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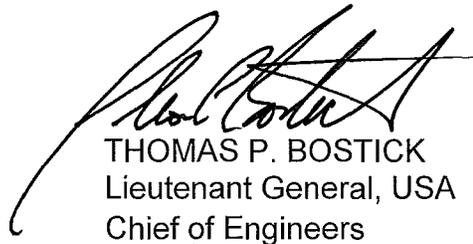
JUN 25 2015

MEMORANDUM FOR ASSISTANT SECRETARY OF THE ARMY (CIVIL WORKS)
108 ARMY PENTAGON, WASHINGTON, DC 20310-0108

SUBJECT: Port Everglades Harbor Feasibility Study, Broward County, Florida – Final
USACE Response to Independent External Peer Review

1. Independent External Peer Review (IEPR) was conducted for the subject project in accordance with Section 2034 of the Water Resources Development Act of 2007, EC 1165-2-214, and the Office of Management and Budget's Final Information Quality Bulletin for Peer Review (2004).
2. The IEPR was conducted by Battelle Memorial Institute. The IEPR panel consisted of seven members with technical expertise in Civil Works planning, economics, biology, real estate, hydraulic and civil engineering, and geotechnical engineering.
3. The final written responses to the IEPR are hereby approved. The enclosed document contains the final written responses of the Chief of Engineers to the issues raised and the recommendations contained in the IEPR. The IEPR Report and the USACE responses have been coordinated with the vertical team and will be posted on the Internet, as required in EC 1165-2-214.
4. If you have any questions on this matter, please contact me or have a member of your staff contact Ms. Stacey Brown, Deputy Chief, South Atlantic Division Regional Integration Team, at 202-761-4106.

Encl



THOMAS P. BOSTICK
Lieutenant General, USA
Chief of Engineers

**Port Everglades Harbor
Broward County, Florida
Feasibility Report
U.S. Army Corps of Engineers Response to
Independent External Peer Review
May 2015**

Independent External Peer Review (IEPR) was conducted for the subject project in accordance with Section 2034 of WRDA 2007, EC 1165-2-214 and the Office of Management and Budget's *Final Information Quality Bulletin for Peer Review (2004)*.

The goal of the U.S. Army Corps of Engineers (USACE) Civil Works program is to always provide the most scientifically sound, sustainable water resource solutions for the nation. The USACE review processes are essential to ensuring project safety and quality of the products USACE provides to the American people. Battelle Memorial Institute (Battelle), a non-profit science and technology organization with experience in establishing and administering peer review panels for USACE, was engaged to conduct the IEPR of the Port Everglades Feasibility Report.

The IEPR panel reviewed the Draft and Final Feasibility Report, as well as supporting documentation. The Final IEPR Battelle Report was issued on 09 December 2014. Overall, forty-two comments were identified and documented; two were identified as having high significance, four were identified as having medium/high significance, eighteen were identified as having medium significance, four were identified as having medium/low significance, and fourteen were identified as having low significance. The Draft Feasibility Report Review produced twenty-two comments and the Final Feasibility Report Review produced twenty comments. The following discussions present the USACE Final Response to the forty-two comments.

Comments Received on the Draft Feasibility Report (22 comments):

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

This comment included two recommendations, both of which were adopted as discussed below. The comment expresses concern that if an offshore dredged material disposal site (ODMDS) with adequate capacity is not designated, the recommended plan cannot be implemented.

USACE Response: Adopted

Action Taken: The IEPR panel recommended (1) providing complete information and clarity about the status of the ODMDS expansion designation and the feasibility of invoking an emergency one-time designation under Section 103(b) of the MPRSA. In response, this information was added to Section 7.0 of the main report. The IEPR panel recommended (2) adding documentation on how any dredged materials determined to be unsuitable for ocean

disposal will be managed, including the costs and environmental impacts. In response, Section 2.9.4 of the EIS was updated to include information on an available upland site that would be available for any potentially unsuitable material for the ODMDS. Information on environmental impacts and costs of using the upland disposal site were not included in the EIS as the likelihood of utilizing the site is minimal.

2. Comment – *Medium Significance*: Opportunities for upland disposal of dredged material have not been examined fully; therefore, potential costs and benefits have not necessarily been realized.

This comment included one recommendation which was not adopted, as discussed below. The comment expresses the concern that viable upland disposal alternatives for the dredged material have not been fully considered.

USACE Response: Not Adopted

The IEPR panel recommended (1) a comprehensive engineering, economic, and environmental analysis for viable alternatives for upland disposal of dredged materials be provided. Detailed engineering, environmental, and cost analysis on additional upland disposal sites were not conducted because the likelihood of needing to utilize an upland disposal site is minimal. Additionally, the only remaining feasible upland disposal option is a small site that would only be used for material that is found unsuitable for ocean disposal. However, in response to this recommendation, additional information regarding the availability of upland disposal sites was added to Section 6.0 of the Dredged Material Management Plan (Appendix E of the Feasibility Report) as well as Section 2.9.4 of the EIS.

3. Comment – *Medium Significance*: Opportunities for beneficial use of dredged material have not been fully examined; therefore, potential cost and environmental benefits have not been realized.

This comment included one recommendation which was not adopted as discussed below. The comment expresses a concern that adopting beneficial uses of dredged material may change costs or benefits (possibly both) of the project.

USACE Response: Not Adopted

The IEPR panel recommended (1) performing a comprehensive analysis of methods, costs, and direct plus indirect benefits of dredged material beneficial uses from both construction and maintenance of the improved channels. Beneficial use alternatives are very limited for this project. The lack of staging areas and cost considerations prevented several beneficial use options from being carried forward in the planning analysis. In response recommendation, information regarding why beneficial use alternatives were not future considered was added to Section 7.0 of the Dredged Material Management Plan (Appendix E of the Feasibility Report).

4. Comment – *Medium Significance*: Opportunities for the multiple placement of dredged material have not been fully examined; therefore, potential cost and environmental benefits have not been realized.

This comment included three recommendations; two were adopted and one was not adopted, as discussed below. This comment expresses a concern that the possibility of identifying multiple disposal options based on isolating project components or on the characteristics of the project's dredged material by depth intervals may substantially reduce the volume of material designated for the ODMDS and possibly generate future cost benefits.

USACE Response: Adopted

Action Taken: The IEPR panel recommended that the report (1) explore opportunities for refining sediment size analyses by project component and by dredged depth, and (2) determine whether beneficial use opportunities exist if dredged material is analyzed by individual project component or layer (depth), and calculate the cost for this level of dredged material management. In response to this comment, additional information was added to Section 7.0 of the Dredged Material Management Plan (Appendix E of the Feasibility Report) indicating that refining sediment size for beneficial use purposes has been considered and explaining why such an action is not feasible during the dredging process due to the mixed quality of the material being dredged and lack of cost-effective upland staging areas for separating out materials after it has been dredged.

