D H E C
PROMOTE PROTECT PROSPER
C. Earl Hunter, Commissioner
Promoting and protecting the health of the public and the environment

January 25, 2011

Colonel Jeffrey M. Hall, District Commander
U.S. Army Corps of Engineers, Savannah District
P.O. Box 889
Savannah, Georgia 31402-0889

Re: Savannah Harbor Expansion Project: Draft General Re-Evaluation Report and Draft Tier II Environmental Impact Statement

Dear Colonel Hall:

The South Carolina Department of Health and Environmental Control- Office of Ocean and Coastal Resource Management (SCDHEC OCRM or DHEC or the Department) has made great efforts to review the Draft General Re-Evaluation Report (DGRR) and the Tier II Draft Environmental Impact Statement (DEIS) (collectively referred to herein as the Federal Agency Consistency Determination) for the Savannah Harbor Expansion Project within the time frame provided by your letter of January 24, 2011. However, the Department disagrees with your analysis of the timeframe that the Coastal Zone Management Act provides to the Department to provide comments.

The Department received notice of the federal agency's consistency determination on November 17, 2010.[1] 15 C.F.R. § 930.41(a) provides the State agency 60 days from receipt of the Federal agency's consistency determination and supporting information to inform the federal agency of the state agency's concurrence with or objection to the Federal agency's consistency determination. In addition, 15 C.F.R. § 930.41(b) provides that state agency concurrence shall not be presumed in cases where the State agency, within the 60-day period, requests an extension of time to review the matter. This regulation requires the Federal agency to approve one request for an extension period of fifteen days or less, if requested, and authorizes the Federal agency to approve a longer or additional extension period as appropriate. Additionally, this regulation requires that the Federal agency should consider the magnitude and complexity of the information contained in the consistency determination when considering whether a longer or an additional extension period is appropriate. DHEC OCRM requested additional time to evaluate the project on Dec. 3, 2010 and again on January 21, 2011. Because there is no discretion given to the Federal Agency to deny a first request for an additional fifteen days, the federal agency may not presume state concurrence until at least seventy-five days after the State agency's

[1] In your letter dated January 24, 2011, you indicate that you provided notice to the state agency on November 15, 2010. In fact, the Department received notice of the Corps' consistency determination on November 17, 2010. 15 C.F.R. § 930.41 provides the stage agency "60 days from receipt of the Federal agency's consistency determination and supporting information" to provide notice to the Federal agency of the state agency's response.

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
Ocean and Coastal Resource Management
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receipt of notice of the federal agency's consistency determination.[2] Thus, DHEC has at least until January 31, 2011 to notify the Federal agency of its objection to the Federal agency's consistency determination.[3] Additionally, given the magnitude and complexity of the information contained in the consistency determination, the Federal agency should grant an additional or longer period and the Department again requests that the Corps exercise its discretion and authorize the Department additional time to submit further comments on the federal agency's consistency determination. The Department believes that the 15 day extension is necessary to give the public and resource agencies the proper time to evaluate the project due to the "complexity and magnitude of the information" and the timeliness of the public notice during holiday season.

Reserving the Department's rights under the Act to submit additional comments objecting to the federal agency's consistency determination within the maximum amount of time provided under 15 C.F.R. § 930.41(b), the Department objects to the federal agency's consistency determination based on the following grounds.

As an initial matter, as the Federal Consistency Determination points out, the Coastal Zone Management Act, 16 U.S.C. §§ 1451, et. seq., requires that "Each federal agency activity within or outside the coastal zone that affects any land or water use or natural resource of the coastal zone shall be carried out in a manner which is consistent to the maximum extent practicable with the enforceable policies of approved state management programs." 16 U.S.C. § 1456(c)(1)(A). "Consistent to the maximum extent feasible" is defined in the Regulations promulgated by the Secretary of Commerce and means "fully consistent with the enforceable policies of management programs unless full consistency is prohibited by existing law applicable to the Federal Agency." 15 C.F.R. § 930.32(a)(1). The Regulations further provide that "if a Federal agency asserts that full consistency with the management program is prohibited, it shall clearly describe, in writing, to the State agency the statutory provisions, legislative history, or other legal authority which limits the Federal agency's discretion to be fully consistent with the enforceable policies of the management program." 15 C.F.R. 930.32(a)(2). Here, the Federal Agency has not identified in writing to the state agency any existing law which prohibits full consistency with South Carolina's approved management program. Therefore, because the federal agency has not identified to the state agency any existing laws which prohibit full consistency, the

[2] In your letter dated January 24, 2011, you rely on the "Corps [sic] coastal zone consistency regulations (33 C.F.R. 336.1, et. seq.)" which purport to provide a 45-day window for state agency review but also have the requirement that the Corps grant a 15-day extension if an extension is requested and which also provide the Corps with authority to grant additional or longer extensions. The Department sees no statutory authority in the Coastal Zone Management Act for the Corps of Engineers to promulgate regulations different from the regulations promulgated by the Secretary of Commerce to carry out the provisions of the Coastal Zone Management Act. The Congress specifically gave the Secretary of Commerce the authority to promulgate regulations necessary to carry out the provisions of this chapter. See 16 U.S.C. § 1463 and 16 U.S.C. § 1453(16) (defining "secretary" as the "Secretary of Commerce.") The Secretary of Commerce has promulgated these regulations under 15 C.F.R. Part 930. Therefore, though the Department is issuing this letter in accordance with the timeframe you set forth in your letter dated January 24, 2011, the Department reserves its full authority under 15 C.F.R. Part 930 et. seq., to use the full timeframe provided therein to comment on the federal agency's consistency determination.

[3] Even using the November 15, 2010 date upon which the Corps asserts that the clock begins to run, the seventy fifth day falls on Saturday, January 29, 2011.

Coastal Zone Management Act's requirement that the federal agency activity be consistent to the maximum extent practicable requires that the Federal agency activity be fully consistent with South Carolina's approved management program.

Based on staff's evaluation of the DGRR, DEIS and the Savannah District Army Corp of Engineers Federal Consistency Determination, the SCDHEC OCRM does not concur that the five dredging alternatives are consistent with the South Carolina Coastal Management Program(SCCMP) . The following specific policies and responses will inform you how the proposed activity is inconsistent with the SCCMP:

Chapter III, Section C.I. Guidelines for Evaluation of All Projects:

- (1)(b) The extent to which the project will further the policies of the South Carolina General Assembly which are mandated for OCRM in implementation of its management program these being: (b) To protect and, where possible, to restore or enhance the resources of the State's coastal zone for this and succeeding generations. (Sections 48-39-30(B)(1) and (2), S.C. Coastal Management Act of 1977).
  The project as proposed will not restore or enhance the resources of the state but will result in a degradation of coastal resources.

- (2) The extent to which the project will have adverse impacts on the "critical areas" (beach/dune system, coastal waters, tidelands).
  The project as proposed will reduce dissolved oxygen, and depends on mechanical means in an attempt to maintain current levels. This causes a net loss of degraded fisheries habitat.

- (3) The extent to which the project will protect, maintain or improve water quality, particularly in coastal aquatic areas of special resource value, for example, spawning areas or productive oyster beds.
  The proposed dredging to deepen the Savannah Harbor as set forth in the National Economic Development (NED) Plan, 47-foot Depth Alternative, and the Locally Preferred (LP) Plan, 48-foot Depth Alternative, will reduce the dissolved oxygen levels in the Savannah River from the existing state in an area utilized for spawning of important fisheries species including striped bass and shortnose sturgeon (SNS). Mitigation for this impact is to stock bass fingerlings provided by Georgia DNR and construction of a fishway for Shortnose Sturgeon at the New Savannah Bluff Lock & Dam at Augusta Georgia. Stocking of fingerlings does not eliminate impacts to spawning and nursery areas for the Striped Bass and the construction of a fishway does not assure the Shortnose Sturgeon will be able to use it. In the event low DO (Dissolved Oxygen) levels fall below current concentrations, as predicted in the DEIS, the lower part of the river may not be passable by adult or juvenile sturgeon. The shallower dredging alternatives are more desirable to both the NED and LP alternatives, however all dredging alternatives (with or without mitigation) result in a net loss of Striper and SNS habitat.

- (4) The extent to which the project will meet existing State and Federal Requirements for waste discharges, specifically point sources of air and water discharge, and for protection of inland wetlands.
  Models described in the EIS indicate impacts to large areas of freshwater marshlands including important habitat for fish, wading birds, & waterfowl. While efforts have been addressed to minimize impacts, a minimum of 337 acres of freshwater marsh will be affected by salt waters. Mitigation for this impact is to preserve additional wetlands adjacent to the Savannah River National Wildlife Refuge. Preservation does not replace the lost values and functions of the impacted freshwater marsh.

- (7) The possible long-range, cumulative effects of the project, when reviewed in the context of other possible development and the general character of the area.
  This project will result in a very large volume of spoils that will use significant areas within the exiting spoils disposal sites, located mostly in Jasper County, resulting in shorter life expectancy of the CDF (Contained Disposal Facility). This may result in the need for additional wetland impacts for expansion of the CDF in Jasper County. Additional impacts from existing port expansions, storage, and transportation facilities associated with the port will likely result in additional impacts to wetlands and water quality. The proposed disposal of spoils in the CDF will potentially eliminate the possibility of a new port in Jasper County.

- (8) The extent and significance of negative impacts on Geographic Areas of Particular Concern (GAPCs). The determination of negative impacts will be made by OCRM in each case with reference to the priorities of use for the particular GAPC. Applications which would significantly impact a GAPC will not be approved or certified unless there are no feasible alternatives or an overriding public interest can be demonstrated, and any substantial environmental impact is minimized.
  The proposed project will impact habitat for the federally endangered Shortnose Sturgeon. Endangered species habitat is considered GAPC in the SCCZMP. Mitigation offered to offset this impact is to construct a fishway at the New Savannah Bluff Lock & Dam. There is no certainty that the sturgeon will use this structure or that it will have any effect on spawning or survival of this species. Additionally, the project proposes a net loss of SNS habitat.

- (9) The extent and significance of impact on the following aspects of quality or quantity of these valuable coastal resources:
  - (i) unique natural areas—destruction of endangered wildlife or vegetation or of significant marine species (as identified in the Living Marine Resources segment), degradation of existing water quality standards.

  This project will have a significant impact on Striped Bass and Shortnose Sturgeon. Mitigation of these impacts is dependent on mechanical means (oxygen injection and release of fingerlings) that has not been adequately demonstrated to reduce or eliminate the impacts to water quality and fish survival.

Chapter III, Section C.II. In critical areas of the coastal zone, it is OCRM policy that, in determining whether a permit application is approved or denied, OCRM "shall base its determination on the individual merits of each application, the policies specified in Sections 48-39-20 and 48-39-30 (of the Act), and be guided by the following general considerations:

- (3) The extent to which the applicant's completed project would affect the production of fish, shrimp, oysters, crabs or clams or any marine life or wildlife or other natural resources in a particular area including but not limited to water and oxygen supply.
  The project as proposed will impact dissolved oxygen concentrations and finfish production. However, the DEIS states mitigation will result in a minimal net improvement. SCDHEC OCRM believes the use of mechanical oxygen injection systems may not be adequate to maintain current DO levels. Additionally, the Department has concerns regarding the maintenance and long term viability of these systems.

- (6) The extent to which the development could affect the habitats for rare and endangered species of wildlife or irreplaceable historic and archeological sites of South Carolina's coastal zone.
  The project as proposed will effect Shortnose Sturgeon spawning, juvenile, and adult habitats. Additionally, SNS habitat will result in a net loss.

- (10) The extent to which the proposed use could affect the value and enjoyment of adjacent owners. (Section 48-39-150, S.C. Coastal Management Act of 1977, as amended).
  Adjoining lands owned by the state of South Carolina are currently identified as a potential site for a new ports facility. The use of this site for spoil disposal and maintenance dredge disposal will potentially eliminate the Jasper County location as a suitable location for the Ocean Terminal.

Chapter III, Section VII. A. Wildlife and Fisheries Management

- (1) In the coastal zone, including critical areas, Council (Department) issuance or review and certification of permit applications which would impact wildlife and fisheries resources will be based on the following policies:
  - a) Activities deemed, by the South Carolina Coastal Council (now SCDHEC OCRM) in consultation with the South Carolina Wildlife and Marine Resources(now SCDNR) Department, to have a significant negative impact on wildlife and fisheries resources, whether it be on the stocks themselves or their habitat, will not be approved unless overriding socio-economic considerations are involved. In reviewing permit applications relative to wildlife and fisheries resources, social and economic impacts as well as biological impacts will be considered.

  The proposed dredging to the depths chosen for the NED and the LP would greatly reduce habitat utilized by fisheries species, Striped Bass, as well as State and Federally listed endangered species, Shortnose Sturgeon. The shallower dredging alternatives are more desirable to both the NED and LP alternatives, however all

dredging alternatives (with or without mitigation) result in a net loss of Striper and SNS habitat.

Chapter III, Policy Section VIII. Dredging

- 1(c) Dredging should not reduce water circulation, water currents, mixing, flushing or salinity in the immediate area.
  As proposed, the project will increase the salinities within the immediate and upstream areas, causing a significant impact to the freshwater marshes.

- 2(b) Dredge activities should be restricted in nursery areas, in public and private shellfish grounds during periods of migration, spawning, and early development of important sport and commercial species;
  As proposed in the DEIS, the dredging under the NEP and LP plans would negatively impact areas utilized for spawning and early development of Striped Bass. The proposed mitigation for this impact by release of hatchery raised fingerlings by Georgia DNR; however this activity does not offset the spawning or loss of essential habitat.

- 2(c) Dredging and excavation shall not create stagnant water conditions, lethal fish entrapments, or deposit sumps or otherwise contribute to water quality degradation.
  As proposed dredging under the NED and LP plans, the project will further degrade the existing water quality conditions.

- 2(e) Dredged materials shall be deposited and contained in such a manner so as to prevent dispersal into adjacent wetland areas;
  The project proposes to utilize the deposition of these dredged materials to be placed into the Middle River, Rifle Cut, and the Little Back River; this deposition is for mitigating the predicted increase in salinity.

- 2(h) a specialized form of dredging activity involves the creation and maintenance of navigational channels and access canals. These activities have a potential for severe environmental impacts and should meet a demonstrated public need.
  The proposed deepening under the NED and LP plans result in a negative impact to areas of important resources for fisheries and wildlife. The shallower dredging alternatives are more desirable to both the NED and LP alternatives. Additionally, a demonstrated public need for the citizens of South Carolina has not been sufficiently demonstrated. Also, SCDHEC OCRM believes there may be other feasible alternatives that should be explored.

Chapter III, Policy Section XII. Activities in Areas of Special Resource Significance

- C. Navigation Channels
  - 1) Development which would result in loss of navigability will be prohibited

The measures proposed to mitigate for the predicted increase in salinity are to close Rifle Cut and Little Back River. These alterations would result in a loss of navigable waters by the public in these two water bodies.

- D. Public Open Space
  - 1) Proposals which would restrict or limit the continued use of a recreational open area or disrupt the character of such a natural area (aesthetically or environmentally) will not be certified where other alternatives exist.

The project proposed to close off Rifle Cut and Little Back River to reduce the potential effects of increased salinity. This proposed activity would restrict the continued use of these water bodies as recreational open areas. The Department believes that other alternatives exist aside from the closure of Rifle Cut and Little Back River.

- E. Wetlands (Outside of Critical Areas)

Findings: In addition to the extensive areas of salt and brackish marsh within the critical areas along the South Carolina coastline, the State's coastal zone also contains over 60,000 acres of fresh-water marshes. These wetlands further up the creeks and rivers, beyond the reach of saltwater at high tides, have a great diversity of plant species. They play a vitally important role in contributing nutrients to the waters which eventually reach the estuarine system (the critical areas). Fresh-water marsh areas are active filters for improving water quality, and since they are linked with the downstream system, they affect water quality in the critical areas. The freshwater marshes are important flood buffers and also function in maintenance of salinity levels in downstream estuaries.

  - 1) Project proposals which would require fill or other significant permanent alteration of a productive freshwater marsh will not be approved unless no feasible alternative exist or an overriding public interest can be demonstrated, and any substantial environmental impact can be minimized.

The project as proposed in the preferred LP alternative will impact 1212 acres of freshwater marsh through the introduction of more saline waters. While mitigation is proposed to offset these impacts, there are other feasible alternatives to further minimize the proposed impacts. All other dredging alternatives result in a net loss of freshwater wetlands and saltmarsh, even with mitigation, except for the 44 foot dredge alternative. The 44 foot dredge alternative will result in the net gain of 332 acres of freshwater marsh due to the conversion of brackish wetlands. Additionally, there is no overriding public interest for the citizens of the State of South Carolina in this project. As proposed, all of the benefits from the deepening of the Savannah Harbor will be accrued to the State of Georgia, while the majority of the ecological impacts will occur within the State of South Carolina.

In addition to the enforceable policies of the SCCMP, the proposed project is not consistent with governing regulations for the Critical Areas. Specifically, the following regulations:

G. Dredging and Filling:

2) The specific standards are as follows:

(c) To the maximum extent feasible, dredging and filling activities should be restricted in nursery areas and shellfish grounds and during periods of migration, spawning, and early development of important sport and commercial species;

(d) Dredging and excavation shall not create stagnant water conditions, lethal fish entrapments, or deposit sumps or otherwise contribute to water quality degradation;

H. Navigation Channels and Access Canals:

(1) Certain dredging activities involve the creation and maintenance of navigation channels and access canals. These activities have a potential for severe environmental impacts and should meet a demonstrated public need.

Several of the above cited policies require a demonstration of no feasible alternatives. The Federal Consistency Determination does not sufficiently demonstrate that there are no feasible alternatives. South Carolina's coastal zone management program defines "Feasible" as used in the Coastal Management Program in the context of "unless no feasible alternative exists." "Feasibility is determined by [DHEC OCRM] with respect to individual project proposals. Feasibility in each case is based on the best available information, including technical input from relevant agencies with expertise in the subject area, and considering factors of environmental, economic, social, legal, and technological suitability of the proposed activity and its alternatives. Use of this word includes the concept of reasonableness and likelihood of success in achieving the project goal or purpose. "Feasible alternative" applies both to locations or sites and to methods of design or construction, and includes the no action alternative." Here, the Federal Consistency Determination relies on its determination that adverse impacts will be mitigated. Though the CMP requires that unavoidable impacts be mitigated, there must first be a demonstration of no feasible alternatives/unavoidability. While the Federal Consistency Determination states that there are no feasible alternatives, it does so in a conclusory fashion and does not demonstrate why the other alternatives are not feasible. The Federal Consistency Determination does not consider other locations but only looks at methods for this location. In addition, its conclusion that the no action alternative and other alternatives are not feasible is conclusory and therefore is inadequate as a matter of law.

Based upon the above SCDHEC OCRM does not concur that the five dredging alternatives are consistent with the South Carolina Coastal Management Program (SCCMP) to the maximum extent practicable because it would result in the permanent alteration of productive freshwater marshlands, a net loss in spawning and juvenile habitat for Striped bass and SNS (T&E listed species) and degradation of water quality due to a reduction in dissolved oxygen. The DEIS has not adequately demonstrated that no feasible alternatives exist since other alternatives such as the potential location of the Jasper County Ocean Terminal were not considered. In addition, the DEIS fails to demonstrate an overriding public interest for the citizens of South Carolina. Again, It is DHEC's position that additional time remains to object to the federal agency's consistency determination, and reserves the right to supplement this letter accordingly.

Sincerely,

Carolyn Boltin-Kelly

Carolyn Boltin-Kelly

cc: Earl Hunter, SCDHEC-OCRM
Barbara Neale, SCDHEC-OCRM
Heather Preston, SCDHEC-BOW
Donna Weiting, Acting Director NOAA-OCRM

DEPARTMENT OF THE ARMY
SAVANNAH DISTRICT, CORPS OF ENGINEERS
100 W. OGLETHORPE AVENUE
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REPLY TO
ATTENTION OF:

March 30, 2011

Office of Counsel

Ms. Carolyn Boltin-Kelly
Deputy Commissioner
Office of Ocean and Coastal Resource Management,
South Carolina Department of Health and Environmental Control
1362 McMillan Avenue, Suite 400
Charleston, South Carolina 29405

Dear Ms. Boltin-Kelly:

In your letters, dated January 25, 2011 and January 31, 2011, you offered comments on the Draft General Reevaluation Report (GRR) and the Tier II Draft Environmental Impact Statement (DEIS) for the Savannah Harbor Expansion Project (SHEP) objecting to the Corps' determination that the project is consistent, to the maximum extent practicable, with South Carolina's Coastal Management Program (SCCMP). Your letter enumerates the enforceable policies applicable to the SHEP as: (1) Wildlife and fisheries management; (2) dredging; (3) Navigation channels; (4) Public open space; (5) Wetlands, and (6) Areas of historic, archaeological or cultural significance. However, your letter only offers commentary on how the Department of Health and Environmental Control (DHEC) does not concur with the Corps' determination that the SHEP is consistent with the aforementioned policies, and fails to offer recommendations that could be implemented into the project to obtain DHEC's concurrence.

Your letter identified several reasons why you disagree with the Corps' determination that the SHEP is consistent with the enforceable policies in the South Carolina Coastal Management Program (SCCMP). The enclosures contain our responses to each of those reasons.

It appears that your letter is not consistent with the enforceable polices in the SCCMP because it failed to consider the national interest and regional benefits of SHEP, failed to follow your policies regarding existing versus new port facilities, and failed to substantiate your consistency review with supporting information.

Your Coastal Zone Management Act (CZMA) consistency review failed to consider the national interest and regional benefits of the SHEP. Such consideration is mandated by Federal Law and regulations, South Carolina State Law, and the SCCMP. The CZMA at 16 U.S.C. § 1454(d)(12), requires that a management plan contain "a method for assuring that local land use and water use regulations within the coastal zone do not unreasonably restrict or exclude land uses of regional benefit." The National Oceanic and Atmospheric Administration (NOAA), CZMA regulations at 15 C.F.R 923.12 state that in accordance with this statutory requirement a management program must "identify what constitutes uses of regional benefit" 15 C.F.R § 923.12(a) and "identify and utilize one or a combination of methods, consistent with the control

techniques employed by the State, to assure local land and water use regulations do not unreasonably restrict or exclude uses of regional benefit." 15 C.F.R § 923.12(b). Also, 15 C.F.R § 923.52(a) states that a "management program must provide for adequate consideration of the national interest involved in planning for, and managing the coastal zone, including the siting of facilities…which are of greater than local significance." To this end, S.C. Code. Ann. § 48-39-80(B)(6) states that the management program shall "provide for adequate consideration of the local, regional, state, and national interest involved in the siting of facilities for...adequate transportation facilities and other public services necessary to meet requirements which are other than local in nature."

The SCCMP defines activities considered to be of regional benefit as those that "1) have been identified as Activities Subject to Management, that is, those determined to have direct and significant impact on coastal waters, and 2) result in a multi-county environmental, economic, social, or cultural benefit." SCCMP at III-8. The SCCMP explicitly states that "Activities of Regional Benefit in the South Carolina coastal zone are: 1) Transportation facilities – including…ports". Id. The SCCMP also states that the "following concerns are considered by South Carolina to be of such long-range, comprehensive importance as to be in the national interest: 1. National Defense" and "3. Maintenance of Navigation". SCCMP at III-5. The SCCMP goes on to state that "Resource Policies of particular interest for national defense are: Transportation a) Ports" and "Dredging, a) Dredging, b) Dredge Material Disposal." SCCMP at III-6.

The SHEP is a substantial navigation project that involves both dredging and dredge material disposal that our studies indicate will produce well over $100 million a year in national economic benefits. The SCCMP explicitly states that port projects are activities of regional benefit. The SCCMP explicitly states the maintenance of navigation is a concern of national interest. The SCCMP explicitly states that national defense is a concern of national interest and that ports, dredging, and dredge material disposal are of particular interest for National defense. Federal and State laws require that your consistency determinations adequately consider the national interest and regional benefits of projects submitted for your review. However, your review did not recognize the national interest or regional benefits of the SHEP. Your consistency review contains statements that directly contradict your policies. The Garden City Terminal, the facility that will receive most of the more efficiently received cargo, is sited only miles from the border of South Carolina. The SCCMP states that the ports and commercial waterways of South Carolina "have a major National impact by providing a means of access to international and domestic markets." SCCMP at III-19. Yet, your letter of January 25, 2011, at pp. 7, states that "all of the benefits from the deepening of the Savannah Harbor will be accrued to the state of Georgia…" In light of the SCCMP statements regarding the great importance of South Carolina ports, all of which handle substantially less cargo than Savannah Harbor, and are not located as close to any bordering state, your conclusion doesn't appear to be supported or enforceable.

The next area where your consistency review is inconsistent with the SCCMP is in its discussion of a Jasper Ocean Terminal. The SCCMP states that "new port development should take place in existing industrialized areas where sufficient support facilities are available

including public utilities, rail and highway transportation access, and navigation channels which are already maintained, unless there are no feasible alternatives or an overriding public interest can be demonstrated, and any substantial environment damage can be minimized." SCCMP at III- 19-20. The SCCMP also states that when considering port and harbor development projects in the coastal zone a policy of "maximizing the use of existing developed port areas, when feasible, before establishing new facilities in relatively undeveloped areas" should be considered. SCCMP at III-21. Thus, it is apparent that the SCCMP strongly supports the development of existing port facilities in favor of constructing new ports. Also, as you are aware, there is no current utility, highway, or rail access to a potential Jasper Ocean Terminal site.

Finally your consistency review failed to provide any supporting information upon which your determination is based. The SCCMP states that "should the State agency disagree with the Federal agency's determination, it must accompany its response with the reasons for disagreement as well as supporting information upon which its decision is based." SCCMP at V-16. Your review was not accompanied by information providing a basis for your decision.

In conclusion, the SCCMP itself summarizes the principle that underpins the CZMA consistency requirement; that "national interests must be taken into consideration by coastal states, and in return for this concession, the states are allowed a greater say in the future of their coastal zones." SCCMP at V-15. We continue to believe that the SHEP is consistent, to the maximum extent practicable, with SCCMP. We trust these explanations will allow you to concur in our determination.

I look forward to receiving your recommendations and appreciate and look forward to our continued collaboration on this project. If you would like to meet to discuss these matters, please let me know.

Sincerely,

Jeffrey M. Hall
Colonel, US Army
Commanding

Enclosures

South Carolina Department of Health and Environmental Control, Ocean and Coastal Resource Management

These responses have been updated from those which accompanied the USACE Letter to SCDHEC dated 30 March 2011.

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763-BB-28-EV01

Comment: *The South Carolina Department of Health and Environmental Control- Office of Ocean and Coastal Resource Management (SCDHEC OCRM or DHEC or the Department) has made great efforts to review the Draft General Re-Evaluation Report (DGRR) and the Tier II Draft Environmental Impact Statement (DEIS) (collectively referred to herein as the Federal Agency Consistency Determination) for the Savannah Harbor Expansion Project within the time frame provided by your letter of January 24, 2011. However, the Department disagrees with your analysis of the timeframe that the Coastal Zone Management Act provides to the Department to provide comments.*

Response: The timeframe for a State's review of a US Army Corps of Engineers Coastal Zone Management Consistency Determination varies depending on the regulation consulted. As noted in your letter of January 25, 2011, the NOAA Regulations [15 CFR 930.41] provide a State with a 60-day review period from receipt of the Federal agency's Consistency Determination. As explained in the District's letter of January 24, 2011, the Corps of Engineers must operate under its regulations (33 CFR 336.1 et seq), which provide a 45-day review period for the States. The Corps regulations include a 15-day extension of this review period if requested by a State. When the extension is included, a 60-day review period results.

Based on subsequent events, there is no issue concerning time to comment. The Corps extended the Draft EIS public comment period until January 25, 2011. The Corps received some comments even after that deadline, and they were accepted and considered in the Final EIS preparation. SCDHEC-OCRM submitted another comment letter on January 31, 2011 which was accepted and considered. On March 30, 2011, the Corps sent a letter to SCDHEC-OCRM responding to points raised in the SCDHEC-OCRM January 25 and 31, 2011 letters. As noted in more detail below, there was then further dialogue between the agencies and additional explanatory information was provided by the Corps to SCDHEC-OCRM. On May 27, 2011, SCDHEC-OCRM sent a letter replying to the Corps's March 30, 2011 letter. The Corps accepted SCDHEC-OCRM's additional comments after January 31, 2011.

763-BB-28-EV02

Comment: *The Department received notice of the federal agency's consistency determination on November 17, 2010.1 15 C.F.R. § 930.41(a) provides the State agency 60 days from receipt of the Federal agency's consistency determination and supporting information to inform the federal agency of the state agency's concurrence with or objection to the Federal agency's consistency determination. In addition, 15 C.F.R. § 930.41(b) provides that state agency concurrence shall not be presumed in cases where the State agency, within the 60-day period, requests an extension of time to review the matter. This regulation requires the Federal agency to approve one request for an extension period of fifteen days or less, if requested, and authorizes the Federal agency to approve a longer or additional extension period as appropriate. Additionally, this regulation requires that the Federal agency should consider the magnitude and complexity of the information contained in the consistency determination when considering whether a longer or an additional extension period is appropriate. DHEC OCRM requested*

additional time to evaluate the project on Dec. 3, 2010 and again on January 21, 2011. Because there is no discretion given to the Federal Agency to deny a first request for an additional fifteen days, the federal agency may not presume state concurrence until at least seventy-five days after the State agency's receipt of notice of the federal agency's consistency determination.2 Thus, DHEC has at least until January 31, 2011 to notify the Federal agency of its objection to the Federal agency's consistency determination.3 Additionally, given the magnitude and complexity of the information contained in the consistency determination, the Federal agency should grant an additional or longer period and the Department again requests that the Corps exercise its discretion and authorize the Department additional time to submit further comments on the federal agency's consistency determination. The Department believes that the 15 day extension is necessary to give the public and resource agencies the proper time to evaluate the project due to the "complexity and magnitude of the information" and the timeliness of the public notice during holiday season.

Response: See previous and subsequent responses.

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763-BB-28-EV03

Comment: *As an initial matter, as the Federal Consistency Determination points out, the Coastal Zone Management Act, 16 U.S.C. §§ 1451, et. seq., requires that "Each federal agency activity within or outside the coastal zone that affects any land or water use or natural resource of the coastal zone shall be carried out in a manner which is consistent to the maximum extent practicable with the enforceable policies of approved state management programs." 16 U.S.C. § 1456(c)(1)(A). "Consistent to the maximum extent feasible" is defined in the Regulations promulgated by the Secretary of Commerce and means "fully consistent with the enforceable policies of management programs unless full consistency is prohibited by existing law applicable to the Federal Agency." 15 C.F.R. § 930.32(a)(1). The Regulations further provide that "if a Federal agency asserts that full consistency with the management program is prohibited, it shall clearly describe, in writing, to the State agency the statutory provisions, legislative history, or other legal authority which limits the Federal agency's discretion to be fully consistent with the enforceable policies of the management program." 15 C.F.R. 930.32(a)(2). Here, the Federal Agency has not identified in writing to the state agency any existing law which prohibits full consistency with South Carolina's approved management program. Therefore, because the federal agency has not identified to the state agency any existing laws which prohibit full consistency, the Coastal Zone Management Act's requirement that the federal agency activity be consistent to the maximum extent practicable requires that the Federal agency activity be fully consistent with South Carolina's approved management program.*

Response: Under the Coastal Zone Management Act and Corps' regulations, the SHEP must be consistent with South Carolina's approved Coastal Zone Management Program (the South Carolina Coastal Management Program or SCCMP) to the maximum extent practicable, and that standard is met. In addition, as explained in the EIS, Section 5.0, and Appendix J, and the Corps' Federal Consistency Determination for South Carolina, the project with its associated mitigation is fully consistent with the enforceable provisions of the SCCMP. This determination is supported by the project's mitigation plan, including monitoring and adaptive management, which would ensure that the resources of South Carolina's coastal zone are protected.

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763-BB-28-EV04

Comment: *The project as proposed will not restore or enhance the resources of the state but will result in a degradation of coastal resources.*

Response: SHEP clearly meets the primary criterion of protecting the State's coastal resources, even if it may not restore/enhance all of the environmental resources of the State's coastal zone. It is doubtful that many of the large development projects that SCDHEC-OCRM reviews and approves meet the secondary restore and enhance criterion. SCDHEC-OCRM's letter regarding the guidelines for evaluating all projects states the applicable criteria as follows: "The extent to which the project will further the policies of the State of South General Assembly which are mandated for OCRM in implementation of its program these being: (b) to protect and where possible, to restore and enhance the resources of the State's coastal zone for this and succeeding generations." The SHEP meets the protection criterion since the project's design was repeatedly modified to minimize adverse impacts as well as include features to mitigate for unavoidable adverse effects. The Monitoring and Adaptive Management Plans detail the measures which will be implemented to protect the sensitive resources of coastal South Carolina.

763-BB-28-EV05

Comment: *The project as proposed will reduce dissolved oxygen, and depends on mechanical means in an attempt to maintain current levels. This causes a net loss of degraded fisheries habitat.*

Response: The impacts of the SHEP on the dissolved oxygen regime in the Savannah Harbor estuary are discussed in the EIS and in greater detail in the Engineering Appendix of the GRR. Based on the potential impacts to dissolved oxygen that would be caused by implementation of the SHEP, the project's mitigation plan includes an oxygen injection system. This system has been designed to remove the incremental impacts of the SHEP on the dissolved oxygen regime in the harbor. Due to the spacing of the system, the dissolved oxygen regime would be improved in over 90 percent of the estuary, when compared to existing conditions. The mitigation plan also includes various flow re-routing features in McCoy's Cut, Middle River, and Back River to supply that portion of the estuary with additional freshwater to reduce salinity levels. The project also includes a feature in the lower end Back River to reduce the amount of saltwater that would move up the Back River.

Even with the injection of oxygen and the flow diversion features of the mitigation plan, there would still be residual impacts to Shortnose sturgeon and Striped bass habitat. The Fisheries Interagency Coordination Team (of which SC DNR was a member) could not identify any mitigation features in the estuary that would be effective in replacing those lost habitats over the full range of river flow conditions. The team determined that annual funding for stocking Striped bass fingerlings and constructing a fish bypass at the New Savannah Bluff Lock and Dam to expand Shortnose sturgeon spawning habitat would be appropriate mitigation for their loss of habitat. The National Marine Fisheries Service (NMFS) approved and required the fish passage in its November 4, 2011 Biological Opinion. The SHEP is fully consistent with the SCCMP because the project provides adequate mitigation to offset the adverse effects on dissolved oxygen. Additionally, implementation of the Monitoring and Adaptive Management Plan would ensure that dissolved oxygen impacts due to dredging are mitigated in South Carolina waters after construction of the project is completed.

763-BB-28-EV06, 763-BB-28-EV07, 763-BB-28-EV08

Comment: *The proposed dredging to deepen the Savannah Harbor as set forth in the National Economic Development (NED) Plan, 47-foot Depth Alternative, and the Locally Preferred (LP) Plan, 48-foot Depth Alternative, will reduce the dissolved oxygen levels in the Savannah River from the existing state in an area utilized for spawning of important fisheries species including striped bass and shortnose sturgeon (SNS). Mitigation for this impact is to stock bass fingerlings provided by Georgia DNR and construction of a fishway for Shortnose Sturgeon at the New Savannah Bluff Lock & Dam at Augusta Georgia. Stocking of fingerlings does not eliminate impacts to spawning and nursery areas for the Striped Bass and the construction of a fishway does not assure the Shortnose Sturgeon will be able to use it. In the event low DO (Dissolved Oxygen) levels fall below current concentrations, as predicted in the DEIS, the lower part of the river may not be passable by adult or juvenile sturgeon. The shallower dredging alternatives are more desirable to both the NED and LP alternatives, however all dredging alternatives (with or without mitigation) result in a net loss of Striper and SNS habitat.*

Response: Shortnose sturgeon do not spawn in the estuary, but upstream in the Savannah River well outside the project effect's area. Low dissolved oxygen levels are not a concern in these upstream habitats during the spring spawning season for this species.

The Fisheries Interagency Coordination Team (of which SC DNR was a member) identified conditions to differentiate between areas that serve as suitable and unsuitable spawning habitats for Striped bass. Dissolved oxygen levels were included in the criteria of suitable habitat for Striped bass. The project's mitigation plan includes an oxygen injection system. The system has been designed to remove the incremental impacts of the SHEP on the dissolved oxygen regime in the harbor. Due to the spacing of the system, the dissolved oxygen regime would be incidentally improved in over 90 percent of the estuary, when compared to existing conditions.

As a result, the SHEP is fully consistent with the South Carolina Coastal Zone Management Plan in that it includes effective measures to protect and maintain water quality and provides adequate offsetting mitigation for significant adverse effects. Additionally, implementation of the Monitoring and Adaptive Management Plan would ensure that important fisheries species of South Carolina are protected during and after construction of the project.

The SHEP's mitigation does not eliminate the impacts to Striped bass spawning habitat. However, when it is not possible to avoid an impact, mitigation is used to lessen its importance. This objective would be realized via annual stocking of Striped bass fingerlings which will ensure the continued health and viability of this fishery in the lower Savannah River.

Construction of a fish bypass at New Savannah Bluff Lock and Dam will expand the Shortnose sturgeon's spawning habitat. The adverse impacts of reservoir and other construction which blocked sturgeon's access to historical upriver spawning areas are well-documented. Once constructed, Shortnose sturgeon use of the fish way would be monitored to determine its effectiveness. Adaptive Management funds would be available to modify the structure if the monitoring indicates that is required. Other anadromous species (American shad, Atlantic sturgeon, etc.) are also likely to benefit from the fish way. Successful fish passage at New Savannah Bluff Lock and Dam would result in fish passage structures being installed at the Augusta Diversion and Stevens Creek Dams, which will allow access to even more spawning habitat for anadromous fish. Restoring access to the traditional spawning habitat above the New Savannah Bluff Lock and Dam has been a high priority of NMFSs, US Fish and Wildlife Service, and SC DNR.

Since the proposed dissolved oxygen system would restore [and incrementally increase] dissolved oxygen levels in the estuary, there is no indication from the hydrodynamic and water quality model studies that the Shortnose sturgeon would not be able to use the lower reaches of the Savannah River from the standpoint of dissolved oxygen after harbor deepening.

The OCRM's preference for the project alternatives less than the 47-foot [or 48-foot] depth is acknowledged. Further, it is correct that some impacts to Striped bass and Shortnose sturgeon would remain despite extensive changes to the harbor deepening design and development of a comprehensive mitigation plan. Appendix C details why these apparent shortcomings are not significant.

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763-BB-28-EV09

Comment: *Models described in the EIS indicate impacts to large areas of freshwater marshlands including important habitat for fish, wading birds, & waterfowl. While efforts have been addressed to minimize impacts, a minimum of 337 acres of freshwater marsh will be affected by salt waters. Mitigation for this impact is to preserve additional wetlands adjacent to the Savannah River National Wildlife Refuge. Preservation does not replace the lost values and functions of the impacted freshwater marsh.*

Response: With the exception of the 44-foot alternative, all channel depths evaluated in the SHEP would affect some of the tidal freshwater marshes (via increased salinity levels) located in the estuary. This would be the case irrespective of the proposed mitigation features (flow rerouting). However, the SHEP would not result in the actual destruction [or even degradation] of these marshes. Instead, an increase in upstream salinity levels would cause areas of tidal freshwater marsh (223 acres with the 47-foot project) to transition into a brackish marsh community. Nonetheless, many of the emergent plant species associated with the tidal freshwater marsh communities would still flourish after project implementation. In fact, emergent plant species often associated with freshwater plant communities are readily observed in environments that have been defined as brackish marsh (Latham et. al., 1994).

Although the composition of tidal freshwater marshes would change with brackish marsh species becoming more prevalent, the basic wetland functions associated with these plant communities would not be materially transformed. A comparison of potential changes in wetland function after conversion of freshwater wetlands to brackish wetlands (shown in the following table) reveals there are only negligible alteration to functions such as water purification, flood protection, shoreline stabilization, groundwater recharge, stream flow maintenance, retention of particles, surface water storage, subsurface storage, nutrient cycling, and values to society.

Changes in Wetland Function as a Result of Wetland Conversion

Elements of Wetland Function	Freshwater to Brackish Marsh (Approximately 223 acres)	Saltmarsh to Brackish Marsh (Approximately 740 acres)
Water Purification	Negligible	Negligible
Flood Protection	Negligible	Negligible
Shoreline Stabilization	Negligible	Negligible
Groundwater Recharge	Negligible	Negligible
Stream flow Maintenance	Negligible	Negligible
Retention of Particles	Negligible	Negligible
Surface Water Storage	Negligible	Negligible
Subsurface Storage	Negligible	Negligible
Nutrient Cycling	Negligible	Negligible
Values to Society	Negligible	Negligible
Fish and Wildlife Habitat	Minor Adverse	Negligible

Likewise, the 47-foot depth would have a similar effect on 740 acres of saltmarsh which would also change through time into a brackish marsh. Dominant saltmarsh species like Spartina alterniflora would still be observed in areas which have salinities that define a brackish marsh. However, the overall basic wetland functions typically associated with these systems would not change. A comparison of potential changes in elements of wetland function for both conversion scenarios is shown in the table below.

