DEPARTMENT OF THE ARMY
CHIEF OF ENGINEERS
2600 ARMY PENTAGON
WASHINGTON, D.C. 20310-2600

SEP 8 2015

MEMORANDUM FOR Assistant Secretary of the Army (Civil Works)
108 Army Pentagon, Washington, D.C. 20310-0108

SUBJECT: Charleston Harbor Post-45 Feasibility Study, Charleston, South Carolina – 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 five members with technical expertise in plan formulation, environmental, economics, hydraulic 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

Charleston Harbor Post 45
Charleston, South Carolina
Feasibility Report
U.S. Army Corps of Engineers Response to
Independent External Peer Review
September 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 Charleston Harbor Post 45 Feasibility Report.

The IEPR panel reviewed the Draft Integrated Feasibility Report and Environmental Impact Statement (FR/EIS), as well as supporting documentation. The Final IEPR Battelle Report was issued on 14 May 2015. Overall, eighteen comments were identified and documented; one was identified as having high significance, six were identified as having medium/high significance, seven were identified as having medium significance, and four were identified as having medium/low significance. The following discussions present the USACE Final Response to the eighteen comments.

1. Comment – *High Significance*: The FR/EIS does not describe a contingency plan if the ODMDS expansion is not approved.

This comment included one recommendation which was not adopted as discussed below. The comment expresses concern that project construction and future maintenance are contingent on Environmental Protection Agency (EPA) approval to increase the ODMDS.

USACE Response: Not Adopted

The IEPR panel recommended (1) presenting a contingency plan with detailed costs to demonstrate that the project can move forward if the change to the offshore dredged material disposal site (ODMDS) limit is not allowed. A contingency plan with detailed costs was not added to the report because USACE has been in close coordination with the EPA on this matter, no issues in approving the expansion are expected, and the ODMDS expansion is on schedule to be completed far before construction would be impacted. However, in response to the comment, additional information on USACE coordination with EPA and actions related to the ODMDS expansion was added to Sections 2.3.4.3, 5.3.4.3, and Section 6 of the FR/EIS. Additionally, a letter from the EPA to USACE dated 28 April 2015 that describes the steps that have occurred to date related to the ODMDS expansion, the forward progress made, and EPA's intent to continue to

work with USACE to complete the remaining steps to expand the ODMDS was added to Appendix Q (Coordination).

2. Comment – *Medium/High Significance*: The use of the 1995 Section 401 Water Quality certification for disposal of dredged material effluent from the existing disposal areas in the project area may not be appropriate.

This comment included four recommendations; three were not adopted and one was adopted, as discussed below. The comment expresses concern that for the project to proceed, there must be a valid Section 401 Water Quality Certification (WQC) or the FR/EIS needs to provide sufficient data to conclude that it is still valid.

USACE Response: Adopted

Action Taken: The IEPR panel recommended (4) that the report describe the special protocols that are in place to manage effluent, and demonstrate that they are sufficient to ensure that the discharge is not in violation of the 1995 Section 401 permit. In response, Section 2.4.7 of the main report was revised to discuss the management protocols currently in place. Section 5.4.7 of the main report was also revised to state that the conditions of the WQC will be adhered to, including specific conditions as available.

USACE Response: Not Adopted

The IEPR panel recommended (1) providing a summary of the existing data justifying the finding that the 1995 Certification is valid, including (but not limited to) evidence that the amounts of toxic materials in the sediment have not increased in the past 19 years. This information was not added because the feasibility report references the existing certification only in the context of the future without-project conditions. The Corps recognizes that a new certification would be needed in order to implement the recommended plan. The IEPR panel recommended (2) collecting additional data to support the validity of the 1995 permit. As indicated earlier in this response, there is no intention of utilizing the 1995 certification for the recommended plan. Additionally, the South Carolina Department of Health and Environmental Control (SCDHEC) has determined that sufficient data has already been collected on sediment quality and elutriates in order for them to conduct their review of the FR/EIS for 401 WQC. Hence, no additional data collection is needed. The IEPR panel recommended (3) demonstrating that when sediments in the Cooper River are dredged and deposited in the enhanced disposal areas, the discharge will meet current water quality standards. SCDHEC has evaluated the proposed action and has issued a new 401 WQC that is included in Appendix Q (Coordination).

3. Comment – *Medium/High Significance*: The alternative formulation process, which reduced the early alternatives from 294 to 6, is not sufficiently described.