USACE Response: Not Adopted

The IEPR panel recommended (3) that the cost-benefit analyses be recalculated to include any cost savings from future beach nourishment projects or reduction of limestone quarrying costs, and include these benefits in the project cost analysis. However, because separation of beach quality material for future nourishment activities was not feasible, cost savings from such an activity were not calculated. With regards to utilizing dredged rock for beneficial use as opposed to limestone quarrying, this option would be further analyzed during the Pre-construction Engineering and Design phase of the study, however, any potential cost savings to be gained would not have affected the comparison of project alternatives or the selection and justification of the recommended plan, hence, a cost-benefit analysis was not conducted.

5. Comment – *Medium Significance*: Projected maintenance dredging requirements for the channels and berthing areas may be underestimated and do not appear to have been included in the lifecycle cost of the Tentatively Selected Plan (TSP).

This comment had two recommendations, which were not adopted as discussed below. The comment expresses concerns that the future maintenance dredging amounts and costs have not been accurately accounted for, which can affect the total life-cycle cost of the TSP and thus can alter the project benefit-cost ratio.

USACE Response: Not Adopted

The IEPR panel recommended (1) performing a more robust estimation of future maintenance dredging requirements using: a more detailed analysis of past sedimentation rates, gross longshore transport measured from previous reports as a normal upper limit on the Outer Entrance Channel

sedimentation rate, at least one storm event in which sedimentation is greatly increased and (2) express future maintenance dredging requirements as a range of probable outcomes. The feasibility report determined maintenance dredging requirements by multiplying the historical dredging volume per unit area by the project footprint area. In the case of Port Everglades, this method is considered to be conservative (rather than under-predicting) because (1) there is very limited sediment in the system that can reach the inlet due to impoundment by a shoal north of the jetty, (2) expansion of the entrance channel will not tap new sediment pathways due to the presence of reefs and complete lack of natural sediment bypassing of the inlet. Historical maintenance requirements have been limited to the entrance channels and main turning basin rather than the entire channel, and portions of the outer entrance channel expansion being located in water depths which are naturally deeper than the project depth. Therefore using the entire increased footprint, including interior channels and basins, predicts a shoaling rate that is likely higher than what will occur. Furthermore, sensitivity analysis has shown that additional detailed analysis of maintenance dredging requirements would not change the comparison of project alternatives or economic justification of the recommended plan required for the feasibility study.

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

This comment had one recommendation which was not adopted as discussed below. The comment expresses the concern that Broward County sand bypassing plan will affect maintenance dredging costs and could influence which project measures are included in the TSP.

USACE Response: Not Adopted

The IEPR panel recommended (1) evaluation of a selected Broward County sand bypassing plan for its potential effects on adverse currents in the OEC and maintenance dredging requirements. However, the sand bypassing plan is still only a proposal and is currently undergoing redesign and refinement and as such was not included as part of the with or without project condition. Only approved, authorized and/or existing projects were evaluated for this purpose as those projects are either in place now, or there is a greater certainty that they will be in place in the future.

7. Comment – *Medium Significance*: Alternatives to blasting for hard rock excavation, as well as the project cost risks associated with blasting, has not been examined fully.

This comment included four recommendations; two were adopted and two were not adopted, as discussed below. This comment indicated that a more comprehensive assessment of possible alternatives to blasting would improve the completeness of the analyses supporting the recommended plan.

USACE Response: Adopted

Action Taken: The IEPR panel recommended (1) providing additional information about the method used to estimate the volume of hard rock including two plan views: one showing contours of depth to hard rock overlain by boring and probe locations, and another showing the thickness of

hard rock to be excavated for the plan. In response, additional information documenting the method used to estimate the volume of hard rock was added to Section 3.7.2 of Appendix A (Engineering) of the feasibility report. The IEPR Panel recommended (2) a quantitative assessment of the cost risk associated with underestimating the volume of hard rock, and explaining how this risk has been addressed in estimating the project cost. In response, a Cost and Schedule Risk Analysis (CSRA) was completed and added to the Appendix F (Cost Engineering) of the feasibility report. Details on this risk (documented as Risk No. CA-2 and TL-1) are found on pages 48 - 50 of Appendix F. The level of risk is reflected in the Moderate and High risk levels that result from the analysis. The CSRA includes an overall contingency that incorporates the appropriate level of risk assigned for the uncertainties that remain regarding the quantity of rock that might need blasting.

USACE Response: Not Adopted

The IEPR panel recommended (3) providing additional information about recent experiences in dredging for the Port of Miami concerning the estimated versus actual quantities and costs for drilling and blasting. Providing information regarding quantities and costs at Miami would not be an appropriate comparison as the geotechnical composition of materials at the two separate locations is not the same and the methods of excavation are contractor dependent and an assumption that identical methods will be used at both locations would not be accurate. The IEPR panel recommended (4) assessing effects on costs and benefits to the environment if blasting were not used. This analysis was not done since the geotechnical data suggests that it is very likely that some degree of blasting will still take place, even if the contractor has access to a rock-cutter dredge. Additionally, this analysis would not affect the comparison of project alternatives or the justification of the recommended plan required for the feasibility study.

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

This comment included three recommendations; all were adopted as discussed below. The comment expresses the concern that the replacement of existing bulkheads and construction of new bulkheads by the Port could delay implementation of the TSP and affect the project costs and benefits.

USACE Response: Adopted

Action Taken: The IEPR panel recommended (1) providing more information, including figures and graphics, for the lengths and locations of existing bulkheads that will either be replaced or reinforced before channel deepening. In response, additional figures/graphics were included in the Appendix A (Engineering), Section 3.8.3, Table A-16, to show the locations of bulkhead construction/replacement/reinforcement. The IEPR panel recommended (2) reconciling the apparent discrepancies between the TSP and the engineering analyses concerning the approach for reinforcing existing bulkheads and the costs and schedule for replacing and reinforcing existing bulkheads and constructing new bulkheads. These discrepancies were removed from the report and updated cost information for the bulkheads was included in the project cost estimate. The IEPR panel recommended (3) addressing the feasibility and time required for the Port to complete the bulkhead work necessary to begin implementation of the TSP. The Cost Schedule Risk

Assessment included in the Appendix F (Cost) captures the risks and implications to the Project if the local sponsor does not complete the necessary improvements at the appropriate time. However, it is assumed that Port bulkhead construction will be done concurrently with the approved expansion project.

9. Comment – *Medium Significance*: Benefiting cargoes and commodities have not been clearly identified, and assumptions and growth rates between the present and 2017 are not well documented or explained.

The comment included five recommendations; four were adopted and one was not adopted, as discussed below. The comment expresses the concern that there are undocumented and unverifiable commodity forecasts that directly affect the reliability of the claimed benefits.