As illustrated in the table, the only indirect effect the 47-foot project would have on the function of these wetlands systems would be associated with fish and wildlife habitat. All other elements of wetland function associated with predicted shifts in wetlands categorization would be negligible as a result of the anticipated salinity changes. It should be noted that areas of the Savannah Harbor identified as saltmarsh or brackish marsh support similar fish and wildlife species (Jennings, 2003). Any anticipated conversion of saltmarsh to a brackish marsh system would have a negligible impact on the overall function of the wetland system. The Corps recognizes that a comparison of fish and wildlife habitat between freshwater and brackish marsh systems yields fewer similarities. However, the conversion in fish and wildlife habitat would still be minor when considering the total function of the wetland and continued existence of some freshwater vegetation after deepening in wetland areas that would be viewed as brackish marsh.

The Wetlands Interagency Coordination Team (which included a representative of the South Carolina Department of Natural Resources) concluded that there were no opportunities either to restore or create substantial acreages of tidal freshwater marsh in the estuary. Consequently, preservation of lands that are ecologically valuable and add to the purposes of the Savannah National Wildlife Refuge was identified as appropriate mitigation for the remaining wetland impacts. These would be properties already identified in the Savannah National Wildlife Refuge Acquisition Plan. Vegetation-wise they consist of freshwater wetlands including bottomland hardwoods, maritime forest, and uplands dominated by deciduous forest and re-growth. The bottom land hardwoods are classified as palustrine forested, broad-leaved deciduous communities that are both temporarily and seasonally flooded. Preserving these areas would ensure their wildlife habitat value is protected in perpetuity. It was the consensus of the team that acquisition/preservation of these lands would serve as mitigation for reducing the only wetland function (fish and wildlife habitat value of freshwater marsh) materially

changed by SHEP. It is important to observe that the subject conversion impacts to tidal freshwater marsh would only occur in the State of Georgia. With the flow diversion measures in place, the amount of tidal freshwater marsh in South Carolina should increase along the Little Back River in the vicinity of the Savannah National Wildlife Refuge.

The proposed preservation parcel[s] to mitigate for the above vegetative changes consist of 2,245 acres of bottomland hardwoods, maritime forest and uplands dominated by deciduous forest and re-growth. The bottomland hardwoods are classified as palustrine, forested, broad-leaved deciduous systems that are both temporarily and seasonally flooded. Preserving these areas would ensure wildlife habitat is protected in perpetuity. Moreover, the additional lands would buffer the SNWR from future threats of development such that changes in land use would not occur immediately adjacent to existing areas of the Refuge that do contain emergent wetland characteristics. Thus, the acquisition and preservation of 2,245 acres of wetland and upland buffer provides a functional replacement for the conversion of the only wetland function (i.e., fish and wildlife habitat) that would be expected as a result of the 223 acre freshwater to brackish marsh conversion (See table above). Thus, the functional assessment conducted for all wetland areas proposed for impact and mitigation satisfies the intent of the no-net-loss criterion.

The Corps made use of a Wetland Interagency Coordination Team (ICT) [consisting of technical expert representatives from USACE, Federal natural resource agencies, and State natural resource agencies representatives] to identify acceptable mitigation for the proposed project. At that time, USFWS stated that mitigation actions must be performed within the basin for impacts to the SNWR wetlands. The Service recommended preservation as a possible solution and proposed sites that are part of its long-term acquisition strategy to compliment the SNWR. The Corps also consulted with the Stakeholder Evaluation Group, including its Non-governmental Organizations (NGOs) members, to identify any other suitable mitigation alternatives. Over the ten-year study period, no agency or organization could identify another feasible alternative as mitigation for impacts that would occur as a result of wetland conversion. Therefore, the Corps proceeded with the identification of preservation sites.

763-BB-28-EV10, 763-BB-28-EV11

Comment: *This project will result in a very large volume of spoils that will use significant areas within the exiting spoils disposal sites, located mostly in Jasper County, resulting in shorter life expectancy of the CDF (Contained Disposal Facility). This may result in the need for additional wetland impacts for expansion of the CDF in Jasper County. Additional impacts from existing port expansions, storage, and transportation facilities associated with the port will likely result in additional impacts to wetlands and water quality. The proposed disposal of spoils in the CDF will potentially eliminate the possibility of a new port in Jasper County.*

Response: The CDFs bordering Savannah Harbor [including those in South Carolina] are designated to receive sediment dredged from the Savannah Harbor Navigation Project. The environmental impacts associated with using these sites for dredged material disposal were addressed in the Long-Term Management Strategy EIS completed in 1996. Although the US Government does not own these sites in fee, the Corps of Engineers maintains easements to permit deposition of dredged sediments. These diked CDFs have been used for dredged material disposal for many years. Their continued use for disposal is considered the least environmentally damaging option for sediment placement in Savannah Harbor. When the perimeter dikes are raised, the existing CDFs could be used beyond the 50-year project evaluation period. Using the existing CDFs for new work material excavated during harbor deepening would not markedly decrease their useful life or lead to an earlier need to locate any new CDFs.

The Georgia Department of Transportation has requested that the Corps relinquish its sediment disposal rights for Disposal Areas 14A and 14B, the sites presently being considered for a container terminal in Jasper County. The Corps is providing technical information to the Joint Project Office to identify a disposal site to replace this lost capacity for Savannah Harbor, as well as a means to replace the existing mitigation features [from previous projects] located within those Areas. The Corps has advised GA DOT and the Joint Project Office that it would not release the disposal easements until development of a Jasper Container Terminal is imminent, i.e. the developer obtains a Section 404 permit. The JPO's consultant observed that placing new work sediments on Areas 14A and 14B would save the terminal development project over $200 million by raising its elevation to a workable height. Therefore, if SHEP is constructed, it would benefit the development of a container terminal in Jasper County by significantly reducing its initial construction costs.

763-BB-28-EV12

Comment: *The proposed project will impact habitat for the federally endangered Shortnose Sturgeon. Endangered species habitat is considered GAPC in the SCCZMP. Mitigation offered to offset this impact is to construct a fishway at the New Savannah Bluff Lock & Dam. There is no certainty that the sturgeon will use this structure or that it will have any effect on spawning or survival of this species. Additionally, the project proposes a net loss of SNS habitat.*

Response: The Monitoring and Adaptive Management Plan contain provisions to monitor the success of the proposed fish bypass at the New Savannah Bluff Lock and Dam in passing Shortnose sturgeon. The structure was specifically designed to accommodate passage of this species to its historic upstream spawning habitats. Consultation with relevant natural resource agencies was conducted to ensure a state of the art design for the structure. Other than removal of the dam, none could identify a better design for the conditions at this site. During the plans and specifications phase of the project, the Corps will consult with the resource agencies again to finalize the design. The Adaptive Management Plan includes funds to modify the fish way in the future if that proves necessary.

763-BB-28-EV13

Comment: *This project will have a significant impact on Striped Bass and Shortnose Sturgeon. Mitigation of these impacts is dependent on mechanical means (oxygen injection and release of fingerlings) that has not been adequately demonstrated to reduce or eliminate the impacts to water quality and fish survival.*

Response: The proposed DO system employs technology widely used in industrial settings. This long-term use has demonstrated its effectiveness in adding dissolved oxygen to all volumes of water. The Monitoring- and Adaptive Mitigation Plan provides for five years of post-construction monitoring to determine the efficiency/effectiveness of the oxygen injection system. The adaptive management plan provides the means to make any required modification to the oxygen injection system. Harbor deepening would adversely affect habitat of Shortnose sturgeon and Striped bass in the estuary. As noted above repeatedly, the proposed measures of mitigating for those impacts were deemed appropriate/acceptable by the Fisheries Interagency Coordination Team, of which SC DNR was a member. The survival of stocked Striped bass fingerlings in the Savannah River Estuary has been well documented by researchers from the University of Georgia.

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763-BB-28-EV14

Comment: *The project as proposed will impact dissolved oxygen concentrations and finfish production. However, the DEIS states mitigation will result in a minimal net improvement. SCDHEC OCRM believes the use of mechanical oxygen injection systems may not be adequate to maintain current DO levels. Additionally, the Department has concerns regarding the maintenance and long term viability of these systems.*

Response: Each of the proposed harbor deepening alternatives includes a dissolved oxygen improvement system to mitigate its adverse DO effects. The Corps' projections for dissolved oxygen levels in the harbor and the project's impacts to those levels are based on the hydrodynamic and water quality models that SC DHEC approved for the Corps to use on this project. EPA used a variation of those models in development of its April 2010 Draft Revised Dissolved Oxygen TMDL for Savannah Harbor. It is our understanding that SC DHEC concurred in EPA's use of that model. The models that the Corps used to predict impacts to dissolved oxygen are the same ones it used to design the DO improvement systems. The predictions from the models should be as reliable for impact determinations as they are for mitigation design and effectiveness. Use of Speece Cone injection along with other mitigation measures is expected to incrementally improve dissolved oxygen conditions in over 90 percent of the estuary compared to existing conditions. To ensure the DO systems function as intended, monitoring and adaptive management is a component of the post-construction commitments. The Corps intends to include operation of the mitigation features (including the DO systems) in the Record of Decision as a requirement for maintenance of the navigation channel. Successful installation, operation, and maintenance of the oxygen injection system is a requirement of several environmental approvals for the project, including Georgia and South Carolina's water quality certifications and the National Marine Fisheries Service Biological Opinion. On November 15, 2011, SC DHEC issued a Section 401 water quality certification that included, among other things, a condition requiring the project to mitigate for dissolved oxygen impacts that is protective of South Carolina waters.

763-BB-28-EV15

Comment: *The project as proposed will effect Shortnose Sturgeon spawning, juvenile, and adult habitats. Additionally, SNS habitat will result in a net loss.*

Response: There would be a reduction in Shortnose sturgeon habitat in the estuary as a result of the project. However, the proposed fish bypass would provide access to additional upstream sturgeon spawning habitats which will more than compensate for the losses in the estuary. See also other responses on these issues.

763-BB-28-EV16

Comment: *Adjoining lands owned by the state of South Carolina are currently identified as a potential site for a new ports facility. The use of this site for spoil disposal and maintenance dredge disposal will potentially eliminate the Jasper County location as a suitable location for the Ocean Terminal.*

Response: The Corps does not concur with the allegation that construction of the SHEP project effectively eliminates the Jasper County location as a candidate site for an ocean terminal. The Corps agrees with the engineering consultant to the Joint Project Office that placement of new work sediments on Areas 14A and 14B would reduce the terminal development costs by raising the site's elevation to a workable height. The Corps has advised GA DOT and the Joint Project Office that it would

not release its disposal easements on the property until development of the Jasper Container Terminal is imminent, i.e. the developer obtains a Section 404 permit. In addition, the Joint Project Office has stated that a terminal at Jasper would also require a navigation channel deeper that the present 42-foot depth.

763-BB-28-EV17

Comment: *The proposed dredging to the depths chosen for the NED and the LP would greatly reduce habitat utilized by fisheries species, Striped Bass, as well as State and Federally listed endangered species, Shortnose Sturgeon. The shallower dredging alternatives are more desirable to both the NED and LP alternatives, however all dredging alternatives (with or without mitigation) result in a net loss of Striper and SNS habitat.*

Response: The OCRM's preference for the project alternatives less than the 47-foot [or 48-foot] depth is acknowledged. Further, it is correct that some impacts to Striped bass and Shortnose sturgeon will remain [despite extensive changes to the harbor deepening design and development of a comprehensive mitigation plan]. Appendix C of the EIS describes the mitigation that would be performed to compensate for those remaining impacts. See also other responses on these issues.

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763-BB-28-EV18

Comment: *As proposed, the project will increase the salinities within the immediate and upstream areas, causing a significant impact to the freshwater marshes.*

Response: The EIS fully discusses the impacts of the SHEP on tidal freshwater marsh in the estuary. The project includes measures to minimize impacts to tidal freshwater marsh and compensate for those impacts that cannot be avoided. See also other responses on these issues.

763-BB-28-EV19

Comment: *As proposed in the DEIS, the dredging under the NEP and LP plans would negatively impact areas utilized for spawning and early development of Striped Bass. The proposed mitigation for this impact by release of hatchery raised fingerlings by Georgia DNR; however this activity does not offset the spawning or loss of essential habitat.*

Response: The Fisheries Interagency Coordination Team (which included the SC DNR) agreed that annual stocking of fingerling Striped bass in the lower Savannah River would be an appropriate mitigation technique for the loss of an increment of its spawning, egg, and larvae habitat. The fingerlings would replace juvenile fish that might not reach this life cycle stage because of SHEP's impacts on their habitat. Historically, the GA DNR-WRD stocked this species in the estuary for similar reasons. The recent growth in the Savannah River Striped bass population indicates that stocking is effective in addressing many life cycle problems. In fact, annual stocking of fingerling Striped bass would ensure that this sport fishery continues to prosper.

763-BB-28-EV20

Comment: *As proposed dredging under the NED and LP plans, the project will further degrade the existing water quality conditions.*

Response: The proposed project would not create stagnant water conditions, lethal fish entrapments, or deposit sumps. The use of Speece Cone injection along with other mitigation measures will incrementally improve dissolved oxygen conditions in over 90 percent of the estuary compared to existing conditions. See also other responses on these issues.

763-BB-28-EV21

Comment: *The project proposes to utilize the deposition of these dredged materials to be placed into the Middle River, Rifle Cut, and the Little Back River; this deposition is for mitigating the predicted increase in salinity.*

Response: None of the material [rock, stone, and sandy sediments] used to construct the closure structures in McCoy's Cut and Rifle Cut, , and the flow diversion structure at McCoy's Cut to increase the flow of freshwater downstream or restrict the flow of saltwater upstream would be placed in wetland areas in South Carolina. Rather, it would be placed in open water in Georgia. Materials used to construct the sill in Back River (in open water) would be deposited in ways that do not allow their dispersal into wetland areas.

763-BB-28-EV22

Comment: *The proposed deepening under the NED and LP plans result in a negative impact to areas of important resources for fisheries and wildlife. The shallower dredging alternatives are more desirable to both the NED and LP alternatives. Additionally, a demonstrated public need for the citizens of South Carolina has not been sufficiently demonstrated. Also, SCDHEC OCRM believes there may be other feasible alternatives that should be explored.*

Response: With regard to fisheries and wildlife impacts, see other responses to comments on these issues. As discussed in other responses and more fully in EIS, Section 5.0 and Appendix J, the SHEP is fully consistent with the South Carolina Coastal Zone Management Plan because it includes effective measures to protect and maintain water quality and provides adequate offsetting/compensatory mitigation for significant adverse effects. Additionally, implementation of the Monitoring and Adaptive Management Plan would ensure that important fisheries species of South Carolina are protected during and after construction of the project. Navigation studies undertaken by the US Army Corps of Engineers evaluate the benefits of a proposed project from a national perspective and do not focus on an individual state [or even region] when selecting the National Economic Development Plan. The SHEP evaluated a full range of alternatives and determined that deepening of Savannah Harbor to allow vessels to use it without light loading and/or tidal constraints is in the national interest. The screening of potential management measures to address the identified navigation needs is contained in Appendix O of the EIS. The majority of the construction activities and the environmental impacts would occur within the State of Georgia. With regard to feasible alternatives and public need, please see other responses to comments, i.e., 763-BB-28-EV27 and EV28, below.

763-BB-28-EV23

Comment*: The measures proposed to mitigate for the predicted increase in salinity are to close Rifle Cut and Little Back River. These alterations would result in a loss of navigable waters by the public in these two water bodies.*

Response: The public would not lose access to navigable waters as a result of the proposed mitigation features. Closures would occur at Rifle Cut (a man-made passage in Georgia) and the western end of McCoys Cut (South Carolina). Both of these areas are within the Savannah National Wildlife Refuge and

are not used by commercial traffic. Closing Rifle Cut would lengthen the transit of recreational boaters using the existing boat ramp at the Houlihan Bridge who travel to Back River. Constructing a new boat ramp on Hutchinson Island would provide more direct access to Back River for recreational boaters and addresses this issue (Appendix C-Figure 46). Chatham County would be given the ramp and operate the facility in perpetuity. The project does not include any closure structures on Little Back River.

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763-BB-28-EV24

Comment: *The project proposed to close off Rifle Cut and Little Back River to reduce the potential effects of increased salinity. This proposed activity would restrict the continued use of these water bodies as recreational open areas. The Department believes that other alternatives exist aside from the closure of Rifle Cut and Little Back River.*

Response: Extensive modeling of the Savannah Harbor was conducted to determine the most practicable means of avoiding/minimizing aquatic impacts to the maximum extent practicable while still achieving the project's purpose and need. Ultimately, implementation of flow routing measures proved to be the best way to achieve this objective [especially minimization of wetland impacts - see Appendix C]. Closing the western end of McCoys Cut is designed to bring more freshwater into Little Back and Middle Rivers while closing Rifle Cut would reduce the amount of salty water entering Little Back River via Middle River. Without the flow alteration structures, approximately 1,177 acres of freshwater marsh would be converted to brackish marsh by the 47-feet SHEP project. By implementing flow rerouting measure 6A, only 223 acres of freshwater marsh would be similarly converted. Thus, flow rerouting measure 6A satisfies both avoidance and minimization elements by maintaining 954 acres of freshwater marsh that would otherwise experience some degree of vegetative succession. Waters in the vicinity of the flow diversion structures would still be available for recreational use.

763-BB-28-EV25, 763-BB-28-EV26

Comment: *The project as proposed in the preferred LP alternative will impact 1212 acres of freshwater marsh through the introduction of more saline waters. While mitigation is proposed to offset these impacts, there are other feasible alternatives to further minimize the proposed impacts. All other dredging alternatives result in a net loss of freshwater wetlands and saltmarsh, even with mitigation, except for the 44 foot dredge alternative. The 44 foot dredge alternative will result in the net gain of 332 acres of freshwater marsh due to the conversion of brackish wetlands. Additionally, there is no overriding public interest for the citizens of the State of South Carolina in this project. As proposed, all of the benefits from the deepening of the Savannah Harbor will be accrued to the State of Georgia, while the majority of the ecological impacts will occur within the State of South Carolina.*

Response: With regard to marsh impacts, see other responses to comments on these issues, including response to comment 763-BB-28-EV09. As discussed in other responses and more fully in EIS, Section 5.0 and Appendix J, the SHEP is fully consistent with the South Carolina Coastal Zone Management Plan because it includes effective measures to protect and maintain water quality and provides adequate offsetting/compensatory mitigation for indirect impacts to salt marsh. Additionally, implementation of the Monitoring and Adaptive Management Plan would ensure that flow rerouting and marsh conversion is monitored and adaptively managed to protect South Carolina waters during and after construction of the project. It should also be noted that the majority of the construction activities and the environmental impacts would occur within the State of Georgia. With regard to public interest, please see other responses to comments, i.e., 763-BB-28-EV27 and EV28, below.

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763-BB-28-EV27

Comment: *Several of the above cited policies require a demonstration of no feasible alternatives. The Federal Consistency Determination does not sufficiently demonstrate that there are no feasible alternatives. South Carolina's coastal zone management program defines "Feasible" as used in the Coastal Management Program in the context of "unless no feasible alternative exists." "Feasibility is determined by [DHEC OCRM] with respect to individual project proposals. Feasibility in each case is based on the best available information, including technical input from relevant agencies with expertise in the subject area, and considering factors of environmental, economic, social, legal, and technological suitability of the proposed activity and its alternatives. Use of this word includes the concept of reasonableness and likelihood of success in achieving the project goal or purpose. "Feasible alternative" applies both to locations or sites and to methods of design or construction, and includes the no action alternative." Here, the Federal Consistency Determination relies on its determination that adverse impacts will be mitigated. Though the CMP requires that unavoidable impacts be mitigated, there must first be a demonstration of no feasible alternatives/unavoidability. While the Federal Consistency Determination states that there are no feasible alternatives, it does so in a conclusory fashion and does not demonstrate why the other alternatives are not feasible. The Federal Consistency Determination does not consider other locations but only looks at methods for this location. In addition, its conclusion that the no action alternative and other alternatives are not feasible is conclusory and therefore is inadequate as a matter of law.*

Response: The SHEP NEPA alternatives analysis ranged from considering other potential options or sites for the project, including other South Atlantic ports, to evaluating potential specific locations for disposal of dredged or fill material along Savannah Harbor and in the Atlantic Ocean along the entrance channel. The SHEP NEPA alternatives analysis is found in various places in the Environmental Impact Statement (EIS) and General Re-Evaluation Report (GRR) , including EIS Section 2.0, Purpose and Need for Action; EIS Section 3.0, Alternatives; EIS Appendix O, Formulation of Alternatives; GRR Section 6, Formulation of Alternatives; various other sections in the GRR; GRR Appendix A, Economics; GRR Appendix A, Attachment 6 (Regional Port Analysis); GRR Appendix A, Attachment 4 (Multiport Analysis); and GRR Appendix D, Plan Formulation Appendix.

The SHEP NEPA alternatives analysis includes the following key elements: (1) the statement of project purpose and need (EIS Section 2.0); (2) a Regional Port Analysis (GRR, Appendix A, Attachment 6); (3) a Multiport Analysis (GRR, Appendix A, Attachment 4); (4) analysis of various structural and non-structural alternatives (EIS, Section 3.0; GRR, Appendix D); (5) analysis of eight alternative locations or sites for a port/terminal along the Savannah River (EIS, Section 3.0 and Appendix O; GRR Section 6 and Appendix D); (6) analysis of six different depths of harbor deepening along the Savannah River (EIS, Section 3.0 and Appendix O; GRR, various sections); (7) analysis of alternative disposal sites, methods, or beneficial use of dredged sediments (EIS, Section 3.01.1 and 3.07); (8) analysis of related maintenance dredging requirements (EIS, Section 3.08-3.10); and (9) analysis of the no-action alternative (EIS, Section 3.01.1 and Appendix O; GRR Section 6.12.1).

The Regional Port Analysis specifically evaluated current and projected port capacity, demand, and growth, and environmental impacts and constraints for other South Atlantic ports (Norfolk, VA; Wilmington, NC; Charleston, SC; Savannah, GA; and Jacksonville, FL) and a proposed Jasper County Marine Terminal. GRR, Appendix A, Attachment 6, Final Report, pp. 1-20, and Interim Reports. In addition, the information regarding a Jasper County Marine Terminal from the Regional Port Analysis

was further analyzed in a study of the potential costs and environmental impacts of locating the project at one of eight different sites along the Savannah River (four on the South Carolina side, four on the Georgia side). EIS Sec. 3.0 and Appendix O; GRR Section 6.8 and Appendix D.

Among the conclusions reached as a result of the Regional Port Analysis, the Multiport Analysis, and the analysis of eight alternative sites for the project along the Savannah River were the following: (1) no one port could accommodate all the growth in container volume expected in the region, (2) all the major South Atlantic ports will experience so much cargo growth from 2005 to 2050 that they will all need deepening or improvement currently planned, (3) the proposed deepening of Savannah Harbor would not take business from another port because the shipping cost efficiencies would not outweigh the additional landside transportation costs (largely due to the longer distances from each port to and from population centers that are outside its primary service area), and (4) a Jasper County Marine Terminal would not be cost effective when compared to improving Savannah Harbor based on the high cost involved (now estimated by the Jasper terminal Joint Project Office at more than $4 billion including the cost of constructing the new transportation infrastructure that would have to be built), and the timing (Jasper does not exist at present and cannot be constructed in time to meet the growth in demand occurring through Savannah Harbor).

According to South Carolina's criteria, the SHEP NEPA alternatives analysis demonstrates there is no feasible alternative to deepening Savannah Harbor. In South Carolina, a feasible alternative must be reasonable, taking into account the likelihood that it will achieve the project purpose, the cost of the alternative, and other factors – and it must reduce adverse consequences on water quality. A proper feasible alternatives analysis includes analysis of alternative locations and sites, analysis of methods of design or construction, and analysis of the no-action alternative. The Corps's alternatives analysis for SHEP fully complied with these principles.

Originally, the local sponsor proposed the project with the purpose of improving navigation in Savannah Harbor. The Corps had a duty to take that project purpose into account. In addition, the US Congress then authorized the specific project (subject to further study and approval by other federal agencies). 1999 Water Resources Development Act, Pub. L. No. 106-53, sec. 101(b)(9). Despite the specific Congressional authorization, the Corps still undertook a wide-ranging, multi-level alternatives analysis as described.

It should be noted that South Carolina's Coastal Management Plan (SCCMP) specifically establishes a strong preference for developing ports in industrialized areas with existing infrastructure. See SCCMP, Part III, Transportation Facilities, at III-19 – III-20. This preference plus the high cost associated with developing a Jasper Terminal and the twenty years that will be required to study, permit, and construct that project, weigh heavily against finding a Jasper Terminal alternative to be feasible.

A March 11, 2011 "Update" from the Jasper Ocean Terminal project office, contains numerous statements that SHEP is necessary and beneficial for a Jasper Terminal project ("The development of the Jasper site is predicated on the success of ports in Savannah and Charleston. A completed SHEP and the planned expansion of Charleston are the first steps . . . ."). The Update states that a Jasper Terminal will handle container volumes in excess of what an improved (deepened) Savannah Harbor or Charleston Harbor could handle. The Update also confirms that a Jasper Terminal will cost $4 billion (a more recent estimate by the SCSPA is $5 billion).

In light of the information provided in the Update, combined with the fact that a Jasper Terminal would have its own environmental impacts requiring mitigation (Regional Port Analysis, DGRR, Appendix A, Attachment 6, Final Report, at 14-20, and associated Interim Reports), a Jasper Terminal is not presently a feasible alternative to SHEP. After extensive study, no other specific feasible alternative was identified or found.

The no-action or "without project" alternative was thoroughly considered in the GRR/EIS as well, but was not selected because it would not fulfill the project purpose and need, which are to address navigation inefficiencies in Savannah Harbor. The no-action alternative would not allow deepening the harbor so that larger and/or more fully loaded vessels could use it. By not enabling more efficient navigation in the harbor, the no-action alternative would not realize more than $170 million in net annual economic benefits that could be achieved with harbor deepening, even after taking the total project cost of SHEP into account. And while it is true that with the no-action alternative there would be no additional environmental impacts, the total project cost of SHEP includes comprehensive avoidance and mitigation that would reduce any potential impacts to natural resources to an acceptable level.

763-BB-28-EV28

Comment: *Based upon the above SCDHEC OCRM does not concur that the five dredging alternatives are consistent with the South Carolina Coastal Management Program (SCCMP) to the maximum extent practicable because it would result in the permanent alteration of productive freshwater marshlands, a net loss in spawning and juvenile habitat for Striped bass and SNS (T&E listed species) and degradation of water quality due to a reduction in dissolved oxygen. The DEIS has not adequately demonstrated that no feasible alternatives exist since other alternatives such as the potential location of the Jasper County Ocean Terminal were not considered. In addition, the DEIS fails to demonstrate an overriding public interest for the citizens of South Carolina. Again, it is DHEC's position that additional time remains to object to the federal agency's consistency determination, and reserves the right to supplement this letter accordingly.*

Response: The components of this summary comment have been addressed in various previous responses. As with any water resource development project having a large scope, the SHEP will have adverse impacts on the environment. Harbor deepening was evaluated from an impact and mitigation standpoint using the standard process which is (1) avoid impacts where possible (maintaining the existing side slopes of the channel to avoid additional wetland impacts), (2) minimize impacts that cannot be avoided (flow rerouting measures to reduce upstream salinity levels) and (3) compensate for the remaining impacts. Based on this evaluation process, the project's mitigation plan, including the-Monitoring and Adaptive Management Plan provide appropriate compensation for the remaining impacts of the project in regards to direct wetland impacts, indirect impacts to tidal freshwater marsh, dissolved oxygen, Striped bass, and Shortnose sturgeon. The mitigation measures for these resources have been discussed in previous responses.

As to the feasible alternatives issue, see previous response. In addition, SCDHEC-OCRM's initial consistency review did not adequately consider the national interest and regional benefits of the SHEP. Such consideration is mandated by federal law and regulations, South Carolina state law, and the SCCMP. The CZMA at 16 U.S.C. § 1455(d)(12) requires that a management plan contain "a method for assuring that local land use and water use regulations within the coastal zone do not unreasonably restrict or exclude land uses of regional benefit." NOAA's CZMA regulations at 15 CFR 923.12 state that in accordance with this statutory requirement a management program must "identify what constitutes uses of regional benefit" 15 CFR § 923.12(a) and "identify and utilize one or a combination of methods,

consistent with the control techniques employed by the State, to assure local land and water use regulations do not unreasonably restrict or exclude uses of regional benefit." 15 C.F.R § 923.12(b). Also, 15 CFR § 923.52(a) states that a "management program must provide for adequate consideration of the national interest involved in planning for, and managing the coastal zone, including the siting of facilities…which are of greater than local significance." To this end, S.C. Code. Ann. § 48-39-80(B)(6) states that the management program shall "provide for adequate consideration of the local, regional, state, and national interest involved in the siting of facilities for...adequate transportation facilities and other public services necessary to meet requirements which are other than local in nature."

The SCCMP defines activities considered to be of regional benefit as those that "1) have been identified as Activities Subject to Management, that is, those determined to have direct and significant impact on coastal waters, and 2) result in a multi-county environmental, economic, social, or cultural benefit." SCCMP at III-8. The SCCMP explicitly states that "Activities of Regional Benefit in the South Carolina coastal zone are: 1) Transportation facilities – including…ports". Id. The SCCMP also states that the "following concerns are considered by South Carolina to be of such long-range, comprehensive importance as to be in the national interest: 1. National Defense" and "3. Maintenance of Navigation". SCCMP at III-5. The SCCMP goes on to state that "Resource Policies of particular interest for national defense are: Transportation a) Ports" and "Dredging, a) Dredging, b) Dredge Material Disposal. SCCMP at III-6.

The SHEP is a substantial navigation project that involves both dredging and dredged material disposal that our studies indicate will produce well over $150 Million a year in national economic benefits. The SCCMP explicitly states that port projects are activities of regional benefit. The SCCMP explicitly states the maintenance of navigation is a concern of national interest. The SCCMP explicitly states that national defense is a concern of national interest and that ports, dredging, and dredged material disposal are of particular interest for national defense. Federal and state laws require that consistency determinations adequately consider the national interest and regional benefits of projects submitted for review. However, SCDHEC-OCRM's initial review does not recognize the national interest or regional benefits of the SHEP. In fact, the initial SCDHEC-OCRM consistency review contains statements that directly contradict the SCCMP. The Garden City Terminal, the facility that will receive most of the more efficiently received cargo, is sited only miles from the border of South Carolina. The SCCMP states that the ports and commercial waterways of South Carolina "have a major national impact by providing a means of access to international and domestic markets." SCCMP at III-19. Yet, SCDHEC-OCRM's letter of January 25, 2011 states that "all of the benefits from the deepening of the Savannah Harbor will be accrued to the state of Georgia . . . ." Since South Carolina residents comprise 40% of the longshoremen working at the Garden City Terminal, the statement regarding the effect of SHEP on the citizens of South Carolina is unfounded.

Navigation studies undertaken by the US Army Corps of Engineers evaluate the benefits of a proposed project from a national perspective and do not focus on an individual state [or even region] when selecting the National Economic Development Plan. The SHEP evaluated a full range of alternatives and determined that deepening of Savannah Harbor to allow vessels to use it without light loading and/or tidal constraints is in the national interest.

D H E C
PROMOTE PROTECT PROSPER
C. Earl Hunter, Commissioner
Promoting and protecting the health of the public and the environment

January 31, 2011

Colonel Jeffrey M. Hall, District Commander
U.S. Army Corps of Engineers, Savannah District
P.O. Box 889
Savannah, Georgia 31402-0889

Re: Savannah Harbor Expansion Project: Draft General Re-Evaluation Report and Draft Tier II Environmental Impact Statement

Dear Colonel Hall:

The South Carolina Department of Health and Environmental Control- Office of Ocean and Coastal Resource Management (SCDHEC OCRM) offers the following supplemental comments to our January 25, 2011 letter on the Draft General Re-Evaluation Report (DGRR) and the Tier II Draft Environmental Impact Statement (DEIS) for the Savannah Harbor Expansion Project. As stated previously SCDHEC-OCRM maintains that the time period allowed for the State to comment on this direct federal activity is a total of 75 days. Therefore, SCDHEC-OCRM maintains that the close of the comment period is close of business January 31, 2011.

Chapter IV Special Management Areas

A. Geographic Areas of Particular Concern (GAPC)

- (8)(c) Areas of Historic, Archeological or Cultural Significance: The extent and significance of negative impacts on Geographic Areas of Particular Concern (GAPCs). The determination of negative impacts will be made by OCRM in each case with reference to the priorities of use for the particular GAPC. Applications which would significantly impact a GAPC will not be approved or certified unless there are no feasible alternatives or an overriding public interest can be demonstrated, and any substantial environmental impact is minimized.

  The proposed project may potentially impact archeological resources which are potentially eligible, eligible or listed on the National Register. Specifically, two anomalies within SC waters between Stations 41+500 – 49+500 , two confederate crib obstructions within GA and SC waters between stations 55+000 – 68+500 and the CSS Georgia. SCDHEC OCRM staff has coordinated with the South Carolina Department of Archives and History (SHPO) and re-enforce their concerns in a letter to you dated December 7, 2010. SCDHEC OCRM has the responsibility to consider the impacts to the extent to which the proposed project will have on these resources.

Boltin-Kelly to Colonel Hall
SHEP
January 31, 2011

SCDHEC OCRM does not concur that the five dredging alternatives are consistent with the South Carolina Coastal Management Program (SCCMP) to the maximum extent practicable because it will potentially result in the adverse impact to GAPCs. However, SCDHEC-OCRM could find this aspect of the federal activity consistent if properly mitigated to SHPOs satisfaction.

Sincerely,

Carolyn Boltin-Kelly

Carolyn Boltin-Kelly

cc: Earl Hunter, SCDHEC-OCRM
Barbara Neale, SCDHEC-OCRM
Heather Preston, SCDHEC-BOW
Donna Weiting, Acting Director NOAA-OCRM

South Carolina Department of Health and Environmental Control, Ocean and Coastal Resource Management

These responses accompanied the USACE Transmittal Letter dated 30 March 2011

Page 1

1116-BB-02-EV01

Comment: *The proposed project may potentially impact archeological resources which are potentially eligible, eligible or listed on the National Register. Specifically, two anomalies within SC waters between Stations 41+500 – 49+500 , two confederate crib obstructions within GA and SC waters between stations 55+000 – 68+500 and the CSS Georgia. SCDHEC OCRM staff has coordinated with the South Carolina Department of Archives and History (SHPO) and re-enforce their concerns in a letter to you dated December 7, 2010. SCDHEC OCRM has the responsibility to consider the impacts to the extent to which the proposed project will have on these resources.*

Response: All cultural resource issues with South Carolina have been resolved. See SC DHEC Board Final Agency Decision, Nov. 15, 2011, SC DHEC-OCRM letter same date removing objection to Federal Consistency Determination, and EIS Appendix G (cultural resources Programmatic Agreement for SHEP signed by South Carolina SHPO and other parties).

Page 2

1116-BB-02-EV02

Comment: *SCDHEC OCRM does not concur that the five dredging alternatives are consistent with the South Carolina Coastal Management Program (SCCMP) to the maximum extent practicable because it will potentially result in the adverse impact to GAPCs. However, SCDHEC-OCRM could find this aspect of the federal activity consistent if properly mitigated to SHPOs satisfaction.*

Response: All cultural resource issues with South Carolina have been resolved. See SC DHEC Board Final Agency Decision, Nov. 15, 2011, SC DHEC-OCRM letter same date removing objection to Federal Consistency Determination, and EIS Appendix G (cultural resources Programmatic Agreement for SHEP signed by South Carolina SHPO and other parties).

D H E C
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C. Earl Hunter, Commissioner
Promoting and protecting the health of the public and the environment

May 27, 2011

Colonel Jeffrey M. Hall, District Commander
U.S. Army Corps of Engineers, Savannah District
P.O. Box 889
Savannah, Georgia 31402-0889

Re: Coastal Zone Consistency Determination for SHEP

Dear Colonel Hall:

I want to thank you and your staff for meeting with my staff in Charleston on April 21, 2011, to discuss the Savannah Harbor Expansion Project (SHEP). We appreciated the opportunity to further discuss some of the aspects of this project which could potentially have a significant impact on coastal resources and uses. As outlined in our letters dated January 25 and 31, 2011, South Carolina Department of Health and Environmental Control, Office of Ocean and Coastal Resource Management (SCDHEC-OCRM) does not concur with the Corps' finding of consistency for SHEP. SCDHEC-OCRM has objected to the Corps finding of Consistent to the Maximum Extent Practicable as well as the expressed opinion that SHEP is fully consistent.

We have received the additional information from Mr. Bailey on May 13th and will review and provide additional feedback as needed.

As a threshold matter, I believe it is important to ensure there is a mutual understanding on where we are in the Federal Consistency process as stated in §§ 1451, et. Seq., and 15 C.F.R § 930 Subpart C. The Corps of Engineers found SHEP consistent with South Carolina's Coastal Program to the maximum extent practicable. In fact the Corps asserts that SHEP is fully consistent. SCDHEC-OCRM objects to this finding. The Federal Consistency process allows for the State and the federal agency (in this case the Corps of Engineers) to attempt to resolve those differences either informally or formally or via mediation (15 C.R.R. § 930.112) or judicial review (15 C.F.R. §930.116). However, before we attempt to more 'formally' resolve our agencies' different positions on consistency, it is important for the Corps to understand that positions and/or outcomes can potentially change.

In response to your letter dated March 30, 2011, I'd like to address a few issues. SCDHEC-OCRM did consider the national interest of SHEP as well as the potential regional benefits of this project as they relate to South Carolina's Coastal Program. The fundamental principle that underpins both the State and the federal Coastal Zone Management Act (CZMA) is the importance of our nation's coastal resources. Sections 302 and 303 of the federal CZMA detail the congressional findings and declaration of policy for the nation as it relates to coastal resources. In evaluating SHEP, SCDHEC-OCRM found that it contravened the State's applicable resource policies resulting in potential significant negative effects on coastal resources and uses which have been determined to be in the national interest to preserve and protect. However, with respect to the national interest in port related activities, SCDHEC-OCRM has carefully evaluated and weighed the potential significant negative environmental effects from SHEP and found that these negative impacts outweighed any benefits that might be in the national interest.

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
Ocean and Coastal Resource Management
Charleston Office • 1362 McMillan Avenue • Suite 400 • Charleston, SC 29405 • Phone: (843) 953-0200 • Fax: (843) 953-0201 • www.scdhec.gov

As to activities of Regional Benefit, South Carolina's federally approved Coastal Program identified two categories of activities of Regional Benefit, transportation facilities and parks. Activities of regional benefit must also be found consistent with SC's CZMP. SCDHEC-OCRM finds SHEP to be inconsistent with the applicable resource policies even when given full consideration of any potential regional benefit. It is worth re-stating that the benefits to South Carolina from this project are minimal in light of the direct and indirect impacts.

Finally, SCDHEC-OCRM clearly articulated our reasons for objecting to the Corps' consistency determination and provided supporting information in our letters of January 25 and 31, 2010. Specifically, the potential impacts to the resources under the proposed plan would be excessive and without adequate opportunities to avoid or minimize such impacts. Furthermore, the plan's proposed mitigation would also be inconsistent with the regulations and policies of South Carolina's Coastal Program. Of particular note is the proposal to mitigate a significant amount of wetland impacts (both direct and indirect) with out-of-kind mitigation. Of the 2,683 acres proposed to be acquired and preserved as mitigation, it is unknown how much of this land is in fact wetlands versus uplands. Furthermore, other identified mitigation techniques rely on elaborate flow modifications to and mechanical injection of oxygen with Speece cones into the Savannah River. Even though this technology has not been shown to be effective in tidal systems it is being relied upon as the single best management practice to restore dissolved oxygen (DO) to pre-project conditions in this highly altered and impacted river system. Perhaps the most troubling aspect of the mitigation proposal is the reliance on annual appropriations to fund the purchase of the 2,683 acres of land for 'mitigation', construction, operation and maintenance of flow modifications, as well as Speece cone installation, operations and maintenance. The flow modifications will require on-going maintenance and the Speece cones are highly mechanized systems and if used, should require a dedicated source of funding as well as contingencies in the event these systems do not perform as predicted. SCDHEC-OCRM does not concur that relying on annual federal budget appropriations is an adequate mechanism for ensuring the successful mitigation for a project of this large nature and scope. For projects of similar scope found consistent with South Carolina's coastal program, SCDHEC-OCRM required a showing of an on-going financial commitment to operate and maintain such a system/structure. Additionally, projects of similar scope that SCDHEC-OCRM found consistent with the Coastal program required an identifiable financially binding commitment such as a performance bond or letter of credit to cover the cost of maintenance, operation, reconstructing or removal of structures that do not perform as predicted as well as restoring the affected area.