This comment included five recommendations, all of which were adopted as discussed below. The comment expresses concern that the plan formulation process must be clearly described in order to inform the reasoning behind the NED and LPP plan selection.

USACE Response: Adopted

Action Taken: The IEPR panel recommended (1) modifying Table 3.2 to include, at a minimum, a row showing the 147 alternatives to lead the reader through the plan formulation process. In response, Table 3-2 of the feasibility report was modified to better explain how all alternatives were derived. The IEPR panel recommended (2) including a detailed table showing the computed benefits and costs for all 54 and 44 alternatives, based on the September and November 2012 analyses. In response, this information was added as Table 3-2-1 of the main report. The IEPR panel recommended (3) separating the final array of 6 alternatives into a separate table, since the level of detailed analysis is significantly different from the earlier processes to reduce the alternatives to 54, then 44. In response, this information was added to Table 3-3 of the main report, and additional reference to this information was added as a note under Table 3-2 of the main report. The IEPR panel recommended (4) including information from Appendix P (page 3) to provide the reasoning behind the assumption of maximum widening for the alternatives, and to clarify details in callout boxes on Figures 3-7, 3-8, and 3-9 with regard to the "widening" level of detail when the text says "all of the alternatives assumed maximum widening measures." In response, the information from Appendix P (Mitigation, Monitoring and Adaptive Management), page 3, was added to Section 3.6.3.1 of the main report. Instead of adding callout boxes with information on widening to Figures 3-7 to 3-9, Figures 3-6-1 to 3-6-6 containing this information were added to the main report. The IEPR panel recommended (5) including the South Carolina State Ports Authority letter of support of the locally preferred plan (LPP) in Appendix Q. In response, this letter was added to Appendix Q (Correspondence).

4. Comment – *Medium/High Significance*: The proposed wetland mitigation plan includes a high degree of uncertainty and does not provide enough information to determine whether the plan is appropriate and/or can be successfully completed.

This comment included four recommendations; three were adopted and one was not adopted, as discussed below. This comment expresses concern that for the project to move forward, the wetland mitigation plan must be described in sufficient detail to evaluate whether it will meet the mitigation requirements for the project and whether the preservation of wetlands option meets the criteria of the 2008 USACE Mitigation Rule, Part 332.2(h).

USACE Response: Adopted

Action Taken: The IEPR panel recommended (1) providing the information needed to assess whether the proposed acquisition of up to 831 acres is appropriate and attainable and (2) providing information needed to demonstrate that the proposed preservation of wetlands option meets the criteria of Part 332.2(h). In response, Sections 2.4.9, 5.4.9, and 4.3.1 of the main report, Section 2 of Appendix L (Wetlands Impact Assessment), and Section 2.5 of Appendix P (Mitigation, Monitoring, and Adaptive Management) were revised to include additional information on the impact assessment and mitigation determination which demonstrates that the proposed mitigation by preservation meets criteria of the 2008 USACE Mitigation Rule, Part 332.2(h). The IEPR panel recommended (4) preparing an Adaptive Management plan to address the changes that will be needed if the goals of the original plan cannot be attained. In response; Sections 2 and 5 of Appendix P (Mitigation, Monitoring, and Adaptive Management) were expanded to include additional information on Adaptive Management.

USACE Response: Not Adopted

The IEPR panel recommended (3) investigating the possibility that Pinopolis Dam discharges could decrease the required mitigation amounts. The discharge from Pinopolis is controlled via a congressionally mandated agreement that balances hydropower generation, shoaling rates, and biological impacts to two separate river systems. Investigating the feasibility and consequences of changing these flows is well beyond the scope of the FR/EIS.

5. Comment – *Medium/High Significance*: A significant number of SPTs do not extend below pay depth, which may have implications for the types of dredging equipment used, predicted production rates, and disposal site capacity.

This comment had two recommendations, which were not adopted as discussed below. The comment indicated the estimated New Work project cost must consider the potential and reasonable highest cost for project completion.

USACE Response: Not Adopted

The IEPR panel recommended (1) preparing a map marking which sediment penetration test (SPT) locations do, and which do not, have data for depths that are 4 feet deeper than the proposed pay depth and use the map to determine where additional borings or borings of greater depth are required. Such a map was not considered necessary for the FR/EIS because the likelihood of a contractor working outside of the scope of a contract and excavating significantly below the pay limit is very low. The IEPR panel recommended (2) preparing a dredge and disposal plan and cost estimate based on dredging 4 feet deeper than maximum pay depth. However, the project cost estimate already includes a minimum of 5 feet below the required depth and up to 11 feet below the required depth in areas where high shoaling rates are expected. Any incursion below this limit would be done at the contractor's own cost.