USACE Response: Adopted

Action Taken: The IEPR panel recommended (1) that the benefiting commodities and the amounts and shares of benefits attributable to each be identified. In response, this information was added as Figure 39 in Section 5.0 of Appendix B (Economics). The IEPR panel recommended (2) a single table showing calendar year 2010, 2017, and 2067 tonnages for the benefiting commodities with accompanying calendar year growth rates (CAGRs) be provided. In response, this information was added as Tables 24-26 and Figures 23-24 in Section 5.0 of Appendix B. The IEPR panel recommended (3) a detailed explanation, including sources, of expected 2010-2017 commodity growth be provided and (4) a discussion of the development of the commodity growth rates and any related assumptions in greater detail. In response, reference was provided in Appendix B to the Global Insight report that was used to estimate the tonnage during the period of analysis. The commodity forecast evaluated in the analysis was based on data provided by Global Insight for the anticipated commodities (trade concepts) projected to be transported through the East Coast. This data was used to calculate the total tonnage anticipated to be transported through Port Everglades. Additionally, a sensitivity analysis was also run that assumed less than 0.6 percent annual growth to the base year of the period of analysis which was then held constant throughout the period of analysis. The 0.6 percent growth is less than the assumed growth for the base scenario. This scenario still estimated a Benefit-Cost Ratio greater than 1. Discussion of this sensitivity analyses was added to Section 14 of Appendix B.

USACE Response: Not Adopted

The IEPR panel recommended (5) providing in an Appendix a copy of the IHS Global Insight forecast and a discussion of any IHS forecast modifications in Appendix B (Economics). However, the inputs developed using the IHS Global Insight commodity forecast for the South Atlantic is considered proprietary therefore this information was not able to be included in a public report.

10. Comment - *Medium Significance*: The vessel fleet forecast is not well documented and the benefiting vessels have not been identified.

The comment included six recommendations, all of which have been adopted as discussed below. The comment requests a more detailed analysis of the vessel fleet, operation, and cost savings for

Port Everglades to more clearly determine the extent of project benefits and verify the benefit-cost ratio.

USACE Response: Adopted

Action Taken: The IEPR panel recommended (1) explaining the basis for anticipated changes in benefiting vessel fleet, sailing drafts, and calls between 2010 and 2017, including the application of the MSI study. In response, this information was added to Appendix B (Economics) Sections 8.2 and 9.1.4, indicating that it is anticipated that as the world fleet transitions to larger vessels, those vessels will begin calling on the East Coast, and therefore Port Everglades with greater frequency. Therefore, the analysis assumes that these vessels will become a greater portion of the anticipated fleet calling on the port in the future. The sailing drafts of these vessels are not anticipated to shift until the proposed deepening has been constructed. Therefore, there is not a significant shift between 2010 and 2017, the base year of the project. The total numbers of calls anticipated at the harbor is anticipated to increase along with commodity growth. The tonnage transported through the harbor has increased historically. This commodity growth is anticipated to continue in the future with or without a project. The IEPR panel recommended (2) explaining the basis of the underkeel clearances used. It is unclear whether they were based on historical/institutional fixed distance or perhaps a percent of draft. In response, Section 3.3 of Appendix B was updated to indicate that underkeel clearance was based on historical information. Additionally, Section 9.1.4 of Appendix B discusses the sailing draft of the empirical fleet which was evaluated along with the channel depth and available tide during that time. The IEPR panel recommended (3) adding text explaining the cost assumptions used, distances traveled, and cost differentials between smaller and larger vessels. In response, information was added to Section 11.3.1 of Appendix B indicating that vessel operating costs used in the analysis were developed by the Corps Institute of Water Resources (IWR). Vessel Operating Costs are based on actual resources used and are not the rates charged by the shippers. Aggregate or standardized vessel costs are developed based on a sample of data and information according to carrier type and size from vessel operators and management groups combined with additional sources including banking and financial institutions, and technical consultancies involved with the worldwide maritime business sector. Additionally, Section 11.3.5 of Appendix B was updated to indicate that the distances traveled were based on historical information provided by Port Everglades. The IEPR panel recommended (4) adding text comparing the with-project and without-project vessel fleet, call, and draft forecasts. In response, Section 6 and Section 9 of Appendix B were updated to include, respectively, the without-project fleet forecast and the with-project fleet forecasts. Included in these sections are graphs for the container vessel sailing drafts with reference made to the tanker fleet as well. The IEPR panel recommended (5) indicating which vessels in the 2017-2067 forecast period would benefit from deepening and widening. In response, Figures 38 and 39 were added to Appendix B to display the breakdown of benefits by commodity (and thereby vessel class). A sensitivity analysis was also added to Section 14 of Appendix B to demonstrate the significance of each commodity on project justification. The IEPR panel recommended (6) explaining the increase in future without project calls of Post Panamax Generation II (PPX2) vessels. In response, Section 9.1 of Appendix B was updated to indicate that as PPX2 vessel become an increased portion of the world container fleet, the assumption was made that these vessels would begin calling on Port Everglades along with other East Coast ports; that these vessels have already started calling on the US East Coast during the last few years; and that as these vessels become

more prevalent in the world fleet, the frequency of calls on the East Coast, and Port Everglades, will increase as well.

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

The comment included three recommendations, two were adopted and one was not adopted as discussed below. The comment expresses concern that underdeveloped sensitivity analyses increase the uncertainty in the various projections that are critical to the benefits calculation and the BCR.

USACE Response: Adopted

Action Taken: The IEPR panel recommended (1) a review of all sensitivity analyses that have been done on the assumptions and major projections during the course of the Feasibility Study, and description of those sensitivity analyses and results in the project documentation, and (3) conducting sensitivity analyses on the critical variables identified in recommendation 2 below, detailing potential impacts on the BCR. In response, additional economic sensitivity analyses were done and are detailed in Table 64 of Appendix B (Economics). The sensitivity analyses were developed using various commodity growth scenarios and were based on the benefits associated with each major trade concept (Containers and Petroleum).

USACE Response: Not Adopted

The IEPR panel recommended (2) if additional sensitivity analyses were not done, inventory the major assumptions of the analyses and sub-analyses, such as cargo growth and vessel fleet composition, and explain in the Feasibility Study why sensitivity analyses were not done. A change in the vessel fleet forecast was not included in the sensitivity scenarios, however the sensitivity scenarios were separated by trade concept. A reduction in the total benefits by trade concept does not make the project economically unjustified.

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

The comment included five recommendations, all of which were adopted as discussed below. The comment indicates that a better description of the role and current status of the WLP project would improve the Port Everglades project documentation, especially the Port Everglades proposed mitigation plan.

