanying impact assessment, conducted and reported in a manner that will ensure defensible and meaningful results?

2. Did the approach used to assess potential impacts to the project area ecosystem(s) meet the intent of USACE environmental guidance and NEPA regulations?

3. Was the environmental baseline habitat assessment and mapping conducted with appropriate methods for the communities of seagrass, hardbottom and coral reef?

4. Was the sampling of the marine biological community (e.g., fish, plants, etc.) consistent with the data needed to assess potential impacts from the project alternatives?

5. Was the environmental baseline habitat assessment and mapping conducted with appropriate methods for the terrestrial communities?

6. Did the amount of background information gathered (e.g., empirical studies, agency monitoring data, list and potential locations of threatened and endangered species, etc.) seem sufficient for this area and type of ecosystem(s)?

7. Was the impact assessment presented clearly, transparently and with enough detail to make a decision on the adequacy of the conclusions?

8. Did the impact assessment clearly delineate resources that would be impacted and describe impacts with measures of quantity and quality?

9. Were the mitigation options commensurate with federal guidance and regulations?

10. Were the mitigation options presented with enough detail to ensure adequate understanding of how these actions would replace or compensate for lost resource quantity and quality?

11. Is the HEA model appropriate to conduct an impact assessment related to the natural resources present within the project area?

12. Has the HEA model assumptions been clearly presented within the documents under review?

13. Has the HEA model been appropriately modified and applied to the project area natural resources?

14. Has the results and conclusions generated by the HEA model been correctly interpreted for the type of impacts expected from project alternatives?

15. Has the study conducted a thorough analysis of all types of direct, indirect and cumulative impacts from proposed project alternatives, with respect to the specific evaluated resources, and have the results been presented in a clear and transparent format?