As mentioned previously, SCDHEC-OCRM would welcome continued discussions with the Corps regarding this project to discuss a potential outcome that reduces the impacts of the project as well as modifications to the proposed mitigation. If this is an option to which the Corps is agreeable, I will have my staff set up a meeting to facilitate further discussion. However, if this is not a viable option, then SCDHEC-OCRM will consider other pathways to ensure consistency with our State's Coastal program.

Sincerely,

Carolyn Boltin-Kelly
Deputy Commissioner, SCDHEC-OCRM

cc: Earl Hunter, Commissioner, SCDHEC
Donna Weiting, Acting Director NOAA-OCRM

South Carolina Department of
Natural Resources
DNR

John E. Frampton
Director

January 25, 2011

Col. Jeffrey M. Hall
US Army Corps of Engineers
Savannah District
100 West Oglethorpe Avenue
Savannah, GA 31401-3640

REFERENCE: Draft General Re-Evaluation Report and Tier II Draft Environmental Impact Statement for the Savannah Harbor Expansion Project Chatham County, Georgia and Jasper County, South Carolina

Dear Col. Hall,

Personnel with the South Carolina Department of Natural Resources (DNR) have attempted to review in a timely fashion both the Draft General Re-Evaluation Report (DGRR) and the Tier II Draft Environmental Impact Statement (DEIS) for the Savannah Harbor Expansion Project. It should be noted that I formally requested a 120-day public comment period by letter to you dated November 18, 2010. Without direct reply to my request, the US Army Corp of Engineers (USACE) extended the initial 45-day comment period by 15 days, for a total public comment period of only 60 days.

These documents were released for public review immediately preceding the holiday period further burdening reviewers. Given the lengthy delays in final internal USACE review of these documents, I cannot help but believe that it would have been more appropriate to wait until the new year for their public release. There is the appearance that the timing of their release was a deliberate attempt to minimize thorough public and scientific scrutiny. DNR continues to assert that a 60-day period is insufficient to conduct a thorough review of the DEIS and DGRR and provide detailed comments on these large and complex documents. Therefore, DNR intends to submit additional comments following our continuing review of these documents or if new information becomes available regarding the proposed project.

Based on our assessment of the environmental impacts as presented in the DEIS and DGRR, and on the adequacy of the mitigation proposed, DNR has concluded that the only deepening alternatives that could be considered minimally environmentally acceptable are the 44-ft alternative or the 45-ft alternative, provided the proposed mitigation for each of these alternatives proves to be successful. Although, DNR does not support any deepening scenario greater than the 45-ft alternative, it should be noted that comments made by members of the South Carolina Maritime Commission (SRMC) indicate that even the 48-ft alternative would result in a channel that is shallower and narrower than USACE design standards for fully loaded Post-Panamax

ships. This would result in a lower margin of safety and, by extension, a higher risk to the environment from potential vessel groundings. Therefore, none of the alternatives considered would accomplish the goal of ensuring navigational efficiency or safety for these larger vessels. The documents cite the preferred alternative provides "an acceptable level of risk" with respect to under-keel clearance. The SRMC analysis concludes USACE has applied this same level of "acceptable risk" to the narrow passage and passing lanes in the proposed channel. The DNR position is that there is no acceptable level of risk associated with environmental damage that could result from vessel grounding, hull breaching and a catastrophic spill endangering natural resources, public interests, commerce and tourism.

Our analysis concludes that the majority of benefits associated with the project occur in the state of Georgia while the majority of environmental impacts occur in South Carolina or in the Savannah River which is a shared tributary whose natural resources must be apportioned equitably, managed appropriately and respected by the leadership and people of both states.

In view of these concerns, DNR has concluded that a better alternative to consider is to conduct minimal deepening of the channel now and to a depth of -44 or -45 ft in order to alleviate draft restrictions on the existing fleet of vessels, and then to conduct additional studies and hydrodynamic modeling to evaluate the economic and environmental impacts of deepening to a greater depth only as far as the site of proposed Jasper Port Terminal. Since this site is several miles closer to the ocean than the Garden City Terminal, this alternative could potentially reduce the environmental impacts and cost of deepening, while increasing navigational safety and efficiency for the next generation of vessels predicted to call on the proposed Jasper Port Terminal. DNR recommends that this alternative be given serious consideration.

Specific comments on the DEIS appear in the attachment to this letter. Many of these comments apply to the DGRR as well; therefore a copy of this letter and attachment should be included in the administrative record for each of these documents. If you or any member of your staff has any questions regarding DNR comments, please contact Bob Perry of my staff at 803.734.3766 or perryb@dnr.sc.gov.

Very truly yours,

John E. Frampton
Director

Attachment as stated

c: Hon. Nikki R. Haley – Governor of the State of South Carolina
Hon. Lawrence K. Grooms – Senator SC District 37
C. Earl Hunter – Commissioner SC DHEC
Dean Moss – SRMC Chairman
Michael G. McShane – DNR Board Chairman
LTC Jason A. Kirk – USACE Charleston District Commander
William G. Bailey – USACE Savannah District Planning Chief

South Carolina Department of Natural Resources

Analysis of the

DRAFT TIER II ENVIRONMENTAL IMPACT STATEMENT FOR THE SAVANNAH HARBOR EXPANSION

Major Points Addressed in the DEIS:

The stated purpose of the proposed Savannah Harbor Expansion Project (SHEP) is to save current and future shipping costs due to draft restrictions on larger vessels. The DEIS presents an incremental analysis of the impacts of project depth alternatives ranging from 42 ft, the "no action" alternative through 48 ft. The Maximum Authorized Plan of -48 ft is supported by the non-Federal cost share sponsor. The US Army Corps of Engineers (USACE) has tentatively identified the 47-ft depth alternative as the National Economic Development (NED) Plan. The NED Plan is defined as:

> . . . *the plan that maximizes net economic benefits to the Nation and fully complies with Army policy.*

Although it is acknowledged in the DEIS that environmental impacts associated with shallower depths would be less than those associated with the NED Plan, the USACE concludes that:

> . . . *the lesser impacts of the 44-foot depth, 45-foot depth, and 46-foot depth alternatives are not considered sufficient to justify recommendation of these alternatives instead of the NED Plan.*

The DEIS further concludes that all depth alternatives, with the inclusion of proposed mitigation features, are:

> . . . *environmentally acceptable.*

DNR Summary Comment:

DNR disagrees with the conclusions reached in the DEIS and believes that the only 2 deepening alternatives that are environmentally acceptable are the 44-ft and the 45-ft alternatives, provided the proposed mitigation is effective in minimizing any adverse impacts of these alternatives. Obviously, the "no action" alternative, maintaining the channel at the currently authorized depth of 42 ft, would have the fewest adverse environmental impacts.

The NED Plan, the 47-ft alternative, would involve the initial excavation of about 28 million yd^3 of dredged sediment, and would result in both direct and indirect impacts to natural resources. Direct impacts would result from the physical removal and disposal of sediments, while indirect impacts would result from increased salinity intrusion and reduced dissolved oxygen (DO) levels. Overall impacts include adverse effects on managed freshwater wetlands in the Savannah

National Wildlife Refuge (SNWR), loss of tidal freshwater wetlands, impacts to public use of the estuarine/riverine system, loss of foraging and nursery habitat for the endangered shortnose sturgeon (*Acipenser brevirostrum*) (SNS), loss of salt and brackish marsh and loss of habitat for Striped bass (*Morone saxatilis*).

DNR Specific Comments:

Sediment Disposal and Associated Impacts:

Approximately 13 million yd^3 of sediment from the Entrance Channel would be placed in nearshore "feeder berms" off Tybee Island, "submerged berms" near the ocean bar entrance channel or in the EPA-approved Savannah Ocean Dredged Material Disposal Site (ODMDS). Since all of the proposed nearshore and offshore disposal sites are located either in federal waters south of the Entrance Channel or in state waters off the coast of Georgia (GA), DNR will defer to the federal agencies and state of GA regarding the potential environmental impacts of sediment disposal in those areas. DNR generally opposes open-water disposal of dredged material, except in an approved ODMDS or for the purpose of nourishing seriously eroding beaches with beach-compatible sand. Channel and harbor sediments may not be of the quality and size suitable for future beach nourishment.

Approximately 15 million yd^3 of sediment from the Inner Harbor, including new work material, would be disposed in the 8 existing upland confined disposal facilities (CDFs), 6 of which are on the South Carolina (SC) side of the river. Use of specific CDFs would be determined based on their availability and planned maintenance and improvement activities. Sediments collected from the project area in 1997 were tested for contaminants as part of the Tier I EIS. Parameters analyzed included metals, polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), phenols, pesticides, dioxin/furan congeners, cyanide, organotins, and nutrients. Sampling conducted in 2005, and again in 2007, indicated the only analyte of significant ecological concern was cadmium, which occurs naturally in high concentrations in the Miocene clays that would be excavated and/or exposed as part of the deepening project. Bioaccumulation studies suggested that the risk to aquatic organisms exposed to these cadmium-laden sediments is low. The potentially greater risk to avian and terrestrial species foraging in the CDFs where these sediments would be disposed of would be mitigated by "capping" these sediments with a 2-ft layer of comparatively clean sediments from another part of the channel. A detailed protocol for sampling the surficial sediments and vegetation in the CDFs before and after capping is described in Appendix M of the DEIS. Should the project go forward, DNR concurs with this approach to managing the cadmium-laden sediments, and believes the proposed monitoring and contingency plans are adequate to ensure a minimal risk to wildlife.

Wetlands Impacts:

As stated in Section 5.1 of the DEIS, the extent of direct wetland impacts resulting from excavation of channel bend wideners, enlarging Kings Island Turning Basin and removing the Tidegate, would not differ substantially among the 5 deepening alternatives considered. In each

case, a total of 14.08 acres of salt and brackish marsh would be affected.[1] In the absence of an approved saltwater mitigation bank in the Savannah River Basin, USACE proposes to mitigate for these direct losses by grading down approximately 42 acres of a former confined dredge spoil disposal site (CDF 1S) near the confluence of the Front and Middle rivers to an elevation that would support *Spartina alterniflora*. A "feeder" creek system also would be constructed toward the interior of the restored marsh. This area would then be allowed to revegetate naturally. Active planting of *Spartina* would be conducted only if the area did not revegetate naturally at a rate that would provide 15% vegetative cover after 1 year and 80% vegetative cover after 5 years (with interim goals of 25, 40, and 60% cover at the end of 2, 3 and 4 years, respectively). Conceptually, DNR concurs with this approach to mitigating for the direct loss of brackish and saltwater wetlands resulting from any of the deepening alternatives; however, the DNR overriding concern about the indirect effects of harbor deepening on tidal freshwater marsh should be given greater weight.

As stated in Chapter 5 of the DEIS:

> *All of the deepening alternatives would adversely impact tidal freshwater marsh.*

Model predictions indicate that, without mitigation, deepening the harbor would result in the conversion of tidal freshwater marsh to brackish marsh as a result of increased salinity intrusion. Under conditions of average flow and low sea level rise, the acreage of freshwater marsh that would be lost as a result of deepening is predicted to range from 551 acres for the 44-ft alternative to 1,212 acres for the 48-ft alternative, assuming no mitigation is implemented. With the flow-altering modifications proposed as mitigation by USACE, the acreage of freshwater marsh is projected to increase by 332 acres with the 44-ft alternative; whereas, a net loss of freshwater marsh (ranging from 32 acres for the 45-ft alternative to 337 acres for the 48-ft alternative) would still result from the other deepening alternatives, even with mitigation. Considering the substantial loss of tidal freshwater wetlands that has already occurred as a result of past dredging operations and other modifications to the system, DNR considers anything more than a *de minimis* loss of freshwater wetlands to be a significant adverse impact of the proposed deepening project.

USACE proposes to minimize indirect impacts to tidal freshwater wetlands due to increased salinity intrusion by implementing several flow-altering modifications of the Savannah River system. These include diverting more fresh water from the Front River down the Middle and Little Back rivers at McCoy Cut, closing the lower, western arm of McCoy cut, removing the Tidegate abutments and piers from the lower Back River, constructing a broad berm at the lower end of the sediment basin located below the Tidegate, filling in the sediment basin using "new work" material, constructing a submerged sill at the mouth of the Middle River and closing Rifle Cut. USACE used the results of hydrodynamic modeling to develop a flow-alteration plan for each depth alternative and has determined that Plan 6B is the most "cost-effective" plan for the 44-ft depth alternative; whereas, Plan 6A is more "cost-effective" for all of the other depth

[1] It should be noted that this number differs from that cited elsewhere in the DEIS. The acreage of estuarine emergent marsh that would be lost as a direct result of excavation is given as 15.48 acres in Section 6.04, and as 15.68 acres in Appendix C. This apparent discrepancy should be corrected or clarified in the text of the DEIS.

alternatives analyzed including the 45-, 46-, 47- and 48-foot alternatives. Both Plans 6A and 6B would incorporate all flow-altering modifications described above, except that Plan 6A also would include deepening McCoy Cut and the upper portions of the Little Back and Middle rivers; whereas, Plan 6B would not include any such deepening.

USACE proposes to provide compensatory mitigation for unavoidable impacts to tidal freshwater wetlands. Initially, an attempt was made to identify other sites in the Savannah River estuary that could be used for restoration or creation of tidal freshwater marsh; however, neither the USACE nor any of the stakeholders could locate any suitable sites available within the Savannah River Basin. In the absence of any such sites, USACE, in consultation with US Fish and Wildlife Service (USFWS) and other natural resource agencies, used the Savannah District Mitigation Standard Operating Procedure to calculate the minimum acreage required to be acquired and preserved to acceptably mitigate for unavoidable freshwater wetland impacts. Using this procedure, it was determined that the total acreage of wetlands necessary to be preserved ranged from 0 acres for the 44-ft deepening alternative, with flow-altering mitigation, to 2,683 acres for the 48-ft alternative, with flow-altering mitigation. USACE proposes to acquire lands identified in the latest version of the Savannah National Wildlife Refuge (SNWR) Acquisition Plan (dated July 2007), and provide this acreage to the USFWS to manage as additions to SNWR as compensatory mitigation for unavoidable wetland impacts from the deepening project. USACE proposes to give priority to acquiring ecologically valuable properties that provide positive contributions to the goals of SNWR, that enhance fish and wildlife resources and that are dominated by freshwater wetlands. DNR concurs with this approach to mitigating for any unavoidable impacts to tidal freshwater wetlands, particularly since most of the indirect impacts of deepening would occur within the SNWR. However, DNR acknowledges the proposed philosophy of mitigating for loss of one type of wetland that is being converted to another by protecting wetlands which are under no threat of development or degradation is in direct contravention with national policy of no-net loss of wetlands [Executive Order 11988].

Water Quality Impacts:

As discussed in the DEIS, there are significant concerns related to the predicted decrease in DO that would result from the proposed deepening project. Degradation of the DO regime in Savannah Harbor has the potential to adversely affect numerous aquatic species. The primary area of concern for DO is the portion of the Savannah River between Fort Pulaski (river mile 0.0) and the Seaboard Coastline Railroad Bridge (river mile 27.4). This section of the Savannah River estuary would be directly affected by the deepening project. As noted in the DEIS, this segment of the river is on GA's Section 303(d) list as impaired for DO. Modeling studies conducted in support of the development of a Total Maximum Daily Load (TMDL) for DO in Savannah Harbor estimate that the existing DO concentration in Savannah Harbor is 1 mg/l lower than it was during the baseline year (1854) and condition (12-foot controlling depth) because of dredging operations that have been conducted since then. Model predictions from SHEP studies indicate that further deepening will cause additional impacts on the DO regime in Savannah Harbor.

USACE proposes to minimize impacts due to the incremental decrease in DO levels by installing several land-based oxygen injection systems, individual units of Speece Cones, at 3 locations in the estuary where DO levels are predicted to be lower as a result of deepening. The number of oxygen injection units installed would range from 8 to 10, depending on the depth alternative selected. Water would be withdrawn from the river through pipes, then super-saturated with oxygen and returned to the river. The systems would be operated to provide the needed amount of oxygen for the depth alternative selected during July, August and September. The DO system configuration is designed to remove the incremental effect of a deeper channel in 97% of the cells in the hydrodynamic model. As reported in the DEIS, hydrodynamic and water quality modeling conducted in support of the deepening project suggest that the proposed mitigation features, the flow-altering plans and the DO injection systems, would substantially reduce project impacts to tidal freshwater wetlands and certain species of fish including American shad (*Alosa sapidissima*) and Southern flounder (*Paralichthys lethostigma*).

DNR is concerned that a substantial amount of uncertainty remains regarding the predicted magnitude of adverse impacts and the effectiveness of the proposed mitigation measures. While DNR does not necessarily dispute the hydrodynamic and water quality modeling results, it should be noted that stakeholders have not conducted nor can any stakeholder conduct an independent review of all of the modeling assumptions or input parameters based on the documents and time provided for review. In addition, although we have been assured by USACE that the hydrodynamic and water quality models used to predict the impacts of deepening do, in fact, account for the effects of overdepth and advance maintenance dredging, we could locate no specific statement to this effect in either the DGRR or the DEIS. At the request of DNR, SCDHEC provided an analysis of the bathymetry used in developing the base model. This analysis suggests that the base model did not fully account for the combined effect of overdepth and advance maintenance dredging. Therefore, the model used to predict project impacts on salinity, DO, and loss of tidal freshwater wetlands may have underestimated those impacts. This possibility should be fully addressed in the text of both the DGRR and the DEIS. In addition, all assumptions and input parameters used in developing the hydrodynamic and water quality models should be discussed in detail and in layman's terms in both documents.

DNR also is concerned about the effectiveness of the proposed mitigation measures, particularly, the oxygen injection system. The results of a demonstration project conducted to determine the effectiveness of the system in Savannah Harbor were inconclusive. The slight increase in dissolved oxygen in the vicinity of the oxygen injection system was shown to be within the normal range of natural variability due to tidal influences and could not be definitively attributed to the oxygen injection system itself. Furthermore, the long-term effectiveness and viability of a mechanical oxygen injection system in a tidal brackish water environment is highly questionable. The minimal net improvement in DO predicted by the model may not be sufficient to warrant the initial cost of the system or the long-term maintenance costs. Additionally, DNR believes DO levels may deteriorate more than expected after the proposed deepening of the channel and require operation of the oxygen injection system for a longer period of time than the proposed 3-month interval during late summer-early fall. Longer periods of low flow and high temperature are anticipated in an era of climate change and will be magnifiers of the already existing water quality problems. Instead of reliance on an oxygen injection system, DNR recommends that adverse impacts to DO levels be minimized by deepening the project to no more than -45 ft.

SNS Habitat Impacts, Unintended Consequences and Proposed Mitigation:

DNR also is concerned that some or all of the flow-altering modifications could have unintended consequences that result in additional adverse impacts to natural resources. Significantly, the modifications proposed to reduce salinity intrusion into the Back River to protect tidal and managed freshwater wetlands could result in increased salinity intrusion into the Front and lower Middle rivers, where both juvenile and adult SNS are known to concentrate, particularly during the winter when temperatures are below 22° C.[2] [3] In fact, Table 5-30 shows that the loss of adult SNS habitat in winter would be much greater with the flow alterations (maximum loss of 439 acres for the 48-ft alternative) than without them (maximum loss of 44 acres for the 48-ft alternative). Conversely, the loss of adult SNS habitat in summer and juvenile SNS habitat in winter is predicted to be less with the proposed flow-alterations than without them.

The deepening alternative that is predicted to have the least negative impact on SNS habitat overall, including adults and juveniles during winter and summer, is the 44-ft alternative, which would result in a net loss of approximately 60 acres of SNS habitat with flow-altering mitigation, and 151 acres without flow alterations. By comparison, the NED Plan, the 47-ft alternative, is predicted to result in a net loss of 473 acres of SNS habitat overall with the proposed flow alterations, or a loss of 545 acres without flow alterations. The locally preferred plan, the 48-ft alternative, would result in even greater net losses of SNS habitat overall. DNR considers the magnitude of these impacts to the habitat of shortnose sturgeon to be unacceptable, with or without mitigation.

Other unintended consequences of flow alterations also are likely. Recent and ongoing tagging studies suggest that SNS may move freely between the Front, Middle and Back rivers via Steamboat Cut and Rifle Cut.[4] If this proves to be the case, closing Rifle Cut could impede this movement, and limit SNS access to suitable foraging and nursery habitat. In addition, DNR field biologists recently have reported that the upper end of the sediment basin immediately below the Tidegate has already filled in to a large extent, particularly along the sides of the basin, and that any further deposition of sediments in this area could present another impediment to SNS migration throughout the system.[5] Furthermore, DNR is concerned about the potential impact of open-water disposal of dredged material on water quality in the Back River. This could exacerbate recurring episodes of hypoxia in this area, and worsen shoaling in upstream portions of Back River by increasing the deposition of fine-grained sediments there.

As noted above, USACE also proposes to construct a sill near the mouth of the Middle River to protect important nursery habitat for juvenile SNS from adverse impacts. The intended purpose of this sill is to minimize the predicted increase in salinity in the lower portion of Middle River as a result of deepening. USACE proposes to provide compensatory mitigation for unavoidable

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[2] Collins, M.R., W. C. Post, and D. Russ. 2001. Distribution of shortnose sturgeon in the lower Savannah River: Results of research from 1999-2000. Final Report to Georgia Ports Authority. 21 pp plus appendices.

[3] Collins, M. R., W. C. Post, D. Russ, and T. I. J. Smith. 2002. Habitat use and movements of juvenile shortnose sturgeon in the Savannah River, Georgia/South Carolina. Trans. Am. Fish. Soc. 131:975-979.

[4] Meadows, A. W., W. C. Post, and J. Moak. *In prep.* Draft report on the movements of shortnose sturgeon in the Savannah River, GA/SC: 2006-2009.

[5] W. C. Post, Personal communication.

impacts to SNS foraging and nursery habitat by constructing a fish passage structure around the New Savannah Bluff Lock and Dam (NSBLD) near Augusta, GA, at a projected cost of $6.3 million. The structure described in section 5.3.2 as "a rock ramp fishway" would be located on the SC side of the river, and would theoretically provide SNS access to approximately 20 miles of upstream spawning habitat. DNR believes the likelihood that this approach would be successful in passing SNS is highly doubtful. While such a fish passage structure might benefit other migratory fish, its success in passing SNS has never been demonstrated. Because of its unproven success, DNR is opposed to implementing active fish passage as mitigation for unavoidable impacts to SNS habitat, and believes that the best approach to protecting SNS habitat would be to minimize those impacts by selecting either the "no action" alternative or the 44-ft deepening alternative with flow-altering mitigation.

Striped Bass Impacts:

While impacts to SNS would be minimized by selecting either the "no action" alternative or the 44-ft alternative, modeling results presented in the DEIS Table 5-36 suggest that the overall net loss of striped bass habitat including suitable habitat for spawning, eggs and larvae would be less with the 45-ft alternative (net loss of 0 acres for all life stages combined) than with the 44-ft alternative (net loss of 219 acres for all life stages combined). This seeming anomaly is a result of the proposal to increase freshwater flow down the Middle and Back rivers by dredging McCoy Cut and the upper reaches of the Middle and Little Back rivers as part of the flow-altering mitigation plan for the 45-ft alternative (Plan 6A), but not for the 44-ft alternative (Plan 6B). Striped bass is an important recreational species whose population in the lower Savannah River has been drastically reduced by earlier dredging operations and flow-altering modifications to the system. Because of the predicted increase in suitable habitat for the survival of striped bass eggs and larvae, DNR would consider the 45-ft alternative, with the proposed flow-alterations, to be environmentally acceptable, as well – provided USACE contributes supplemental funding to GA Department of Natural Resources (GADNR) ongoing striped bass stocking program in order to adequately compensate for all unavoidable impacts to striped bass habitat as described in Appendix C.

Public Use Issues:

As noted in the DEIS, closing Rifle Cut would lengthen the transit time and distance travelled by recreational boaters currently using Rifle Cut to reach the Back River from the only public boat ramp in this area at Houlihan Bridge on the Front River. USACE proposes to mitigate for this impact on recreational boating by constructing a new boat ramp on the north side of Hutchinson Island on the Back River. USACE then would turn over the site to Chatham County, which would operate the facility in perpetuity. If the deepening project is approved in some form and Rifle Cut is, in fact, closed as one of the flow-altering modifications, DNR would support the boat ramp proposal; however, our greater concern is that the indirect impacts to natural resources be minimized by limiting any deepening to no more than -44 or -45 ft. However, DNR is concerned about the proposal to turn the boat ramp over to the local county without providing continuing funding for maintenance, especially during a period when local governments are struggling financially. A funding mechanism to support the local government's operation of the boat ramp in perpetuity should be identified.

Potential for Invasive Species:

The DEIS acknowledges ballast water is:

> . . . *a major source for introducing non-native species into aquatic ecosystems where they would not otherwise be present.*

It is also acknowledged that invasive, non-native species can adversely impact the environment, the economy and, in some cases, human health. Nevertheless, the DEIS concludes that there would be no additional risk from the introduction of invasive species through ballast water since there is no projected increase in the number of vessels expected to call on the port of Savannah as a result of the proposed deepening. This conclusion is apparently based on the unsubstantiated assumption that the volume of ballast water is related only to the number of vessels calling on the port. Absent a comparison of the volume of ballast water currently carried and discharged into the port by the smaller vessels (in aggregate) vs. the volume of ballast water projected to be carried and discharged into the port by the fewer larger vessels (in aggregate) that are expected, the conclusion of "no additional risk" is without any rational basis. The possibility that larger vessels might actually carry and discharge more ballast water than smaller vessels would seem to further weaken that conclusion. In addition to any change in the volume of ballast water expected, other factors that should be considered are any projected changes in vessel speed and origin of ballast water. Any increase in vessel speed would presumably result in decreased transit time, thus increasing the probability of survival and delivery of invasive species propagules. Any projected change in the origin of ballast water also could affect propagule survival, as well as determine which species might be introduced. In summary, DNR believes the conclusion of "no additional risk" is not substantiated by evidence presented in the DEIS, and recommends that further analysis and discussion of the ballast water issue be included in the Final Environmental Impact Statement.

The DEIS states that, currently:

> . . . *ballast water exchange is the only effective management tool to reduce the risk of ballast-mediated invasion.*

However, it is widely acknowledged that ballast water exchange is not completely effective in eliminating the risk of introducing non-native species.[6] Other treatment technologies, such as filtration, heating, ultraviolet light and certain biocides (used either alone or in combination with ballast water exchange) have the potential to be more effective in reducing this risk. These technologies and the feasibility of implementing them should be discussed in greater detail in the DEIS.

It is stated in the DEIS that the University of Georgia, Marine Extension Service (MES) has completed a study designed to monitor for aquatic invasive species in the Port of Savannah, and that the MES was:

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[6] National Research Council. 1996. Stemming the tide: Controlling introductions of nonindigenous Species by ships' ballast water. 141 pp.

> . . . *expected to release an Invasive Species Management Plan for the State of Georgia later in 2008.*

No further mention is made of this plan in the DEIS, however. This plan should be discussed with respect to its implications for SHEP.

Impacts on Essential Fish Habitat:

It is acknowledged in Section 5.04, that:

> . . . *the proposed action would adversely impact habitat of Striped Bass and the endangered Shortnose sturgeon.*

In section 5.15, however, USACE concludes that, with mitigation and monitoring:

> . . . *the proposed action is not expected to cause significant adverse impacts to Essential Fish Habitat or EFH species.*

This conclusion is repeated in Appendix S (Essential Fish Habitat). Similarly, it is stated in Appendix B (Threatened and Endangered Species) that with the implementation of certain conservation measures and the proposed mitigation plan for SNS, specifically the sill in Middle River and fish passage at New Savannah Bluff Lock and Dam:

> . . . *the proposed project may affect, but is not likely to adversely affect Shortnose or Atlantic sturgeon or their critical habitat.*

DNR believes that all of these statements are misleading and should be qualified. Specifically, it should be noted that the proposed mitigation for SNS (providing fish passage at New Savannah Bluff Lock and Dam), even if successful in providing access to upstream spawning habitat, would not replace the critical nursery and foraging habitat that would be lost as a result of harbor deepening. Similarly, while the proposed funding of the GADNR striped bass stocking program would help offset losses to striped bass habitat, it would not replace that lost habitat.

Monitoring and Adaptive Management Plan (Appendix D)

As stated in the first paragraph of Appendix D:

> *The Savannah Harbor Expansion Project . . . has the potential to adversely affect nationally important resources. In addition, since predictions are made about future effects to biological resources, there is a degree of uncertainty about the impacts which the recommended action would actually produce. Those uncertainties include both the accuracy of the predictive impact tools and the biological responses that will occur as a result of changes in the environment.*

DNR concurs with this assessment of the uncertainty regarding the accuracy of the hydrodynamic and water quality models used to predict the physical, chemical and biological

impacts of the proposed project and constructed mitigation features. DNR also agrees there is considerable uncertainty regarding the biological responses to these impacts. Because of this uncertainty, it is imperative that a comprehensive monitoring and adaptive management strategy be developed, implemented, and adequately funded, if the deepening project goes forward.

USACE defines "adaptive management" as:

> . . . *evaluating the accuracy of the predicted environmental impacts, assessing the effectiveness of the mitigation features, and modifying the project as needed to ensure the levels of environmental effects predicted in the Environmental Impact Statement (EIS) are not exceeded.*

As part of the EIS process, field investigations were conducted to identify important resources in the project area and obtain data from which the hydrodynamic and water quality models were developed. In order to determine the accuracy of these models in predicting the environmental impacts of the project, as well as the effectiveness of the constructed mitigation features, USACE proposes to conduct additional field studies before, during, and after construction (for a period of 5 years following construction). In addition, USACE proposes to conduct long-term post-construction monitoring "over the life of the project."

DNR generally concurs with the proposed pre-construction monitoring of physical characteristics and biological resources, in order to update existing information and provide a baseline for comparison with post-construction monitoring results; however, we question whether the intensive monitoring of hydrologic parameters within the lower estuary over one lunar cycle, will be sufficient to evaluate hourly, daily and, especially, monthly variations in the aquatic environment. DNR suggests that intensive hydrologic monitoring be conducted over a period of at least 2, and preferably 3, lunar cycles. The estimated cost of any such additional monitoring should be factored into the total pre-construction monitoring cost.

The proposed monitoring of biological resources would focus on impacts to tidal wetlands and shortnose sturgeon (SNS), which are described as:

> . . . *the two most critical resources that could be or are expected to be impacted by the project.*

DNR recommends that Atlantic sturgeon (*Acipenser oxyrinchus*), recently proposed to be listed as an endangered species, and striped bass be added to the list of biological resources to be monitored. If monitoring of striped bass is already included as a component of the GADNR striped bass stocking program, which USACE proposes to partially fund as compensatory mitigation for impacts to this species, this monitoring plan and its relevance to the deepening project should be described in Appendix D of the DEIS. Development of a monitoring protocol for Atlantic sturgeon should be closely coordinated with federal and state natural resource agencies. The estimated cost of adding these monitoring components should be factored into the total monitoring cost of the project.

No mention is made in Appendix D of a specific monitoring plan, or any associated costs, to evaluate vegetative species composition and percent cover at the brackish marsh creation site that is proposed as compensatory mitigation for direct impacts to fringing saltmarsh. This is one of the few proposed mitigation measures that actually has well-defined success criteria, based on percent cover, and an identified adaptive management strategy if the success criteria are not met (e.g., planting *Spartina alterniflora*). A monitoring plan designed to evaluate the progress and ultimate success of this project should be included in the "Post-Construction Monitoring" section of this appendix. The estimated cost of this monitoring component, conducted over a 5-yr period, should be added to the total monitoring costs.

As stated in Appendix D, current estimates for the project construction period range from 3 to 6 years, and that USACE would perform monitoring during construction "for whatever length of time it takes to construct the project." The cost estimates, however, assume only a 3-year construction period. DNR is concerned that the project may take considerably longer than 3 years to construct, and that the cost estimates for this phase of the monitoring plan may be too low. DNR recommends that the cost estimates for this monitoring phase be based on the maximum estimated duration of construction (6 years).

It is stated on p. 18 of Appendix D:

> *The Sediment Basin would be allowed to fill naturally after construction of the submerged sill at its lower end.*

Earlier in the main body of the DEIS, however, it is stated that the sediment basin would be actively filled in with dredged material. This discrepancy should be rectified and explained. In addition, it should be noted that DNR already has expressed its opposition to using the sediment basin for dredge spoil disposal because of its potential to further degrade water quality in the Back River.

DNR recommends that post-construction monitoring of: (1) nearshore benthic communities, (2) fish utilization of oceanward sediment placement sites, and (3) fish distribution and abundance along the marsh edges be extended from 3 years to 5 years. Cost estimates should be adjusted accordingly.

Depending on the results of the proposed monitoring studies, USACE in consultation with the federal and state natural resources agencies, may undertake appropriate adaptive management measures to ensure that the environmental impacts remain within the range predicted by the models, and that the constructed mitigation features perform as expected and adequately compensate for any unanticipated impacts. Appendix D lists several adaptive management measures that could be undertaken, depending on which environmental impact or mitigation feature might require corrective action. For most of the potential adaptive management measures listed, USACE proposes to allocate funds equal to 10% (or in some cases, only 5%) of the initial construction cost to the implementation of these corrective measures.

DNR is concerned that the amount of money proposed to be allocated for these, or other, adaptive management measures may be insufficient, particularly for those mitigation measures

that have a high degree of uncertainty associated with their success such as the oxygen injection system, the flow-altering modifications to the system and the fish passage structure at NSBLD. DNR recommends that funding for these adaptive management measures be increased to at least 15% of the initial cost of construction, and that funding for this purpose be secured prior to starting the project.

If corrective action is required, USACE proposes to conduct post-construction monitoring for only 1 year after implementing the adaptive management feature. DNR believes monitoring for only 1 year may be insufficient to determine the effectiveness of the corrective action, and recommends that dedicated funding be provided for monitoring the effects of any adaptive management feature for a minimum of 3 years.

The proposed long-term monitoring plan which is the plan to monitor certain aspects of the project on an annual basis beyond the initial 5-year post-construction monitoring period seems inadequate in that the cost of this monitoring component is only projected for one year, with funding in subsequent years presumably dependent on annual appropriations. DNR recommends that the total cost of long-term monitoring, as well as the cost of continued operation and maintenance for each mitigation component, be projected over the entire life of the project, and that this funding be secured prior to starting the deepening project.

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759-BB-48-EV01

Comment: *These documents were released for public review immediately preceding the holiday period further burdening reviewers. Given the lengthy delays in final internal USACE review of these documents, I cannot help but believe that it would have been more appropriate to wait until the new year for their public release. There is the appearance that the timing of their release was a deliberate attempt to minimize thorough public and scientific scrutiny. DNR continues to assert that a 60-day period is insufficient to conduct a thorough review of the DEIS and DGRR and provide detailed comments on these large and complex documents. Therefore, DNR intends to submit additional comments following our continuing review of these documents or if new information becomes available regarding the proposed project.*

Response: Based on the request for an extension of time from SC DNR as well as from other reviewers, the District Commander extended the public comment period until January 25, 2011 which provided a total of 70 days for the public review period. The District received some comments after January 25 which will be made part of the record, and those comments will receive consideration in the preparation of the Final EIS.

759-BB-48-EV02, 759-BB-48-EV03, 759-BB-48-EV04

Comment: *Based on our assessment of the environmental impacts as presented in the DEIS and DGRR, and on the adequacy of the mitigation proposed, DNR has concluded that the only deepening alternatives that could be considered minimally environmentally acceptable are the 44-ft alternative or the 45-ft alternative, provided the proposed mitigation for each of these alternatives proves to be successful. Although, DNR does not support any deepening scenario greater than the 45-ft alternative, it should be noted that comments made by members of the South Carolina Maritime Commission (SRMC) indicate that even the 48-ft alternative would result in a channel that is shallower and narrower than USACE design standards for fully loaded Post-Panamax ships. This would result in a lower margin of safety and, by extension, a higher risk to the environment from potential vessel groundings. Therefore, none of the alternatives considered would accomplish the goal of ensuring navigational efficiency or safety for these larger vessels. The documents cite the preferred alternative provides "an acceptable level of risk" with respect to under-keel clearance. The SRMC analysis concludes USACE has applied this same level of "acceptable risk" to the narrow passage and passing lanes in the proposed channel. The DNR position is that there is no acceptable level of risk associated with environmental damage that could result from vessel grounding, hull breaching and a catastrophic spill endangering natural resources, public interests, commerce and tourism.*

Response: The position of the SC DNR that only the 44-foot project or the 45-foot project can be considered minimally environmentally -acceptable provided the proposed mitigation proves successful is acknowledged.

The preliminary channel design was determined using the Corps of Engineers' design standards and procedures outlined in EM-1110-2-1613, Hydraulic Design of Deep Draft Navigation Projects. In accordance with ER-1110-2-1403, the District developed final channel dimensions and navigation requirements using the Corps' state-of-the-art Ship Simulator, with input from the Savannah Harbor Pilots Association (SHPA). The use of ship simulators to establish final design parameters for deep-draft

navigation channels is standard practice worldwide. It ensures that channels are safe and economical and minimizes environmental impact and long term maintenance requirements. The use of ship simulators also provides the harbor pilots who will actually use the channel with the opportunity to provide input into the design and ensure the navigability and safety of the channel.

The existing channel dimensions can accommodate meeting the deepening design vessel (post-panamax Generation 2; 140' beam) and a smaller vessel. Ship simulation verified that the channel could be deepened and widened at 2 bends in the inner harbor and 1 bend in the entrance channel to maintain two-way traffic capability for the design vessel and a smaller vessel. Two meeting areas are also included to provide for meeting of two design vessels.

In reference to “Army Corps design standards” for depth of channel, the Corps, ASCE, and PIANC recommend a preliminary or concept design of channel depth in exposed entrance channels using the ratio of channel depth(h) to ship draft (T)of at least h/T =1.2. For Savannah Harbor, a detailed design study was performed using extensive laboratory models, field measurements, site-specific factors, numerical model simulations, and probabilistic models to refine the required channel depths. Currently the Savannah Harbor Pilots safely bring in vessels with a minimum of 4-foot underkeel clearance (UKC). This practice would continue with the deepened channel. Depending on the draft of the vessel, use of tide may be required to maintain that UKC throughout transit. The vertical ship motion study conducted for this study used a ratio channel depth h to ship draft T of h/T =1.09, which for the light-loaded vessel drafting 45-feet corresponds to a channel depth of 49’. This condition matches the SHPA policy of 4-foot UKC. The vertical motion study confirmed that the light-loaded vessel would not touch bottom if sailing with 4-foot UKC and if vessel speed does not exceed 12 knots (kt). The study also showed that given additional water depth, and therefore higher h/T values, ships could travel at higher speeds without causing enough squat to cause grounding.

For the fully loaded 47.5-foot draft, using a channel depth (h) to ship draft (T) of h/T =1.09, would correspond to a water depth of 52-feet requiring at least a 3’ tidal advantage for the 49-foot entrance channel depth (47-foot project). The vertical motion study showed that a ship speed of 14 kts or less would not cause grounding due to squat for this condition. Greater speeds would require additional depth to prevent grounding due to squat.

Documentation for both the ship simulation and vertical motion studies can be found in Engineering Appendix Supplemental Materials.

The margin of safety for the project is in accordance with Corps of Engineers Guidance for Channel Design. We do not agree that there is a greater than normal risk for the project. Although there is always a degree of “risk” inherent with any project, this project was designed using sound engineering practices to minimize the risk to the maximum extent practicable.

The Corps understands SC DNR’s concern about the risk of environmental damage that could result from a vessel accident in the harbor that damages or endangers natural resources. The US Coast Guard has similar concerns and oversees vessel movements in the harbor to ensure they are conducted in a safe manner. The Coast Guard has participated in the SHEP and provided the study team with valuable information about channel design and vessel operations. In their official comments on the Draft documents, the US Coast Guard raised no issues with the proposed channel design.