USACE Response: Adopted

Action Taken: The IEPR panel recommended (1) clearly describing the WLP project's role with regard to Port Everglades mitigation, and explaining how the Port Everglades mitigation plan could be affected and (2) defining the current status of the WLP project. In response, Section 4.4 of Appendix E (Mitigation and Monitoring Plan) of the EIS was updated to detail the role of WLP in the project and the status of the improvements at WLP. The IEPR panel recommended (3)

providing any monitoring information (from either the WLP project or the Port Everglades project) that demonstrates the success (or failure) of the proposed methods and/or mitigation efforts that apply to both projects and (4) including adaptive management for the Port Everglades project, based on immediate results of the WLP project, if methods proved unsuccessful. In response, Sections 4.5, 4.6, and 4.7 of Appendix E of the EIS were updated to discuss the monitoring and adaptive management at WLP including a discussion of mitigation monitoring (Section 4.5), success criteria for WLP (Section 4.6) and adaptive management for mitigation at WLP (Section 4.7). The IEPR panel recommended (5) adding a sentence to Appendix E that obligates Broward County to long-term maintenance activities. In response, Section 4.4 of Appendix E of the EIS was updated to indicate that the liability for construction, monitoring and success for mitigation at West Lake Park rests solely with Broward County.

13. Comment - *Low Significance*: The link between ocean currents, vessel accidents, and navigation safety improvements is not clear.

The comment included three recommendations, all which were not adopted, as discussed below. The comment recommended that since safety is one of the objectives of the proposed project, the Feasibility Study needs to clearly document the current safety concerns and the potential benefits of the project for safety.

USACE Response: Not Adopted

The IEPR panel recommended that the report (1) examine and discuss the frequency and magnitude of Port Everglades accidents relative to the collision and accident data in other ports made available by the USCG, especially those in the southeastern United States, (2) describe in detail the relationship between past incidents and how the TSP would reduce those incidents, and (3) relate the findings of the first two recommendations to the benefits claimed for safety improvements. However, the main feasibility report has been updated throughout to clarify that increased channel maneuverability, rather than increasing safety, is a study objective. Under current conditions the port pilots enact navigation restrictions to allow for safe transit of vessels.

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

The comment included one recommendation, which was adopted as discussed below. The comment recommended including other structural options to improve the technical quality and completeness of the report.

USACE Response: Adopted

The IEPR panel recommended (1) including a structural option to reduce adverse cross-currents to the list of elements considered. In response, information on why structural options were screened out early in the formulation process due to their ineffectiveness was added to Section 4.6 of the main feasibility report.

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

The comment included three recommendations, two were adopted and one was not adopted, as discussed below. The comment indicated that including additional information about the mangrove avian populations would improve the baseline information.

USACE Response: Adopted

Action Taken: The IEPR panel recommended (1) collecting/compiling more information about the local mangrove bird populations from the local Audubon Society; local, state, or federal resource agencies; and academic institutions and (2) incorporating new information on avian populations into the EIS. In response, information on local mangrove bird populations was collected and added to Section 3.5.2 of the EIS.

USACE Response: Not Adopted

The IEPR panel recommended (3) considering adding mangrove avian fauna monitoring to the Port Everglades project. Due to the impacts to mangroves being minimal as compared to the densities of mangrove forest in Broward County as well as the availability of mangroves directly adjacent to the impact area, monitoring of additional indicators of mangrove vitality, such as avian populations, would not be warranted.

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

The comment included two recommendations, one was adopted and one was not adopted, as discussed below. The comment expresses a concern that the absence of accurate and current status and trends for the mangroves, seagrasses, and hard bottom-reef communities affects the completeness of the project and has implications for the future success of adaptive management and recovery.

USACE Response: Adopted

Action to be Taken: The IEPR panel recommended (1) acquiring and compiling more-recent information on mangrove, seagrass, and hard bottom-reef communities' status and trends. In response, during the Pre-Construction Engineering Design (PED) phase of the study, the Corps will undertake a final seagrass, hardbottom and mangrove communities survey, as well as obtaining current information from the Southeast Florida Coral Reef Evaluation and Monitoring Project.

USACE Response: Not Adopted

The IEPR panel recommended (2) baseline information to be collected six months before the Port Everglades project is initiated. As indicated above, this information will be collected during the PED phase of the project, prior to construction. The mangrove, seagrass, and hard-bottom

communities are unlikely to change substantially from the surveys taken during PED to 6 months prior to construction.

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

The comment included three recommendations; all were adopted, as discussed below. The comment expresses a concern that the proposed method to obtain settlement and/or sand covering data may not enable analysts to accurately determine the sedimentation characteristics of hard bottom habitats; therefore, the true potential impacts may not be ascertained.

USACE Response: Adopted

Action Taken: The IEPR panel recommended the report (1) clearly describe whether the intent of the monitoring methodology is to obtain five subsamples at each quadrat location or to sample five discrete locations across the general area. In response, the intent of the artificial reef monitoring is to sample no less than five discrete locations as discussed in the EIS Sub-Appendix E Monitoring Plan E-5 (page 18) and Section 6.5.1 of the Mitigation Plan.

Action to be Taken: The IEPR panel recommended (2) adopting the more conservative approach of sub-sampling by collecting five such measurements at each quadrat. In response, this approach will be considered as the monitoring plan is further refined during the Pre-Construction Engineering and Design (PED) phase of the study. The IEPR panel recommended (3) researching and identifying more robust methods to determine sedimentation impacts besides a weighted tape measure, given the nature of the environment. In response, lessons learned from other ongoing monitoring efforts and any other additional information that becomes available will be utilized to modify the monitoring plan as appropriate during the study PED phase. Additionally, the Corps will continue to actively work with the resource agencies to identify any new and improved methods.

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

The comment included one recommendation, which was not adopted as discussed below. The comment expresses a concern that the completeness of the mitigation would not be realized using *A. cervicornis* to mitigate for injuries.

USACE Response: Not Adopted

The IEPR panel recommended (1) implementing the limestone boulder and coral transplanting mitigation-restoration option presented in the EIS. Subsequent to this recommendation being made, additional consultation with the National Marine Fisheries Service resulted in final mitigation plan which included artificial reef creation and coral transplanting, as well as coral propagation utilizing a variety of species.

19. Comment - *Low Significance*: The Feasibility Study and the Environmental Impact Statement are inconsistent with regard to the need for mitigation of benthic invertebrates.

The comment included two recommendations, one was adopted and one was not adopted, as discussed below. The comment expresses a concern that the need for mitigation of benthic invertebrates has not been presented clearly; therefore, it is not clear if potential impacts will be mitigated.

USACE Response: Adopted

Action Taken: The IEPR panel recommended (1) the inconsistencies between the Feasibility Study and Appendices C and E of the EIS regarding mitigation for benthic communities be resolved. In response, page 2 of the EIS Sub-Appendix C was updated to clarify that impacts to significant benthic invertebrate resources will be mitigated.