6. Comment – *Medium/High Significance*: The need for advanced maintenance in the channel to compensate for high shoaling volumes was not included in the hydraulic modeling and, therefore, was not factored into the evaluation of project impacts and cost estimation.

This comment had two recommendations which were not adopted as discussed below. The comment expresses concern that advanced maintenance must be evaluated for the Charleston project to ensure that all project impacts are evaluated and maximum benefit versus cost is realized.

USACE Response: Not Adopted

The IEPR panel recommended (1) conducting additional hydraulic modeling to evaluate how advanced maintenance could compensate for high shoaling events. The numerical modeling done for the study already factors in 2 feet of advanced maintenance, as is stated in Section 3.5 of Appendix A (Engineering). The IEPR panel recommended (2) evaluating the possibility of slope failure and channel shoaling along the man-made and maintained future width and depth of the navigation channel. The template used already has side slopes of 4:1 to address these concerns and

was used in determination of impacts using Environmental Fluid Dynamics Code (EFDC) cell elevations in the analysis of all alternatives.

7. Comment – *Medium/High Significance*: The Charleston Harbor Post 45 FR/EIS does not evaluate the effect of storm surge on the TSP.

This comment included three recommendations; all were adopted, as discussed below. This comment expresses concern that a storm surge analysis could reveal significant impacts of the TSP that would warrant re-estimation of cost, benefits, and mitigation.

USACE Response: Adopted

Action to be Taken: The IEPR panel recommended (1) providing in the FR/EIS empirical evidence of the impacts of storm surge on dredged Charleston Harbor waterways. This analysis was not performed during the feasibility phase and included in the FR/EIS because it was not considered essential for selecting the recommended plan. However, storm surge modeling will be done during the Preconstruction Engineering and Design (PED) phase to verify there are no changes in the FEMA Flood Insurance Rate Map (FIRM) base flood elevations, to verify that there will not be changes to the risk or insurance rates due to the project. In the event of a storm impact, a post condition survey of the navigation will be done to determine if there are any obstructions to navigation and if so, emergency funds would be requested. Additionally, coastal erosion analysis will be done during the PED phase to verify that the increase in depth of the existing entrance channel and the extension (much of which is at or near authorized depth plus advanced and over depth allowances) does not increase erosion of the coastal shorelines. The IEPR panel recommended (2) providing documentation during the PED phase that the TSP will not likely generate significant impacts during storm surge conditions. Otherwise, compare the pre- and post-TSP surge impacts. In response, documentation of storm surge modeling results and coastal erosion analysis will be produced during the Preconstruction Engineering and Design (PED) phase. The IEPR panel recommended (3) re-evaluating the TSP cost, benefits, and/or mitigations at the PED phase if the TSP has significant impacts during surge events. In response, this re-evaluation will be done during the PED phase if storm surge or coastal erosion analysis results indicate significant impacts.

USACE Response: Not Adopted

8. Comment – *Medium Significance*: The documentation of the navigation problems that support the need to widen the channel and turning basin has not been provided.

This comment included one recommendation which was adopted as discussed below. The comment expresses the concern that without additional documentation to support the navigation problems, the project need has not been fully demonstrated.

USACE Response: Adopted

Action Taken: The IEPR panel recommended (1) providing a detailed discussion of the navigation difficulties, safety considerations, and/or delays (including documentation of actual incidents and associated damages) in support of each area identified for channel and turning basin widening. In response, Section 3.5.5 of the main report was updated to include GIS maps

(Figures 3-6-1 through 3-6-5) with text boxes, which provide a discussion of the navigation difficulties, safety considerations, and/or delays in support of each area identified for channel and turning basin widening.

9. Comment – *Medium Significance*: Incremental analysis of each channel and turning basin improvement has not been performed to demonstrate the feasibility of the improvements and support the identification of the NED plan and the LPP.

The comment included one recommendation which was adopted as discussed below. The comment expresses the concern that the incremental cost and benefit of the channel and turning basin widening need to be stated to support the NED plan and LPP.

USACE Response: Adopted

Action Taken: The IEPR panel recommended (1) performing in PED (upon completion of the ship simulation analysis) an incremental analysis of each channel and turning basin widening and, if appropriate, modify the National Economic Development (NED) and locally preferred plans (LPP) based on the results of the incremental analyses. In response, Section 4.6 (Incremental Analysis of Channel Widening) of Appendix C (Economics) was updated to include incremental benefits and costs of channel widening for the NED plan. The results of this analysis did not result in any changes to the NED plan or the LPP. The dimensions of the turning basin extensions are based on engineering guidelines and will be finalized using ship simulation in the Preconstruction Engineering and Design (PED) phase.