759-BB-48-EV05

Comment: *Our analysis concludes that the majority of benefits associated with the project occur in the state of Georgia while the majority of environmental impacts occur in South Carolina or in the Savannah River which is a shared tributary whose natural resources must be apportioned equitably, managed appropriately and respected by the leadership and people of both states.*

Response: Actually, the majority of the construction activities and the environmental impacts would occur within the State of Georgia, not South Carolina. Important mitigation, including flow rerouting to maximize protection of freshwater tidal marsh in the Savannah National Wildlife Refuge, would benefit South Carolina natural resources. Regardless, the Savannah River is indeed a shared resource. The SHEP has been designed to avoid, minimize, and compensate for adverse environmental impacts to the Savannah River and its natural resources based on good science without regard to State boundaries or considerations of which State might be most affected.

759-BB-48-EV06

Comment: *In view of these concerns, DNR has concluded that a better alternative to consider is to conduct minimal deepening of the channel now and to a depth of -44 or -45 ft in order to alleviate draft restrictions on the existing fleet of vessels, and then to conduct additional studies and hydrodynamic modeling to evaluate the economic and environmental impacts of deepening to a greater depth only as far as the site of proposed Jasper Port Terminal. Since this site is several miles closer to the ocean than the Garden City Terminal, this alternative could potentially reduce the environmental impacts and cost of deepening, while increasing navigational safety and efficiency for the next generation of vessels predicted to call on the proposed Jasper Port Terminal. DNR recommends that this alternative be given serious consideration.*

Response: The SHEP Draft EIS and GRR were prepared as directed by the authorization for the project which was included in the Water Resources Development Act of 1999 (Public Law 106-53, Section 102(b)(9)). The project was approved to include (1) an analysis of the impacts of project depth alternatives ranging from 42 through 48 feet, and (2) a selected plan for navigation and an associated mitigation plan as required under Section 906(a) of the Water Resources Development Act of 1986 (33 U.S.C. 2283 (a)).

As directed by the authorization, the Corps prepared a DEIS that analyzes the impacts of the five alternative channel depths and then presents a mitigation plan for each alternative depth. The Corps also evaluated non-structural alternatives to meet the project needs, including consideration of alternative terminal locations. The 47-foot project is the alternative that has been identified as the plan with the most net benefits. Consequently, it is designated as the National Economic Development Plan and also the recommended plan. The actual selected plan will be determined after decision makers have reviewed the documents and had the opportunity to review the impacts, mitigation plan and benefits for each alternative. The Secretary of the Interior, the Secretary of Commerce, the Administrator of the Environmental Protection Agency, and the Secretary of the Army must approve the selected plan and determine that the associated mitigation plan adequately addresses the potential environmental impacts of the project.

The study included an extensive evaluation of users and facilities in regards to Savannah Harbor. The proposed Jasper County Terminal was not included as a without or with project condition due to the high level of uncertainty concerning the proposed terminal. Much of the uncertainty centered around

whether a terminal may be constructed in Jasper County, and if it is constructed, when will it be constructed and how would it operate. Although the proposed Jasper terminal was not considered in the detailed analyses, a series of sensitivity analyses were conducted to identify the potential impact that a Jasper County Terminal might have on the justification and recommendation of a proposed channel deepening to GPA's Garden City Terminal if the Jasper facility was constructed. Please see GRR Section 12. Overall, this analysis showed that economic justification for construction of the channel increment between a Jasper County Terminal and the Garden City Terminal is not particularly sensitive to the development of a terminal in Jasper County. In other words, if the Jasper County Terminal was already constructed, deepening the channel to GPA's Garden City Terminal would still be economically justified.

For additional information concerning the wide range of alternatives considered, including a proposed Jasper Terminal, see responses to comments 763-BB-28-EV27 and EV28.

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759-BB-48-EV07

Comment: *DNR disagrees with the conclusions reached in the DEIS and believes that the only 2 deepening alternatives that are environmentally acceptable are the 44-ft and the 45-ft alternatives, provided the proposed mitigation is effective in minimizing any adverse impacts of these alternatives. Obviously, the "no action" alternative, maintaining the channel at the currently authorized depth of 42 ft, would have the fewest adverse environmental impacts.*

Response: The 47-foot channel can be designated as the NED Plan (maximizes net benefits to the nation) despite having greater environmental impacts than the 44-foot, 45-foot, and 46-foot projects, because project plans for the 47-foot project include measures to avoid and minimize adverse impacts to the maximum extent practicable and then mitigation measures for remaining unavoidable impacts. Information (environmental impacts, economic benefits, and costs) is provided in the EIS for all five channel depths evaluated so decision makers can have the data to decide if the benefits of a particular alternative outweigh the associated environmental impacts and costs to minimize and mitigate those impacts.

759-BB-48-EV08, 759-BB-48-EV09

Comment: *The NED Plan, the 47-ft alternative, would involve the initial excavation of about 28 million yd3 of dredged sediment, and would result in both direct and indirect impacts to natural resources. Direct impacts would result from the physical removal and disposal of sediments, while indirect impacts would result from increased salinity intrusion and reduced dissolved oxygen (DO) levels. Overall impacts include adverse effects on managed freshwater wetlands in the Savannah National Wildlife Refuge (SNWR), loss of tidal freshwater wetlands, impacts to public use of the estuarine/riverine system, loss of foraging and nursery habitat for the endangered shortnose sturgeon (Acipenser brevirostrum) (SNS), loss of salt and brackish marsh and loss of habitat for Striped bass (Morone saxatilis).*

Response: This is a broad general comment raising a variety of issues regarding direct and indirect impacts to wetlands and fisheries. EIS Section 5.0 contains a detailed discussion of the expected impacts and the proposed mitigation. See also other responses to comments on these issues.

The SHEP would not have adverse effects on the managed wetlands in the Savannah National Wildlife Refuge. Based on evaluations conducted during the SHEP, none of the five deepening alternatives with mitigation in place would increase salinity levels at the Savannah National Wildlife Refuge diversion

canal entrance. With the proposed mitigation, salinity levels are projected to decrease in that portion of Back River.

Shortnose sturgeon spawning habitat is located well above Savannah Harbor. Thus, the SHEP would have no impacts on nursery habitat. As discussed in the DEIS, there would be impacts to adult and juvenile Shortnose sturgeon habitat.

The project will result in the loss of brackish marsh in the areas of excavation required for the Kings Island Turning Basin expansion, meeting lane construction and Tidegate abutment removal. Project plans provide for 28+ acres of former Disposal Site 1S to be restored as mitigation for these losses. It should be noted that the flow diversion aspects of the mitigation plan would provide indirect beneficial impacts where saltmarsh is converted to brackish marsh. (Brackish marsh is considered more productive from a wildlife standpoint).

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759-BB-48-EV10

Comment: *Approximately 15 million yd3 of sediment from the Inner Harbor, including new work material, would be disposed in the 8 existing upland confined disposal facilities (CDFs), 6 of which are on the South Carolina (SC) side of the river. Use of specific CDFs would be determined based on their availability and planned maintenance and improvement activities. Sediments collected from the project area in 1997 were tested for contaminants as part of the Tier I EIS. Parameters analyzed included metals, polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (P AHs), phenols, pesticides, dioxinlfuran congeners, cyanide, organotins, and nutrients. Sampling conducted in 2005, and again in 2007, indicated the only analyte of significant ecological concern was cadmium, which occurs naturally in high concentrations in the Miocene clays that would be excavated and/or exposed as part of the deepening project. Bioaccumulation studies suggested that the risk to aquatic organisms exposed to these cadmium-laden sediments is low. The potentially greater risk to avian and terrestrial species foraging in the CDFs where these sediments would be disposed of would be mitigated by "capping" these sediments with a 2-ft layer of comparatively clean sediments from another part of the channel. A detailed protocol for sampling the surficial sediments and vegetation in the CDFs before and after capping is described in Appendix M of the DEIS. Should the project go forward, DNR concurs with this approach to managing the cadmium-laden sediments, and believes the proposed monitoring and contingency plans are adequate to ensure a minimal risk to wildlife.*

Response: The Corps has worked with the US Fish and Wildlife Service to develop the appropriate sampling protocol. Monitoring of the disposal areas where cadmium-laden sediments are placed would include sediment sampling, wildlife use monitoring, bird tissue analysis, vegetation sampling (if cadmium levels dictate such monitoring to be appropriate), and analysis of effluent from the CDFs.

759-BB-48-EV11

Comment: *As stated in Section 5.1 of the DEIS, the extent of direct wetland impacts resulting from excavation of channel bend wideners, enlarging Kings Island Turning Basin and removing the Tidegate, would not differ substantially among the 5 deepening alternatives considered. In each case, a total of 14.08 acres of salt and brackish marsh would be affected.' In the absence of an approved saltwater mitigation bank in the Savannah River Basin, USACE proposes to mitigate for these direct losses by grading down approximately 42 acres of a former confined dredge spoil disposal site (CDF 1 S) near the confluence of the Front and Middle rivers to an elevation that would support Spartina alterniflora. A "feeder" creek system also would be constructed toward the interior of the restored marsh. This area*

would then be allowed to revegetate naturally. Active planting of Spartina would be conducted only if the area did not revegetate naturally at a rate that would provide 15% vegetative cover after 1 year and 80% vegetative cover after 5 years (with interim goals of 25, 40, and 60% cover at the end of 2, 3 and 4 years, respectively). Conceptually, DNR concurs with this approach to mitigating for the direct loss of brackish and saltwater wetlands resulting from any of the deepening alternatives; however, the DNR overriding concern about the indirect effects of harbor deepening on tidal freshwater marsh should be given greater weight.

Response: The support of the SC DNR for marsh restoration in Disposal Area 1S for mitigation of the direct losses of brackish marsh is acknowledged. With regard to indirect impacts to tidal freshwater marsh, the Corps has clarified the Final EIS to show that the acreage of tidal freshwater marsh in South Carolina is predicted to increase as a result of the project construction activities. For additional information regarding mitigation for indirect impacts to tidal freshwater marsh, see response to comment 763-BB-28-EV09.

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759-BB-48-EV12

Comment: *Model predictions indicate that, without mitigation, deepening the harbor would result in the conversion of tidal freshwater marsh to brackish marsh as a result of increased salinity intrusion. Under conditions of average flow and low sea level rise, the acreage of freshwater marsh that would be lost as a result of deepening is predicted to range from 551 acres for the 44-ft alternative to 1,212 acres for the 48-ft alternative, assuming no mitigation is implemented. With the flow-altering modifications proposed as mitigation by US ACE, the acreage of freshwater marsh is projected to increase by 332 acres with the 44-ft alternative; whereas, a net loss of freshwater marsh (ranging from 32 acres for the 45-ft alternative to 337 acres for the 48-ft alternative) would still result from the other deepening alternatives, even with mitigation. Considering the substantial loss of tidal freshwater wetlands that has already occurred as a result of past dredging operations and other modifications to the system, DNR considers anything more than a de minimis loss of freshwater wetlands to be a significant adverse impact of the proposed deepening project.*

Response: All alternative channel depths evaluated in the SHEP (except for the 44-foot project) would have impacts on freshwater tidal marsh even with the proposed flow diversion measures. These impacts, as well as the proposed mitigation (purchase of lands for preservation), are fully discussed and quantified in the EIS so that decision makers can weigh the benefits of a particular channel depth alternative with these adverse impacts. For additional information regarding mitigation for indirect impacts to tidal freshwater marsh, see responses to comments 763-BB-28-EV09 and 759-BB-48-EV14/15.

759-BB-48-EV13

Comment: *USACE proposes to minimize indirect impacts to tidal freshwater wetlands due to increased salinity intrusion by implementing several flow-altering modifications of the Savannah River system. These include diverting more fresh water from the Front River down the Middle and Little Back rivers at McCoy Cut, closing the lower, western arm of McCoy cut, removing the Tidegate abutments and piers from the lower Back River, constructing a broad berm at the lower end of the sediment basin located below the Tidegate, filling in the sediment basin using "new work" material, constructing a submerged sill at the mouth of the Middle River and closing Rifle Cut. USACE used the results of hydrodynamic modeling to develop a flow-alteration plan for each depth alternative and has determined that Plan 6B is*

the most "cost-effective" plan for the 44-ft depth alternative; whereas, Plan 6A is more "cost-effective" for all of the other depth alternatives analyzed including the 45-, 46-, 47- and 48-foot alternatives. Both Plans 6A and 6B would incorporate all flow-altering modifications described above, except that Plan 6A also would include deepening McCoy Cut and the upper portions of the Little Back and Middle rivers; whereas, Plan 6B would not include any such deepening.

Response: The Sediment Basin would not be filled in with new work material. A sill would be constructed in Back River in the lower part of the Sediment Basin which would include rock and sandy dredged sediments. The Sediment Basin would then be allowed to fill through natural sediment deposition. The sill in Middle River has also been eliminated from the project because it was determined that construction of this feature would provide very little environmental benefit for the costs involved to implement it.

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759-BB-48-EV14, 759-BB-48-EV15

Comment: *USACE proposes to provide compensatory mitigation for unavoidable impacts to tidal freshwater wetlands. Initially, an attempt was made to identify other sites in the Savannah River estuary that could be used for restoration or creation of tidal freshwater marsh; however, neither the USACE nor any of the stakeholders could locate any suitable sites available within the Savannah River Basin. In the absence of any such sites, USACE, in consultation with US Fish and Wildlife Service (USFWS) and other natural resource agencies, used the Savannah District Mitigation Standard Operating Procedure to calculate the minimum acreage required to be acquired and preserved to acceptably mitigate for unavoidable freshwater wetland impacts. Using this procedure, it was determined that the total acreage of wetlands necessary to be preserved ranged from 0 acres for the 44-ft deepening alternative, with flow-altering mitigation, to 2,683 acres for the 48-ft alternative, with flow-altering mitigation. USACE proposes to acquire lands identified in the latest version of the Savannah National Wildlife Refuge (SNWR) Acquisition Plan (dated July 2007), and provide this acreage to the USFWS to manage as additions to SNWR as compensatory mitigation for unavoidable wetland impacts from the deepening project. USACE proposes to give priority to acquiring ecologically valuable properties that provide positive contributions to the goals of SNWR, that enhance fish and wildlife resources and that are dominated by freshwater wetlands. DNR concurs with this approach to mitigating for any unavoidable impacts to tidal freshwater wetlands, particularly since most of the indirect impacts of deepening would occur within the SNWR. However, DNR acknowledges the proposed philosophy of mitigating for loss of one type of wetland that is being converted to another by protecting wetlands which are under no threat of development or degradation is in direct contravention with national policy of no-net loss of wetlands [Executive Order 11988].*

Response: The Corps acknowledges the support of the SC DNR with respect to acquiring ecologically valuable lands as mitigation for unavoidable impacts to freshwater tidal wetlands.

First of all, it is important to note that any conversion of tidal freshwater marsh to a brackish marsh does not result in a loss of wetlands or a significant decline in wetland function. Many of the emergent plant species associated with freshwater marsh systems would still be readily observed in environments that have been defined as brackish marsh (Leatham et.al., 1994). However, the overall basic wetland functions typically associated with these systems would not change. A comparison of wetland function elements for freshwater marsh versus brackish marsh indicate that there are only negligible differences with respect to water purification, flood protection, shoreline stabilization, groundwater recharge,

streamflow maintenance, retention of particles, surface water storage, subsurface storage, nutrient cycling, and values to society.

The only indirect impact on the function of these wetland systems would be associated with fish and wildlife habitat. While the comparison of fish and wildlife of fish and wildlife habitat between freshwater and brackish marsh systems yield fewer similarities, the conversion in fish and wildlife habitat would still be minor when considering the total function of the wetland and continued existence of some freshwater vegetation in the brackish marsh.

The proposed preservation lands consist of bottomland hardwoods, and uplands dominated by deciduous forest and regrowth. The bottomland hardwoods are classified as palustrine, forested, broad-leaved deciduous systems that are both temporarily and seasonally flooded. Preserving these areas would ensure wildlife habitat is preserved in perpetuity. The sites to be protected are under threat of development or degradation. The USFWS has noted the extensive development immediately adjacent to the Refuge on lands such as these in recent years. Some of these lands are owned by timber companies which periodically harvest the timber, resulting in losses of wildlife habitat. Moreover, the additional lands would buffer the Savannah National Wildlife Refuge from future threats of development such that changes in land use would not occur immediately adjacent to existing areas of the Refuge that contain emergent wetland characteristics. Thus, the acquisition and preservation of wetland and upland buffer would provide a functional replacement for the minor conversion of the only wetland function (fish and wildlife habitat) that would be expected when freshwater marsh is converted to a brackish marsh. Based on these determinations, the Corps has concluded that the functional assessment conducted for all wetland areas proposed for impact and mitigation satisfies the no-net loss of function criterion.

Second, the evaluation and determination of appropriate mitigation for the tidal freshwater marsh that would be impacted by the SHEP was conducted in accordance with the provisions of the 2008 USACE/USEPA Mitigation Rule.

Third, it should also be noted that all adverse impacts to tidal freshwater marsh would occur in the State of Georgia. With the flow diversion measures in place, the State of South Carolina should actually see an increase in tidal freshwater marsh along Little Back River in the vicinity of the SNWR.

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759-BB-48-EV16, 759-BB-48-EV17, 759-BB-48-EV18, 759-BB-48-EV19, 759-BB-48-EV20

Comment: *DNR is concerned that a substantial amount of uncertainty remains regarding the predicted magnitude of adverse impacts and the effectiveness of the proposed mitigation measures. While DNR does not necessarily dispute the hydrodynamic and water quality modeling results, it should be noted that stakeholders have not conducted nor can any stakeholder conduct an independent review of all of the modeling assumptions or input parameters based on the documents and time provided for review. In addition, although we have been assured by USACE that the hydrodynamic and water quality models used to predict the impacts of deepening do, in fact, account for the effects of overdepth and advance maintenance dredging, we could locate no specific statement to this effect in either the DGRR or the DEIS. At the request of DNR, SCDHEC provided an analysis of the bathymetry used in developing the base model. This analysis suggests that the base model did not fully account for the combined effect of overdepth and advance maintenance dredging. Therefore, the model used to predict project impacts on salinity, DO, and loss of tidal freshwater wetlands may have underestimated those impacts. This possibility should be fully addressed in the text of both the DGRR and the DEIS. In addition, all*

assumptions and input parameters used in developing the hydrodynamic and water quality models should be discussed in detail and in layman's terms in both documents.

Response: The uncertainty of various model impact predictions and the effectiveness of the proposed mitigation features are discussed in the Risk and Uncertainty Analysis which is in Appendix Q of the DEIS. The Monitoring Plan and the Adaptive Management Plan are designed to evaluate the accuracy of impact determinations reached during the SHEP as well as the effectiveness of the mitigation features. The project allows for modification of mitigation features if data from the monitoring efforts determine that to be required.

Development of the hydrodynamic and water quality models including model assumptions, input parameters, etc. occurred over many years of coordination between the members of the interagency coordination group responsible for that work. Members of this interagency team included representatives of the involved Federal and State resource agencies. A detailed description of development of the models is included in the Engineering Appendix in the Draft General Reevaluation Report which was made available for the public comment period. The public comment period for the Draft EIS was extended an additional 25 days past the normal 45 day review period to allow additional time for review in consideration of the quantity and complexity of the material to be reviewed.

Contrary to the analysis you received of the bathymetry used in developing the base model, the hydrodynamic modeling did indeed include fully account for the combined effect of overdepth and advance maintenance dredging. Typical existing channel depths were used in the modeling for the base condition. Those depths reflect a snapshot in time of the condition of the overdepth and advance maintenance dredging sections. Dredging occurs essentially year-round in Savannah Harbor. At any given point in time, maintenance dredging would have just concluded in one reach and it would simultaneously be needed in another reach. The channel conditions evident with a “snapshot in time” approach reflect the full range of channel conditions that is typically present, from fully maintained sections to those greatly needing maintenance. Channel deepening alternatives were evaluated by uniformly decreasing the elevation of the channel bottom by the amount of deepening being considered. Please see Section 7 of the Engineering Appendix in the GRR.

The EIS includes sufficient information concerning the development of the various models and the results of the model investigations to permit the reviewer to understand the conclusions reached in the EIS. As discussed in a previous response, more details concerning model use and development are provided in Chapter 7 of the Engineering Appendix in the GRR for those reviewers who need or desire that level of information.

759-BB-48-EV21, 759-BB-48-EV22, 759-BB-48-EV23

Comment: *DNR also is concerned about the effectiveness of the proposed mitigation measures, particularly, the oxygen injection system. The results of a demonstration project conducted to determine the effectiveness of the system in Savannah Harbor were inconclusive. The slight increase in dissolved oxygen in the vicinity of the oxygen injection system was shown to be within the normal range of natural variability due to tidal influences and could not be definitively attributed to the oxygen injection system itself. Furthermore, the long-term effectiveness and viability of a mechanical oxygen injection system in a tidal brackish water environment is highly questionable. The minimal net improvement in DO predicted by the model may not be sufficient to warrant the initial cost of the system or the long-term maintenance costs. Additionally, DNR believes DO levels may deteriorate more than expected after the proposed deepening of the channel and require operation of the oxygen injection system for a longer period of time than the proposed 3-month interval during late summer-early fall. Longer periods of low*

flow and high temperature are anticipated in an era of climate change and will be magnifiers of the already existing water quality problems. Instead of reliance on an oxygen injection system, DNR recommends that adverse impacts to DO levels be minimized by deepening the project to no more than -45 ft.

Response: While the injection of oxygen into an estuary to improve dissolved oxygen levels is a relatively new concept, the technology involved in the oxygen injection process is not. The Corps believes that oxygen injection can be used to eliminate the incremental effects of harbor deepening on the dissolved oxygen regime in Savannah Harbor. This belief is based on both the field demonstration of the oxygen injection equipment that would be used in Savannah Harbor and the subsequent water quality modeling of the effects of oxygen injection on dissolved oxygen levels throughout the water column. The Monitoring Plan provides for an evaluation of the predictions made with respect to the effects of harbor deepening on dissolved oxygen levels as well as an evaluation (Transfer Efficiency Study) of how well the oxygen injection system is performing. The Adaptive Management Plan would permit modifications to the oxygen injection system if that is determined to be required. Modifications to the oxygen injection system could include changes to the amount of oxygen that is injected, modification of the equipment, changes in the locations of the oxygen injections sites, changes in the number of oxygen injection sites, etc.

The oxygen injection system is not designed to produce a large net increase in dissolved oxygen levels in the harbor. The system is designed to ameliorate the adverse effects of harbor deepening on dissolved oxygen levels in Savannah Harbor by raising dissolved oxygen levels approximately 0.36-0.43 mg/l. The costs to construct and operate the oxygen injection system were included in the project costs.

The dissolved oxygen system is designed to only mitigate the impacts of harbor deepening, not to address changes in the estuary over time caused by other factors.

See also other responses to comments regarding dissolved oxygen issues.

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759-BB-48-EV24

Comment: *DNR also is concerned that some or all of the flow-altering modifications could have unintended consequences that result in additional adverse impacts to natural resources. Significantly, the modifications proposed to reduce salinity intrusion into the Back River to protect tidal and managed freshwater wetlands could result in increased salinity intrusion into the Front and lower Middle rivers, where both juvenile and adult SNS are known to concentrate, particularly during the winter when temperatures are below 22° C. In fact, Table 5-30 shows that the loss of adult SNS habitat in winter would be much greater with the flow alterations (maximum loss of 439 acres for the 48-ft alternative) than without them (maximum loss of 44 acres for the 48-ft alternative). Conversely, the loss of adult SNS habitat in summer and juvenile SNS habitat in winter is predicted to be less with the proposed flow-alterations than without them.*

Response: Concur. The Corps evaluated the potential flow-altering features across and their effects across all environmental resources, substantially increasing the complexity of the analysis. Features were evaluated for their potential effects on, among others, salinity, dissolved oxygen, and habitat of four representative species. The proposed flow diversions would provide a gain in Shortnose sturgeon summer habitat while there would be a loss in winter habitat. While there would be a loss of Shortnose sturgeon winter habitat, the flow diversions would create beneficial conditions from an overall fishery

standpoint. The final impact evaluation for the mitigation plan identified the effects of the proposed action on all significant resources.

759-BB-48-EV25

Comment: *The deepening alternative that is predicted to have the least negative impact on SNS habitat overall, including adults and juveniles during winter and summer, is the 44-ft alternative, which would result in a net loss of approximately 60 acres of SNS habitat with flow-altering mitigation, and 151 acres without flow alterations. By comparison, the NED Plan, the 47-ft alternative, is predicted to result in a net loss of 473 acres of SNS habitat overall with the proposed flow alterations, or a loss of 545 acres without flow alterations. The locally preferred plan, the 48-ft alternative, would result in even greater net losses of SNS habitat overall. DNR considers the magnitude of these impacts to the habitat of shortnose sturgeon to be unacceptable, with or without mitigation.*

Response: The opposition of the SC DNR to the 47-foot and 48-foot projects even with mitigation – as a result of adverse impacts on Shortnose sturgeon habitat -- is acknowledged.

759-BB-48-EV26, 759-BB-48-EV27, 759-BB-48-EV28

Comment: *Other unintended consequences of flow alterations also are likely. Recent and ongoing tagging studies suggest that SNS may move freely between the Front, Middle and Back rivers via Steamboat Cut and Rifle Cut. If this proves to be the case, closing Rifle Cut could impede this movement, and limit SNS access to suitable foraging and nursery habitat. In addition, DNR field biologists recently have reported that the upper end of the sediment basin immediately below the Tidegate has already filled in to a large extent, particularly along the sides of the basin, and that any further deposition of sediments in this area could present another impediment to SNS migration throughout the system. Furthermore, DNR is concerned about the potential impact of open-water disposal of dredged material on water quality in the Back River. This could exacerbate recurring episodes of hypoxia in this area, and worsen shoaling in upstream portions of Back River by increasing the deposition of fine-grained sediments there.*

Response: Closure of Rifle Cut is part of the flow diversion mitigation and is designed to impede the flow of salty water from Middle River into Little Back River. Although Shortnose sturgeon would be blocked from using this passage from Middle River to Little Back River, they would still have access to all waterways in the study area.

The sill in Back River would not impede the movement of fish. The sill would be gradually sloping (not a vertical wall) and have approximately 6-10 feet of water over it at low tide.

Material used to construct the sill in Back River would be clean dredged material low in fines (silt). Construction of the sill would occur outside of the fish spawning season, especially the Striped bass spawning season (1 April-15 May).

759-BB-48-EV29, 759-BB-48-EV30

Comment: *As noted above, USACE also proposes to construct a sill near the mouth of the Middle River to protect important nursery habitat for juvenile SNS from adverse impacts. The intended purpose of this sill is to minimize the predicted increase in salinity in the lower portion of Middle River as a result of deepening. USACE proposes to provide compensatory mitigation for unavoidable impacts to SNS foraging and nursery habitat by constructing a fish passage structure around the New Savannah Bluff Lock and Dam (NSBLD) near Augusta, GA, at a projected cost of $6.3 million. The structure described in section 5.3.2 as "a rock ramp fishway" would be located on the SC side of the river, and would*

theoretically provide SNS access to approximately 20 miles of upstream spawning habitat. DNR believes the likelihood that this approach would be successful in passing SNS is highly doubtful. While such a fish passage structure might benefit other migratory fish, its success in passing SNS has never been demonstrated. Because of its unproven success, DNR is opposed to implementing active fish passage as mitigation for unavoidable impacts to SNS habitat, and believes that the best approach to protecting SNS habitat would be to minimize those impacts by selecting either the "no action" alternative or the 44-ft deepening alternative with flow-altering mitigation.

Response: The Fishery Interagency Coordination Team concluded that construction of a fish bypass at the New Savannah Bluff Lock and Dam was an acceptable means of mitigation in regards to the adverse impacts of the SHEP on the Shortnose sturgeon. The Off-Channel Rock Ramp design was selected as the best alternative to provide opportunity for Shortnose sturgeon to navigate the river past the dam. The Corps has not seen any scientific literature that suggests that this structure would not provide such opportunity. The Monitoring Plan includes provisions to monitor Shortnose sturgeon use of the structure as well as their success in moving to upstream spawning grounds. The Adaptive Management Plan provides the means to modify the fishway if required, or evaluate other mitigation measures if necessary.

Additional evaluations that the Corps performed since release of the DEIS has led Savannah District to conclude that the Middle River sill would not be cost effective. The structure would provide no adult summer or winter SNS habitat benefits, and only benefit juvenile SNS winter habitat on some depth alternatives. As a result of this new information and after coordination with NOAA Fisheries, the District deleted the Middle River sill from the proposed mitigation plan.

The position of the SC DNR that selection of the No Action or the 44-foot project is the best approach to protecting Shortnose sturgeon habitat is acknowledged. As explained in a previous response, the EIS must present a discussion of all five deepening alternatives including their environmental impacts and associated mitigation plans so decision makers can compare this information to the project costs and benefits for each alternative.

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759-BB-48-EV31

Comment: *While impacts to SNS would be minimized by selecting either the "no action" alternative or the 44-ft alternative, modeling results presented in the DEIS Table 5-36 suggest that the overall net loss of striped bass habitat including suitable habitat for spawning, eggs and larvae would be less with the 45-ft alternative (net loss of 0 acres for all life stages combined) than with the 44-ft alternative (net loss of219 acres for all life stages combined). This seeming anomaly is a result of the proposal to increase freshwater flow down the Middle and Back rivers by dredging McCoy Cut and the upper reaches of the Middle and Little Back rivers as part of the flow altering mitigation plan for the 45-ft alternative (Plan 6A), but not for the 44-ft alternative (Plan 6B). Striped bass is an important recreational species whose population in the lower Savannah River has been drastically reduced by earlier dredging operations and flow-altering modifications to the system. Because of the predicted increase in suitable habitat for the survival of striped bass eggs and larvae, DNR would consider the 45-ft alternative, with the proposed flow alterations, to be environmentally acceptable, as well - provided USACE contributes supplemental funding to GA Department of Natural Resources (GADNR) ongoing striped bass stocking program in order to adequately compensate for all unavoidable impacts to striped bass habitat as described in Appendix C.*

Response: The potential acceptability of the 45-foot project to the SC DNR based on the predicted increase in suitable habitat for Striped bass eggs and larvae is acknowledged. This potential acceptability is based on implementation of the mitigation plan for the project including flow diversion and payment to GA DNR for stocking Striped bass fingerlings.

759-BB-48-EV32, 759-BB-48-EV33

Comment: *As noted in the DEIS, closing Rifle Cut would lengthen the transit time and distance travelled by recreational boaters currently using Rifle Cut to reach the Back River from the only public boat ramp in this area at Houlihan Bridge on the Front River. USACE proposes to mitigate for this impact on recreational boating by constructing a new boat ramp on the north side of Hutchinson Island on the Back River. USACE then would turn over the site to Chatham County, which would operate the facility in perpetuity. If the deepening project is approved in some form and Rifle Cut is, in fact, closed as one of the flow-altering modifications, DNR would support the boat ramp proposal; however, our greater concern is that the indirect impacts to natural resources be minimized by limiting any deepening to no more than -44 or -45 ft. However, DNR is concerned about the proposal to turn the boat ramp over to the local county without providing continuing funding for maintenance, especially during a period when local governments are struggling financially. A funding mechanism to support the local government's operation of the boat ramp in perpetuity should be identified.*

Response: The support of the SC DNR for construction of the boat ramp on Hutchinson Island on Back River as mitigation for loss of recreational boating access due to the closure of Rifle Cut is acknowledged.

The boat ramp would be turned over to Chatham County for operation and maintenance. Chatham County has not requested any compensation for maintenance of the boat ramp.

Page 10

759-BB-48-EV34

Comment: *It is also acknowledged that invasive, non-native species can adversely impact the environment, the economy and, in some cases, human health. Nevertheless, the DEIS concludes that there would be no additional risk from the introduction of invasive species through ballast water since there is no projected increase in the number of vessels expected to call on the port of Savannah as a result of the proposed deepening. This conclusion is apparently based on the unsubstantiated assumption that the volume of ballast water is related only to the number of vessels calling on the port. Absent a comparison of the volume of ballast water currently carried and discharged into the port by the smaller vessels (in aggregate) vs. the volume of ballast water projected to be carried and discharged into the port by the fewer larger vessels (in aggregate) that are expected, the conclusion of "no additional risk" is without any rational basis. The possibility that larger vessels might actually carry and discharge more ballast water than smaller vessels would seem to further weaken that conclusion. In addition to any change in the volume of ballast water expected, other factors that should be considered are any projected changes in vessel speed and origin of ballast water; Any increase in vessel speed would presumably result in decreased transit time, thus increasing the probability of survival and delivery of invasive species propagules. Any projected change in the origin of ballast water also could affect propagule survival, as well as determine which species might be introduced. In summary, DNR believes the conclusion of "no additional risk" is not substantiated by evidence presented in the DEIS, and recommends that further analysis and discussion of the ballast water issue be included in the Final Environmental Impact Statement.*

Response: Concur. The discussion in the FEIS has been revised to more adequately assess the possibility of non-native species being introduced into Savannah Harbor as result of ballast water discharges.

759-BB-48-EV35

Comment: *The DEIS states that, currently:. . . ballast water exchange is the only effective management tool to reduce the risk of ballast-mediated invasion. However, it is widely acknowledged that ballast water exchange is not completely effective in eliminating the risk of introducing non-native species.6 Other treatment technologies, such as filtration, heating, ultraviolet light and certain biocides (used either alone or in combination with ballast water exchange) have the potential to be more effective in reducing this risk. These technologies and the feasibility of implementing them should be discussed in greater detail in the DEIS.*

Response: Concur. The language in the FEIS has been revised to indicate that ballast water exchange is then most cost effective management tool to reduce the risk of ballast mediated invasion. Discussion has also been added to the text to address other potential technologies.

759-BB-48-EV36

Comment: *It is stated in the OEIS that the University of Georgia, Marine Extension Service (MES) has completed a study designed to monitor for aquatic invasive species in the Port of Savannah, and that the MES was:... expected to release an Invasive Species Management Plan for the State of Georgia later in 2008. No further mention is made of this plan in the DEIS, however. This plan should be discussed with respect to its implications for SHEP.*

Response: Concur. Discussion has been added to the text to address the major conclusions in the report "Invasive Species Management Plan for the State of Georgia" and how those conclusions apply to the SHEP.

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759-BB-48-EV37

Comment: *This conclusion is repeated in Appendix S (Essential Fish Habitat). Similarly, it is stated in Appendix B (Threatened and Endangered Species) that with the implementation of certain conservation measures and the proposed mitigation plan for SNS, specifically the sill in Middle River and fish passage at New Savannah Bluff Lock and Dam: .. the proposed project may affect, but is not likely to adversely affect Shortnose or Atlantic sturgeon or their critical habitat. DNR believes that all of these statements are misleading and should be qualified. Specifically, it should be noted that the proposed mitigation for SNS (providing fish passage at New Savannah Bluff Lock and Dam), even if successful in providing access to upstream spawning habitat, would not replace the critical nursery and foraging habitat that would be lost as a result of harbor deepening. Similarly, while the proposed funding of the GADNR striped bass stocking program would help offset losses to striped bass habitat, it would not replace that lost habitat.*

Response: The Corps, through the Fisheries ICT of which SC DNR was a participating member, sought the views of fisheries experts on potential avenues to restore or create Shortnose sturgeon habitat in the Savannah Harbor estuary. After extensive coordination, the team could not identify any feasible measures to implement within the estuary. The team then agreed that restoring access to historic spawning areas upstream would benefit the population and mitigate for expected habitat losses in the estuary.

The statement in Appendix B that "the proposed project may affect but is not likely to adversely affect Shortnose or Atlantic sturgeon or their critical habitat" refers to the overall population of the species in the Savannah River. The SHEP with implementation of the mitigation plan is not expected to adversely affect those species. There is no designated critical habitat for the Shortnose sturgeon or the Atlantic sturgeon in the Savannah River.

The NMFS prepared a Biological Opinion (BO) which addressed SHEP impacts to Shortnose sturgeon and Atlantic sturgeon. The NMFS determined that the SHEP was likely to adversely affect both the Shortnose and Atlantic sturgeon. However, their Jeopardy Analysis concluded that implementation of the SHEP is not likely to jeopardize the survival of either species in the Savannah River.

NMFS expects that construction of the fish passage facility at the NSBL&D will result in access to historic spawning habitat upstream of the dam that is expected to increase spawning activity over the long-term. Based on these determinations, the NMFS concluded that construction of the SHEP is not likely to jeopardize the survival and recovery of the Shortnose sturgeon in the Savannah River. With implementation of the Reasonable and Prudent Measures NMFS identified to protect this species, NMFS concluded that the overall effect on the species would be acceptable.

The "likely to adversely affect" determination for Atlantic sturgeon is primarily based on NMFS' estimated incidental take of four Atlantic sturgeon during hopper dredging operations necessary to construct the SHEP and adverse effects (increase in salinity) to important estuarine foraging habitat for juveniles and adults. The estimated incidental take of four Atlantic sturgeon during entrance channel construction would not decrease the overall population of this species in the South Atlantic DPS (Distinct Population Segment) as there are significant numbers of fish found in the rivers comprising the South Atlantic DPS range of Atlantic sturgeon. The effects of SHEP on foraging habitat and spawning success of Atlantic sturgeon are similar to those for the Shortnose sturgeon. Based on these determinations, the NMFS concluded that construction of the SHEP would not appreciably reduce the likelihood of the Atlantic sturgeon's survival in the Savannah River and that the project's overall effect on the species would be acceptable.

759-BB-48-EV38

Comment: *As stated in the first paragraph of Appendix D: The Savannah Harbor Expansion Project . . . has the potential to adversely affect nationally important resources. In addition, since predictions are made about future effects to biological resources, there is a degree of uncertainty about the impacts which the recommended action would actually produce. Those uncertainties include both the accuracy of the predictive impact tools and the biological responses that will occur as a result of changes in the environment. DNR concurs with this assessment of the uncertainty regarding the accuracy of the hydrodynamic and water quality models used to predict the physical, chemical and biological impacts of the proposed project and constructed mitigation features. DNR also agrees there is considerable uncertainty regarding the biological responses to these impacts. Because of this uncertainty, it is imperative that a comprehensive monitoring and adaptive management strategy be developed, implemented, and adequately funded, if the deepening project goes forward.*

Response: Concur. The SHEP includes a comprehensive Monitoring Plan and Adaptive Management Plan.

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759-BB-48-EN01

Comment: *DNR generally concurs with the proposed pre-construction monitoring of physical characteristics and biological resources, in order to update existing information and provide a baseline for comparison with post-construction monitoring results; however, we question whether the intensive monitoring of hydrologic parameters within the lower estuary over one lunar cycle, will be sufficient to evaluate hourly, daily and, especially, monthly variations in the aquatic environment. DNR suggests that intensive hydrologic monitoring be conducted over a period of at least 2, and preferably 3, lunar cycles. The estimated cost of any such additional monitoring should be factored into the total pre-construction monitoring cost.*

Response: The proposed intense monitoring over a 28-day lunar cycle would provide sufficient information to add to the existing dataset to update, review and refine (if necessary) the hydrodynamic and water quality models for the pre-construction phase of the project.

759-BB-48-EV39

Comment: *DNR recommends that Atlantic sturgeon (Acipenser oxyrinchus), recently proposed to be listed as an endangered species, and striped bass be added to the list of biological resources to be monitored. If monitoring of striped bass is already included as a component of the GADNR striped bass stocking program, which USACE proposes to partially fund as compensatory mitigation for impacts to this species, this monitoring plan and its relevance to the deepening project should be described in Appendix D of the DEIS. Development of a monitoring protocol for Atlantic sturgeon should be closely coordinated with federal and state natural resource agencies. The estimated cost of adding these monitoring components should be factored into the total monitoring cost of the project.*

Response: As requested by the USDI, the Monitoring Plan has been modified to include an assessment of post-project impacts on the Striped bass. The monitoring data that is collected and the updated models would be used to evaluate impacts to the Striped bass during years 2,4, and 9 of the Post-Construction Monitoring. The Atlantic sturgeon was not identified by the Interagency Coordination Team as a species of concern that should be included in the SHEP monitoring plan. If the Atlantic sturgeon becomes listed as an endangered species, the Corps would consider including this species in the monitoring plan.

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759-BB-48-EV40

Comment: *No mention is made in Appendix D of a specific monitoring plan, or any associated costs, to evaluate vegetative species composition and percent cover at the brackish marsh creation site that is proposed as compensatory mitigation for direct impacts to fringing saltmarsh. This is one of the few proposed mitigation measures that actually has well-defined success criteria, based on percent cover, and an identified adaptive management strategy if the success criteria are not met (e.g., planting Spartina alterniflora). A monitoring plan designed to evaluate the progress and ultimate success of this project should be included in the "Post-Construction Monitoring" section of this appendix. The estimated cost of this monitoring component, conducted over a 5-yr period, should be added to the total monitoring costs.*

Response: Appendix D addresses the monitoring of the marsh restoration site (Disposal Area 1S) to determine the success of establishing wetland vegetation on the site. This discussion has been revised to include more details on the monitoring of this site. Additionally, the discussion has been revised to include evaluation of invasive species that may inhabit the site as well as measures to remove these species if necessary.