USACE Response: Not Adopted

The IEPR panel recommended (2) defining the mitigation efforts, if any, for the benthic invertebrates in the proposed mitigation plan. Impacts to benthic invertebrates are expected to be minimal, hence, mitigation for non-coral benthic invertebrates is not proposed for the project.

20. Comment - *Low Significance*: The primary mitigation plan selects a non-conservative approach with minimum construction impacts to hard bottom habitats.

The comment included two recommendations, both of which were not adopted as discussed below. The comment recommended use of a more conservative approach to assessing potential construction impacts that would demonstrate the ecologically sensitive nature of the area is recognized, but overall mitigation costs would not be affected.

USACE Response: Not Adopted

Action Taken: The IEPR panel recommended (1) considering adopting Scenario 1 for the proposed impact determination. Scenario 1 assumes anchor/cable impacts will occur and mitigation for them is planned upfront. However, since these impacts are typically minimal and temporary, rather than plan mitigation upfront, mitigation for these impacts is not assumed. Mitigation would only occur if significant impacts are shown to have occurred based on a post-construction survey. Funding for potential additional mitigation has been included as part of the project cost contingency. The IEPR panel recommended (2) if Scenario 1 is adopted, define the timeline for the post-construction survey. Although Scenario 1 is not being adopted, a post construction survey would still be conducted within the first 45 days after construction, as is detailed on page 17 of Appendix E (Mitigation and Monitoring Plan) of the EIS.

21. Comment - *Low Significance*: The criteria to evaluate the success of hard bottom benthic community colonization do not account for community structure-resemblance measurements.

The comment included one recommendation, which was adopted, as discussed below. The comment notes that the technical quality of the project and the mitigation evaluation would be improved by implementing the multivariate marine community approach.

USACE Response: Adopted

Action Taken: The IEPR panel recommended redesign of the success criteria for mitigation using the community resemblance multivariate approach. In response, Section E-5 (Monitoring Plan) of EIS Sub-Appendix E was updated to include use of multi-variate analysis and computing Bray-Curtis similarities in order to compare reference and mitigation sites.

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

The comment included two recommendations, which were not adopted as discussed below. The comment stated that implementing additional recommendations from PERG may reduce future project costs and improve the likelihood of successful restoration efforts for this project, and future projects, at little to no additional cost.

USACE Response: Not Adopted

The IEPR panel recommended (1) adopting additional PERG recommendations that have no initial costs, while increasing scientific knowledge of project restoration methods. The Corps thoroughly reviewed all PERG recommendations and considered those that directly related to implementation of the project. Although some additional recommendations would have no cost, they would be better implemented by other agencies that have a scientific research mission. The IEPR panel recommended (2) considering potential indirect cost benefits on future projects that may result from adopting PERG recommendations that involve small increases in project costs. Since Corps projects are generally individually authorized and have different cost sharing partners, the Corps cannot accrue benefits to a future hypothetical project at the expense of added costs to a current project under study.

Comments Received on the Final Feasibility Report (20 comments):

1. Comment – *High Significance*: Commodity forecasts are not sufficiently documented, and the approach appears to overstate the forecast for key benefitting commodities.

The comment included seven recommendations, three were adopted and four were not adopted, as discussed below. The comment expresses concern that the project benefits depend critically on commodity and major benefitting commodity forecasts, which may be overstated.

USACE Response: Adopted

Action Taken: The IEPR panel recommended; (1) contacting Lehigh Hudson and CEMEX to determine their plans for Port Everglades facilities and imports (or provide notes if contacts have been made). In response, contact was made with Lehigh and is noted on page 36 of Appendix B (Economics). The IEPR panel recommended (5) providing details on all forecast adjustments, with precise citations to sources used, and (6) providing data (actual and forecast tonnages and growth rates) for each benefitting commodity for 2010-2060. In response, the following updates were made to Appendix B: Tables 24 -26 were updated to show the growth rates for near-term foreign trade forecast by trade concept, trade concept growth rates, and the total Port Everglades foreign and domestic cargo throughput forecast. Table 64 was updated to show the results of no growth after the base year and assumes a reduced compound annual growth rate of .58% between 2013 and 2023. Section 5.1 was updated to include the commodity forecast methods and assumptions and discusses the primary benefitting commodities. Tables 21-23 were updated to discuss Port Everglades historical percent share of South Atlantic imports and exports by commodity type and region and Figures 17-24 were added which display forecasts by commodity and throughput forecast. Section 11.5 was updated to show a breakdown of benefits by commodity type.

USACE Response: Not Adopted

The IEPR panel recommended (2) revising the cement forecast to reflect more accurately post-recession cargo shares and trends. Bulk cement has grown at Port Everglades from just over 240,000 metric tonnes in 2010 to just over 485,000 metric tonnes in 2013. The 2013 actual total is above the forecasted tonnage for cement therefore the forecast is considered conservative. Additionally, cement accounts for just 3 percent of the total tonnage transported through the harbor and has been rolled into the Dry Bulk/General Cargo trade concept. The trade concept provides only 3 to 5 percent of the total benefits. This trade concept does not provide the benefits to determine the recommended plan or justification of the recommended plan, hence revisions to the forecast were not considered necessary. The IEPR panel recommended (3) providing copies of notes from the MSC contact cited in the footnotes in the Economic Appendix on pages 31-32, and from other container shipping line contacts, and (4) providing the IHS forecast as an appendix or provide a detailed summary as part of the Economic Appendix. The requested information is proprietary and was not added to the report, however, the information was provided to the panel under a non-disclosure agreement. The IEPR panel recommended (7) performing sensitivity analyses on the impact of reduced 2015 cement and container market shares on benefits estimates. Sensitivity scenarios were developed to demonstrate the impact of lower growth rates for all commodities transported through the harbor, rather than for individual commodities. As discussed above, variations to the benefits derived from cement would not change the justification of the recommended plan.

2. Comment – *Medium/High Significance:* The analyses presented in revised Section 4.0 of the Final Environmental Impact Statement (FEIS) do not support the conclusion that “there would be no cumulative adverse effect on the geology or coastal sediment budget/transfer for the area.”

The comment included two recommendations, both of which were not adopted as discussed below. The comment expresses a concern that inaccurate cumulative geological impacts of the Port Everglades project will have a negative effect on an already eroding shoreline, which may affect the recommendation or justification of the project.

USACE Response: Not Adopted

The IEPR panel recommended (1) revising the Cumulative Impacts (Section 4.28) of the FEIS to state that the recommended plan will increase coastal erosion south of the inlet and (2) providing a sound quantitative estimate of the potential erosion rate. The Port Everglades entrance channel acts as a complete sediment sink that allows for no natural bypassing of material in the nearshore littoral zone. If no material is presently moving past the existing entrance channel and depositing onto the beaches to the south, then there is no physical means by which modification of the entrance channel can increase (or decrease) the existing shoreline erosion rates by interrupting nonexistent transport. No change in the erosion rate of shorelines adjacent to the channel is expected due to the additional shoaling. However, Section 4.28.5, of the feasibility report Appendix A (Engineering), "Geology and Sediments" was revised to clarify sediment transport and maintenance activities.