10. Comment - *Medium Significance*: The TSP does not commit to using dredged material to restore Crab Bank and/or enhance Shutes Folly, even though the FR/EIS acknowledges Federal emphasis on such beneficial uses and suitable dredged material appears to be available.

The comment included one recommendation which was not adopted as discussed below. The comment indicates that in order to comply with USACE's emphasis on the beneficial use of dredged material, a commitment to restore Crab Bank and enhance Shutes Folly is needed in the TSP rather than delaying the decision to the PED.

USACE Response: Not Adopted

The IEPR panel recommended (1) evaluating existing and historic sediment data that are available and develop plans to restore Crab Bank and enhance Shutes Folly. Since the project will be dredging new work material, historical dredging records do not provide an adequate assessment of the type of material that would be available. Sediment testing for the project was homogenized and consolidated rather than evaluated by separating the cores. At this time, USACE does not possess the data to determine what amount of suitable material would be available for beneficial use. A detailed beneficial use study will be still be completed prior to construction and as an environmental commitment of the project.

11. Comment - *Medium Significance*: The possible presence of hardbottom resources adjacent to the proposed expanded ODMDS may affect the ability of the ODMDS to provide sufficient capacity for the construction and maintenance dredging events.

The comment included two recommendations, one was adopted and one was not adopted as discussed below. The comment indicates that due to a lack of documentation, the presence/absence of hardbottom areas adjacent to the Offshore Dredged Material Management Site (ODMDS) is uncertain, and potential impacts to the proposed ODMDS boundary if hardbottom is present in this area cannot be determined.

USACE Response: Adopted

Action to be Taken: The IEPR panel recommended that the report (1) confirm the presence/absence of hardbottom in the area identified as "probable hardbottom." In response, the ODMDS modification is being evaluated in a separate action (102 of the Marine Protection, Research and Sanctuaries Act) by the US Environmental Protection Agency (EPA). USACE is currently working on the Environmental Assessment for this action. Currently there is approximately 1.7 acres of "probable" habitat within the northern boundary of the proposed modified ODMDS. This amount may be adjusted and the document revised based upon outcomes of the NEPA process with EPA on the ODMDS modification.

USACE Response: Not Adopted

The IEPR panel recommended (2) adjusting the ODMDS boundary to ensure that impacts to the hardbottom resources are avoided and that the ODMDS retains the capacity to meet the project requirements. Since the ODMDS is being evaluated under a separate document, as is discussed in Section 4.2.1 of the FR/EIS, any adjustments if needed would be made after the completion of that evaluation.

12. Comment - *Medium Significance*: A pipeline dredge with cutterhead may not be the most appropriate equipment for the construction of the berm adjacent to the ODMDS because it does not perform effectively in open waters with large wave conditions.

The comment included two recommendations; both were not adopted as discussed below. The comment expresses concern that if unsuitable dredge equipment is chosen for the Offshore Dredged Material Disposal Site (ODMDS) berm construction, a variety of cost implications could result, including schedule delays, production rate inaccuracies, and the cost of securing new equipment.

USACE Response: Not Adopted

The IEPR panel recommended (1) re-evaluating the use of a pipeline dredge for the berm construction project, based on the open-water conditions at the ODMDS. All methods of excavating the material from the entrance channel were considered in the analysis which determined the most cost efficient method of removing the limestone material is utilizing a large cutter suction pipeline dredge that is designed to cut hard material. A mechanical dredge would face the same difficulty of dredging in high wave conditions would as a large pipeline dredge. In addition, due to the lower production of a mechanical dredge, the duration of dredging the limestone material would be over 11 years as opposed to less than 3 years when utilizing a large rock cutter dredge. The IEPR panel recommended that (2) if a pipeline dredge is determined not to be the best equipment, recalculate the costs of using another dredging and disposal system. Since it has been determined that the pipeline dredge is the best equipment to use for this construction, the cost of dredging using alternate equipment was not recalculated.

13. Comment – *Medium Significance*: The project schedule and cost estimate has not considered the need for an additional 15-20% of New Work dredging volume.

The comment included one recommendation which was not adopted, as discussed below. The comment expresses concern that if the dredge volume is underestimated, there will be cost, construction, and schedule consequences for the project.