759-BB-48-EV41

Comment: *As stated in Appendix D, current estimates for the project construction period range from 3 to 6 years, and that USACE would perform monitoring during construction "for whatever length of time it takes to construct the project." The cost estimates, however, assume only a 3-year construction period. DNR is concerned that the project may take considerably longer than 3 years to construct, and that the cost estimates for this phase of the monitoring plan may be too low. DNR recommends that the cost estimates for this monitoring phase be based on the maximum estimated duration of construction (6 years).*

Response: The Corps concurs that the project my take longer than 3 years to construct. However, the Corps believes 4 years is a realistic timeframe for construction. Consequently, the Monitoring Plan has been revised to reflect a four-year monitoring plan for the construction phase. If the construction extends beyond that period, additional funds would be obtained to continue monitoring during the construction phase.

759-BB-48-EV42

Comment: *Earlier in the main body of the DEIS, however, it is stated that the sediment basin would be actively filled in with dredged material. This discrepancy should be rectified and explained. In addition, it should be noted that DNR already has expressed its opposition to using the sediment basin for dredge spoil disposal because of its potential to further degrade water quality in the Back River.*

Response: Please see previous response to this issue. Some dredged sediment would be deposited in the lower part of the Sediment Basin to construct the broad berm at the lower end of the basin. Originally, consideration was given to filling in the Sediment Basin with dredged sediment, but plans were revised to include a sill at the lower end of the basin, followed by natural sedimentation in the remaining portion.

759-BB-48-EV43

Comment: *DNR recommends that post-construction monitoring of: (1) nearshore benthic communities, (2) fish utilization of oceanward sediment placement sites, and (3) fish distribution and abundance along the marsh edges be extended from 3 years to 5 years. Cost estimates should be adjusted accordingly.*

Response: Monitoring of benthic community recovery at the nearshore placement sites and fish use of the oceanward placement sites will not be required since placement of dredged sediment at these sites has been removed from the project. All new work sediment removed from the entrance channel would be deposited in the Jones/Oysterbed CDF or the approved Offshore Dredged Material Disposal Site (ODMDS). The fish abundance and distribution study would be conducted during years 1, 3, 5, and 9 of the Post-Construction Monitoring program and is considered sufficient.

759-BB-48-EV44, 759-BB-48-EV45

Comment: *DNR is concerned that the amount of money proposed to be allocated for these, or other, adaptive management measures may be insufficient, particularly for those mitigation measures that have a high degree of uncertainty associated with their success such as the oxygen injection system, the*

flow-altering modifications to the system and the fish passage structure at NSBLD. DNR recommends that funding for these adaptive management measures be increased to at least 15% of the initial cost of construction, and that funding for this purpose be secured prior to starting the project.

Response: The use of 5 percent and 10 percent of the initial construction costs to estimate the costs to modify the mitigation features of the project, if required, is considered a reasonable amount. The adaptive management funds would be used as a group, such that whatever funds are needed to implement a specific adaptive management action could be used up to the total amount available for adaptive management.

The various funding mechanisms that could be used to secure upfront contingency funds are being evaluated. The non-Federal sponsor and the District intend to have adaptive management funds available if/when they are needed. If the needs exceed the budgeted amounts, the District could seek additional funds through the normal annual budget process The non-Federal sponsor, acting through the Georgia Ports Authority, has agreed to set aside, in advance, their cost-shared portion of the adaptive management funds in an escrow account upon approval of the project. Further explanation of funding mechanisms is provided in Appendix D.

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759-BB-48-EV46

Comment: *If corrective action is required, USACE proposes to conduct post-construction monitoring for only 1 year after implementing the adaptive management feature. DNR believes monitoring for only 1 year may be insufficient to determine the effectiveness of the corrective action, and recommends that dedicated funding be provided for monitoring the effects of any adaptive management feature for a minimum of 3 years.*

Response: The Adaptive Management Plan has been revised to indicate that any adaptive management modification to a SHEP mitigation feature would be monitored for two years after completion of the modification. Also, the plan provides for monitoring of an adaptive management feature for even longer should the Corps and the resource agencies determine that to be prudent. See previous response regarding funding of adaptive management features.

759-BB-48-EV47

Comment: *The proposed long-term monitoring plan which is the plan to monitor certain aspects of the project on an annual basis beyond the initial 5-year post-construction monitoring period seems inadequate in that the cost of this monitoring component is only projected for one year, with funding in subsequent years presumably dependent on annual appropriations. DNR recommends that the total cost of long-term monitoring, as well as the cost of continued operation and maintenance for each mitigation component, be projected over the entire life of the project, and that this funding be secured prior to starting the deepening project.*

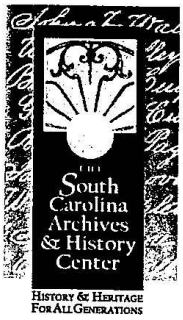
Response: All long-term monitoring as well as maintenance of the various mitigation features would become part of the Operation and Maintenance Program for the Savannah Harbor Navigation Project. Operation and Maintenance funds are requested annually two years ahead of the year in which the funds would be received. It is not possible to obtain “upfront” Operation and Maintenance funds.

File

DNR Historic
Preservation Div

2010 DEC -9 PM 2:49

December 7, 2010



Mr. William Bailey
ATTN: PD
Corps of Engineers, Savannah District
100 W. Oglethorpe Ave.
Savannah, GA 31401-3640

Re: Savannah Harbor Deepening
Tier II Environmental Impact Statement, draft
Jasper County, South Carolina
SHPO Project No. 03-VM0063

Dear Mr. Bailey:

Thank you for your letter of November 15, which we received on November 17, regarding the above-referenced project. We also received a copy of the draft Tier II Environmental Impact Statement (DEIS) as supporting documentation for this undertaking. The State Historic Preservation Office is providing comments to the Corps of Engineers pursuant to Section 106 of the National Historic Preservation Act and its implementing regulations, 36 CFR 800. Consultation with the SHPO is not a substitution for consultation with Tribal Historic Preservation Offices, other Native American tribes, local governments, or the public.

As the proposed project will occur in both South Carolina and Georgia, we understand that all Section 106 consultation will be coordinated between our office and the Georgia State Historic Preservation Office (SHPO). Therefore, the comments in this letter only reference those portions of the overall project that have an area of potential effect (APE) in South Carolina.

Our office concurs with the determination in the DEIS on the "Previously Disturbed Areas within the Area of Potential Effect for which No Historic Property Investigations are Proposed" (sections 4.10.3 and 5.12.2). We understand that the following cultural resources investigations will be coordinated with our office:

- Full-channel-width Dredging Area (SC waters)—Stations +41+500 to +49+500: Previous underwater archaeological survey identified two anomalies/targets that will be relocated and assessed for their eligibility for the National Register of Historic Places. These targets are SH-R16-2 and SH-R17N-1.
- Meeting Areas (GA and SC Waters—Stations +55+000 to +68+500): Two Confederate crib obstructions were identified in a 2005 underwater archaeological survey of this portion of the project. Our office concurs that these crib obstructions are eligible for listing in the National Register. It is not clear from the DEIS if these historic properties will be affected by the project. Additional consultation with our office is needed on this portion of the project.

S. C. Department of Archives & History • 8301 Parklane Road • Columbia • South Carolina • 29223-4905 • (803) 896-6100 • http://scdah.sc.gov

- New Savannah Bluff Lock and Dam Fish Ladder: The Corps will construct a fish ladder at the New Savannah Bluff Lock and Dam as part of the environmental mitigation of this project. The Corps will conduct a cultural resources survey prior to construction. Additional consultation with our office is needed on this portion of the project.

Our office concurs with the determination that the proposed Savannah Harbor Deepening project will have an adverse effect on the *CSS Georgia*, a Confederate naval vessel listed in the National Register and located in the waters of both Georgia and South Carolina. We also concur with the Corps' proposal to mitigate the adverse effects on the *CSS Georgia* by conducting data recovery and conservation of the ship and associated artifacts. A draft timeline of the steps in mitigation is included in the DEIS.

In preparation for this complex undertaking, our office consulted with the Corps of Engineers in 2005 and 2006 on a programmatic agreement designed to manage the effects to historic properties. We request that the Corps update our office and consult with us on a revised programmatic agreement that encompasses the studies and the revised project area.

We look forward to continuing to work with the Corps on this project. If you have any questions, please contact me at (803) 896-6183 or dobrasko@scdah.state.sc.us.

Sincerely,

Rebekah Dobrasko

Rebekah Dobrasko
Supervisor of Compliance, Tax Incentives, and Survey
State Historic Preservation Office

cc: Chris Amer, SCIAA
Barbara Neal, SCDHEC-OCRM
Dean Moss, Savannah River Maritime Commission
Elizabeth Shirk, GA SHPO

South Carolina State Historic Preservation Officer

559-MM-01-EV01

Comment: *Meeting Areas (GA and SC Waters-8tations +55+000 to +68+500): Two Confederate crib obstructions were identified in a 2005 underwater archaeological survey of this portion of the project. Our office concurs that these crib obstructions are eligible for listing in the National Register. It is not clear from the DEIS if these historic properties will be affected by the project. Additional consultation with our office is needed on this portion of the project.*

Response: The two Confederate crib obstructions are included among the cultural resources addressed by the Programmatic Agreement; any additional coordination will be carried out in accordance with the procedures outlined in the Agreement.

Review & Oversight Commission
On the South Carolina State Ports Authority

POST OFFICE BOX 142
COLUMBIA, SOUTH CAROLINA 29202-0142
(803) 212-6400

VIA OVERNIGHT DELIVERY AND ELECTRONIC MAIL

January 24, 2011

Mr. William G. Bailey
ATTN: PD
Savannah District, U.S. Army Corps of Engineers
100 West Oglethorpe Ave
Savannah, GA 31401

RE: Comments on GRR and Draft Tier II EIS for the Savannah Harbor Expansion Project

Dear Mr. Bailey:

The Review and Oversight Commission on the South Carolina State Ports Authority is a joint legislative commission tasked with ensuring the promotion, development and operation of the state's current and future harbors and seaports in accordance with all applicable laws and regulations. In keeping its charge, the Commission has reviewed the SHEP DEIS. Our members have grave concerns with what we find to be an unbalanced and unsound study.

The Commission has numerous questions about the study's assumptions, methodology and conclusions, and will seek answers before the final EIS is released. However, we are doubtful our concerns can be adequately addressed in the current project and believe the applicant should withdraw the application, significantly amend it, and resubmit. For purposes of this letter, we include three areas we believe will have the greatest effect on South Carolina's residents:

1) **Environmental.** The Corps identifies impacts upon the habitats of Shortnose Sturgeon and Striped Bass and upon tidal freshwaters and brackish marsh. Recreational fishermen and boaters would be affected by increased vessel traffic and dredging. The harbor's dissolved oxygen would decrease, while proposed techniques to restore dissolved oxygen have not been thoroughly vetted. Relating to federal and state law, the Commission notes that of the twenty-three federal and state environmental laws that apply, the draft complies with just eight. **The environmental damage caused by the SHEP as planned means that no future project could be permitted on the Savannah River, including the deepening needed to accommodate two-way post-Panamax traffic at the Jasper Ocean Terminal.**

2) **Economic.** The Corps fails to reconcile the **severe and dangerous limitations imposed by its imprudent recommendations for draft, channel width, vessel speed and single-lane layout.** On the contrary, the Corps wrongly implies that the channel could accommodate significant numbers of the largest post-Panamax ships. The Corps' defective channel models are neither wide enough nor deep enough to allow for unencumbered use by these vessels. **The Commission is astonished to find the Corps believes that the Georgia Ports Authority would enjoy the same growth in container traffic regardless of whether or not the SHEP is completed.** If this is accurate, why would taxpayers spend a dime to make *any* "improvements" to the Savannah? Finally, it is

bewildering to see that the DEIS's 'Need for and Objective of Action' – essentially why the project is necessary – contains just 11 sentences.

3) **Navigability.** The Commission finds that of study's plentiful inconsistencies, a daunting number concern navigability. Tonnage estimates suggest the use of post-Panamax ships with drafts of 50 feet, but the DEIS itself shows ships with drafts as low as 46 feet would run aground, even in normal weather conditions. The ill-advised single-lane plan is inefficient and its passing lanes fell short of expectations during simulations. **If built to study specifications, the channel would not accommodate the number of ships upon which many of the benefits of the project are based.** The Commission is alarmed to find a recommendation for an "acceptable level of risk of accidents" is not in keeping with published U.S. Army Corps of Engineers standards for channel width and depth. These standards are designed to provide a minimum margin of safety, but it seems they were conveniently disregarded for this project.

Additionally, the Commission is baffled by the Corps' blatant and unjustified dismissal of a Jasper Ocean Terminal. While discussed within the DEIS, the Corps fails to consider the JOT as a viable alternative. **The Corps' repudiation of the JOT is abundantly clear from the Corps' published plans for dredge disposal: proposed dredge disposal sites are the very same sites upon which a JOT would be built. To add insult to injury, these sites would be used for disposal until 2060.** We also question the likelihood of the Corps ever approving taking these 1,500 acres of upland disposal out of use for maintenance dredging capacity because the replacement capacity would need to be cost neutral for the federal government.

There are ongoing negotiations between South Carolina and Georgia to build a Jasper Ocean Terminal, and this week officials in both states reaffirmed their commitment to that project. Given the improbability that leaders in the State of Georgia sat quietly by as the contradictory expectations of the DEIS were made public, our Commission questions their commitment to the project. Further, the Corps plans to use the JOT site for dredge disposal, while the 2007 Water Resources Development Act reads, in pertinent part:

> SEC. 4084. SAVANNAH RIVER, SOUTH CAROLINA AND GEORGIA. (a) In General- The Secretary shall determine the feasibility of carrying out projects-- (1) to improve the Savannah River for navigation and related purposes that may be necessary to support the location of container cargo and other port facilities to be located in Jasper County, South Carolina, in the vicinity of Mile 6 of the Savannah Harbor entrance channel; and (2) to remove from the proposed Jasper County port site the easements used by the Corps of Engineers for placement of dredged fill materials for the Savannah Harbor Federal navigation project.

The Commission maintains that improvements to the Savannah River must: 1) provide more acceptable levels of environmental impact and commensurate mitigation; 2) be based upon reconcilable economic methodology; and 3) demonstrate clearly that navigation would be cost-effective, efficient and safe. Further, the plan must make the JOT site available for its use pursuant to the intergovernmental agreement between South Carolina and Georgia; must, by a date certain, remove easements upon it (as the Corps is authorized to do in the 2007 WRDA); and must make the JOT accessible by post-Panamax traffic.

Sincerely,

Lawrence K. Grooms
Chairman

Review and Oversight Commission On the South Carolina State Ports Authority

Page 1

695-MR-05-EV01

Comment: *Environmental. The Corps identifies impacts upon the habitats of Shortnose Sturgeon and Striped Bass and upon tidal freshwaters and brackish marsh. Recreational fishermen and boaters would be affected by increased vessel traffic and dredging. The harbor's dissolved oxygen would decrease, while proposed techniques to restore dissolved oxygen have not been thoroughly vetted. Relating to federal and state law, the Commission notes that of the twenty-three federal and state environmental laws that apply, the draft complies with just eight. The environmental damage caused by the SHEP as planned means that no future project could be permitted on the Savannah River, including the deepening needed to accommodate two-way post-Panamax traffic at the Jasper Ocean Terminal.*

Response: The environmental impacts identified in this comment, e.g., impacts to fish, marsh, dissolved oxygen, and mitigation for these impacts, are fully addressed in the FEIS, especially Section 5.0, and various appendices including C, Mitigation Planning, D, Monitoring and Adaptive Management Plan, and others. See also other responses to comments on these issues.

The general comment about compliance with only eight of twenty-three environmental laws is unclear because the laws are not specified. Section 6.0 of the FEIS, which is a non-exhaustive listing, documents project compliance with more than twenty federal and state environmental laws and executive orders.

Environmental evaluations were conducted in accordance with NEPA and Council on Environmental Quality (CEQ) Regulations for Implementing NEPA (40 CFR 1500-1508), the platform for ensuring compliance with applicable environmental laws and regulations. Additional procedural steps were also taken as a result of the conditional authorization of this project (WRDA 1999). Those include the requirement that the Secretary of the Interior, Secretary of Commerce, Secretary of Army, and Administrator of the Environmental Protection Agency approve the selected plan and verify that the associated mitigation plan adequately addresses its potential environmental impacts. The environmental impact/mitigation planning process included comprehensive assessment, avoidance, minimization, and mitigation components. This process has also included years of close coordination with pertinent federal and state agencies, as well as a host of other stakeholders. Given this lengthy cooperation among so many interested parties, the District is satisfied that all evaluations were conducted in full compliance with required environmental laws.

The DEIS will be modified and revised as appropriate to resolve the comments received during public review [resulting in the FEIS]. The Record of Decision [ROD] is the final step in the NEPA process and is only issued after the FEIS has been approved, with recognition that the action is in full compliance with all applicable laws and regulations.

Construction of the proposed action does not preclude further development on the Savannah River or the permitting of future projects including a Jasper Terminal. The cumulative impact evaluation includes an assessment of past, present, and future actions and the associated acceptable levels of impacts. The cumulative impact evaluation for this project did not identify any resource for which the project impacts with mitigation would approach an unacceptable threshold. See also other responses to comments regarding a Jasper Terminal, many of which discuss the permitting that would be necessary for such a facility.

695-MR-05-EN01, 695-MR-05-EC01

Comment: *Economic. The Corps fails to reconcile the severe and dangerous limitations imposed by its imprudent recommendations for draft, channel width, vessel speed and single-lane layout. On the contrary, the Corps wrongly implies that the channel could accommodate significant numbers of the largest post-Panamax ships. The Corps‟ defective channel models are neither wide enough nor deep enough to allow for unencumbered use by these vessels. The Commission is astonished to find the Corps believes that the Georgia Ports Authority would enjoy the same growth in container traffic regardless of whether or not the SHEP is completed. If this is accurate, why would taxpayers spend a dime to make any "improvements" to the Savannah? Finally, it is bewildering to see that the DEIS‟s „Need for and Objective of Action‟ – essentially why the project is necessary – contains just 11 sentences.*

Response: With regard to the channel safety (width and depth) comment, please see other responses to comments on these issues, especially responses to comments by the Savannah River Maritime Commission. In addition, the channel was designed in accordance with Corps of Engineers' Design Standards and Procedures outlined in EM-1110-2-1613. Final channel dimensions and navigation requirements were developed using the Corps' state-of-the-art ship simulation, with input from the Savannah Harbor Pilots Association (SHPA). Since those pilots guide vessels through the harbor on a daily basis, they are thoroughly familiar with environmental conditions that affect the way vessels handle in this particular harbor. The use of ship simulators to establish final design parameters for deep-draft navigation channels is the standard practice worldwide and ensures that channels are safe and economical and minimize environmental impact and long-term maintenance requirements. The use of ship simulators also provides the harbor pilots who would actually use the channel with the opportunity to provide input into the design and ensure the navigability and safety of the channel. The existing channel dimensions can accommodate meeting of a deepening design vessel (Post-Panamax Generation 2 with a 140' beam) and a smaller vessel. Ship simulation verified that the inner harbor channel could be widened at 3 bends to maintain two-way traffic capability after deepening for a design vessel and smaller vessel. The entrance channel would be wide enough for two design vessels to meet. Two meeting areas are included to allow two design vessels to meet in the inner harbor.

With regard to the portion of the comment relating to growth in container traffic, the District evaluates its water resource projects from a National Economic Development (NED) perspective which, in essence, is the alternative [meeting project objectives] having the greatest net economic benefits [benefits minus costs]. In this instance, the NED benefits are comprised primarily of the reduced transportation costs resulting from removing the current constraints of draft. It is important to note that these economic benefits accrue from the use of larger, more cost-effective container ships, not an increase in the number of containers. The savings are presumably passed on to US consumers and businesses in the form of lower prices. In determining the NED, analysts are mindful not to claim benefits if a project would merely redistribute commerce from one port to another rather than actually increase the size of the market.

In recent years, additional analyses have been undertaken which focus on Regional Economic Development [RED]. In doing so, analysts calculate the economic impacts to the region that could result from the funds expended to construct a project. The primary effects measured in a RED analysis include jobs and worker income. Chapter 8 of the Economic Appendix describes regional economic impacts.

The District conducted a multi-port analysis of alternate ports and networks. That analysis indicated that most of the cargo imported and exported through Savannah served a distinct hinterland. After evaluating the total transportation costs to serve several key hubs in the hinterland, the analysis

concluded that deepening Savannah Harbor would likely not result in sufficient savings in transportation costs to cause cargo to divert from other ports. A deepening project would allow the same volume of cargo to be moved more efficiently via larger or more fully-loaded vessels. This basic position is supported by the present calling of PPX 1 vessels on Savannah in increasing numbers. Those and PPX 2 vessels are anticipated to call in greater numbers once the Panama Canal is enlarged.

The largest capacity vessels calling on the US East Coast [including Garden City Terminal] are expected to be about 8,000 TEUs. Vessels much larger than 8,000 TEUs are more apt to be deployed on Asia to Europe and/or Transpacific trade routes. The Economic Appendix [page 51] explains why these larger vessels are unlikely to call at Savannah, irrespective of SHEP.

Table 42 [Economic Appendix-Page 73] displays the forecasted vessel calls by size class for the "without project condition" and for each of the deepening alternatives. The transportation costs of keeping the channel at its present depth is compared to same for each of the depth options to derive its project savings (benefits).

With regard to the need and objective comment, FEIS Section 2.0 provides a concise explanation of the purpose and need for this action.

Page 2

695-MR-05-EN02

Comment: *Navigability. The Commission finds that of study's plentiful inconsistencies, a daunting number concern navigability. Tonnage estimates suggest the use of post-Panamax ships with drafts of 50 feet, but the DEIS itself shows ships with drafts as low as 46 feet would run aground, even in normal weather conditions. The ill-advised single-lane plan is inefficient and its passing lanes fell short of expectations during simulations. If built to study specifications, the channel would not accommodate the number of ships upon which many of the benefits of the project are based. The Commission is alarmed to find a recommendation for an "acceptable level of risk of accidents" is not in keeping with published U.S. Army Corps of Engineers standards for channel width and depth. These standards are designed to provide a minimum margin of safety, but it seems they were conveniently disregarded for this project.*

Response: As stated previously, the deeper channels conform to US Army Corps of Engineers design guidelines. The channel was designed in accordance with Corps of Engineers' Design Standards and Procedures outlined in EM-1110-2-1613. Final channel dimensions and navigation requirements were developed using the Corps' state-of-the-art Ship Simulator with input from the Savannah Harbor Pilots Association (pilots that regularly guide vessels through Savannah Harbor). The use of ship simulators to establish final design parameters for deep-draft navigation channels is the standard practice worldwide and ensures that channels are safe and economical and result in minimal environmental impact and long term maintenance requirements. The use of ship simulators also provides the harbor pilots who will actually use the channel with the opportunity to provide input into the design and ensure the navigability and safety of the channel. The District also consulted the US Coast Guard, who stated that they had no concerns with the safety of vessels using the proposed channel design. The US Army Corps of Engineers, US Coast Guard, and Savannah Harbor Pilots Association are confident that the proposed deeper channel would allow safe passage of the design vessel and the entire fleet of deep-draft vessels projected to call at Savannah.

The existing channel dimensions can accommodate meeting the deepening design vessel (Post-Panamax Generation 2; 140' beam) and a smaller vessel. Two meeting areas are also included to provide for meeting of two design vessels.

Please see also other responses to comments on these issues, especially responses to comments by the Savannah River Maritime Commission.

695-MR-05-EV02

Comment: *Additionally, the Commission is baffled by the Corps‟ blatant and unjustified dismissal of a Jasper Ocean Terminal. While discussed within the DEIS, the Corps fails to consider the JOT as a viable alternative. The Corps' repudiation of the JOT is abundantly clear from the Corps' published plans for dredge disposal: proposed dredge disposal sites are the very same sites upon which a JOT would be built. To add insult to injury, these sites would be used for disposal until 2060. We also question the likelihood of the Corps ever approving taking these 1,500 acres of upland disposal out of use for maintenance dredging capacity because the replacement capacity would need to be cost neutral for the federal government.*

Response: The SHEP NEPA alternatives analysis and Clean Water Act practicable alternatives analysis fully considered a proposed Jasper Terminal. Among other things, the Regional Port Analysis specifically evaluated current and projected port capacity, demand, and growth, and environmental impacts and constraints for other South Atlantic ports (Norfolk, VA; Wilmington, NC; Charleston, SC; Savannah, GA; and Jacksonville, FL) and a proposed Jasper Terminal (GRR, Appendix A, Attachment 6, Final Report). In addition, the information regarding analysis of a Jasper Terminal was analyzed in a study of the potential costs and environmental impacts of locating the project at one of eight different sites along the Savannah River (four on the South Carolina side, four on the Georgia side). EIS Section 3.0 and Appendix O. Among the conclusions reached as a result of the Regional Port Analysis, the Multiport Analysis, and the analysis of eight alternative sites for the project along the Savannah River were the following: a Jasper Terminal would not be cost effective when compared to improving Savannah Harbor based on the high cost involved (now estimated at $4 billion including the cost of constructing the new transportation infrastructure that would have to be built), and the timing (a Jasper Terminal does not exist at present and cannot be constructed in time to meet the growth in demand occurring through Savannah Harbor).

Appendix O [2005] makes no reference to the "Jasper Terminal" because the document was completed before the term "Jasper" was used in its description. The following locations for a new terminal were evaluated in Appendix O:

Georgia - Garden City Terminal, East Coast Terminal, Ocean Terminal, Elba Island, Brunswick;

South Carolina- Disposal Area 12A, Disposal Areas 14A/B (this is the site of what is now currently proposed for a Jasper Terminal), Tybee Island National Wildlife Refuge (NWR), and other locations.

It should also be noted that the SHEP and a Jasper Terminal are not viewed by the Joint Project Office as opposing alternatives. Rather, the JPO believes both ports are needed. A March 11, 2011 "Update" from the Jasper Ocean Terminal Joint Project Office, contains numerous statements that SHEP is necessary and beneficial for a Jasper Terminal project ("The development of the Jasper site is predicated on the success of ports in Savannah and Charleston. A completed SHEP and the planned expansion of Charleston are the first steps . . . ."). The Update states that the Jasper Terminal will handle container

volumes in excess of what an improved (deepened) Savannah Harbor or Charleston Harbor could handle. The Update also confirms that the Jasper Ocean Terminal will cost $4 billion (a more recent estimate by the SCSPA is $5 billion).

The Georgia Department of Transportation has requested that the District relinquish its sediment disposal rights for Dredged Material Containment Areas 14A and 14B [presently proposed site for a Jasper Terminal]. The District is providing technical information to the Joint Project Office to identify an alternate disposal site to replace this sediment storage lost capacity for Savannah Harbor, as well as the mitigation features [from previous projects] that those sites presently provide. The District has advised GA DOT and the Joint Project Office that it would not consider releasing the disposal easements until development of the new container terminal is imminent, i.e. the developer obtains a Section 404 permit. The JPO's consultant observed that placing new work sediments on Areas 14A and 14B would save the terminal development project over $400 million by raising its elevation to a workable height. Therefore, if SHEP is constructed, it could benefit the development of a terminal in Jasper facility by significantly reducing initial construction costs. Further, the Joint Project Office has stated that a terminal at Jasper would require a navigation channel deeper that the present 42-foot depth. So the SHEP project would provide a deeper channel beyond the location of a future terminal in Jasper County, reducing the costs of developing a functioning terminal if construction occurs.

Development of a container terminal in Jasper County would be challenging. Site development work would be substantial, since most of the sites along the river were once marsh [which provides a weak foundation upon which to construct heavy structures]. Road and rail access to the site would need to be constructed. The Joint Project Office has begun the design studies, but much work remains. The controlling organization recently extended completion of those needed design studies. The JPO has not obtained or applied for a Section 404 construction permit. The legislatures in the two states have not ratified a bi-state compact (as outlined in the Governors' 2007 Term Sheet). When viewed holistically, there is still considerable uncertainty about development of a container terminal in Jasper County.

See also other responses regarding alternatives issues including 760-JK-400-EV02, 760-JK-400-EV50, 765-DC-149-EV28, and 765-DC-149-EV46.

Comments from the Savannah River Maritime Commission on the Savannah River Expansion Project DEIS and GRR

January 21, 2011

Report Prepared By:

Savannah River Maritime Commission

Columbia, South Carolina

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Attachments

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   Appendix C - Mitigation Planning
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   Appendix H - Section 404(b) (1) Evaluation
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2. **Verbatim Agency Comments**
   - Department of Natural Resources
   - South Carolina Archives & History Center, State Historic Preservation Office
   - South Carolina State Ports Authority
   - Lowcountry Economic Alliance
   - Lowcountry Office of Government, Planning Department

1. Introduction

This document presents the combined and integrated comments of agencies, interested parties and representatives of the State of South Carolina relative to the Tier II Draft Environmental Impact Statement for the Savannah Harbor Expansion (DEIS), the accompanying Draft General Re-Evaluation Report for Savannah Harbor Expansion (DGRR) and associated attachments and appendices. Both the DEIS and the DGRR are dated November 2010. Comments on the economic analyses that were provided for this project in Appendix A of the GRR are contained under separate title, "Comments from the Savannah River Maritime Commission on the Savannah River Expansion Project DEIS and GRR - Costs and Economic Benefits, January 21, 2011".

This document provides comments grouped according to major issues identified by the Commission at its September 2010 meeting.

The agencies, entities and representatives of the State of South Carolina which have either participated in discussions pertinent to comments on the DEIS and DGRR and/or provided written comments on the DEIS and DGRR include the following:

- Department of Natural Resources
- Department of Health and Environmental Control, Division of Water Quality and Shellfish Management
- Department of Health and Environmental Control, Office of Ocean and Coastal Resources Management
- State Historic Preservation Officer
- Department of Archives and History
- Attorney General's Office
- South Carolina State Ports Authority
- Lowcountry Economic Alliance
- Lowcountry Office of Government, Planning Department

The preparation of this document has been coordinated by the Savannah River Maritime Commission (SRMC), an agency charged by the State of South Carolina with the responsibility of representing the interests of the State of South Carolina in all matters related to the "navigability, depth, dredging, wastewater and sludge disposal and related collateral issues in regard to the use of the Savannah River as a waterway for ocean-going container or commerce vessels.".

This document represents an overall State of South Carolina review of the DEIS and the DGRR. Comments on issues addressed by multiple contributors have been merged and synthesized to reflect a consensus of opinion, where appropriate. Comments on specific issues or resource categories have been compiled and integrated, as practical, into unified narratives where respective issues or resources have been presented in a number of DEIS or DGRR sections. For example, comments pertinent to water quality are incorporated into a single narrative instead of separate comments concerning water quality from the various sections on Alternatives, Affected Environment, Environmental Consequences of the Proposed Action and other portions of the DEIS. Where deemed appropriate, comments on select appendices are provided as an attachment to this document (Attachment 1). In addition, all of the verbatim written comments provided by agencies, entities and representatives of the State of South Carolina are included in this document in Attachment 2.

In the following sections comments are first presented regarding compliance with National Environmental Policy Act (NEPA) related regulations and then comments on the two DEIS sections on Need for and Objective of Action and Alternatives. Subsequently, as mentioned above comments are organized for specific resource categories in an issue based approach that integrates review of the DEIS sections on Affected Environment, Environmental Consequences of the Proposed Action, subsections addressing mitigation and other parts of the DEIS or DGRR as appropriate.

2. General Comments

General

1. CEQ NEPA Regulations (1502.13) require that the section on Purpose and Need "specify the underlying purpose and need to which the agency is responding in proposing the alternatives including the proposed action." The DEIS section on Purpose and Need describes existing conditions and presumed benefits of the proposed action, and is vague on whether these individually or collectively comprise the underlying purpose and need. There is no clear statement of the proposed action's purpose and need.

2. CEQ NEPA Regulations (1502.14(a)) require that the proponent agency "rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated". The DEIS section on Alternatives evaluates no "build" alternatives other than deepening the channel to Garden City (i.e. no other locations for a marine terminal were given serious consideration). There is no discussion of alternatives that were eliminated from detailed study, and no reasons are given for their elimination.

3. Section 1502.14 of the CEQ NEPA Regulations states that the Alternatives section of the DEIS "should present the environmental impacts of the proposal and the alternatives in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decision-maker and the public". This is not done.

4. In the Introduction to the 2010 General Re-Evaluation Report (GRR) it states that "the Panama Canal Expansion Project will be fully operational by 2014, which will allow passage for vessels with up to 50 feet of draft. The Georgia Ports Authority has planned and funded improvements at Garden City Terminal to coincide with the Panama Canal Expansion Project." Would the GPA be making this major investment in the Garden City Terminal if it were concerned about the risk of some other alternative (perhaps a different terminal site) being proposed in the DEIS?

Environmental

Wetlands

1. The DEIS states that the Harbor Expansion Project will likely result in impacts to over 1,200 acres of tidal freshwater wetlands, more than 1,000 acres of brackish water wetlands, and several acres of tidal saltwater wetlands. Mitigation (by re-routing freshwater flow from adjacent streams and offering to purchase and

preserve more than 2,000 acres of existing wetlands) is estimated to reduce the permanent wetlands impacts to 330 acres of freshwater wetlands and 730 acres of brackish water wetlands. The re-routing of freshwater flow would have its own impact (which may be significant) on the environment and this impact was not evaluated in the DEIS. Further, the use of preservation (for wetlands that are under no current threat of development) as mitigation for the permanent loss of hundreds of acres of wetlands is inconsistent with Federal "no net loss" policy.

Essential Fish Habitat

1. The DEIS contains a paucity of information about impacts to essential fish habitat or how the project will impact essential fish habitat from a fish accessibility perspective. Instead the DEIS focused on the mitigation of essential fish habitat in the majority of the discussion. The lack of detail on the impacts or consideration of realistic options that would avoid the impacts suggests that the "full disclosure" intent of NEPA may not have been met.

2. Extensive areas of essential fish habitat will be lost because of the project. The mitigation of essential fish habitat through the restoration of inaccessible marsh habitats or the purchase of woodland does not provide adequate replacement for the essential fish habitat.

3. Regarding Shortnose sturgeon, a federally-listed Endangered Species, the Corps conducted a preliminary review of the 2001 fishway design and confirmed that conditions had not changed that would reduce its effectiveness or implementability. Does the Corps have documentation that Shortnose sturgeons have used fishways in the Savannah River, or any other river of similar characteristics?

Marine and Estuarine Resources

1. There was a lack of discussion and a lack of recent evaluation of the project's impacts on commercial and non-commercial pelagic and benthic invertebrates. In that this trophic level serves as the base of the food chain, more analysis is needed to determine the impacts on these resources.

Terrestrial Resources and Shoreline

1. Impacts to terrestrial resources and existing shorelines were examined in three separate USACE documents titled *Ship Forces on the Shoreline of the Savannah Harbor Project (2006)*, *Impacts of the Savannah Harbor Expansion Project-Draft (2006)*, and *Savannah Harbor Expansion Bank Erosion Study-Update (2010)*. The studies were designed to determine the impacts that the project would have on the shorelines of the Confined Sediment Placement/Disposal

Facilities, City Front, Ft. Pulaski, and Tybee Island (Ship Forces on the Shoreline of the Savannah Harbor Project and Savannah Harbor Expansion Bank Erosion Study-Update) as well as to determine the change in shoreline and sediment volume and to predict changes in circulation, waves, and potential sediment transport between the existing and future conditions (Impacts of the Savannah Harbor Expansion Project-Draft).

Some of the conclusions made in the documents were sound; however, many were based on unsubstantiated claims. In some cases conclusions were based on existing conditions without determining the impacts of the proposed conditions. Comparisons were made between alternatives which were not the proposed alternative, while ignoring differences in impacts between the existing condition and the proposed alternative. Data which could be used to allow peer review of some of the models was missing or omitted. Some conclusions were based on incomplete models and impacts to some resources were not determined because they were not under the scope of the current study. It remains unclear whether impacts to these resources were determined. Finally, none of the studies examined the impacts resulting from the use of Generation 2 post-panamax vessels within the deepened channel.

The documentation does not clearly quantify the impacts to the Confined Sediment Placement/Disposal Facilities, City Front, Ft. Pulaski, and Tybee Island. The conclusions drawn from these studies have not been substantiated and continuation of the NEPA process without disclosing the potential impacts to these resources would be in error.

Threatened and Endangered Species

1. The DEIS lacked information that is critical to make an assessment on listed and candidate species, did not substantiate its determination of non-significant impacts when adverse impacts were acknowledged, and often relied upon unsubstantiated assumptions and conclusions to make its determinations. If the assumptions and conclusions were based on peer-reviewed or project related studies, the DEIS should cite that source as a basis upon which the assessment occurred.

2. The shortnose and Atlantic sturgeon are examples of the incompleteness of the assessment. Shortnose sturgeon and Atlantic sturgeon were grouped together for purposes of assessing impacts from the project. The DEIS justifies the grouping due to their "similarities in habitat use, distribution throughout the proposed action area, foraging behavior and prey base, and subsequent risk of take relative to dredging and trawling operations..." No citations or other reference information was provided to substantiate this decision to group the species. Other information provided in the DEIS provides information that contradicts the

claim that the species are similar enough to group together for impact assessment purposes. For example, the narrative states that Atlantic sturgeon primarily lead a marine existence and are therefore more likely to be impacted by hopper dredges than the more estuarine-based shortnose sturgeon. The document states that shortnose sturgeon spawn 100 miles upstream of the project area, but also states that an Atlantic sturgeon larva was found 6.7 km (4 miles) upstream of the project impact area. This information not only suggests that shortnose and Atlantic sturgeon spawn in different areas, it also highlights the possibility that some larva may drift into the project area and may be affected by the upstream increases in salinity that would occur as a part of this project. Additional information should be collected to verify the actual location of Atlantic sturgeon spawning to ensure the project dredging and upstream movement of salinity and decreases in DO will not deleteriously impact Atlantic Sturgeon.

3. The impact summary to the Essential Fish Habitat in Appendix S, acknowledges that the proposed action would have adverse impacts on shortnose sturgeon, an endangered species. Nonetheless, the text dismisses the adverse impacts as non-significant without providing sufficient detail as to how the non-significant status had been applied. Over 400 acres of habitat is expected to be lost to the shortnose sturgeon alone. Moreover, the lost habitat may have been underrepresented by the modeling. For example, a baseline level of 3.0 to 4.0 mg/l of dissolved oxygen was used to determine if habitat was available for shortnose sturgeon. This is a minimum level at which the agencies determined shortnose sturgeon can survive, but does not necessarily indicate the dissolved oxygen level that is necessary for foraging, resting, and moving. For example, the Collins et al. (2001) study of shortnose sturgeon habitat use cited in the DEIS, reported minimum mean dissolved oxygen levels of 6.36 and 6.45 in areas where adults and juveniles were found, respectively. In the Appendix N documentation, Prescott Brownell, from NMFS requested that a range of suitable habitat thresholds be used for modeling habitat availability. The agency panel then redacted his comments from the record without providing an adequate basis for the redaction. The panel decided the current methods were "acceptable for now." This comment would suggest that additional work would be necessary in the future in order to adequately asses the impacts. The narrative does not provide adequate discussion as to why the pass/fail approach was more adequate than the range approach suggested by Mr. Brownell.

4. A number of the state-listed sensitive species were dismissed from further discussion without sufficiently detailed information to determine if any impacts would occur and how impacts would be avoided. As an example, the DEIS often stated that sediment deposition would be conducted in a manner to not interfere with nesting of various sensitive species. There was no detail provided to

substantiate this claim. There was no monitoring plan cited nor detailed deposition plan cited to document that the sensitive species will be avoided. Modification of presently licensed or future licensed disposal areas will require endangered species review in with a sufficient level of detail to ensure impacts will be avoided. Moreover, other sensitive species were dismissed because they were not known to exist in the project area even when habitat existed that may support the species. If the habitat requirement is similar to what is found in the estuary, then surveys should be conducted in impact areas to demonstrate absence from the habitats. It is impossible to determine impact without knowing whether or not it exists in the impact areas.

Water Quality (Chlorides in Groundwater)

1. Regulatory officials from both South Carolina and Georgia agree that future pumping from the Upper Floridan aquifer must decrease in order to limit the impacts of salt-water intrusion in the coastal area. A recently-released GAEPD document entitled Coastal Georgia Water and Waste Water Permitting Plan for Managing Salt-Water Intrusion (2006) indicates that Georgia will reduce withdrawals from the Upper Floridan aquifer by 5 MGD by the end of 2008; therefore keeping the pumping rate constant provided a conservative assessment of future ground-water production in the area."