3. Comment – *Medium/High Significance*: The assumptions supporting the impact analyses could not be verified because information on the revised analyses and mitigation and monitoring plans is not provided in the FEIS.

The comment included two recommendations, both of which were adopted, as discussed below. The comment expressed concern that without reviewing the analyses and assumptions that form the basis of the revised mitigation plan, or reviewing the plan itself (as well as the monitoring plan), the Panel cannot determine whether the mitigation plan is likely to succeed.

USACE Response: Adopted

The IEPR panel recommended (1) including in the FEIS a summary of the HEA and UMAM assumptions, clarifications on the sources of data, information on whether preconstruction surveys will be conducted to finalize numbers, and a description of resulting conclusions as to mitigation requirements and (2) including in the FEIS a summary of the key aspects of the monitoring plan, including likely recovery times, monitoring requirements, success criteria, contingency plans, and state thresholds that will trigger adaptive management. While this information was included in the FEIS, it was mistakenly not originally provided to the panel for review. The information was subsequently provided and reviewed by the panel.

4. Comment – *Medium/High Significance*: The planned mitigation planting of seagrass at West Lake Park may not provide equivalent ecosystem services in comparison to the seagrass impacted by the expansion.

The comment included two recommendations, both of which were not adopted as discussed below. The comment expresses concern that the seagrass mitigation planned at West Lake Park (WLP) may not replace ecosystem services lost to the project; therefore, the mitigation may be inadequate.

USACE Response: Not Adopted

The IEPR panel recommended (1) an assessment of all other potential locations for seagrass mitigation that may be closer to the inlet and provide ecosystem services needed by managed species and (2) for the report to document how seagrass restoration in WLP will replace ecosystem services lost from areas close to the Port Everglades inlet. The National Marine Fisheries Service (NMFS) recommendation and Environmental Protection Agency (EPA)'s adoption of the NMFS recommendation regarding the location of the seagrass mitigation at West Lake Park and the appropriateness of this location can be found in the Environmental Impact Statement Mitigation and Monitoring Plan (Sub-Appendix E). Literature cited by NMFS states that for large estuarine systems like the Indian River Lagoon, the distance from inlets for restoration projects should be less than three miles. As Port Everglades is an inlet and not an estuarine lagoon, any seagrasses in this system have colonized the manmade channel walls since dredging began and serves very little functional value to resources. Other than the potential for a small area behind an environmentally friendly bulkhead on the western side of the IWW, there are no seagrass mitigation areas closer to the inlet. West Lake Park is the closest mitigation option to the inlet. West Lake Park is and will remain the largest contiguous seagrass bed within 1 mile of the inlet and is the most appropriate location near the impacts for mitigation to occur.

5. Comment – *Medium/High Significance*: The sensitivity analysis does not provide sufficient detail and does not consider the uncertainties involved in commodity forecasts prior to the 2023 base year, in the vessel fleet forecasts, or in the realization of projected transportation cost savings.

The comment included two recommendations, both of which were adopted, as discussed below. The comment expresses concern that the sensitivity analysis does not address significant sources of uncertainty and risk.

USACE Response: Adopted

Action Taken: The IEPR panel recommended (1) analyzing the sensitivity of transportation cost savings estimates and the BCR to commodity forecasts for the base year, applying assumptions regarding the base year fleet, port market share, and actions taken by fleet operations and (2) providing sufficient detail for the reader to follow and understand the structure and findings of the sensitivity analyses. In response, Section 14 and Tables 63 and 64 in Appendix B (Economics) of the feasibility report were updated to present and discuss the results of additional sensitivity analyses, including a “No Growth after Base Year (2023)” which shows that the project is still economically justified under this scenario. Additionally, the benefits by commodity were evaluated to determine how reliant the project justification is on each specific trade concept and the “No growth after Base year” scenario was further adjusted to assume lower growth in the tonnage being transported through the harbor up to 2023.

6. Comment - *Medium Significance*: Details about coral nursery development, operation, and evaluation are not provided in the revised FEIS; therefore, the competency of this form of mitigation cannot be verified.

The comment included three recommendations, all of which were adopted as discussed below. The comment expresses concern that due to the lack of detail provided in the FEIS, which is necessary to understand the coral nursery mitigation approach, it is not clear whether the mitigation will have a reasonable chance for success.

USACE Response: Adopted

The IEPR panel recommended (1) providing more details on the coral nursery mitigation project, (2) providing evidence that success is possible for coral nursery mitigation, given the many marginal environmental variables (water quality, spatial competition from other organisms, predation, disease, nutrient enrichment) that exist in the Broward County reef system, and (3) explaining how the monitoring plan integrates with coral nursery mitigation. For example, if, after six months of monitoring, more than 60% of the outplanted nursery corals are deceased, perhaps a meeting would be convened by the regulatory agencies to consider the problems, find solutions, or alternatives. While this information was included in the FEIS, it was mistakenly not originally provided to the panel for review. The information was subsequently provided and reviewed by the panel. The level of detail provided in the FEIS was sufficient for the National Marine Fisheries Service to issue its Biological Opinion and complete their consultation under the Endangered Species Act.

7. Comment - *Medium Significance*: The estimates of transportation cost benefits do not provide a breakdown by benefitting vessel type or by commodity, nor do they distinguish between benefits due to larger vessel size, heavier vessel loading, and reduced delays.

The comment included one recommendation, which was adopted, as discussed below. The comment expresses concern that the reasonableness of project benefit estimates and the benefit-cost ratio cannot be determined without more detailed information on the types and sources of transportation cost savings.

USACE Response: Adopted

Action Taken: The IEPR panel recommended (1) providing a breakdown of estimated transportation savings by benefitting vessel type and commodity, distinguishing between benefits of larger vessels, heavier loading, and reduced delays. In response, total operating costs by vessel class was added to the feasibility report in Section 11.5 of Appendix B (Economics) and the benefits by trade concept were added in Figures 38 and 39 of Appendix B.

8. Comment - *Medium Significance*: The impact of a potential severe storm event and associated sediment mobilization on newly restored resources or new channel depths has not been adequately addressed.

The comment included four recommendations, all of which were not adopted as discussed below. The comment expresses concern that many elements of the Port Everglades Port expansion are at

risk from severe storm events, and the lack of a clear contingency plan for these occurrences is a risk to the future success of the project.