USACE Response: Not Adopted

The IEPR panel recommended that the report (1) prepare a disposal site design and contract estimate based on the fact that New Work dredging requires considerations for significant non-pay dredging volume and subsequent greater disposal volumes. The project cost and schedule calculations include an additional 1-foot of non-pay material that should account for any additional disposal volume. The cost and schedule calculations also conservatively assumes that 95% of allowable overdepth will be dredged, whereas new work dredging historically removes only 90% or less of the allowable overdepth. Also, new dredging operations implement computer aided controls that make dredging operations more accurate than in the past. Therefore, adequate material volume has already been accounted for in the project cost and schedule calculations. However, in response to the comment, additional information was added to Section 5.1 of Appendix B (Geotechnical) to further describe project new work depth requirements of the Entrance Channel. Additional clarification was also added to Section D.2 of the Appendix D (Cost Engineering) that further describes the derivation of quantities for the project depths including the required depth, advanced maintenance, allowable overdepth and unpaid overdepth to derive a cost estimate that is accurate for the conditions expected in this project.

14. Comment – *Medium/Low Significance*: The extent of the Charleston Harbor entrance entrainment area is not described in sufficient detail to determine whether the hydraulic model grid extends far enough into the ocean to account for the mixing of water and salinity at the Harbor connection.

The comment included two recommendations, which were not adopted as discussed below. The comment expresses concern that the impact of the project on salinity in inshore areas may not be accurately described if the model grid does not cover enough of the entrainment area.

USACE Response: Not Adopted

The IEPR panel recommended (1) comparing the ocean area in the EFDC model grid with the Charleston Harbor entrance entrainment area, and confirming whether the model ocean area encompasses the largest extent of the entrainment area, and (2) providing documentation that the EFDC model domain, as shown in Figure 3.3.1, provides sufficient ocean area to simulate accurately water and salinity mixing at the Charleston Harbor entrance. As discussed in Section 3.3.3 of Appendix A (Engineering), model convergence testing was conducted at the beginning of the model development to ensure that the ocean boundary is sufficiently seaward to prevent the boundary conditions from over-influencing the predicted changes in salinity and water quality caused by the proposed channel deepening. The results of this testing resulted in moving the offshore boundary from the initial model location (approximately 10 miles offshore) to the end of the entrance channel located approximately 18 miles offshore. Changing the boundary location from 10 to 18 miles offshore causes a 5 to 10 percent change in salinity inside the harbor. It was

concluded that pushing the boundary further out would result in less than five percent changes. In reviewing the alternative 50/48 (50 feet for segments 1 and 2 and 48 feet for segment 3 in the upper harbor) and the future without-project change in surface salinity, the changes are less than 0.1 for the region greater than 12 miles offshore, confirming that the model boundary is sufficiently far offshore.

15. Comment – *Medium/Low Significance*: The iterative adjustments of the offshore water level, salinity, and temperature to match inshore station data during EFDC model calibration could result in a less robust hydraulic model validation.

The comment included two recommendations; both were adopted as discussed below. The comment indicated that errors introduced by the iterative adjustment procedure applied to better define offshore water level, salinity, and temperature could be larger than the errors inherent in the measurements of these variables.

USACE Response: Adopted

Action Taken: The IEPR panel recommended (1) providing documentation that the errors introduced by iterative adjustments of the offshore boundary are smaller than the errors associated with the water level, salinity, and temperature measurements. In response, section 3.4 of Appendix A Engineering includes information on the calibration of the model. Since most of the changes in water level, salinity and temperature occur inside the harbor entrance, the adjustment of the measured data to develop offshore boundaries that compare well to the measured data at the harbor entrance results in a model that does not introduce significant errors into the model predictions within the estuary as a result of offshore boundary specification. The IEPR panel recommended (2) conducting a sensitivity analysis to determine how the Tentatively Selected Plan (TSP) impacts will change with changes in offshore water level, salinity, and temperature. In response, a sensitivity analysis was performed and documented in Section 3.4.5 of Appendix A (Engineering). The sensitivity analysis indicates that any errors introduced by the adjustments of the offshore boundary are relatively minor. Absolute salinity values are not used to compare and select alternatives or to estimate impacts. Instead, the relative differences are used. In Appendix L, which discusses the wetland impact methodology, USACE describes how model variability and uncertainty was accounted for in determining the potential indirect impacts to wetlands. i USACE applied an averaging method to determine impacts to wetlands. Appendix A (Engineering) presents a sensitivity analysis based on multiple scenarios. Wetland impacts were averaged between 4 scenarios (2022 historic sea level rise, 2071 historic SLR, 2071 intermediate SLR, and 2071 high SLR).