   Has groundwater use in the Upper Floridan aquifer decreased in Georgia and South Carolina as assumed in the model and analysis?

   Did groundwater withdrawals from the Upper Floridan aquifer decrease by at least 5 MGD between 2006 and 2008 in Georgia?

2. Groundwater use trends and restrictions by GAEPD are discussed in various sections of the GRR and supporting appendices. There appears to be a lack of corresponding discussion on groundwater use and restrictions by SDHEC in South Carolina.

3. While the overall conclusion that the impacts to groundwater are not expected to be significant appear reasonably well substantiated, quantifying the increased flow through the confining unit to 3-4% does not appear to be well substantiated given the uncertainty in leakage though this unit.

4. In the Draft GRR (page 150) the following conceptual mitigation measures are presented:

   Deposit channel sediments in nearshore areas where the groundwater aquifer is near the ocean floor.

Acquire but not use a permit from the State to withdrawal fresh water from the Upper Floridan aquifer.

Reduce pumping of groundwater by acquiring – but not using – permitted rights from industries to remove freshwater from the Upper Floridan aquifer.

These potential mitigation measures, in particular the last two, have significant ramifications on water use in the region by reducing overall water availability. The ability to acquire permitted rights in Georgia and presumably South Carolina, including existing permitted rights without replacing them with an alternate source raise significant questions regarding the viability of these conceptual alternatives.

Water Quality (Chlorides in Surface Water)

1. Available input data relating to chloride/salinity changes over tidal cycles and over cross-sectional areas of critical river reaches appear to be sparse to absent. There is reference to proposed or on-going chloride / salinity monitoring, however these does not appear to be any detail on this monitoring effort. Given the highly stratified nature of the chloride distribution in conjunction with tidal effects, understanding the temporal and spatial distribution throughout the estuary may prove critical to evaluating peak chloride levels at the Abercorn Creek intake. Clarification on the existing data and any proposed monitoring would be useful in evaluating potential future impacts at the intake.

2. As a potential mitigation measure, cost for a supplemental water intake approximately 10-miles upstream from the current intake was presented in a document titled "Review and Costs for Supplemental Water Supply – City of Savannah Intake at Abercorn Creek" dated 17 Sep 2009. It is not clear if environmental impacts from this proposed new intake have been evaluated, including the potential in increase salinity in Abercorn Creek further upstream from the current intake location.

Water Quality (Dissolved Oxygen)

1. The water quality-related sections of the DEIS include detailed assessments of the project's impacts on dissolved oxygen and chloride concentrations. The analysis relied on models and field testing of mitigation techniques. Much of this information is useful for identifying the potential water quality impacts and mitigation strategies. However, the DEIS understates that uncertainty and risks associated with both the water quality impacts and the proposed mitigation. The DEIS also does not explicitly consider the manner in which the water quality of

the harbor is currently being managed and regulated. For example, the DEIS does not address impact of the project on the 2010 draft TMDL for oxygen-demanding substances, nor the related regulatory framework for achieving full compliance of water quality standards.

2. Much of the DEIS's analysis of potential water quality is based on models that are have some capability to predict "average" dissolved oxygen or chloride conditions, but limited ability to characterize the trends and variability in water quality. Therefore, it is unclear whether the models are accurately predicting the critical conditions for water quality protection. The DEIS provided little indication that model uncertainties were explicitly considered in either predicting impacts or designing mitigation strategies. This is an especially important concern for the mitigation of dissolved oxygen impacts, because the proposed technology is somewhat experimental and of highly uncertain benefit.

3. The pending dissolved oxygen TMDL is expected to have a major regulatory and economic impact on both industrial and municipal dischargers, many of which will have to make large capital investments to reduce wasteloads. It tends to be controlled by the location in which attainment of dissolved oxygen concentrations is most difficult. From this perspective, it would not matter if 97% of the system experienced oxygen improvements if the critical location(s) experienced degradation, or if the wasteload allocations to achieve full attainment would be lower. The DEIS currently does not allow this determination. Similarly, it is unclear if how the proposed mitigation approach would affect the ability of point source dischargers to use the same technology for TMDL compliance.

4. The analysis should be revised to (1) more accurately characterize the uncertainties associated with water quality impacts; (2) more explicitly consider those uncertainties in designing environmentally conservative mitigation strategies; and (3) specifically examine the impact on the project on water quality management of the estuary under the draft 2010 TMDL.

Abstract – Pg 1, 2nd para – "The Corps of Engineers issued a Chief of Engineers' Report later in 1999 which provided further direction on the additional studies that needed to be conducted". Please include the Chief's Report as an Appendix to the EIS.

Section 1.02 Areas of Concern and Issues – Pg 1-4, 1st para – "The proposed deepening of the Savannah River Federal Navigation Channel would impact the endangered Shortnose sturgeon and Striped bass habitat, tidal freshwater wetlands, brackish marsh, increase salinity at the City of Savannah's Water Intake at Abercorn Creek, and decrease dissolved oxygen in the harbor". Atlantic sturgeon, recently proposed for listing as an endangered species by NMFS, should also be identified as a resource that would be impacted by the SHEP.

Section 2.04 Study Authority – Pg 2-3, 4th para – "(ii) the Secretary of the Interior, the Secretary of Commerce, the Administrator of the Environmental Protection Agency and the Secretary approve the selected plan and determine that the associated mitigation plan adequately addresses the potential environmental impacts of the project". The mitigation plan needs to adequately compensate (not just address) for the potential environmental impacts.

Section 5.16 Cumulative Effects of the Proposed Action – Pg 5-142, 6th para – "The cumulative effects analysis is found in Appendix L of the EIS". A summary of the findings of the cumulative impacts analysis, that includes text on the magnitude and significance of the collective impacts, would be appropriate for inclusion in this section of the DEIS.

Section 5.19 Socio-Economic Resources – Pg 5-144, 1st para – "The harbor deepening project is expected to reduce the cost of shipping containerized goods through the port". This statement needs elaboration with specific details, or a reference to a document that contains those details.

Section 5.19 Socio-Economic Resources – Pg 5-144, 2nd para – "None of the alternatives conflicts with long term land use plans outlined in 1987 Special Area Management Plan for the Lower Savannah River which was prepared by the SC Coastal Council (SCCC)". The referenced document is more than 20 years old and has almost certainly been updated or replaced with a more current land use plan. To be accurate, the Corps' impact analysis should be based on the most recent land use planning information available.

Section 5.20 Protection of Children and Environmental Justice, Overview – Pg 5-144, 6th para – "The Corps collected and analyzed information concerning the potential impact on minority populations, low-income populations, and children from the proposed Savannah Harbor Expansion Project. The information shows that the proposed action would not cause disproportionately high and adverse impacts on minority populations". What specific information lead the Corps to this conclusion and where is the analysis located?

Section 5.21.E. Community and Regional Growth – Pg 5-155, 2nd para – "No additional cargo is expected to pass through the harbor as a result of the proposed project". This statement appears to be inconsistent with recent and future planned actions taken by the GPA to increase the container through-put capabilities of their Garden City Terminal. The Corps should elaborate on their statement above, and reconcile the disparity.

Section 7.01 Public Involvement and Review – Pg 71-, 1st para – "Comments on these scoping meetings were received from the following:" Were no scoping comments received from South Carolina interests?

The maximum authorized plan of -48 ft is supported by the non-Federal cost share sponsor. Although it is acknowledged in the DEIS that environmental impacts associated with shallower depths would be less than those associated with the NED plan, the DEIS concludes that *"the lesser impacts of the 44-foot depth, 45-foot depth, and 46-foot depth alternatives are not considered sufficient to justify recommendation of these*

alternatives instead of the NED Plan". The DEIS further concludes that all depth alternatives, with the inclusion of proposed mitigation features, are *"environmentally acceptable."*

DNR disagrees with this conclusion, and believes that the only two deepening alternatives that might be considered environmentally acceptable are the 44-ft and the 45-ft alternatives, provided the proposed mitigation is effective in minimizing any adverse impacts of these alternatives. Obviously, the "no action" alternative (i.e., maintaining the channel at the currently authorized depth of 42 ft) would have the fewest adverse environmental impacts.

As stated in the DEIS, the extent of direct wetland impacts resulting from the excavation of bend wideners would not differ substantially among the five deepening alternatives considered. In each case, a total of 14.08 acres of salt and brackish marsh would be affected. In the absence of an approved saltwater mitigation bank in the Savannah River Basin, the USACE proposes to mitigate for these direct losses by grading down approximately 42 acres of a former confined dredge spoil disposal site (CDF 1S) near the confluence of the Front and Middle rivers to an elevation that would support *Spartina alterniflora*. A "feeder" creek system would also be constructed toward the interior of the restored marsh. This area would then be allowed to revegetate naturally. Active planting of *Spartina* would only be conducted if the area did not revegetate naturally at a rate that would provide 15 percent vegetative cover after 1 year and 80 percent vegetative cover after 5 years (with interim goals of 25, 40, and 60 percent cover at the end of two, three and four years, respectively). Conceptually, DNR concurs with this approach to mitigating for the direct loss of brackish and saltwater wetlands resulting from any of the deepening alternatives; however, DNR's overriding concern about the indirect effects of harbor deepening should be given greater weight.

As stated in Chapter 5 of the DEIS, *"All of the deepening alternatives would adversely impact tidal freshwater marsh."* Model predictions indicate that, without mitigation, deepening the harbor would result in the conversion of tidal freshwater marsh to brackish marsh as a result of increased salinity intrusion. Under conditions of average flow and low sea level rise, the acreage of freshwater marsh that would be lost as a result of deepening is predicted to range from 551 acres for the 44-ft alternative to 1,212 acres for the 48-ft alternative, assuming no mitigation is implemented. With the flow-altering modifications proposed as mitigation by the USACE, however, the acreage of freshwater marsh is actually projected to *increase* by 332 acres with the 44-ft alternative; whereas, a net *loss* of freshwater marsh (ranging from 32 acres for the 45-ft alternative to 337 acres for the 48-ft alternative) would still result from the other deepening alternatives, even with mitigation. Considering the substantial loss of tidal freshwater wetlands that has already occurred as a result of past dredging operations and other modifications to the

system, the DNR considers anything more than a *de minimis* loss of freshwater wetlands to be a significant adverse impact of the proposed deepening project.

As discussed in the DEIS, there are significant concerns related to the predicted decrease in dissolved oxygen that would result from the proposed deepening project. The primary area of concern for dissolved oxygen is the portion of the Savannah River between Fort Pulaski (River Mile 0.0) and the Seaboard Coastline Railroad Bridge (Mile 27.4). This is the section of the Savannah River estuary that would be directly affected by the deepening project. As noted in the DEIS, this segment of the river is on Georgia's Section 303(d) list as impaired for dissolved oxygen. Modeling studies conducted in support of the development of a Total Maximum Daily Load (TMDL) for dissolved oxygen in Savannah Harbor estimate that the existing dissolved oxygen concentration in Savannah Harbor is 1 mg/l lower than it was during the baseline year (1854) and condition (12-foot controlling depth) because of dredging operations that have been conducted since then. Model predictions from the SHEP studies indicate that further deepening will have additional impacts on the dissolved oxygen regime in Savannah Harbor.

As reported in the DEIS, hydrodynamic and water quality modeling conducted in support of the deepening project suggest that the proposed mitigation features (i.e., the flow-altering plans discussed above and the DO injection systems) would substantially reduce project impacts to freshwater wetlands and some species of fish. While DNR does not necessarily dispute the hydrodynamic and water quality modeling results, we are concerned that there is still substantial uncertainty regarding the predicted magnitude of adverse impacts and the effectiveness of the proposed mitigation measures, particularly, the oxygen injection system. The results of a demonstration project conducted to determine the effectiveness of the system in Savannah Harbor were inconclusive. The slight increase in dissolved oxygen in the vicinity of the Speece Cones was shown to be within the normal range of natural variability due to tidal influences, and could not be definitively attributed to the oxygen injection system itself. Furthermore, the long-term effectiveness and viability of this system in a tidal brackish water environment is highly questionable. The minimal net improvement in DO predicted by the model may not be sufficient to warrant the initial cost of the system or the long-term maintenance costs. Instead, DNR recommends that adverse impacts to dissolved oxygen levels be minimized by deepening to no more than -45 ft.

DNR also is concerned that some or all of the flow-altering modifications could have unintended consequences that result in additional adverse impacts to natural resources. Significantly, the modifications proposed to reduce salinity intrusion into the Back River to protect tidal and managed freshwater wetlands could result in increased salinity intrusion into the Front and lower Middle rivers, where both juvenile and adult SNS have been found to concentrate, particularly during the winter when temperatures are below

22° C (Collins et al., 2001). In fact, Table 5-30 shows that the loss of adult SNS habitat in winter would be much greater *with* the flow alterations (maximum loss of 439 acres for the 48-ft alternative) than *without* them (maximum loss of 44 acres for the 48-ft alternative). Conversely, the loss of adult SNS habitat in summer and juvenile SNS habitat in winter is predicted to be *less* with the proposed flow-alterations than without them.

The deepening alternative that is predicted to have the least negative impact on SNS habitat *overall* (including adults and juveniles during winter and summer) is the 44-ft alternative, which would result in a net loss of approximately 60 acres of SNS habitat with flow-altering mitigation, and 151 acres without flow alterations. By comparison, the NED Plan (i.e., the 47-ft alternative) is predicted to result in a net loss of 473 acres of SNS habitat overall with flow alterations (or a loss of 545 acres without flow alterations). The locally preferred plan (i.e., the 48-ft alternative) would result in even greater net losses of SNS habitat overall. DNR considers magnitude of these impacts to the habitat of shortnose sturgeon to be unacceptable, with or without mitigation.

Other unintended consequences of flow alterations could also occur. Recent and ongoing tagging studies suggest that SNS may move freely between the Front, Middle and Back rivers via Steamboat Cut and Rifle Cut. If this proves to be the case, closing Rifle Cut could impede this movement, and limit SNS access to suitable foraging and nursery habitat. In addition, DNR field biologists have recently reported that the sediment basin in the lower Back River has already filled in to a large extent, and that any further deposition of sediments in this area could present another impediment to SNS migration throughout the system.

The USACE proposes to provide compensatory mitigation for unavoidable impacts to SNS foraging and nursery habitat by constructing a fish passage structure around the New Savannah Bluff Lock and Dam (NSBLD) near Augusta, at a projected cost of $6.3 million. The structure (a rock ramp) would be located on the South Carolina side of the river, and would theoretically provide SNS access to approximately 20 miles of upstream spawning habitat. DNR believes the likelihood that this approach would be successful in passing SNS is highly doubtful. While such a fish passage structure might benefit other migratory fish, its success in passing SNS has never been demonstrated. Because of its unproven success, DNR is opposed to implementing active fish passage as mitigation for unavoidable impacts to SNS habitat, and believes that the best approach to protecting shortnose sturgeon habitat would be to minimize those impacts by selecting either the "no action" alternative or the 44-ft deepening alternative (with flow-altering mitigation).
While impacts to SNS would be minimized by selecting either the no action alternative or the 44-ft alternative, modeling results presented in the DEIS suggest that the overall net loss of striped bass habitat (including suitable habitat for spawning, eggs and larvae) would be less with the 45-ft alternative. Because of this apparent benefit to striped bass,

an important recreational species whose population in the lower Savannah River has been drastically reduced by earlier dredging operations and flow-altering modifications to the system, DNR would consider the 45-ft deepening alternative (with flow-altering mitigation) to be acceptable, as well.

The USACE also proposes to provide compensatory mitigation for unavoidable impacts to tidal freshwater wetlands. Initially, an attempt was made to identify other sites in the Savannah River estuary that could be used for restoration or creation of tidal freshwater marsh; however, neither the USACE nor any of the stakeholders could find any suitable sites that were available within the Savannah River Basin. In the absence of any such sites, the USACE (in consultation with the USFWS and other natural resource agencies) used the Savannah District Standard Operating Procedures (SOP) to calculate the minimum number of acres that would need to be acquired and preserved to acceptably mitigate for unavoidable freshwater wetland impacts. Using this procedure, it was determined that the total acreage of wetlands that would need to be preserved ranged from 0 acres for the 44-ft deepening alternative (with flow-altering mitigation) to 2,683 acres for the 48-ft alternative (with flow-altering mitigation). The USACE proposes to acquire lands identified in the latest version of the Savannah National Wildlife Refuge Acquisition Plan (dated July 2007), and provide them to the USFWS to manage as additions to the Refuge as compensatory mitigation for unavoidable wetland impacts from the deepening project. Priority will be given to acquiring properties that are dominated by freshwater wetlands. DNR concurs with this approach to mitigating for any unavoidable impacts to tidal freshwater wetlands, particularly since most of the indirect impacts of deepening would occur within the Savannah National Wildlife Refuge. DNR recommends that any such acquired properties be made accessible to the public for educational and recreational activities that are consistent with the wildlife management goals of the Refuge.

Navigation

Channels: The channel is shallower and narrower than Army Corps design standards for fully loaded post-panamax ships. This indicates margins of safety for navigation will be lower than normal. The Engineering Investigations section promotes accepting greater than normal levels of risk without further justification (page 59).

Channel Depth and ship draft: The project will not accommodate post-panamax draft even on high tide. It will most likely handle drafts of 43 feet on any tide, and 47 feet on high tide, well under post-panamax. Tide range in the offshore channel is reported at 50 to 75 percent in excess of the actual tide range offshore, distorting estimates.

Channel Width and Ship Width: The proposed channel width will be narrower than present, and therefore will decrease the number of ships the project can handle. This is

contrary to the objectives. The channel is only wide enough for ships up to 117 feet wide, and then only in one-way traffic, according to Army Corps channel design standards. Post-panamax beam is 160 feet.

One-Way Traffic: The channel is not satisfactory for two-way traffic of any appreciably sized ships, per Army Corps standards. Navigational simulation studies only simulated ships up to 140 feet wide, less than post-panamax, and problems presented in these simulations. There were no simulations of a full sized post-panamax ship reported.

Passing Lanes: One passing lane was found to be inadequate, leaving one viable passing lane throughout the length of the project.

Offshore Channel Bend: This critical point was found to be navigationally sound only when ranges are visible, limiting use to days when the visibility is good.

Traffic Load: The project cannot accommodate the number of ships projected to be calling on the port with only one-way traffic. No traffic density study was reported verifying the number of ships the port might handle daily.

Maintenance Dredging: The GRR suggests maintenance dredging will not increase in cost or volume over present levels, though four other ACOE studies indicate the contrary. Maintenance at present levels is lacking, as the existing channel is less than project depth across seven ranges of the channel. Basing future maintenance on inadequate present maintenance of a shallower project is likely to prove inaccurate.

Dredge Spoil Disposal: Even with artificially low estimates of dredge spoil volume, the project relies on the availability of the site considered for a Jasper County terminal for 60 years. The actual amount of dredge spoil disposal volumes is likely to be much higher than estimated in the report, creating further reliance on the Jasper site for decades.

Economic Benefit: The economic analysis did not account for limitations on draft, width, speed, and two-way traffic, but rather assumed the project could actually handle post-panamax ships at unlimited density. Actual ship activity is unlikely to meet economic benefit estimates.

Draft General Reevaluation Report-General Comments:

Navigation

The DGRR states that the Garden City Container will handle up to 6.5 million twenty foot containers (TEU) being on or off loaded at this facility annually. Using several

methods to analyze potential capacity with their proposed capital improvements, a more realistic capacity for the facility would be about 3.5 million TEUs annually.

The Savannah Maritime Association recommends a 2 ft minimum water clearance under vessels transiting the Port of Savannah. The GRR uses clearances of over 4 ft for certain classes of vessels in the analysis. There should be general agreement between operational practices at the port and assumptions used in the report.

Given forecasts for the year 2030 in the report, it is assumed there will be 3,500 container ships calling at Savannah Harbor, along with about 3,000 general cargo ships and 167 LNG tankers. This equates to over 13,000 commercial vessel transits in or out of Savannah Harbor annually. Given:

- Multi-mile wide safety zone required for LNG transits,
- Recreational boating at the cross point of the channel and the ICWW,
- Large size of vessels expected to call Savannah, and
- Complexity of navigation within the Savannah River complex.

The report offers no details on how Savannah Harbor can accommodate so many vessel calls.

Economics

Most of the anticipated traffic increase forecasted for Savannah Harbor in the future is imports with a large increase forecasted for imports from the Far East. The report does not effectively address the impact of a significant increase in import cargo versus U.S. exports. By 2030, given the forecasts in the report, there will be over 1.5 million TEUs of empty containers going out of Savannah harbor, due to the imbalance between import volumes and export volumes. This forecasted imbalance in trade flows has an effect on outbound vessel loading and draft requirements that do not seem to change over time. For some trade routes, the depth of outbound vessels is the main source of benefits.

There is only minimal analysis of the effect deepening Savannah Harbor may have on other Southeast US and Gulf ports. It is acknowledged in the report that there are plans for potential port capacity expansion of 12 million TEUs at Southeastern US ports. Market service areas of ports can often overlap. Rather than looking at each port as a singular entity, they need to be evaluated in a regional as well as national scope, to optimize potential public investment in this industry.

One argument for the expansion project is the need of greater depth within the river or tonnage will move elsewhere, but the GDRR claims lower shipping costs all the way from China. Benefits would be much lower if the transportation benefits were measured from a likely alternative U.S. port.

The NED channel depth to Garden City seems to be about 44 ft. Reducing under-keel clearance alone reduces the optimal channel depth by one to two feet. As depth increases, fewer and fewer vessels draft deep enough to save money.

3. Comments on Compliance with NEPA Related Regulations

Format of the EIS

Section 1502.10 of the CEQ NEPA regulations (40 CFR Part 1500) and 32 CFR Part 651, Environmental Analysis of Army Actions; Final Rule prescribe the format of an EIS. The Savannah Harbor EIS does not follow this format and should be revised accordingly. Specifically, Section 2.00 should be entitled Purpose of and Need for the Action; Section 3.00 needs to be titled Alternatives Including Proposed Action; a List of Preparers section should be added (presently the list of preparers appears in Appendix V) and should include persons who were primarily responsible for "significant background papers" per 1502.17; the List of Preparers section should be followed by a section entitled Distribution List, which would be the list of agencies, organizations and persons to whom copies of the statement are sent (this list is currently in Section 7.00); and an Index (there is no index in the EIS).

CEQ NEPA Regulations (1502.13) require that the Purpose of and need for action section of an EIS "specify the underlying purpose and need to which the agency is responding in proposing the alternatives including the proposed action." Section 2.00 includes statements that describe existing conditions and presumed benefits of the proposed action, but it is not clear if these individually or collectively comprise the underlying purpose and need. The purpose and need needs to be clearly and concisely presented.

CEQ NEPA regulations (1502.14(a)) require that agencies "Rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated." Paragraph 4 on page 3-2 in Section 3.00 states that "The Corps considered three locations in Jasper County, SC that were considered by others for a 'Jasper Terminal'." Paragraph 5 states that the ". . . analyses . . . resulted in several conceptual alternatives being eliminated from further consideration." It references "Formulation of Alternatives, May 2005, found in Appendix O" as the document describing that work. However, Appendix O contains no evaluation of the three locations in Jasper County that were considered for a "Jasper Terminal." A Plan Formulation Appendix that discussed the Jasper Terminal locations is included in the General Reevaluation Report, but there is no reference to this in Section 3.00. Additionally, Section 3.00 of the EIS does not identify the alternatives which were eliminated from detailed study, nor does it discuss the reasons for elimination of those alternatives. This deficiency in the document needs to be corrected for the EIS to comply with CEQ NEPA regulation Section 1502.14(a).

Section 1502.14 of the CEQ NEPA regulations states that the Alternatives section of an EIS "... should present the environmental impacts of the proposal and the alternatives in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decisionmaker and the public." Section 3.03, however, does not present a comparison of the impacts of alternatives as recommended in the NEPA regulations.

CEQ NEPA regulations 1502.14(f) requires the alternatives section of an EIS to "include appropriate mitigation measures not already included in the proposed action or alternatives." A review of Section 3.00 indicates that the alternatives section does not discuss mitigation of identified adverse impacts listed in the abstract and in other sections of the EIS, including adverse impacts on the endangered shortnose sturgeon and striped bass habitat, tidal freshwater wetlands, fringe brackish wetlands, and water quality (lowered dissolved oxygen in the inner harbor). For example, the acquisition of lands to mitigate for freshwater wetland impacts is discussed in Appendix C but is not included in the Alternatives section. A mitigation subsection should be added to the Alternatives section which clearly describes mitigation measures not already included in the proposed action or alternatives.

CEQ NEPA regulations (1502.15) require that the affected environment section of an EIS "concentrate effort and attention on important issues." It is unclear if Project Economics, for example, which is identified in Table 1-1, is an important issue. If so, it should be discussed in the Affected Environment section.

Methodology

CEQ NEPA regulations (1502.24) requires that agencies "shall identify any methodologies used . . ." in analyses in environmental impact statements. In many instances, the Environmental Consequences Section 5.00 of the EIS clearly states the methodologies that were used to complete the analysis of impacts (e.g., wetlands), but in other instances, such as Environmental Justice, the methodology used to conduct the analysis is not clear and needs to be described.

4. Comments on Purpose and Need

In reviewing the DEIS it becomes apparent that the actual purpose of the proposed action is to implement a channel deepening program to mainly support the expansion objectives of the Georgia Ports Authority's (GPA) Garden City Terminal (GCT). In the Introduction to the 2010 General Reevaluation Report (GRR) it states that "…the Panama Canal Expansion Project will be fully operational by 2014, which will allow passage for vessels with up to 50 feet of draft. The Georgia Ports Authority has planned and funded improvements at Garden City Terminal to coincide with the Panama Canal Expansion Project." This would indicate that the GPA has already made and will continue to plan/make modifications to the GCT facilities in clear anticipation that the deepening of the Savannah Harbor to enable larger vessels to reach the GCT will be approved and implemented. Would the GPA be making this major investment in GCT modifications (about $130 million according to the 2005 version of the GRR) if it were concerned about the risk of some other option being chosen? Would the improvements to the GCT be carried out if another alternative, perhaps involving a different terminal site, was selected in the FEIS as a preferred action?

5. Comments on the Alternatives Considered

CEQ NEPA regulations (1502.14(a)) require that agencies "Rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated." Paragraph 4 on page 3-2 in Section 3.00 states that "The Corps considered three locations in Jasper County, SC that were considered by others for a 'Jasper Terminal'." Paragraph 5 states that the ". . . analyses . . . resulted in several conceptual alternatives being eliminated from further consideration." It references "Formulation of Alternatives, May 2005, found in Appendix O" as the document describing that work. However, Appendix O contains no evaluation of the three locations in Jasper County that were considered for a "Jasper Terminal." A Plan Formulation Appendix that discussed the Jasper Terminal locations is included in the General Reevaluation Report, but there is no reference to this in Section 3.00. Additionally, Section 3.00 of the DEIS does not identify the alternatives which were eliminated from detailed study, nor does it discuss the reasons for elimination of those alternatives. This deficiency in the document needs to be corrected for the DEIS to comply with CEQ NEPA regulation Section 1502.14(a).

Paragraph 5, line 5 on page 3-2 of Section 3.00 discusses "Four alternate terminal locations . . ." The section continues by stating that "Those four sites were then compared on their economics . . .", implying that economics was a reason for eliminating alternatives from detailed study. However, if economics was a reason for eliminating alternatives from detailed study, it is not clearly stated. Moreover, if there were other reasons for eliminating alternatives from detailed study, the DEIS does not state so. Additionally, the DEIS should identify the criteria that were used to compare the feasibility of alternatives for further consideration in the DEIS.

Section 3.03, Comparative Impacts of Alternatives. Section 1502.14 of the CEQ NEPA regulations states that the Alternatives section of an EIS " . . . should present the environmental impacts of the proposal and the alternatives in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decisionmaker and the public." Section 3.03, however, does not present a comparison of the impacts of alternatives as recommended in the NEPA regulations.

Section 3.04, Rationale for Plan Selection. Paragraph 1, line 2 of this section references two pages of the DEIS following the Section 3.04 text that ". . . summarize the results of the impact analyses." However, the two pages (Table 3-6 and Table 3-7) only summarize the hydrodynamic-related impacts of the five depth alternatives and do not summarize the impacts of the No Action Alternative, nor deepening only the Garden City Terminal site,

which Section 3.00 states in Paragraph 5 on page 3-2 ". . . was considered in the detailed evaluations." Section 3.04 of the DEIS, therefore, should be revised to present the environmental impacts of the No Action and Garden City Terminal site alternatives with the five depth alternatives in comparative form to provide a clear basis for choice among options. Moreover, the comparison of alternatives should include all environmental impacts that are discussed in Section 5, Environmental Consequences. In addition to those impacts currently included in Tables 3-6 and 3-7, the summary of impacts should include the following: sediment quality, air quality, marine and estuarine resources, terrestrial resources, floodplains, threatened and endangered species, cultural resources, essential fish habitat, cumulative effects, aesthetics and recreational, recreational and commercial fishing, socioeconomic resources, environmental justice, and other items and factors.

Section 3.07, Alternative Methods or Beneficial Use of Dredged Sediments. Paragraph 1 on page 3-23 of this Section identifies that ". . . Savannah Harbor ODMDS is the least cost disposal alternative for long term maintenance of the proposed harbor deepening project." It is not clear whether or not maintenance dredging is part of the proposed action. If it is part of the proposed action and alternatives, the DEIS must present the environmental consequences of the disposal alternatives and should present these in a comparative form so that the decisionmaker and the public are presented with a comprehensive evaluation of the short-term and long-term impacts of each alternative.

Paragraph 1 on page 3-24 of Section 3.07 discusses a "sediment placement plan" that was developed by the Savannah District for the new dredging work associated with the proposed action and alternatives. The text in paragraph 1, line 2 on page 3-24 indicates that "The plan was reviewed from an environmental perspective . . ." However, the text does not present the results of that review nor indicate if a complete analysis of impacts of the plan was completed. Since placement of sediment is part of the proposed action, an evaluation of the environmental impact of that component of the proposed action needs to be included in the DEIS. Additionally, Paragraph 3 of Section 3.07 indicates that the " . . . currently proposed plan is based . . .", in part, on ". . . general environmental acceptability issues." These issues need to be explained and presented for the proposed plan and any reasonable alternatives to allow a comparison of the impacts of alternatives.

Selection of the Garden City Terminal Alternative

As stated in the 2005 GRR, the preferred terminal was the GCT and it was selected on the basis of construction costs only (page 34). The comparison of these construction costs is skewed to the GCT. Table 6 compares the construction costs of the various potential terminal alternatives. For the GCT there 0$ cost shown in the column for facilities costs. Yet in the succeeding discussion there are $130 million in costs to modify the GCT to achieve a 1.5 m TEUs. This $130 m is considered in the GRR as part of the without

Project Condition and not part of the cost of the SHEP. How can that be when the modifications are to accommodate the larger ships from the Panama Canal Expansion? Facility costs for all the other terminals which range from $250m to $370 m and as they are included in the cost comparison, all of the other alternatives are more costly than the GCT. For example the total facility, dredging and mitigation costs are $326 m for the GCT compared to the Jasper County 14A/14B terminal site of $484 m. However, if the $130 m in facility costs are included for the GCT, its total would be $426 m making the actual cost comparisons among the terminal alternatives more equitable. This analysis was repeated in the 2010 GRR with slightly altered numbers in Table 6-3 but again without including any facility costs for the GCT and thus again the conclusion is that the GCT is the best terminal alternative.

On pages 105-106 of the 2010 GRR the stated goal for the GCT build-out will be 6.5 m TEUs. The costs to achieve this to the GCT would be expected to be substantial yet they are never included in the cost comparison of the terminal alternatives.

In addition, the cost comparisons of the terminal alternatives do not include operations and maintenance costs. From the dredging maintenance required these costs would be expected to be much higher for the GCT than the other alternatives since the GCT is much further upstream.

All of this would indicate that a more thorough and comprehensive cost analysis is warranted. Furthermore, a construction cost comparison alone is not the complete picture. There has been no benefit/cost financial analysis performed for any of the terminal alternatives and it is recommended that one be carried out to provide a more equitable comparison.

The comparison of potential adverse environmental impacts among the terminal alternatives is further evidence of the bias favoring the GCT. Table 5 in the 2005 GRR and discussions in the 2010 GRR clearly demonstrate that the adverse impacts associated with deepening all the way to the GCT are much more significant than those for any other terminal alternative. Yet the economic "efficiency" of the GCT is considered the controlling variable in selecting it as the preferred alternative. The large discrepancy in the degree of adverse impacts attributable to the deepening to service the GCT as compared to the other terminal alternatives and the subsequent elimination of all the other terminal options from further consideration in the DEIS implies an inadequacy of the DEIS to provide a truly rigorous assessment of reasonable terminal alternatives.

Range of Reasonable Alternatives

What is left in the DEIS is not a range of reasonable alternatives but a range of alternatives to deepen the approach to the GCT. The comparative effects of possible terminal alternatives have been effectively removed from consideration in the DEIS.

They have been segmented out of the alternatives analysis and segmentation of this nature can be a basis for inadequacy of the DEIS. The analysis presented only addresses comparative impacts of the deepening alternatives, not of the combined total potential impacts of both terminals (new or modified) and deepening options. Some alternatives to consider:

Clearly a thorough analysis of comparative impacts of at least some of the terminal options in concert with the deepening options should be included other than only the GCT. It would appear that the alternatives for a Jasper County terminal would merit inclusion since it appears that many of the most serious environmental adverse impacts would be eliminated or minimized with those options. The possibility of a Jasper County terminal is discussed in the GRR, but it requires a more rigorous comparison of impacts with the GCT and other alternatives. This position is supported in Appendix L: Cumulative Impacts where there a number brief mentions of the minimal adverse impacts (to salinity intrusion, oxygen depletion, shortnose sturgeon) associated with a Jasper County terminal location in comparison with the deepening to the GCT.

In fact, the degree of adverse impacts associated with deepening to the GCT and the respective major investments required for mitigation calls into question whether the GCT is located optimally. Some of these impacts, specifically related to the endangered shortnose sturgeon, cannot be well mitigated. Perhaps an alternative that removes the GCT from the SHEP or maintains it as a companion facility to a more optimally located terminal with substantially less adverse environmental effects could be evaluated.

With regard to the deepening alternatives that are presented within the DEIS a question arises as to the need for evaluations at one foot intervals since the overdraft is estimated at two feet. Why not evaluate alternatives that are two or more feet between them? Further, why is there no deepening alternative of 50 feet? Or even 52 or 55 feet? It would seem reasonable to include alternatives of 50 feet or more since that is the deepest depth of draft for the ships that will traversing the Panama Canal in 2014? As stated in the GRR, economic benefits increase with deeper alternatives. This may also possibly necessitate other terminal options than only the GCT.

Other

3.0 Alternatives – Pg 3-3, 2nd para – "The studies found that (1) the expected growth of container cargo over the next 20 years would exceed the capability of any single existing or future (Greenfield) deepwater container terminal along the East Coast, (2) expansion of any existing container terminal or creation of a new terminal would cause environmental impacts, and (3) improving Savannah Harbor would not cause cargoes to shift from other ports to Savannah. Dismissing as an alternative the creation of a new terminal because it would cause environmental impacts is shortsighted and premature. Only after investigating the potential impacts of a new terminal to a level that would

allow them to be directly compared against potential impacts of other alternatives such as incremental deepening, would it be possible to determine if the new terminal alternative were the least environmentally damaging practicable alternative.

3.0 Alternatives – Pg 3-4, 3rd para – "For all dredging alternatives, the proposed dredging depths would include an additional 2 feet of allowable overdepth to ensure the contractor obtains the required dredging template. The dredging depths also include advanced maintenance that help the project remain at the authorized project depth between maintenance events. The existing amounts of advanced maintenance are shown in Table 3-2". The project alternatives that are being considered in detail within this DEIS are channel deepening activities ranging from authorized depths of -44 feet to -48 feet. Based on the above reference to allowable overdepth and advanced maintenance (shown in Table 3-2), the final channel depths for each deepening alternative could actually range from -52 feet (i.e., -44 feet of authorized depth plus 2 additional feet of depth for allowable overdepth, plus up to 6 additional feet of depth for advanced maintenance) to -56 feet (-48 feet of authorized depth plus 2 additional feet of depth for allowable overdepth, plus up to 6 additional feet of depth for advanced maintenance). This needs to be more clearly identified in the text describing each alternative and in a table that compares the final depths of each alternative.

3.01.1 No Action Alternative – Pg 3-4, 5th para – "Previous investigations indicate that demand for goods moving through Savannah Harbor, particularly as containerized cargoes, will increase in the future". What is/are the references for this statement?

d. Annual Maintenance Dredging – Pg 3-8, 2nd para – "Approximately 7 million cubic yards of sediments are removed each year from Savannah Harbor Navigation Project by the Corps". What is the calculated increase/decrease in maintenance dredging due to the SHEP? Does the calculation include the effects of a navigation channel that could be as deep as -56 feet?

h. Unconfined Placement Sites – Pg 3-14, 2nd para – "Moreover, the results of this survey indicated that no cultural resources would be adversely impacted by the proposed placement of dredged sediment within these areas". Was there SHPO concurrence with this finding?

3.04 Rationale for Plan Selection – Pg 3-19, 4th para – "Environmental impacts associated with a shallower depth would be less than those associated with the NED plan, but the lesser impacts of the 44-foot depth, 45-foot depth and 46-foot depth alternatives are not considered sufficient to justify recommendation of these alternatives instead of the NED plan". There is no explanation as to why the Corps considers the lesser impacts of the 44, 45 and 46 foot channels to be sufficient to justify their recommendation instead of the NED plan. This rationale needs to be discussed in detail.

3.04 Rationale for Plan Selection – Pg 3-20, Table 3-6 – Regarding Fisheries, and the impacts of each Depth Alternative, what does "Loss of Acceptable Habitat" mean?

3.05 Tentatively Recommended Plan – Pg 3-22, 5th para – "Two feet of allowable overdepth and up to 6 feet of advanced maintenance in selected areas (see Table 3-2, above) would also be included for the proposed action". This apparently means that the actual depth of the navigation channel in much of the Savannah River would be either 55 feet deep (for a 47-foot project) or 56 feet deep (for a 48-foot project). This being the case, the water quality and hydrodynamic model results for the 47-foot and 48-foot alternatives don't correctly predict the impacts on dissolved oxygen and salinity. In turn, the discussion of impacts on the river's resources is inaccurate for the 47-foot and 48-foot alternatives. Since the mitigation plan was developed to address the impacts predicted by the models, it too would need to be revised to address impacts of the actual channel depths.

3.12 Relationship of Proposed Action to Other Federal Projects – Pg 3-29, 5th para – "As indicated in Section 3.01 of this Draft EIS, the proposed action assumes that the project feathures associated with the LTMS (USACE 1996), Bank Protection for CDFs 13A and 13B, and the realignment of the Federal Navigation Channel (USACE 2006) have been completed". Given the historic uncertainty in the federal funding stream, what would be the environmental and economic impacts if the above mentioned project features have not been completed when the proposed SHEP project is ready to be constructed? Would the Corps proceed with constructing SHEP?

6. Comments on Critical Resource Categories

6.1. Natural Resources

6.1.1. Wetland Impacts

The sections of the report discussing impacts to wetlands and floodplains are generally without consistent references to the numerous support documents, making the discussion difficult to follow. The document has numerous figures without legends, scales and north arrows; this combined with the actual size of the figures makes them difficult to interpret.

The USACE proposes to allow the wetland restoration site (Disposal Area 1S) to revegetate naturally. Slow vegetative establishment within the restoration site allows for the establishment of invasive species and would allow more temporal loss in wetland functions and values than is necessary. Planting the site with appropriate wetland vegetation would minimize the potential for invasives to colonize the area.

The USACE is depending on the models to estimate proposed impacts and potential mitigation alternatives. Despite these models being independently verified, the USACE is putting too much reliance on their results.

A comprehensive investigation is needed to quantify the impacts of the project and the amount of mitigation proposed to ensure no net loss of wetland functions and values.

DEIS Comments

Section 4.08, page 4-62. The first sentence under the wetlands sub heading references a 1992 Planning Aid Report for the Savannah Comprehensive Study but does not provide an author. Later in the section, references are made to "that USFWS report" or "the UFWS report." Are these the same report? If so what is the correct date? The reference section contains a 1982 and a 1983 report of the same title by USFWS.

The imagery used in the report discussed above was taken in 1979 (31 years ago) and is too old to accurately reflect existing conditions.

Section 4.08, page 4-63, item 14 "Scrub-shrub." The community description only lists one shrub and 4 tree species. Should this more appropriately be classified as a forested community?

Section 4.08, page 4-63. Are there no pine dominated wetlands along the transition between marsh and forested communities?

Section 4.08, page 4-65 cites "Tidal Wetland Studies, USFWS, 2003". This reference cannot be found in Section 9.0 References.