USACE Response: Not Adopted

The IEPR panel recommended (1) assigning a probability to a large storm event occurring one time during the project lifetime (50 years). Storm events would have an equal impact to the resources regardless of whether the resources exist or are newly created, thus the impacts are the same with or without the project. Hence, assigning probabilities to storm events would have no impact on the project recommendation. The IEPR panel recommended (2) summarizing potential impacts to the Port Everglades project resulting from a severe storm event in the FEIS, and (3) defining actions that would be taken in the event that newly restored resources or the new channel depth are adversely affected by a storm event. Should the area be hit with a major storm causing sedimentation in the channel and resulting in the US Coast Guard declaring the channel not open for large vessel passage (as occurred in 2004 & 2005 with a large hurricane season in Florida), an emergency Operations and Maintenance Dredging event would be conducted very quickly. However, this work would be done with or without the project at Port Everglades and hence this information was not added to the report. With regards to restored resources, under the Department of Army permit issued to Broward County Parks for the restoration of Westlake Park, should a major storm damage the resources in the park for which mitigation credits were issued against those resources, the County would either have to restore the damaged resources or provide alternative mitigation credits for the lost resources. As is stated in Section 7.0 of the Main Report; an agreement between the United States of America and Broward County will be executed to guarantee seagrass and mangrove mitigation in perpetuity. For the coral outplanting, there will be at least 10 years of outplanting activities with numerous areas identified for restoration or enhancement by a team led by NOAA and Broward County. The majority of the outplanted corals (<60%) will be *Acropora cervicornis*, this species propagates via fragmentation, which is often storm driven, thus, storm impacts to the enhancement sites may not be detrimental to the resources. The IEPR panel recommended (4) discussing funding sources for repair and maintenance in the FEIS if a large storm event hits the project area. This information was not added to the report since repair of port facilities would be a non-federal sponsor responsibility.

9. Comment – *Medium Significance*: A comparative port analysis has not been conducted to provide justification for Port Everglades’ projected traffic volume.

The comment included two recommendations; both were not adopted as discussed below. The comment expresses concern that without a more complete, quantitative comparative port analysis for each of the major benefitting commodities, confidence in the accuracy of the market share, traffic projections, and the BCR is reduced.

USACE Response: Not Adopted

The IEPR panel recommended (1) for each major benefitting commodity, analyzing the relative landed cost, the capacity (differing modes, terminals, steamship lines, etc.), and other competitive factors affecting the choice between Port Everglades and competing ports and (2) determining the sensitivity of commodity growth projections to changes in port competition, by benefitting commodity. The economic analysis does not assume that a change in channel depth alone will

cause a shift in origin or destination of traffic volume, change the rate of commodity growth at the harbor, or increase the demand of any commodity in the hinterland in which the port serves. As there are many factors that vessel operators take into account when determining which harbor they will call; a multiport analysis would be necessary to document that a change in the parameters of a particular harbor may attract a shift in cargo from one port to another. In lieu of a full multi-port analysis, it was assumed that the historical Port Everglades share remains the same in both the Future Without Project and Future With Project Conditions. In other words, with or without the deepening Port Everglades would receive the same share of regional volumes. By assuming no change in share, the only future benefits are derived from commodity growth transiting through the harbor more efficiently into and through the region and not as a direct result of Port Everglades capturing traffic share from another Port.

10. Comment - *Medium Significance*: The USACE determination that the project's cumulative impacts are negligible may not be accurate because the project components that have been removed from the Federal project are still being pursued by the Port.

The comment included two recommendations, both of which were not adopted as discussed below. The comment expresses concern that cumulative impacts resulting from sponsor activities are not discussed in the FEIS; therefore, cumulative impacts may not have been adequately assessed and the proposed mitigation may not address all impacts.

USACE Response: Not Adopted

The IEPR panel recommended (1) in the FEIS cumulative impact analysis, discussing what potential impacts may result from: the Port's implementation of the Dania Cutoff component, specifically in terms of seagrass impacts; and, the Port's implementation of the Turning Notch component, specifically in terms of mangrove impacts and (2) reassessing the cumulative impacts discussed above to determine whether they are significant and would require additional mitigation. The Dania Cutoff Canal was removed the study and is not a part of the recommended plan. It is also not planned to be dredged by the Port. The assessment of cumulative impacts, including impacts to mangroves, associated with the expansion of the Turning Notch by the port was already included in the Cumulative Effects analysis of the EIS Section 4.28.2 – Table 38 and Section 4.28.6.

11. Comment – *Medium/Low Significance*: The discussion of the HarborSym analysis provides no information on the cost parameters assigned to vessel operations, which are critical to the validity and reasonableness of transportation cost savings.

The comment included one recommendation which was not adopted, as discussed below. The comment notes that without supporting information for vessel costs in HarborSym analysis, it is not possible to determine whether the benefits estimates are reasonable.

USACE Response: Not Adopted

The IEPR panel recommended (1) providing information on the vessel operating costs, the impacts of light-loading and delay on those costs, the method for estimating the costs, and the sources used. Vessel operating cost information is proprietary and could not be added to the feasibility report.

However, in response to the comment, the vessel operating costs used in the analysis were provided to the panel for review under a non-disclosure agreement.

12. Comment – *Medium/Low Significance*: USACE’s response to a public comment indicates there is an upland dredged material disposal area on Port property for dredged material that exceeds toxicity standards; however, the FEIS states that there are no suitable upland disposal sites in the project vicinity.

The comment included three recommendations, all of which were adopted as discussed below. The comment noted that if upland disposal is being considered, then the FEIS is not complete and the environmental impacts from upland disposal need to be addressed.

USACE Response: Adopted

Action Taken: The IEPR panel recommended (1) clarifying whether upland disposal of any dredged materials is being considered, (2) if upland disposal is being considered for any dredged materials, describing and addressing this alternative in the FEIS, and (3) if upland disposal is not being considered, explaining what will be done if any dredged materials are found to be unsuitable for ocean disposal. In response, Section 2.9.4 of the EIS was revised to include information on a small upland site available for any material that is found to be unsuitable for ocean disposal.

13. Comment – *Medium/Low Significance*: The assumption that round-the-clock dredging in Port Everglades would not have significant population impacts on larval fish densities is not supported by the data provided in the revised FEIS.

The comment included one recommendation which was not adopted, as discussed below. The comment expresses concern that the determination of the impact analysis for larval fish populations may not be justified because inadequate data have been presented to support the comparison of the Port Everglades site to the referenced Beaufort site.

USACE Response: Not Adopted

The IEPR panel recommended (1) providing additional information in the FEIS to support the determination that dredging in Port Everglades would not have significant population impacts on larval fish densities. However, all available information related to this determination has already been included in the report.

14. Comment – *Medium/Low Significance*: Public comments and interview notes from private-sector entities that would benefit from the project (e.g., cruise lines, shipping companies, or customers) would be evidence for the reasonableness of the with-project scenarios, but the comments and notes have not been presented.

The comment included three recommendations, two were adopted and one was not adopted, as discussed below. The comment notes that project benefits depend on realization of transportation cost savings by private entities whose views are not well documented, creating uncertainty regarding the validity of with-project scenarios.