16. Comment – *Medium/Low Significance*: Funding for the proposed adaptive management activities is not described.

The comment included one recommendation, which was not adopted as discussed below. The comment expresses concern that the lack of adaptive management funding information affects the completeness of the FR/EIS and the total project cost.

USACE Response: Not Adopted

The IEPR panel recommended (1) including funding for adaptive management in the "Total Project Costs" and a description of the adaptive management implementation process, and adding language authorizing adaptive management if needed in the authorizing language for the project. Adaptive management is based on the success of the mitigation plan. However, because of the type of mitigation being utilized, no adaptive management actions are anticipated and thus there are no costs associated with adaptive management for this project.

17. Comment – *Medium/Low Significance*: The sensitivity analysis of economic data projections does not take into account economic benefit uncertainties related to traffic and fleet projections.

The comment included four recommendations; three were adopted and one was not adopted, as discussed below. The comment indicates that additional sensitivity analyses for future traffic and fleet composition would improve the understanding of the economic uncertainties in the projections and their impacts on economic benefits and project feasibility.

USACE Response: Adopted

Action Taken: The IEPR panel recommended (2) the report include historical general cargo tonnages for 2011 and 2012 to provide increased support for the recommended plan. In response, additional information regarding the historical number of Twenty-foot Equivalent Units (TEUs) for 2012 and 2014 was added to Section 2.4 (Historical Commerce) of Appendix C (Economics). The IEPR panel recommended (3) renaming the current extreme case no-growth traffic projection scenario to better represent that the scenario includes traffic increases through the base year of the project. In response, Appendix C (Economics) was updated to clarify that this scenario assumes no growth beyond 2022 and a scenario assuming no growth from 2014 was not included in the analysis. The IEPR panel recommended (4) performing an additional no-growth sensitivity analysis that includes historical tonnages for 2011 and 2012 with no-growth in traffic from 2013 to the end of the period of analysis. In response; Section 5.2 of Appendix C (Economics) was revised to include a no-growth after 2014 (the most recent year data was available) sensitivity analysis.

USACE Response: Not Adopted

The IEPR panel recommended (1) performing sensitivity analyses for future fleet compositions that reflect lesser and greater use of post-Panamax vessels compared to the current fleet composition projections. This sensitivity analysis was not done since the existing High/Low Growth sensitivity analyses already include vessel fleet forecasts that are not identical to the base scenario. However, in response to the comment, additional information was added to section 5.1 of Appendix C (Economics) that details the methodology used to develop each fleet forecast for the sensitivity scenarios and the projected number of calls for each year modeled will be provided.

18. Comment - *Medium Significance*: The length of the monitoring period (two, four, or five years, depending on parameter) is not necessarily long enough to account for the uncertainty in the future location of the 0.5ppt salinity isopleth and, in turn, that the proposed mitigation plan is sufficient.

The comment included two recommendations, which were adopted as discussed below. The comment expresses concern that limiting the water quality monitoring program to five years and the marsh surveys to two and four years post construction may not be sufficient time to confirm that the proposed mitigation and monitoring plan is sufficient for the proposed action.

USACE Response: Adopted

Action Taken: The IEPR panel recommended (1) adopting an adaptive management position that salinity data will be analyzed yearly and at the end of four years. Classify each year as a dry, wet, or average year and relate salinity data to the amount of upstream water (rainfall and dam releases) to assess if the hydrology represents the conditions used in the numerical modeling. In response, the Monitoring Plan located in Appendix P (Mitigation, Monitoring and Adaptive Management) was revised to state that water quality data will be collected continuously for 5 years with yearly progress reports sent to the resource agencies and at the end of 5 years a statistical analysis of the data will be done. The IEPR panel recommended (2) in conjunction with the above recommendation, analyze the results of the two and four-year post construction assessment of wetlands in the Cooper River along with the salinity data and make a determination of how changes in the 0.5 ppt salinity isopleth have changed over time and if monitoring should continue beyond the five-year period. In response, Section 5 of Appendix P (Mitigation Monitoring and Adaptive Management) was updated from a two and four-year post construction assessment of wetlands to a one, three and five year post construction assessment of wetlands. The data will consist of the vegetation characterization and detailed transect analysis along the affected portion of the Cooper River. The data would be used to help determine if additional monitoring or mitigation actions are warranted.