Section 4.08, page 4-64 states: "It is likely that the percentages of those various wetland community types have changed over time. However, the Corps is not aware of similar information that is more recent."

No project specific wetlands data is provided in this Section. Has a wetland delineation using the Corps 1987 Manual and regional supplement been done for the Project Area? The exact location of wetlands should be shown and each wetland should be characterized based size and dominant flora. If not, an "on-the-ground" delineation is needed. Alternatively, appropriate remote sensing techniques may be used.

Based on Table 5-1 page 5-2, wetland impacts appear to be based solely on elevation. An explanation is appropriate. Have these impacts been field verified? If so, this needs to be stated.

Table 5-1, page 5-2. The use of a single elevation in evaluating wetland impacts throughout the project area is in appropriate. The lower and upper limits within a single wetland community (i.e. *Spartina alterniflora*) will change moving further upstream or downstream. These changes may be small but given the length of this project, the acreage could be significant.

Section 5.1.1.2 Mitigation, identifies *Spartina alterniflora* as occurring at +7.6 to +7.8 MLLW but Table 5-1 is based on MLW. A single vertical datum and tidal stage should be used to reference all elevations or the relationship between each one used needs to be defined within the document.

Figure 5-1, page 5-3. No scale or north arrow provided. Text on background image is illegible. No aerial image. Scale of drawing prevents an evaluation of the two excavation areas planned at the Kings Island Turning Basin.

Figure 5-2, page 5-4. Level of detail and scale of the Figure prevents evaluation of planned wetland impacts.

Figure 5-3, page 5-5 No scale bar, north arrow or legend. The lack of a legend prevents reviewers from determining what exactly is happening at this location.

The fourth sentence on page 5-6 states; "CDF 1S is located adjacent to the confluence of Front River and Middle River, and it is located within the boundaries of the Savannah National Wildlife Refuge (see Figure 5-52)." However; Figure 5-52 on page 5-134 is a photograph of Old Fort Jackson (Upstream Bank Protection).

This project will result in a net loss of wetlands within South Carolina and the Charleston District, based on the fourth sentence on page 5-5 describing the location of the proposed mitigation site

The last sentence of the first paragraph on page 5-6 states "excess mitigation would be credited to the Savannah Harbor Navigation Project." How will this "excess" mitigation be credited and debited to ensure no additional loss of wetland acreage? Establishment of a wetland mitigation bank with the Corps as the sponsor and overseen by the remaining agencies that make up the Wetlands Interagency Coordination Team may be a plausible approach.

In Section 5.1.1.2, page 5-6, the USACE proposes to allow the wetland restoration site (Disposal Area 1S) to revegetate naturally, provided that the minimum percent vegetative cover shown in Table 5-2 is met in each of the first 5 years shown.

Based on the text below Table 5-2, it is uncertain when the USACE would plant, at the end of any year or at the end of the 5 year period? By allowing natural revegetation the Corps is ensuring that the plants that establish within the site are genetically appropriate for the region. However the slow vegetative establishment within the restoration allows for the colonization of invasive species and would allow more temporal loss in wetland functions and values than is necessary. Planting would be more appropriate.

Figure 5-4, page 5-7 No scale bar or legend presented. Level of detail and scale of the Figure prevents evaluation of restoration site.

Section 5.1.2.2, page 5-11, Applied Technology and Management (March 2003) was cited; however this reference does not appear in Section 9 References.

Section 5.1.2.2, page 5-11, USFWS (Welch and Kitchens 2006) was cited; however this reference does not appear in Section 9 References.

Table 5-2, page 5-7. Table title does not match with what is provided in Table of Contents.

Section 5.1.2.1, page 5-8. The accuracy of the models will not be known until years after all of the work is complete. This fact is supported by the internal Corps documents found in Appendix N on page 44.

Table 5-3, page 5-11 Table title does not match with what is provided in the Table of Contents.

Table 5-4, page 5-13 Table title does not match with what is provided in the Table of Contents.

In Section 5.1.2.3 page 5-13, The Corps introduces a component of the mitigation package, "Flow Routing". What are the direct and secondary impacts from Flow Routing?

Table 5-7, page 5-16. Table title does not match with what is provided in the Table of Contents.

Figure 5-5, page 5-15. Table title does not match with what is provided in the Table of Contents.

The following figures have no scale bars or north arrows (not inclusive):

- Figure 5-6, page 5-18
- Figure 5-7, page 5-19
- Figure 5-8, page 5-20
- Figure 5-9, page 5-21
- Figure 5-10, page 5-22
- Figure 5-11, page 5-23
- Figure 5-12, page 5-24
- Figure 5-13, page 5-25
- Figure 5-14, page 5-26

Table 5-16, Page 535. Channel Depth Alternatives 46, 47 and 48-Foot have freshwater wetland impacts too large to go without at least a 1:1 restoration component within the same river basin or at a larger ratio in another river basin.

There is no discussion on potential impacts associated with elements of this project including a new boat ramp and new water intakes. Are there wetland (or other resource) impacts associated with these components of the project?

6.1.2. Essential Fish Habitat Impacts

The Essential Fish Habitat portion of the DEIS was difficult to follow. Tables and figures were mislabeled, lacked legends, or were of poor quality. In addition, the DEIS contained a paucity of information about impacts to essential fish habitat or how the project will impact essential fish habitat from a fish accessibility perspective. Instead the DEIS focused on the mitigation of essential fish habitat in the majority of the discussion. The lack of information about the impacts or consideration of realistic options that would avoid the impacts suggests the requirements of NEPA may not have been satisfied. Extensive areas of essential fish habitat will be lost because of the project. The mitigation of essential fish habitat through the restoration of inaccessible marsh habitats or the purchase of woodland does not provide adequate replacement for the essential fish

habitats that will be lost due to this project. The inaccessibility of mitigation areas renders the essential fish habitats, non-fish habitats and, therefore, non-essential and non-existent from a fisheries perspective.

Following are specific comments on the DEIS regarding essential fish habitat issues.

Table 4-8 highlights potential impacts to essential fish habitats due to the project. The table does not include potential impacts due to the increased wave activity caused by the larger ships for which the project is being constructed. The absence of this information is likely to underestimate the loss of essential fish habitats.

Table 4-8 also highlights a potential loss of live/hard bottoms. Actual loss could be determined by a study of the proposed channel extension or sediment deposit areas. It is difficult to assess the impacts of a project if the proper studies have not been completed to determine the likely impacts of the project.

Table 4-10 does not, but should include the Atlantic Sturgeon as a candidate species.

Section 5.3.2.A.Shortnose sturgeon – Pg 5-91, 3rd para – The Corps conducted a preliminary review of the 2001 fishway design and confirmed that conditions had not changed that would reduce its effectiveness or implementability". Does the Corps have documentation that Shortnose sturgeons have used fishways in the Savannah River, or any other river of similar characteristics?

6.1.3. Recreational and Commercial Fish Resources

GRR Section 4.8.4 Marine and Estuarine Resources – Pg 61, 4th para - "The recreational fishery for striped bass was recently reopened in the harbor, as a response to restored population levels."…"the Savannah River was the location of Georgia's most important striped bass fishery." This is a critical statement. Where is the citation for this?

DEIS Section 4-12, P. 4-79, 5th para. -Shrimp fishing common at the mouth of the River. May be more in the spring when females are moving toward the ocean to release their eggs. As queried above, shrimp fishing is a significant commercial venture but there appears to be no recent survey data to characterize population or health of this resource.

6.1.4. Marine and Estuarine Resource Impacts

The report contained extensive amounts of information on a wide variety of issues. The DEIS would be more understandable if proper citations were made. As currently organized, significant issues are difficult to follow.

Overall, there was a lack of discussion and a lack of recent evaluation of the project's impacts on commercial and non-commercial pelagic and benthic invertebrates. In that this trophic level serves as the base of the food chain more information should be provided on the impacts to these assemblages.

The following comments are on the DEIS:

Section 3.07 - Page 3-23, Para. 4-"Savannah District followed an iterative process to develop a plan for the new work entrance channel sediments. The work started with an engineering determination of sediment quantities to be removed at various channel depths and the composition (i.e., percent fines and percent sands) of those sediments. A review of previous information was conducted, including: the Draft 2003 ERDC Report on Nearshore Placement at Tybee Island;...". What is the citation for this document? It is not listed in the References.

Section 4.04 Marine and Estuarine Resources – Pg 4-20, 1st para – "Shad spawn in the main river, further upriver than do striped bass". Where do American shad spawn in the main river with respect to the limits of the SHEP?

Section 4.04 Marine and Estuarine Resources – Pg 4-20, 3rd para – "However population levels have been much lower in the last 20 years and a higher proportion of the spawning now appears to be occurring in the Savannah River a few miles upstream of the harbor (over 21 miles upstream from the mouth of the Savannah River)." Over what type of bottom does striped bass spawning in the Savannah River occur?

Section 4.04, Page 4-21, Para. 3- Invertebrates s of commercial import- cited from 1974 report (Johnson et al.) ((e.g., crabs, oysters, and shrimp). Cites data back to 1955. Provided an unreferenced, undated Shellfish Harvest Area Map from Mr. Dominic Guadagnoli, Shellfish Program Leader with the Georgia Department of Natural Resources – Coastal Resources Division. Is there more recent data available on the state of invertebrates of commercial importance?

Page.4-38. Para. 1. Information was taken from Collins et al. (2001). Also, discusses plankton in two studies from 2001 and 1988. Not sure of the geographic extent of these studies and they are very qualitative. Simply references species caught in tows. This may indicated that a better understanding of the resource is needed.

5.7 Marine and Estuarine Resources, Page 5-111, Section 5.7.1.1, C - Example of unreferenced critical statement, "More recent data indicate that present-day dredging operations are conducted in ways that do not increase suspended sediment concentrations to such a degree." No reference. Is this real data specific to Savannah River or an industry-wide generalization?

5.7 Marine and Estuarine Resources, Page 5-113, Section 5.7.1.1, C – Example of unreferenced critical statement, "Moreover, the Savannah River already has a very high sediment load and turbidity caused during the new work dredging would not adversely impact shellfish areas." There is no reference or a discussion in the DEIS that supports this. Has it been quantified?

Section 5.7 Marine and Estuarine Resources, Page 5-114, Section 5.7.2, A – "The sediments to be deposited in the nearshore area consist primarily of sands. The sand content of the sediments generally exceed 70 percent and in most reaches exceed 80 percent." Where is the support for these data? It should be cited.

Also, the DEIS states "Eggs and larval fish are not as mobile as adults, so there is a higher potential for those early life stages to be impacted being physically damaged by sediment or materials in the dredge plume. However, the near shore areas off Tybee Island have a very high sediment load since the Savannah River discharges at the north end of the island. Also the wind and wave climate in the near shore area tends to have a naturally high sediment content and high turbidity. The placement activities would be much localized and therefore not impact a large area."-These are very broad, uncited, unquantified statements that, if inaccurate, could have very significant impacts on these life forms in the vicinity of these proposed.

5.7.2 Sediment Placement Impacts, B. Turbidity, p.5-115. Para 5 – "The turbidity in effluent from diked sediment placement is controlled by adjustable spillways. The SC standard for turbidity is that discharges not to exceed 25 NTUs provided the existing uses of the water body are maintained. Savannah District imposes a 500 mg/l limit on suspended solids in the CDF discharges. This limit is believed to be sufficient to reduce turbidity impacts in the receiving waters to acceptable levels."- What is this based on?

6.1.5. Floodplain Impacts

The following comments are on the DEIS.

The three paragraphs within this section fail to sufficiently discuss the floodplains within or immediately adjacent to the project area. Information was lacking on floodplains within or immediately adjacent to the project area and the quantity, functions and values of the floodplains.

The final sentence in this sections states that "large-scale filling of wetlands within the floodplain are not expected in the future". Large is a relative term. If floodplains are going to be impacted, this impact needs to be accurately quantified. Also, why does the SHEP mitigation plan propose to preserve existing wetlands that are "protected" and under no threat of filling as compensation for the loss of 337 acres of tidal freshwater wetlands?

Section 5.10 Floodplains on page 5-122 states "hurricane modeling indicates that change in the water surface elevations due to the proposed harbor deepening is not significant." What statistical analysis was used to determine if a significant difference exist?

Section 5.10 Floodplains on page 5-122 did not quantify any specific impact to floodplains including shift in community composition or land use.

Section 5.10 Floodplains on page 5-122 did not provide any information on the secondary impacts to floodplains caused by this project?

In Section 5.10 Floodplains on page 5-122, modeling discussed involved storm surge from hurricanes. Was any modeling done to identify the effects of the project to floodplains in normal conditions?

Section 5.10 Floodplains on page 5-122. Was the potential impact to floodplains/riparian wetlands caused by increased ship traffic or ships traveling at increased speeds evaluated?

6.1.6. Terrestrial Resource and Shoreline Impacts

Impacts to terrestrial resources and existing shorelines were examined in three separate USACE documents titled *Ship Forces on the Shoreline of the Savannah Harbor Project (2006)*, *Impacts of the Savannah Harbor Expansion Project-Draft (2006)*, and *Savannah Harbor Expansion Bank Erosion Study-Update (2010)*. The studies were designed to determine the impacts that the project would have on the shorelines of the Confined Sediment Placement/Disposal Facilities, City Front, Ft. Pulaski, and Tybee Island (Ship Forces on the Shoreline of the Savannah Harbor Project and Savannah Harbor Expansion Bank Erosion Study-Update) as well as to determine the change in shoreline and sediment volume and to predict changes in circulation, waves, and potential sediment transport between the existing and future conditions (Impacts of the Savannah Harbor Expansion Project-Draft).

Some of the conclusions made in the documents were sound; however, many were based on unsubstantiated claims. In some cases conclusions were based on existing conditions without determining the impacts of the proposed conditions. Comparisons were made between alternatives which were not the proposed alternative, while ignoring differences in impacts between the existing condition and the proposed alternative. Data which could be used to allow peer review of some of the models was missing or omitted. Some conclusions were based on incomplete models and impacts to some resources were not determined because they were not under the scope of the current study. It remains unclear whether impacts to these resources were determined. Finally, none of the studies examined the impacts resulting from the use of Generation 2 post-panamax vessels within the deepened channel.

The documentation does not clearly quantify the impacts to the Confined Sediment Placement/Disposal Facilities, City Front, Ft. Pulaski, and Tybee Island. The conclusions drawn from these studies have not been substantiated and continuation of the NEPA process without knowledge of the potential impacts to these resources would be in error.

Specific comments on Terrestrial Resources are provided below.

4.07. Terrestrial Resources, p. 4-61, Last paragraph: The section titled Existing Shorelines Adjacent to the Federal Navigation Channel is Section 5.9 in the Tier 2 EIS.

5.9. Existing Shorelines Adjacent to the Federal Navigation Channel, p. 5-120: This section fails to discuss the analysis, or lack thereof, of the effects of the project on the shoreline along the Confined Sediment Placement/Disposal Facilities as reported in Ship Forces on the Shoreline of the Savannah Harbor Project. Table 20 of the report lists the observed drawdown of seven inbound vessels and eight outbound vessels not the predicted values resulting from the proposed project.

5.9. Existing Shorelines Adjacent to the Federal Navigation Channel, p. 5-120, 6th paragraph: The Savannah Harbor Expansion Savannah Harbor Expansion Bank Erosion Study was updated in June 2010; the paragraph should indicate this fact.

5.9. Existing Shorelines Adjacent to the Federal Navigation Channel, p. 5-120, Last paragraph: The Savannah Harbor Expansion Savannah Harbor Expansion Bank Erosion Study-Update indicates that Areas 13A, 13B, and 14 B of the Bight Area were to be protected prior to completion of the proposed project and therefore not studied in the Savannah Harbor Expansion Savannah Harbor Expansion Bank Erosion Study-Update. Has the shoreline protection projects within these three areas been completed? Has the shoreline along the remaining portions of the Confined Sediment Placement/Disposal Facilities (Such as the Jones Island Disposal Area) been completely protected and stabilized? If unprotected areas remain, the Savannah Harbor Expansion Bank Erosion Study should be updated again to include an analysis of potential impacts to the unprotected areas of the shoreline along the Confined Sediment Placement/Disposal Facilities.

Did the analysis consider potential sea level rise and its impacts on existing shorelines? Will the areas which are currently protected by hardened shorelines (i.e. jetties and bulkheads), and excluded from this analysis, continue to be protected if sea level rise becomes a reality? The analysis should be updated to include the effects of sea level rise on existing shorelines and quantify the impacts that longer and deeper draft vessels will have at higher, base water levels.

5.9. Existing Shorelines Adjacent to the Federal Navigation Channel, p. 5-121, 3rd paragraph: Paragraph states that from 2003 to 2050 there is 3.1 feet of shoreline erosion along Ft. Pulaski per year due to ship traffic and in the same sentence it states that only 0.1 foot (1.2 inches) of the erosion is due to ship traffic. Both values cannot be correct.

5.9. Existing Shorelines Adjacent to the Federal Navigation Channel, p. 5-121, 3rd paragraph: Paragraph states that from 2003 to 2050 there is only 0.1 foot (1.2 inches) of erosion along the Ft. Pulaski shoreline due to ship traffic. However, in the last sentence

the document reads that up to 2.23 inches of annual erosion could occur by year 2050. Both values cannot be correct.

5.9. Existing Shorelines Adjacent to the Federal Navigation Channel, p. 5-121, 4th paragraph: The paragraph states that the circulation and wave modeling results indicate that very small changes are anticipated with the proposed deepening on the beaches of Tybee Island. However, the paragraph fails to mention the sedimentation modeling results, or lack thereof, detailed in the report titled Impacts of Savannah Harbor Expansion Project contained in the Engineering Appendix of the GRR. This report indicates that "A complete sediment budget was not produced due to lack of broad coverage for bathymetry, lack of multiple surveys pre-project to establish the baseline, and uncertainty in rates of some key pathways (p. 2-15)." This report was completed in 2006, four years earlier then the submittal of the Tier 2 EIS. A complete sediment budget should be formulated to determine the impacts that the project would have on Tybee Island.

5.9. Existing Shorelines Adjacent to the Federal Navigation Channel, p. 5-121, 4th paragraph: The paragraph fails to mention that the shoreline and volume change analysis reported in Impacts of Savannah Harbor Expansion Project did not include the barrier islands along the coastline. The report states that the islands were not studied because they were not part of the "scope of work." If the potential for negative impacts to barrier islands exist then the scope should have been expanded or a separate study should have been conducted to determine potential impacts. If there is potential for negative impacts to barrier islands, the shoreline and volume change analysis should be updated.

5.9.Existing Shorelines Adjacent to the Federal Navigation Channel, p. 5-121, 4th paragraph: The paragraph fails to mention that the shoreline and volume change analysis reported in Impacts of Savannah Harbor Expansion Project could not adequately determine the impacts to Tybee Island as stated as follows: "Data are lacking to fully quantify the impact of the project on Tybee Island (primarily multiple full coverage surveys prior to the project to establish historic rate and recent surveys to establish present rates) (p. 2-17). " The report indicates that the Tybee Island Shelf is currently deflating at a rate of 220,000 m^3/yr and although the full impacts of the project cannot be "full quantified" with the data available, the Report indicates that the major impacts to the Shelf and Barrett Shoals are from "dredging and deepening." The Shoreline and Volume Change Analysis should be completed with the missing data to determine the potential impacts of yet another dredging and deepening project on the Tybee Island Shelf and Barrett Shoals.

5.9. Existing Shorelines Adjacent to the Federal Navigation Channel, p. 5-121, 2nd and 3rd paragraphs: The conclusions drawn from the results detailed in Ship Forces on the

Shoreline of the Savannah Harbor Project, (which is contained as an attachment in the Engineering Appendix) should be reconsidered.

Ship Forces on the Shoreline of the Savannah Harbor Project, p. 2, 1st paragraph: Page 2 is very optimistic about the "blockage ratio". In areas where the channel takes up much of the river, such as the U.S. Route 17 crossing, the blocking ratio is much greater than predicted. A vessel with a 160 ft beam (Such as a Generation 2 post-panamax vessel which is predicted to use the channel by 2015, Savannah Harbor Expansion Bank Erosion Study-Update, Appendix B) and a 42.3 ft draft (Allowing for a10 percent under keel clearance, or 6,768 sq ft), in a channel that's 470 ft wide, 47 ft deep, and has sloped sides at 3:1 (22,560 sq ft) the blockage ratio is 30 percent not the 9.5 percent stated as the maximum in the report. The blockage ratios should be revised to include areas where the river is narrow in width and should be updated based on the predicted use of Generation 2 post-panamax vessels (See below).

Also, the assumption that ship forces are essentially dependent on a two dimensional slice of the ship in the channel is also flawed. It is a problem of added mass, which is the mass of water a ship needs to displace to move into a new location within the fluid. Two ships of the same beam but different hull forms have different added mass factors. A very full ship such as a tanker moves more water than a finer hull like a container ship, which moves more water than a naval ship.

Ship Forces on the Shoreline of the Savannah Harbor Project, p. 13, 2nd paragraph: The writer bases the drawdown, wave height, and wave power calculations on the facts that panamax vessels will have an increased speed in the deepened channel and that post-panamax vessels will have a decreased speed. The assumption that post-panamax vessels will maintain the same power level and travel at a lower speed seems poor (The lower speed resulting from a deeper draft). The post-panamax vessels would travel at a speed which provides safe maneuverability when traveling the channel. To assume that this speed will always be lower than the current speed and that that the captain or pilot will maintain the same power setting, which may result in a speed which provides low maneuverability, is a poor assumption. The analysis should be based on the actual predicted speeds not the predicted power level.

Ship Forces on the Shoreline of the Savannah Harbor Project, p. 20, 2nd paragraph: Wave power, is expected to increase by up to19 percent along Ft. Pulaski. This is not insignificant. Wave power has to increase substantially as the percentages of larger vessels running with deeper drafts are projected to increase in a channel whose cross sectional area is only increasing by 4 percent. It is assumed that the 19 percent increase was forecasted for a post-panamax vessel, as a full summary of the results of the wave power analysis are not provided in this document. The details of the wave power study need to be made public to allow for peer review of these conclusions.

The document states that the project's effects along the Confined Sediment Placement/Disposal Facilities (p. 24, 1st paragraph) will be the same as along Ft. Pulaski, therefore the ship forces along this long section of the river were not modeled. Barring any differences in river width which may exists between the two sections of the river (Wave impacts will be greater in a narrower river as the waves will have less time to decay before reaching the shoreline) the conclusion that wave power will also increase by up to 19 percent along the Confined Sediment Placement/Disposal Facilities is fair. This is a significant increase.

The document states that the only effect which needs to be modeled for the shoreline along the City Front is the long period drawdown. However, the document only provides observed drawdown results (Table 21) and not predicted impacts of the project. The predicted drawdown results, as wells as wave power results, should be published for review.

The study also fails to analyze the predicted drawdown, wave height and wave power increases along the City Front, the Confined Sediment Placement/Disposal Facilities, and Tybee Island resulting from the passage of a Generation II post-panamax vessel along the River. As mentioned previously, according to the updated fleet forecasts detailed in Appendix B of the Savannah Harbor Expansion Bank Erosion Study-Update Generation II post-panamax vessels (Which can have beams up to 160 ft) are expected to call by the year 2015. These vessels will displace an even greater amount of water and it doesn't appear that the effects that they will have has been calculated, or at least reported in Ship Forces on the Shoreline of the Savannah Harbor Project or in the Tier 2 EIS. For example, a Generation 2 post-panamax vessel (160ft beam) with 10 percent underkeel clearance will take up 30 percent of the cross section of the new 47 ft channel. Current panamax vessels in the current channel only take up 18 percent of the cross section of the channel. Thus, Generation 2 vessels will displace 67 percent more water relative to channel cross section. This cannot amount to a negligible erosion rate, and the conclusion that wave power will be substantially greater is accurate. The effects that the use of Generation 2 post-panamax vessels will have on drawdown, wave height and wave power along the City Front, the Confined Sediment Placement/Disposal Facilities, and Tybee Island should be determined.

Ship Forces on the Shoreline of the Savannah Harbor Project, p. 22, 3rd paragraph: The document indicates that the impact analysis conducted for the Tybee Island shoreline compared the typical (80 percent of design draft) and design draft conditions. The document then states that "in all cases, the design draft ship in the deepened channel had slightly less drawdown then the existing channel." The difference between those two conditions is much less important than the difference in drawdown between the current condition (Vessels traveling at 80 percent draft in the existing channel) and the future condition (Vessels traveling at design draft in the deepened channel). Table 15 indicates

that post-panamax vessels traveling at typical and high speed will have drawdown increases of 12.9 percent and 5.73 percent, respectively. These are much less then the differences calculated for panamax and sub-panamax vessels. The increase in drawdown for panamax vessels traveling at typical speed is 31.5 percent and the increase for those traveling at high speed is 22.3 percent between existing and future conditions. The increase for sub-panamax vessels traveling at typical speed is 27.2 percent and the increase for those traveling at high speed is 34.4 percent. These increases are not insignificant.

Ship Forces on the Shoreline of the Savannah Harbor Project, Tables 16-19: The tables should provide the differences between the existing conditions (Vessels traveling at 80 percent draft in the existing channel) and the future conditions (Vessels traveling at design draft in the deepened channel) for the years of 2030 and 2050. The differences in drawdown between the other scenarios matter much less. The updated table should be updated to make these comparisons.

Ship Forces on the Shoreline of the Savannah Harbor Project, p. 36, Table 9: The ship effects should be recalculated using the actual predicted speeds for post-panamax vessels (not an estimate of the power level), and should show the predicted drawdown, return velocity, and wave height for Generation 2 post-panamax vessels. The same type of table should be developed to show the results of these forces on the shorelines of the Confined Sediment Placement/Disposal Facilities and the City Front. Appropriate cross sectional areas should be used for each of these sections of the River.

Ship Forces on the Shoreline of the Savannah Harbor Project, p. 36, Table 9: As the table appears in the report, the predicted return velocity increase for typical speed panamax vessels with the change from 80 percent draft to design draft is 24 percent. The drawdown increase for typical speed panamax vessels is 26 percent. The return velocity increase and drawdown increase for high speed panamax vessels are 30 percent and 35 percent, respectively. The short period bow and stern wave heights for typical and high speed panamax vessels going from 80 percent draft to design draft are 28 percent and 30 percent, respectively. These area substantial increases and should not be hidden within the composite tables which average in the results from the smaller vessels shown in Tables 5 and 9. As mentioned previously, the analysis should be conducted again using predicted speeds and should include an analysis of the impacts of Generation 2 post-panamax vessels using the channel. The results should be updated to clearly indicate that return velocities, drawdowns, and wave heights could increase with the project as shown in the example above.

Ship Forces on the Shoreline of the Savannah Harbor Project, p. 43, Table 15: The table heading indicates that it contains return velocity information, however, this data is absent

from the table. Table 15 should be updated to include this missing information for public review purposes.

5.9. Existing Shorelines Adjacent to the Federal Navigation Channel, p. 5-121, 2nd and 3rd paragraphs: The conclusions drawn from the results detailed in Savannah Harbor Expansion Bank Erosion Study-Update, (which is contained as an attachment in the Engineering Appendix) should be reconsidered to address the following concerns with this document.

Savannah Harbor Expansion Bank Erosion Study – Update, p. 1, 7th paragraph: For 2008, 3,055 calls would have been reduced to only 3,049 calls if the channel is deepened to 48 ft. This is a statistical draw, not a "notable reduction".

Savannah Harbor Expansion Bank Erosion Study – Update, p. 2, 2nd paragraph and p. 7, 3rd paragraph: "The updated forecast changes in ship length, beam, and speed were evaluated." And "Changes with regard to ship length, width, speed were negligible." It appears that changes in draft were not considered and Generation 2 post-panamax vessels were not included as part of this Study. The Study should be amended to address these significant deficiencies.

Savannah Harbor Expansion Bank Erosion Study – Update, p. 5, 4th paragraph: The paragraph mentions the increase in wave power at Ft. Pulaski but doesn't mention which vessels and which speeds were used to develop these numbers and how these results are "Included" or utilized within the bank erosion analysis.

Savannah Harbor Expansion Bank Erosion Study – Update, p. 6, 1st paragraph: The report lists the average length of 98.9 percent of all ships calling from the ERDC report to be 574 ft. It is assumed that these callings are the same as those listed in Table 4 of this report. The average length of the 1,245 callings listed in Table 4 is 869.5 ft, a 51.4 percent increase. This is easily noticeable when 70 percent of the calls were panamax vessels with an average length of 951 ft (Table 4). Using the average length of 869.5 ft divided by the average ship speed (19.6 fps) returns a passing time of 44.4 seconds. This number is 126 percent greater than the estimated time of generated wave activity upon the shoreline. The observed wave incident data from the study needs to be made public to allow for peer review of these conclusions.

Savannah Harbor Expansion Bank Erosion Study – Update, p. 7, 3rd paragraph: The percentage of passing time was revised upwards with the measured forces from the ERDC study and other factors and used to estimate the percentage of annual erosion that could be attributed to vessel traffic. This method appears to be using poor science. There is no evidence presented that indicates that the actual percentage of annual erosion couldn't be higher, or lower, for that matter. A different method should be used to estimate the amount of bank erosion attributable to vessel traffic.

Savannah Harbor Expansion Bank Erosion Study – Update, p. 7, 3rd paragraph: The method used to estimate the impact from vessel traffic in 2030 and 2050 uses equally poor science. Multiplying the year 2003 erosion amount by the change in vessel numbers between 2003 and 2030 and again for 2050 completely ignores changes in vessel length and vessel draft. The Revised Fleet Forecast in Appendix B of the Savannah Harbor Expansion Bank Erosion Study – Update details the increasing use of Generation 1 post-panamax vessels and the use of Generation 2 post-panamax vessels beginning in 2015. At this point, the effect that vessels have on the Savannah River shoreline is unknown. Also unknown are the impacts that longer and deeper draft vessels will have on the shoreline. As mentioned previously, a different method should be used to estimate the amount of bank erosion attributable to vessel traffic.

Savannah Harbor Expansion Bank Erosion Study – Update, Appendix B: Consistent use of year 2050 forecast numbers occurs within the document, yet the table in Appendix B only contains forecasts out to year 2032. The Appendix should be updated to included forecasts out to year 2050.

Savannah Harbor Expansion Bank Erosion Study – Update, p. 8, 2nd paragraph: The document states that "There appears to be a net reduction of bank erosion due to the proposed deepening effort." As mentioned previously, the science in the study does not support this claim.

Savannah Harbor Expansion Bank Erosion Study – Update, p. 8, 4th paragraph: This document states results detailed in the report titled Ship Forces on the Shoreline of the Savannah Harbor Project, and as indicated in a previous comment, the drawdown comparisons should be made between the current condition (Vessels traveling at 80 percent draft in the existing channel) and the future condition (Vessels traveling at design draft in the deepened channel). Comparison s between other scenarios is almost meaningless. The claim that "the Savannah Harbor Deeping will have no significant effect on North Tybee" has yet to be substantiated.

Savannah Harbor Expansion Bank Erosion Study – Update, p. 9, 2nd paragraph: Table 21 of the report titled Ship Forces on the Shoreline of the Savannah Harbor Project lists the observed drawdown of 15 inbound and 22 outbound vessels as they passed the City Front area. The report says nothing of predicted drawdown expect that it was assumed to "remain unchanged" due to low vessel speeds in the area. Even if speeds remain the same, the percentages of longer vessels with deeper drafts are to increase according to the table in Appendix B of the document titled Savannah Harbor Expansion Bank Erosion Study – Update. Therefore, it cannot be assumed that conditions in the area are to remain the same (as obviously they are not with larger vessels passing the area) and the potential effects of the project cannot remain unknown. The effects of the project in the City Front area need to be determined.

General Reevaluation Report Comments – Appendices, Engineering Appendix, Engineering Attachments

Savannah Harbor Expansion Bank Erosion Study – Update

2. General, p. 1, 7th paragraph: For 2008, 3,055 calls would have been reduced to only 3,049 calls if the channel is deepened to 48 ft. This is a statistical draw, not a "notable reduction".

2. General, p. 2, 2nd paragraph and p. 7, 3rd paragraph: "The updated forecast changes in ship length, beam, and speed were evaluated." And "Changes with regard to ship length, width, speed were negligible." It appears that changes in draft were not considered and Generation 2 post-panamax vessels were not included as part of this Study. The Study should be amended to address these significant deficiencies.

5.Fort Pulaski, p. 5, 4th paragraph: The paragraph mentions the increase in wave power at Ft. Pulaski but doesn't mention which vessels and which speeds were used to develop these numbers and how these results are "Included" or utilized within the bank erosion analysis.

5. Fort Pulaski, p. 6, 1st paragraph: The report lists the average length of 98.9 percent of all ships calling from the ERDC report to be 574 ft. It is assumed that these callings are the same as those listed in Table 4 of this report. The average length of the 1,245 callings listed in Table 4 is 869.5 ft, a 51.4 percent increase. This is easily noticeable when 70 percent of the calls were panamax vessels with an average length of 951 ft (Table 4). Using the average length of 869.5 ft divided by the average ship speed (19.6 fps) returns a passing time of 44.4 seconds. This number is 126 percent greater than the estimated time of generated wave activity upon the shoreline. The observed wave incident data from the study needs to be made public to allow for peer review of these conclusions.

5. Fort Pulaski, p. 7, 3rd paragraph: The percentage of passing time was revised upwards with the measured forces from the ERDC study and other factors and used to estimate the percentage of annual erosion that could be attributed to vessel traffic. This method appears to be using poor science. There is no evidence presented that indicates that the actual percentage of annual erosion couldn't be higher, or lower, for that matter. A different method should be used to estimate the amount of bank erosion attributable to vessel traffic.

5. Fort Pulaski, p. 7, 3rd paragraph: The method used to estimate the impact from vessel traffic in 2030 and 2050 uses equally poor science. Multiplying the year 2003 erosion amount by the change in vessel numbers between 2003 and 2030 and again for 2050 completely ignores changes in vessel length and vessel draft. The Revised Fleet Forecast in Appendix B of the Savannah Harbor Expansion Bank Erosion Study – Update details

the increasing use of Generation 1 post-panamax vessels and the use of Generation 2 post-panamax vessels beginning in 2015. At this point, the effect that vessels have on the Savannah River shoreline is unknown. Also unknown are the impacts that longer and deeper draft vessels will have on the shoreline. As mentioned previously, a different method should be used to estimate the amount of bank erosion attributable to vessel traffic.

5. Fort Pulaski, p. 8, 2nd paragraph: The document states that "There appears to be a net reduction of bank erosion due to the proposed deepening effort." As mentioned previously, the science in the study does not support this claim.

6. North Tybee, p. 8, 4th paragraph: This document states results detailed in the report titled Ship Forces on the Shoreline of the Savannah Harbor Project, and as indicated in a previous comment, the drawdown comparisons should be made between the current condition (Vessels traveling at 80 percent draft in the existing channel) and the future condition (Vessels traveling at design draft in the deepened channel). Comparison s between other scenarios is almost meaningless. The claim that "the Savannah Harbor Deeping will have no significant effect on North Tybee" has yet to be substantiated.

7. City Front, p. 9, 2nd paragraph: Table 21 of the report titled Ship Forces on the Shoreline of the Savannah Harbor Project lists the observed drawdown of 15 inbound and 22 outbound vessels as they passed the City Front area. The report says nothing of predicted drawdown expect that it was assumed to "remain unchanged" due to low vessel speeds in the area. Even if speeds remain the same, the percentages of longer vessels with deeper drafts are to increase according to the table in Appendix B of the document titled Savannah Harbor Expansion Bank Erosion Study – Update. Therefore, it cannot be assumed that conditions in the area are to remain the same (as obviously they are not with larger vessels passing the area) and the potential effects of the project cannot remain unknown. The effects of the project in the City Front area need to be determined.

Savannah Harbor Expansion Bank Erosion Study – Update, Appendix B: Consistent use of year 2050 forecast numbers occurs within the document, yet the table in Appendix B only contains forecasts out to year 2032. The Appendix should be updated to included forecasts out to year 2050.

Ship Forces on the Shoreline of the Savannah Harbor Project

1. Savannah Harbor Characteristics, p. 2, 1st paragraph: Page 2 is very optimistic about the "blockage ratio". In areas where the channel takes up much of the river, such as the U.S. Route 17 crossing, the blocking ratio is much greater than predicted. A vessel with a 160 ft beam (Such as a Generation 2 post-panamax vessel which is predicted to use the channel by 2015, Savannah Harbor Expansion Bank Erosion Study-Update, Appendix B) and a 42.3 ft draft (Allowing for a10 percent under keel clearance, or 6,768 sq ft), in a

channel that's 470 ft wide, 47 ft deep, and has sloped sides at 3:1 (22,560 sq ft) the blockage ratio is 30 percent not the 9.5 percent stated as the maximum in the report. The blockage ratios should be revised to include areas where the river is narrow in width and should be updated based on the predicted use of Generation 2 post-panamax vessels (See below).

Also, the assumption that ship forces are essentially dependent on a two dimensional slice of the ship in the channel is also flawed. It is a problem of added mass, which is the mass of water a ship needs to displace to move into a new location within the fluid. Two ships of the same beam but different hull forms have different added mass factors. A very full ship such as a tanker moves more water than a finer hull like a container ship, which moves more water than a naval ship.

5. Ship Speed Analysis, p. 13, 2nd paragraph: The writer bases the drawdown, wave height, and wave power calculations on the facts that panamax vessels will have an increased speed in the deepened channel and that post-panamax vessels will have a decreased speed. The assumption that post-panamax vessels will maintain the same power level and travel at a lower speed seems poor (The lower speed resulting from a deeper draft). The post-panamax vessels would travel at a speed which provides safe maneuverability when traveling the channel. To assume that this speed will always be lower than the current speed and that that the captain or pilot will maintain the same power setting, which may result in a speed which provides low maneuverability, is a poor assumption. The analysis should be based on the actual predicted speeds not the predicted power level.

7. Fort Pulaski Ship Forces Analysis, p. 20, 2nd paragraph: Wave power, is expected to increase by up to19 percent along Ft. Pulaski. This is not insignificant. Wave power has to increase substantially as the percentages of larger vessels running with deeper drafts are projected to increase in a channel whose cross sectional area is only increasing by 4 percent. It is assumed that the 19 percent increase was forecasted for a post-panamax vessel, as a full summary of the results of the wave power analysis are not provided in this document. The details of the wave power study need to be made public to allow for peer review of these conclusions.

The document states that the project's effects along the Confined Sediment Placement/Disposal Facilities (p. 24, 1st paragraph) will be the same as along Ft. Pulaski, therefore the ship forces along this long section of the river were not modeled. Barring any differences in river width which may exists between the two sections of the river (Wave impacts will be greater in a narrower river as the waves will have less time to decay before reaching the shoreline) the conclusion that wave power will also increase by up to 19 percent along the Confined Sediment Placement/Disposal Facilities is fair. This is a significant increase.

The document states that the only effect which needs to be modeled for the shoreline along the City Front is the long period drawdown. However, the document only provides observed drawdown results (Table 21) and not predicted impacts of the project. The predicted drawdown results, as wells as wave power results, should be published for review.

The study also fails to analyze the predicted drawdown, wave height and wave power increases along the City Front, the Confined Sediment Placement/Disposal Facilities, and Tybee Island resulting from the passage of a Generation II post-panamax vessel along the River. As mentioned previously, according to the updated fleet forecasts detailed in Appendix B of the Savannah Harbor Expansion Bank Erosion Study-Update Generation II post-panamax vessels (Which can have beams up to 160 ft) are expected to call by the year 2015. These vessels will displace an even greater amount of water and it doesn't appear that the effects that they will have has been calculated, or at least reported in Ship Forces on the Shoreline of the Savannah Harbor Project or in the Tier 2 EIS. For example, a Generation 2 post-panamax vessel (160ft beam) with 10 percent underkeel clearance will take up 30 percent of the cross section of the new 47 ft channel. Current panamax vessels in the current channel only take up 18 percent of the cross section of the channel. Thus, Generation 2 vessels will displace 67 percent more water relative to channel cross section. This cannot amount to a negligible erosion rate, and the conclusion that wave power will be substantially greater is accurate. The effects that the use of Generation 2 post-panamax vessels will have on drawdown, wave height and wave power along the City Front, the Confined Sediment Placement/Disposal Facilities, and Tybee Island should be determined.