USACE Response: Adopted

Action Taken: The IEPR panel recommended the following; (1) describing efforts made to obtain the views of affected cruise lines, shipping lines, shippers, and receivers and (3) explaining how the information developed in the interviews and documented in the notes supports the project benefits, and discussing what assumptions the interviewees held when asserting benefits accruing to them. Sections 3.4.1 through 3.4.4 of the Appendix B (Economics) were updated to detail what interviews were conducted and how these interview notes were used.

USACE Response: Not Adopted

The IEPR panel recommended (2) providing copies of notes from interviews with Royal Caribbean International CEMEX, Lehigh-Hudson, TransMontaigne, MSC, Hamburg Sud, and other vessel operators or shipper/receivers. The detailed information gathered during the operator interviews is considered proprietary information and could not be added to the report. However, in response to the comment the information was provided to the panel under a non-disclosure agreement.

15. Comment - *Low Significance*: The assumption that reef mitigation projects will restore all ecosystem services and structure to 100% equivalency is unsupported in the FEIS.

The comment included two recommendations, both of which were adopted as discussed below. The comment expresses concern that without quantitative measures of success and realistic equivalency goals, the status and trends of the coral reef mitigation project cannot be reliably measured and project mitigation goals may not be met.

USACE Response: Adopted

Action Taken: The IEPR panel recommended (1) developing quantitative success criteria with defined parameters at specific milestones during the project and (2) defining specific success criteria to trigger adaptive management for remedial action if reef mitigation is not meeting the targeted goals of the project. While this information was included in the FEIS, it was mistakenly not originally provided to the panel for review. The information was subsequently provided and reviewed by the panel.

16. Comment - *Medium Significance*: The monitoring plan for coral reef recovery is not linked to recovery estimates and, therefore, might not be sufficient to determine long-term success and confirm the assumptions of the HEA analysis.

The comment included five recommendations, two were adopted and three were not adopted, as discussed below. The comment notes that the coupling of mitigation monitoring and the anticipated recovery period is important for evaluating the long-term success of the mitigation efforts and for confirming HEA assumptions and overall impact assessment.

USACE Response: Adopted

Action Taken: The IEPR panel recommended (2) including additional monitoring requirements if the reefs are not meeting defined success criteria after 3 or 5 years (i.e., 80 percent assemblage resemblance based on the Bray Curtis Similarity coefficient). In response, additional monitoring requirements through utilization of multi-variate analysis and computing Bray-Curtis similarities

to compare reference and mitigation sites will be required, and these updated requirements were added to page 19 of sub-Appendix E-5 in Appendix E (Mitigation and Monitoring Plan) of the EIS. The IEPR panel recommended (4) defining the specific threshold that will trigger additional measures for adaptive management after 3 years. In response, additional reference as to where this information is located in the report was added to page 19 of EIS Appendix E-5 (Monitoring and Adaptive Management Plan). The IEPR panel recommended (5) including independent experts on the committee to determine adaptive management measures, as needed. Experts from State and Federal resource agencies were involved in the development of the Mitigation Plan. These agencies have separately consulted with independent experts and their input is currently reflected in, and likely will continue to be reflected in these agencies viewpoints.

USACE Response: Not Adopted

The IEPR panel recommended (1) revising the required monitoring period to provide sufficient timeframes for monitoring in conjunction with the defined recovery estimates (i.e., 20, 35-50 years) and (3) requiring 5-year monitoring events over the long term (50-year project duration) to enable assessments of the assumptions presented in this plan comparing the two mitigation methods and their likely recovery timeframes. The duration of proposed monitoring activities in the monitoring plan were coordinated with state and federal resource agencies and are consistent with similar projects. Success criteria are expected to be achieved in no more than five years. If, after five years of post construction monitoring, USACE determines that additional mitigation and monitoring are necessary, appropriate modifications will be recommended at that time.

17. Comment - *Medium Significance*: The mitigation success criteria are inconsistent and the statistical approach to validate success of the mitigation is poorly defined.

The comment included two recommendations, both of which were adopted as discussed below. The comment notes that the statistical approach is a key component for validating HEA assumptions and confirming restoration success.

USACE Response: Adopted

Action Taken: The IEPR panel recommended (1) defining consistent mitigation success criteria in the FEIS and the Port Everglades Mitigation Plan and (2) employing and describing a multivariate status and trends statistical approach for verifying success of mitigation components in the FEIS, the Port Everglades Mitigation Plan, and appendices. In response, the mitigation success criteria for the artificial reef will be set to the same value as was required by Florida Department of Environmental Protection permit for the Port of Miami project, which is 75% similarity between artificial reef and pre-construction 3rd reef surveys, and a multivariate analysis to compare reference and mitigation sites will be utilized. This information is stated in the EIS Sub Appendix E-5 (Monitoring and Adaptive Management Plan).

18. Comment - *Low Significance*: Using diver deployed measuring tapes to evaluate boulder reef structure settlement and sediment is not a safe or accurate method.

The comment included one recommendation, which was not adopted, as discussed below. The comment expresses concern that the potentially unsafe and physically challenging boulder settlement monitoring technique has implications for project accuracy.

USACE Response: Not Adopted

The IEPR panel recommended (1) adopting an alternative method to evaluate boulder settlement. USACE intends to utilize multibeam and side scan surveys as the primary method for evaluating boulder reef structure settlement and sediment. While use of divers cannot be ruled out, they would only be used if the multibeam and side scan survey information is determined to be insufficient. This information is detailed in the EIS Appendix E-5 (Monitoring and Adaptive Management Plan).

19. Comment - *Low Significance*: The purpose of collecting video data along each transect is unclear.

The comment included two recommendations; both were adopted, as discussed below. The comment notes that video post-processing for point count image analysis can reduce the efficiency of data collection.

USACE Response: Adopted

Action Taken: The IEPR panel recommended (1) stating the purpose of taking video transects in the Port Everglades Mitigation Plan. The purpose of taking video transect, which includes being able to assess conditions over the entire project area over time, was included in the EIS Appendix E-5 (Monitoring and Adaptive Management Plan). The IEPR panel recommended (2) that if the videos will be used for quantitative analysis, considering using a still camera instead to increase efficiency. The project intends to use both high definition video as well as still photographs to collect data.

20. Comment - *Low Significance*: The recording of coral health observations in potential poor visibility and strong current conditions is not effective.

The comment included one recommendation which was adopted, as discussed below. The comment expresses concern that trying to record coral observations in situ could compromise the accuracy and efficiency of the data.

USACE Response: Adopted

Action Taken: The IEPR panel recommended (1) considering the use of reference markers and still photography in coral health observations. In response, all photographs and video of habitats will include a reference stake within the frame of the photograph for better reference to the size of the coral. An example of this stake was included as Figure 80 of the EIS.