8. Tybee Island Ship Forces Analysis, p. 22, 3rd paragraph: The document indicates that the impact analysis conducted for the Tybee Island shoreline compared the typical (80 percent of design draft) and design draft conditions. The document then states that "in all cases, the design draft ship in the deepened channel had slightly less drawdown then the existing channel." The difference between those two conditions is much less important than the difference in drawdown between the current condition (Vessels traveling at 80 percent draft in the existing channel) and the future condition (Vessels traveling at design draft in the deepened channel). Table 15 indicates that post-panamax vessels traveling at typical and high speed will have drawdown increases of 12.9 percent and 5.73 percent, respectively. These are much less then the differences calculated for panamax and sub-panamax vessels. The increase in drawdown for panamax vessels traveling at typical speed is 31.5 percent and the increase for those traveling at high speed is 22.3 percent between existing and future conditions. The increase for sub-panamax vessels traveling at typical speed is 27.2 percent and the increase for those traveling at high speed is 34.4 percent. These increases are not insignificant.

Ship Forces on the Shoreline of the Savannah Harbor Project, Tables 16-19: The tables should provide the differences between the existing conditions (Vessels traveling at 80 percent draft in the existing channel) and the future conditions (Vessels traveling at design draft in the deepened channel) for the years of 2030 and 2050. The differences in drawdown between the other scenarios matter much less. The updated table should be updated to make these comparisons.

Ship Forces on the Shoreline of the Savannah Harbor Project, p. 36, Table 9: The ship effects should be recalculated using the actual predicted speeds for post-panamax vessels (not an estimate of the power level), and should show the predicted drawdown, return velocity, and wave height for Generation 2 post-panamax vessels. The same type of table should be developed to show the results of these forces on the shorelines of the Confined Sediment Placement/Disposal Facilities and the City Front. Appropriate cross sectional areas should be used for each of these sections of the River.

Ship Forces on the Shoreline of the Savannah Harbor Project, p. 36, Table 9: As the table appears in the report, the predicted return velocity increase for typical speed panamax vessels with the change from 80 percent draft to design draft is 24 percent. The drawdown increase for typical speed panamax vessels is 26 percent. The return velocity increase and drawdown increase for high speed panamax vessels are 30 percent and 35 percent, respectively. The short period bow and stern wave heights for typical and high speed panamax vessels going from 80 percent draft to design draft are 28 percent and 30 percent, respectively. These area substantial increases and should not be hidden within the composite tables which average in the results from the smaller vessels shown in Tables 5 and 9. As mentioned previously, the analysis should be conducted again using predicted speeds and should include an analysis of the impacts of Generation 2 post-panamax vessels using the channel. The results should be updated to clearly indicate that return velocities, drawdowns, and wave heights could increase with the project as shown in the example above.

Ship Forces on the Shoreline of the Savannah Harbor Project, p. 43, Table 15: The table heading indicates that it contains return velocity information, however, this data is absent from the table. Table 15 should be updated to include this missing information for public review purposes.

6.1.7. Threatened and Endangered Species

General Comments on T & E Information

The June 2010 forecast of vessel calls appearing in Appendix B of the *Savannah Harbor Expansion Bank Erosion Study – Update* indicates that fewer vessels will call under the proposed conditions (completed project) than the current conditions (maintaining the 42 ft depth). If this proves to be true, then the chances for invasive species to enter the

harbor in ballast water are decreased along with the decrease in vessel calls. The analysis of this subject seems appropriate as well as the conclusion that the vessels entering the Port of Savannah will have to adhere to State and Federal laws regarding ballast water regardless of the depth.

The 2007 report from the Atlantic Sturgeon Status Review Team lists a seasonal restriction on dredging in the Savannah River between March 16th and May 31st. The DEIS does not appear to address this seasonal restriction in the document.

The DEIS lacked information that is critical to make an assessment on listed and candidate species, did not substantiate its determination of non-significant impacts when adverse impacts were acknowledged, did not appear to pursue studies to collect the necessary information, and relied upon a significant amount of unsubstantiated assumptions and conclusions to make its determinations. If the assumptions and conclusory statements were based on peer-reviewed or project related studies, the DEIS should cite that source as a basis upon which the assessment occurred. Furthermore, the assessment should include all potential impacts from the project, including omitted impacts, e.g., increased boat strikes and wave erosion due to larger ships accessing the port; disruption of habitat continuity; disruption of habitat accessibility; and mitigation impacts.

The shortnose and Atlantic sturgeon are examples of the shortcomings of the assessment of impacts to threatened and endangered species. Shortnose sturgeon and Atlantic sturgeon were grouped together for purposes of assessing impacts from the project. The DEIS justifies the grouping due to their "similarities in habitat use, distribution throughout the proposed action area, foraging behavior and prey base, and subsequent risk of take relative to dredging and trawling operations..." No citations or other reference information was provided to substantiate this decision to group the species. However, other information provided in the DEIS provides information that contradicts the claim that the species are similar enough to group together for impact assessment purposes. For example, the DEIS states that Atlantic sturgeon primarily lead a marine existence and are therefore more likely to be impacted by hopper dredges than the more estuarine-based shortnose sturgeon. The DEIS states that shortnose sturgeon spawn 100 miles upstream of the project area, but also states that an Atlantic sturgeon larva was found 6.7 km (4 miles) upstream of the project impact area. This information not only suggests that shortnose and Atlantic sturgeon spawn in different areas, it also highlights the possibility that some larva may drift into the project area and may be affected by the upstream increases in salinity that would occur as a part of this project. Additional information should be collected to verify the actual location of Atlantic sturgeon spawning to ensure the project dredging and upstream movement of salinity and decreases in DO will not deleteriously impact Atlantic Sturgeon as its spawning habitat has not been adequately accounted.

The impact summary to the Essential Fish Habitat in Appendix S, acknowledges that the proposed action would have adverse impacts on shortnose sturgeon, an endangered species. Nonetheless, the DEIS dismisses the adverse impacts as non-significant without providing sufficient detail as to how the non-significant status had been applied. The DEIS does not provide an accurate representation of impact. The DEIS states that "the maximum expected reductions in habitat acreage range [sic] of about 11.0 percent or 439.0 acres [with mitigation], depending on channel depth, life stage, and season." First, there is apparently an error in the DEIS narrative as indicated by the out-of-place 'range.' Second, this estimate fails to accurately sum the decreases in habitat that will still be realized even with mitigation. Table 8-13 of Appendix B states that 439 acres of January habitat will be lost for adult shortnose sturgeon alone. An additional 113 acres of August habitat will be lost for adult shortnose sturgeon and another 28 acres of January habitat will be lost for juvenile shortnose sturgeon. The estimated loss in habitat is a minimum projection because it does not include lost habitat that is used during other seasons. Also, shortnose sturgeon use different habitats based upon life stage and season. Thus, estimates of habitat loss by month and life stage may be representative, but are not conclusory as to the total amount of habitat lost.

The DEIS also fails to represent impacts to shortnose sturgeon based upon sediment impacts from the project even though substrate preference information is available and substrates will be affected by the project. For example, the 1998 NMFS Final Shortnose Sturgeon Recovery Plan states that "juveniles in the Savannah River use sand/mud substrate in 10-14 m depths (Hall et al. 1991). Furthermore, the Atlantic sturgeon, for which the DEIS has claimed the shortnose sturgeon is an adequate surrogate for purposes of impact assessment, occupies habitats dominated by gravel and sand substrates (NOAA Fisheries Office of Protected Resources webpage). Presumably, dredging will alter the depth and substrate composition of the river. This impact should be accounted for and quantified in the DEIS.

Moreover, the habitat losses may have been further underrepresented by the habitat suitability modeling in the DEIS due to inaccurate assumptions regarding dissolved oxygen levels necessary for habitat use. For example, a baseline level of 3.0 to 4.0 mg/l of dissolved oxygen was used to determine if habitat was available for juvenile and adult shortnose sturgeon. This is a minimum level at which the agencies determined shortnose sturgeon can survive based on laboratory studies of survival. However, these levels do not necessarily indicate the dissolved oxygen level that is necessary for foraging, resting, and moving. For example, the Collins et al. (2001) study of shortnose sturgeon habitat use, cited in the DEIS, reported minimum mean dissolved oxygen levels of 6.36 and 6.45 in areas where adults and juveniles were found, respectively. In the Appendix N documentation, Prescott Brownell, from NMFS requested that a range of suitable habitat thresholds be used for modeling habitat availability. The agency panel then redacted his comments from the record without providing an adequate basis for the redaction. The

panel decided the current methods were "acceptable for now." This comment would suggest that additional work would be necessary in the future in order to adequately asses the impacts. The narrative does not provide adequate discussion as to why the pass/fail approach was more adequate than the range approach suggested by Mr. Brownell. Moreover, there is no indication of future actions that would be necessary or that any future action was taken in order to compensation for the inadequacies of the pass/fail analysis.

The DEIS also mentions mitigation, but does not accurately quantify the acres of impact or the quantity of mitigation area with the exception of newly provided access to 20 miles of river upstream of the New Savannah Bluff Lock and Dam at Augusta, Georgia. The DEIS fails to describe the habitat upstream of the dam, its adequacy for sturgeon habitat, its past use by sturgeon, or the successful use of fishways by shortnose or Atlantic sturgeon. Spawning habitat for shortnose sturgeon in the Savannah River has been documented by Hall et al. (1991) as areas with gravel/sand/log substrate in curves in the Savannah River. Furthermore, the New Savannah Bluff Lock and Dam are located on or about the fall line. The NOAA Atlantic Sturgeon Fact Sheet states that Atlantic sturgeon spawn between the fall line and salt front, suggesting Atlantic sturgeon would not benefit from the proposed mitigation measures. Thus, the use of the fish passage structure as adequate mitigation has not been shown to be sufficient to mitigate the intensity and extent of impacts to shortnose and Atlantic sturgeon.

Specific Comments from the DEIS on threatened and endangered species follow. Additional T and E comments are contained in Attachment 1 in the form of comments to the DEIS' Appendix B, Biological Assessments for Threatened and Endangered Species.

4.06.1. Invasive Species, p. 4-43, 2nd paragraph: The document should cite the source of the text used for this paragraph. The text appears to be taken from the EPA's Ballast Water Factsheet found on the Agency's website.

4.06.1. Invasive Species, p. 4-44, 2nd paragraph: The document states that the Marine Extension Service was "expected to release an Invasive Species Plan for the State of Georgia later in 2008." This document was finalized in October 2009 and is available from the Marine Extension Service's website. The text should be updated to include this fact and to include information contained in the Plan pertinent to invasive species control in ballast water for this project.

4.06.1. Invasive Species, p. 4-44, 4th paragraph: The document should cite the source of the text used for this paragraph. The text appears to be taken from the USCG's Aquatic Nuisance Species Website.

4.06.1. Invasive Species, p. 4-44, 5th paragraph: The document states the mandatory practices which must be applied by "all vessels with ballast tanks on all waters of the

US." It should be noted that crude oil tankers engaged in coast wide trade, DOD and Homeland Security vessels, and vessels operating exclusively within one COTP zone are excluded from these regulations.

4.06.1. Invasive Species, p. 4-45, 5th paragraph: The words "per cent" should be changed to the word percent.

6.08 Threatened and Endangered Species Act – Pg 6-2, 8th para – "A Biological Assessment evaluating the potential impacts of the proposed action on endangered and threatened species has been prepared (Appendix B)". Impacts to adult Shortnose sturgeon habitat is estimated by the Corps to range from 20 to 220 acres, and for juvenile sturgeon from 86 to 373 acres, depending on the channel depth alternative selected. Under the Endangered Species Act, why would the loss of this habitat not be considered a "take", and thus a violation of the Act? Since Atlantic sturgeon also inhabit the Savannah Harbor, and have recently been proposed for listing by NMFS as endangered, the same question applies to that species.

6.2. Water Quality

This section presents groundwater and surface water quality comments generated from review of the water quality section of the DEIS and other related sections in the GRR and attachments. It focuses on proposed effects on chlorides in groundwater, chlorides in surface water, with respect to drinking water intakes, and dissolved oxygen in surface water.

6.2.1. Chlorides in Groundwater

GRR Engineering Appendix 1.1.36, Page 4-25 – Ground-water pumping; Section 4.4.5.1 Input Parameters: "Future ground-water pumping was kept constant at year 2000 levels. Regulatory officials from both South Carolina and Georgia agree that future pumping from the Upper Floridan aquifer must decrease in order to limit the impacts of salt-water intrusion in the coastal area. A recently-released GAEPD document entitled Coastal Georgia Water and Waste Water Permitting Plan for Managing Salt-Water Intrusion (2006) indicates that Georgia will reduce withdrawals from the Upper Floridan aquifer by 5 MGD by the end of 2008; therefore keeping the pumping rate constant provided a conservative assessment of future ground-water production in the area."

1. Has groundwater use in the Upper Floridan aquifer decreased in Georgia and South Carolina as assumed in the model and analysis?

2. Did groundwater withdrawals from the Upper Floridan aquifer decrease by at least 5 MGD between 2006 and 2008 in Georgia?

Groundwater use trends and restrictions by GAEPD are discussed in various sections of the GRR and supporting appendices. There appears to be a lack of corresponding discussion on groundwater use and restrictions by SDHEC in South Carolina.

There has been a great deal of effort in characterizing the pore water for the Miocene confining unit and underlying Floridan aquifer. One key question evaluated in the DEIS is the rate of vertical movement through the clay, in particular the area near the mouth of the harbor where 1) the confining unit is thinnest; 2) surface water salinity is greatest; 3) paleochannels are abundant. Were any efforts made to age date the pore water and underlying groundwater from the Upper Floridan aquifer as a more direct measure of transport time?

One of six tasks related to the groundwater investigation was an Aquitard Test Feasibility that consisted of a "trial step-drawdown pumping test on two recently installed Upper Floridan wells located adjacent to river channel to determine feasibility of hydraulic testing of confining unit. If results indicate hydraulic testing of confining unit are feasible, estimate design parameters and assumptions for full aquitard testing."

1. The groundwater model was used in place of the step drawdown test. Given that the model is developed from available field data and assumptions on characteristics of the aquifers and confining units, it is not at all clear how the model replaces the field test.

2. It would seem more reasonable to use the model to design an adequate aquitard test that may or may not include pumping directly from the Floridan aquifer, rather than use the model to try and disprove the need to conduct a "trial step-drawing" test altogether.

DEIS Appendix C – Mitigation Planning; page 9. While the overall conclusion that the impacts to groundwater are not expected to be significant appear reasonably well substantiated, quantifying the increased flow through the confining unit to 3-4 percent does not appear to be well substantiated given the uncertainty in leakance though this unit.

Draft GRR, page 150, the following conceptual mitigation measures are presented:

1. Deposit channel sediments in nearshore areas where the groundwater aquifer is near the ocean floor.

2. Acquire but not use a permit from the State to withdrawal fresh water from the Upper Floridan aquifer.

3. Reduce pumping of groundwater by acquiring – but not using – permitted rights from industries to remove freshwater from the Upper Floridan aquifer.

These potential mitigation measures, in particular the last two, have significant ramifications on water use in the region by reducing overall water availability. The ability to acquire permitted rights in Georgia and presumably South Carolina, including existing permitted rights without replacing them with an alternate source raise significant questions regarding the viability of these conceptual alternatives.

6.2.2. Surface Water

6.2.2.1. Chlorides in Surface Water

There are abundant references to past supporting work but there is a lack of specific references to the relevant documents in the DEIS and GRR. This lack of references makes evaluating the supporting information difficult.

GRR (10Nov10), Page 93, Section 5.7.2: A general discussion of global sea level rise and its expected effect on salinity is provided. However, it is not clear if or how the effect of global sea level rise was evaluated in conjunction with the channel deepening, in particular as it relates to chloride levels at the Abercorn Creek intake as well as other intakes on the river. Specifically, it is not clear how the channel deepening will affect the timing and magnitude of salinity intrusion associated with sea level rise.

Chloride Model Analysis:

1. It is not clear what the chloride results presented from the EFDC model used to evaluate potential chloride impacts represent:
   - Average chloride concentrations over a river reach and/or over time?
   - Cross-section maximum chloride levels?
   - Tidal maximum?
   - Another metric?
2. It is not clear what pumping rate was used in the assessment:
   - Current rate is described as 30 MGD.
   - Plant capacity is variously described as 62.5 MGD and 75 MGD.
3. GRR (10Nov10), Page 166, Section 9.8 states that the rate of surface water withdrawal at the Abercorn Creek intake "has been increasing substantially over recent years as the western part of the County has grown rapidly. In addition, the City has been directed by the Georgia EPD to reduce groundwater withdrawals by 11 MGD requiring more surface water use." It is not clear how the expected increase in use at the intake was considered as part of the chloride impact evaluation.

Available input data relating to chloride/salinity changes over tidal cycles and over cross-sectional areas of critical river reaches appear to be sparse to absent. There is reference to proposed or on-going chloride / salinity monitoring, however these does not appear to be any detail on this monitoring effort. Given the highly stratified nature of the chloride distribution in conjunction with tidal effects, understanding the temporal and spatial distribution throughout the estuary may prove critical to evaluating peak chloride levels at the Abercorn Creek intake. Clarification on the existing data and any proposed monitoring would be useful in evaluating potential future impacts at the intake.

The DEIS evaluates potential effects of chloride/salinity changes at the Abercorn Creek intake. Have potential impacts at other intake structures been evaluated?

As a potential mitigation measure, cost for a supplemental water intake approximately 10-miles upstream from the current intake was presented in a document titled "Review and Costs for Supplemental Water Supply – City of Savannah Intake at Abercorn Creek" dated 17 Sep 2009. It is not clear if environmental impacts from this proposed new intake have been evaluated, including the potential in increase salinity in Abercorn Creek further upstream from the current intake location.

DEIS, Page 5-55, Section 5.2.4 - Side-bank storage reservoir options were considered in the GRR. The preliminary design size of the reservoir was to hold a 1-week supply of raw water. It appears for the purpose of evaluating potential locations for the side-bank reservoir a 210 MG capacity was assumed, corresponding to a 30 MGD demand. However, as stated in this section, the plant's capacity is 62.5 MGD. In the GRR Attachment 1.1.7, the plant capacity is stated as 75 MGD, 20-percent more than the 62.5 MGD capacity provided in the DEIS. Also, as stated in Section 5.2.3, page 5-51 of the DEIS as well as in appendices to the GRR, demand has increased significantly due to increased growth in the western part of the County. It is also noted in the GRR appendix 1.1.36 that groundwater use from the Upper Floridan aquifer is being cut back by GAEPD, it is not clear if this reduction in groundwater use corresponds to an increase in surface water demand.

1. A side bank reservoir with a 210 MG capacity provides only 3 1/3 days of capacity at a plant capacity demand of 62.5 MGD. This is less than half of the stated goal of 1-week supply of raw water.
2. It is not clear what analysis was completed to determine that 1-week duration was adequate to address an increase in chlorides. Section 5.2.4, page 5-55 references a "new moon" receding, was this the extent of the evaluation? Were any historical durations considered?
3. It is not clear the level of evaluation completed for the mitigation sites:
   - Can they accommodate a 440 MG capacity (1-week at 62.5 MGD)?

- Has an equivalent of a Phase I ESA been completed to establish past Recognized Environmental Conditions?
- Has a screening level evaluation for wetlands, threatened and endangered species, historic resources, and similar issues that significantly impacts availability of properties been completed?
- What is the proposed process that would implement construction of a side-bank reservoir? How will availability of potential sites be maintained?

DEIS Appendix C – Mitigation Planning; page 9. The accuracy of the chloride model is not sufficient to support the stated increase in chloride levels at the City's intake (e.g.; 0.34 percent during very low flows). It is worth noting that the relatively low accuracy of the model is the stated reason the USACE evaluated various mitigation alternatives that included re-locating the pump intake and use of side-bank storage.

6.2.2.2. Dissolved Oxygen

The water quality-related sections of the DEIS include detailed assessments of the project's impacts on dissolved oxygen and chloride concentrations. The analysis relied on models and field testing of mitigation techniques. Much of this information is useful for identifying the potential water quality impacts and mitigation strategies. However, the DEIS understates that uncertainty and risks associated with both the water quality impacts and the proposed mitigation. The DEIS also does not explicitly consider the manner in which the water quality of the harbor is currently being managed and regulated. For example, the DEIS does not address impact of the project on the 2010 draft TMDL for oxygen-demanding substances, nor the related regulatory framework for achieving full compliance of water quality standards.

Much of the DEIS's analysis of potential water quality is based on models that are have some capability to predict "average" dissolved oxygen or chloride conditions, but limited ability to characterize the trends and variability in water quality. Therefore, it is unclear whether the models are accurately predicting the critical conditions for water quality protection. The DEIS provided little indication that model uncertainties were explicitly considered in either predicting impacts or designing mitigation strategies. This is an especially important concern for the mitigation of dissolved oxygen impacts, because the proposed technology is somewhat experimental and of highly uncertain benefit.

The pending dissolved oxygen TMDL is expected to have a major regulatory and economic impact on both industrial and municipal dischargers, many of which will have to make large capital investments to reduce wasteloads. It tends to be controlled by the location in which attainment of dissolved oxygen concentrations is most difficult. From this perspective, it would not matter if 97 percent of the system experienced oxygen improvements if the critical location(s) experienced degradation, or if the wasteload allocations to achieve full attainment would be lower. The DEIS currently does not allow

this determination. Similarly, it is unclear if how the proposed mitigation approach would affect the ability of point source dischargers to use the same technology for TMDL compliance.

The analysis should be revised to (1) more accurately characterize the uncertainties associated with water quality impacts; (2) more explicitly consider those uncertainties in designing environmentally conservative mitigation strategies; and (3) specifically examine the impact on the project on water quality management of the estuary under the draft 2010 TMDL.

Specific DO Comments

Affected Environment, p. 4-13, 2nd paragraphs: The description of South Carolina's dissolved oxygen criteria should include elements related to naturally-low oxygen conditions. These elements include a 0.1 mg/L allowable deficit from the natural dissolved oxygen concentration and a 10 percent allowable deficit in the event that it was demonstrated that resident aquatic species would not be adversely affected.

Affected Environment, p. 4-13, section 4.02.04, 4th and 5th paragraphs: These paragraphs do not indicate any difference between class SA and SB waters, and should be revised to indicate the more stringent water quality criteria for class SA waters.

Affected Environment, p. 4-14, section 4.02.04, 2nd paragraph: This paragraph incorrectly cites the Georgia D.O. criteria. The criteria listed have been revised, as noted in the third paragraph on this page, so should not be cited using the present tense.

Affected Environment, p. 4-13, 2nd and 3rd paragraphs: The description of Georgia's dissolved oxygen criteria should include elements related to naturally-low oxygen conditions. These elements include a 0.1 mg/L allowable deficit from the natural dissolved oxygen concentration and a 10 percent allowable deficit in the event that it was demonstrated that resident aquatic species would not be adversely affected.

Affected Environment, p. 4-14, section 4.02.04, 2nd paragraph: This paragraph mentions the 2006 TMDL for Savannah Harbor, but makes no mention that this TMDL is being revised by USEPA Region 4, and that a draft revised TMDL was issued in 2010. Statements such as "...the Savannah River cannot accept anthropogenic oxygen-demanding substances..." are no longer true given the revised standards and updated TMDL. Such statements should be modified to reflect the updated regulatory approach.

Env. Consequences, section 5.2.1 (Dissolved Oxygen), Tables 5-19 through 5-23 and related discussion: The dissolved oxygen modeling results presented here—and the associated discussion—focus on the average dissolved oxygen concentrations in the bottom three layers of the 6-layer model. The more appropriate and environmentally

conservative approach would be to examine the "critical" DO concentration; i.e., the lowest concentration of the 6 layers, which will usually occur in the bottom layer. This is because the state water quality criteria apply to entire water column without vertical averaging. The present approach underrepresents the project's impacts to oxygen.

Env. Consequences, p. 5-42, section 5.2.1 (Dissolved Oxygen): It is stated that "from a general perspective, the [project] would result in insignificant (1-2 percent) increases in the percentage of the harbor's waters with violations of existing water quality standards." It is unclear if this determination was correctly made by considering not only the 4-5 mg/L criteria, but also the maximum 0.1 mg/L allowable deficit from natural dissolved oxygen concentrations. Regardless, this is a misleading metric because of the widespread existing D.O. impairments. It is not recommended to use this metric to summarize general project impacts.

Env. Consequences, p. 5-42, section 5.2.1 (Dissolved Oxygen): The analysis defines a "substantial" impact to dissolved oxygen as a reduction of 0.25 mg/L or more. Given the existing water quality impairment, any measureable reduction of dissolved oxygen is a water quality concern. It is not recommended to arbitrarily define a "substantial" impact or imply that only reductions of 0.25 mg/L or greater are a concern.

Env. Consequences, section 5.2.1 and 5.2.2 (Dissolved Oxygen and related mitigation analysis)—general comment: There appears to be a disconnect between the manner in which the dissolved oxygen-related analysis was performed and the manner in which water quality is managed under existing regulations. USEPA has performed extensive water quality modeling and analysis to support the draft TMDL that was issued in 2010 and will be finalized in 2011. The TMDL is expected to have a major regulatory and economic impacts on both industrial and municipal dischargers, many of which will have to make large capital investments to reduce wasteloads. The analysis in the DEIS does not allow the reader to determine whether the project would make full attainment of water quality standards easier or more difficult.

For example, the TMDL tends to be controlled by the location and time at which attainment of dissolved oxygen concentrations is most difficult. From this perspective, it would not matter if 97 percent of the system experienced oxygen improvements if the critical location experienced degradation, or if the wasteload allocations to achieve full attainment would be lower. The analysis should be revised to specifically examine the impact on the project on the critical cells that control wasteload allocations under the draft 2010 TMDL, under critical hydrologic/tidal conditions. This will allow determination of whether the project (with D.O. mitigation) would have a net positive or negative impact on water quality attainment.

Env. Consequences, section 5.2.2 (Mitigation for Impacts to Dissolved Oxygen)—general comment: This section lacks detail with respect to the quantitative benefits of the

mitigation on dissolved oxygen; i.e. it lacks the information corresponding to the tables in section 5.2.1. This is information is in the GRR Engineering Appendix, but it would be recommended to make section 5.2.1 and 5.2.2 consistent with regard to the type and level of detail of model results presented.

Env. Consequences, section 5.2.1 and 5.2.2 (Dissolved Oxygen and related mitigation analysis) and Section 5 of Appendix Q (Risk and Uncertainty Analysis)—general comment: The Corps has inappropriately based its assessment of the dissolved oxygen model's capabilities on its ability to predict "average" conditions, rather the critical conditions. Appendix Q of the DEIS (Risk and Uncertainty Analysis) describes how the dissolved oxygen model is relatively accurate for predicting the 50th percentile dissolved oxygen concentration and general spatial trends. However, it was also indicated that the model was much less accurate for predicting the variability of the dissolved oxygen concentration and the daily minima. DHEC concluded that the model has "limited ability to simulate the variability and trends in the data".

Based on the 2010 draft TMDL, the dissolved oxygen metric of concern is not the 50th percentile but the 10th percentile, a value closer to the minimum value. Therefore, it is not clear from the DEIS that the model can accurately predict the dissolved oxygen metrics of greatest concern. Moreover, the DEIS gives no indication that uncertainty in the model was explicitly considered in characterized impacts. It is recommended that the DEIS explicitly address the ability of the model to predict the lower percentile dissolved oxygen concentrations, and make adjustments as to needed to ensure that it is an environmentally conservative analysis. In the meantime, the Corps has undercharacterized the uncertainty of the dissolved oxygen models, and the statement in Appendix Q that "the model's errors in predicting dissolved oxygen levels present little risk for decision-makers" is unwarranted.

Env. Consequences, section 5.2.1 and 5.2.2 (Dissolved Oxygen and related mitigation analysis) and Section 5 of Appendix Q (Risk and Uncertainty Analysis)—general comment: There have been serious questions raised regarding the whether the proposed, experimental mitigation strategy will be effective. For example, the USGS review of the Speece cone pilot study concluded that the project might not have had any significant effect on DO concentration except near the injection point. The DEIS appears to have largely dismissed this concern based on the uncertain modeling analysis and very limited monitoring evidence. As a result, the DEIS significantly undercharacterizes the risk and uncertainty associated with the dissolved oxygen mitigation.

For example, the DEIS gives no indication that uncertainties associated with the mitigation technology or associated modeling analysis were taken into account during the mitigation planning, such as by providing additional DO injection points in case the system is less effective than modeled. The elements that are proposed in Appendix Q to

reduce risk primarily consist of references back to the original studies and post-construction monitoring. None of these elements would actually reduce dissolved oxygen impacts in the event that the mitigation strategy was ineffective. It is recommended that the mitigation strategy address the uncertainties of the selected technology in a more direct fashion, and include elements that reduce risk by providing environmentally conservative mitigation designs.

Env. Consequences, section 5.2.2 (Mitigation for Impacts to Dissolved Oxygen)—general comment: Dissolved oxygen injection is a key TMDL compliance strategy for dischargers to the Savannah Harbor. Most of these dischargers are already permitted at or below best practical technology (BPT) wastewater treatment levels, and oxygen injection might be the most cost-effective manner for TMDL compliance. It is unclear whether the use of oxygen injection to mitigate the channel deepening impacts would reduce or substitute for the ability of wastewater dischargers to use this same technology for TMDL compliance. In conjunction with consideration of the project's impact on TMDL compliance (see comment above), it is recommended to explicitly consider how the dissolved oxygen mitigation plan would affect compliance options for existing dischargers, and if so, if this would be accompanied by a significant economic impact to those dischargers.

Env. Consequences, p. 5-49, section 5.2.2 (Mitigation for Impacts to Dissolved Oxygen). Figure 5-18: The accompanying text mentions three locations for dissolved oxygen injection, but the map only shows two locations.

Env. Consequences, Section 5 of Appendix Q (Risk and Uncertainty Analysis)—general comment: Even if the dissolved oxygen mitigation works as intended, there would be a risk associated with lack of the funding for the Speece cone operations and maintenance, especially if the mitigation was dependent upon annual funding appropriations. This risk should be stated in Appendix Q. Similarly, this section should explain how this reisk could be reduced, such as by the provision of contingency funding.

6.3. Air Quality, Noise and Dust

The air quality analysis completed for the proposed project is very comprehensive in that it accounts for air emissions from all cargo-carrying vessels (containerships and other marine vessels) and landside cargo handling equipment at both the GPA and private terminals at the port. Further, emission estimates are provided for criteria pollutants, air toxics and greenhouse gases. Although the project is not subject to conformity determination requirements, the emission inventory completed for this project is similar to the comprehensive emission inventories prepared to satisfy conformity requirements.

While the emission inventory completed for the project is very comprehensive, the emission summary tables presented in Appendix K have certain shortcomings. The

reviewer was not able to calculate and confirm the accuracy of the emissions reported in many of the emission summary tables using the information provided in the descriptions preceding the emission summary tables. To facilitate a review of the emission estimates, an example calculation should be provided for each primary emission summary table. Additionally, the emission estimates are presented using various terminology to represent vessel trips (e.g., tons per transit, tons per vessel, and ton/call). The use of consistent terminology is recommended.

The following comments are based on review the Air Quality Section in the DEIS.

Page 5-105, Section 5.6 – the word "volume" is used in the third sentence and in the second to last sentence of the first paragraph. Because mass emission rates are being referred to in these instances, "amount" or "quantity" should be used in lieu of "volume".

Page 5-107, second sentence of the first paragraph - replace the word "volume" with "amount".

Page 5-108, second paragraph – Table 6-4 in Appendix K is referenced comparing port emissions to total emission in Chatham County. The percentages indicated in the second sentence of this paragraph do not match those presented in Table 6-4. The percentage values presented in Table 6-4 and the percentages indicated in this paragraph should be re-calculated or checked to confirm their accuracy.

Page 5-109, end of Air Quality section – a discussion is presented to explain why a conformity determination is not required for the project. Simply, a conformity determination is not required because the project location is in an attainment area (and the area is also not a designated maintenance area). This is well covered in the discussion under item a. It is suggested that item b. be deleted since it is not needed to support the conclusion that a conformity determination is not required. Further, a summary of project emissions is not provided in item b. for comparison with prescribed de minimus levels to confirm that the project emissions are below the de minimus levels. The following comment is made on the Draft GRR:

Page 142, Section 8.2.3 - in recognition that federal projects of this magnitude are typically subject to conformity determinations under the General Conformity or Transportation Conformity regulations, include an introductory statement to indicate that the project is exempt from conformity determination requirements because the project site is located in an area that is designated as an Attainment Area with respect to the National Ambient Air Quality Standards and the project area is not a maintenance area.

6.4. Tidal Intrusion

Issues regarding water quality impacts from tidal intrusion are addressed in section 5.3, Water Quality. Ecological impacts from tidal intrusion are addressed primarily in the Wetland Impacts Section.

6.5. Dredging and Deepening

5.7.1.1.C. Dredge Plume – Pg 5-112, 2nd para – "Another source of turbidity and sedimentation from hopper dredges is through the deposition of their sediment loads at the placement site". Please discuss the potential impact of this type of turbidity.

5.7.1.1.C. Dredge Plume – Pg 5-112, 5th para – "Dredge-induced water quality conditions will only be short-term and impact a small cross-sectional area of the Savannah River". Please quantify "short-term" and estimate the cross-sectional area to be impacted.

5.7.1.1.C. Dredge Plume – Pg 5-113, 3rd para – "All three shellfish harvesting areas are located a sufficient distance from the dredging in the Savannah River channel that sedimentation and high turbidity would not adversely impact these resources". Please state the distance from the dredging activity to the shellfish areas. Section 5.8.4.3 Confined Disposal Facilities (CDFs),

Page 5-118 – This section discusses the minimal impacts predicted on various resources that utilize the CDFs; however, there is no reference to the work that was done regarding identifying cadmium as a contaminant of potential concern (COPC), primarily presented in the DEIS Appendix M-Final Sediment Quality Evaluation.

Section 5.13 - Beneficial use of Dredged Sediment, Page 5- 142- "Impacts to fish (including larvae and eggs), shellfish and benthic communities within the near shore sediment placement areas are discussed in 5.7- Marine and Estuarine Resources. No long term adverse impacts are anticipated to any fishery resources or benthic communities from the near shore beneficial sediment placement." Section 5.7 does not provide adequate information to support this statement.

6.6. Sediment Quality

4.01.2.1 Sediment Quality (potential contaminant impacts) – Pg 4-9, 2nd paragraph – "The evaluation found that most of the sediments did not provide an concern for potential contaminant-related impacts associated with the proposed dredging and dredged sediment placement". What screening criteria were used to reach that conclusion?

4.01.2.1 Sediment Quality (potential contaminant impacts) – Pg 4-9, 3rd paragraph – "Polycyclic aromatic hydrocarbons (PAHs) and cadmium were detected in a sample

taken at about Station – 75+000B near the old RACON tower where a spill of fuel, batteries and paint lacquer occurred in November 1996. Subsequent sampling conducted in 2005 revealed that sediments at that location do not pose a potential for contaminant-related environmental impacts". What screening criteria were used to reach that conclusion?

5.4.2.3 Expected Results of Monitoring Cadmium-Laden Sediments – Pg 5-102, 2nd paragraph – "In light of the information summarized above, the dredging and the placement of cadmium-laden sediment in CDF 14A, CDF 14B and covering these sediments with 2 feet of clean sediment is not anticipated to result in adverse impacts to the aquatic environment or biota found in the CDFs". A discussion of the potential impacts on the river's biota from the dispersion of cadmium-laden sediments during dredging is needed.

6.7. Navigation

The Savannah Harbor Expansion Project, if completed as currently described at either 47 or 48 ft of depth, does not likely provide sufficient harbor depth and width necessary to make the Jasper Ocean Terminal a viable project. We now know that over 80 percent of container ship capacity on order is post-panamax in size and will require harbors with 50 feet mean low water and unrestricted two-way ship traffic capability, such as offered by New York, Baltimore, and Norfolk today, to reliably make Panama Canal appointments. Thus, it is likely that investment in the Jasper Ocean Terminal would require a further harbor deepening project to be cost-justified.

If the Savannah Harbor Expansion Project is approved, the cost of dredging the 48 ft channel to the Garden City Terminal and the resultant environmental damage would make it extremely difficult if not impossible to get the additional dredging to 50 ft needed to make Jasper Ocean Terminal viable.

DEIS Section 5.17 Aesthetics and Recreational, on page 5-143 fails to evaluate how increase ship traffic or speeds may affect recreational boaters and kayakers along the entire length of the project.

The following comments pertain to the documents contained in the GRR Attachment 3, Engineering Investigations Supplemental Materials. The documents are:

- 1.1.11 Savannah Harbor Entrance Channel Simulations 2010 Report; dated 9 March 2010
- 1.1.12 Savannah Harbor Simulations Study 2009; 31 March 2009
- 1.1.13 Navigation Study for Savannah Harbor Channel Improvements; September, 2004

- 1.1.14 Impacts of the Savannah Harbor Expansion Projects; October 2006
- 1.1.16 Vertical Ship Motion Study for Savannah, GA, entrance channel; May 2010
- 1.1.17 Ship Forces on the Shoreline of the Savannah Harbor Project; August 2006
- 1.1.24 Savannah Harbor Expansion Bank Erosion Study; November 2006
- 1.1.25 Savannah Harbor Expansion Bank Erosion Study Update; June 2010
- 1.1.34 Sensitivity Analysis of Proposed Navigation Meeting Areas; September 2009
- 1.1.39 Dredged Material Management Plan; June 2010
- 1.1.43 Correspondence Regarding Pipeline Crossings; May 2008

These reports and studies verify previous shortcomings regarding navigation and operational capability of the proposed project.

SHIP DRAFT CAPABILITY: The inshore project depth will not support post-panamax traffic except on high tide. The ship draft this project will accommodate will roughly equate to what Charleston can do now. Based on Army Corps channel design standards, which recommend channel depths of 110 percent of ship draft in protected waters, this project will support a 24 hour maximum draft of approximately 42 ½ feet, and 47 feet on high tide, in the inshore channels.

SHIP SPEED LIMITATIONS: The narrow offshore channels are proven to be untenable for ships at 46 ft draft and greater. The maximum draft these channels can accommodate may be much less, but simulations were only done for 46 ft and 47.5 ft drafts. Additional simulations should be done to determine a viable draft. The findings were that ships at the drafts simulated must maintain speeds not greater than 6 knots. These speeds also require a range of tide that is exaggerated. The study assumed tide range offshore is the same as tide range in the mouth of the river. This is false. Offshore tide lift in this area is roughly 2/3 of the tide lift at Fort Pulaski.

No simulations were done to verify that ships could maintain sufficient directional control at such slow speeds to safely negotiate the unusually narrow offshore channel design incorporated this project. Narrow offshore channels often require 14 to 18 knots to maintain safe directional control depending on weather and currents. The draft capability of the offshore channels must incorporate a coordinated study to determine vertical ship motions at sufficient navigational speed. Until this study is done, the viability of the offshore channel is indeterminate, except that this report proves it will not support drafts of 46 feet or deeper.

SHIP TRAFFIC: This project will not support two – way traffic of post-panamax traffic. No simulations were done with two full beam post-panamax ships, so passing has not

been verified anywhere in the project. Simulations with smaller ships only identified one passing lane as viable, at Long Island Range. This lane is roughly in the middle of the project, meaning that one inbound may pass one outbound, provided timing two ships 32 miles apart at the start of their planned passing rendezvous can be precisely executed for an exact meeting in a location not longer than 6 1/2 ship lengths. This one marginally adequate passing lane is only viable if lengthened to 8000 feet, according to pilot feedback, requiring additional study.

ECONOMIC BENEFIT LIMITATIONS: Economic benefit must account for accurate capabilities. Ships must be lightly loaded to 42 to 47 feet draft, and traffic density is limited to one-way traffic. Full economic benefit as estimated of Post-Panamax shipping is unattainable in this project. The economic limitations of predominantly one-way traffic and light loading would be significant.

JASPER TERMINAL BENEFIT: This project preempts availability of a South Carolina terminal on the Savannah River, because this project occupies the dredge disposal areas in way of the notionally proposed Jasper Terminal through 2060. No extra dredge material capacity is apparent in the operations and maintenance plan to free up these sites.

This project also will not support navigability parameters to support a viable Jasper Terminal. The Jasper Terminal would only be viable if it can support fully loaded post-panamax ships largely unrestricted. The draft limitations of this project would only allow post-panamax ships that are substantially less than fully loaded. One –way traffic competing with the other terminals in the river would limit ship arrivals such that berth utility at jasper would be severely curtailed. If this project goes forward, and ship traffic density reaches maximum capacity on a one-way channel, there would be no extra capacity to handle increased traffic to a Jasper Terminal, and permitting of a Jasper Terminal would be difficult justify.

Within this plan is a projection of some 19 ship arrivals per day. With many of them dependent on the tide given the limited depth, this may be an unsustainable traffic load. Adding the Jasper Terminal would likely overwhelm the traffic density a one-way channel can support. Proceeding with this project may approach the environmental limits this waterway can sustain, leaving little or no capacity to add width or depth necessary to support a truly post-panamax capable Jasper Terminal.

In order to make a Jasper Terminal viable, a dredging project would have to be designed for full two-way traffic from the terminal to the end of the cannel at sea, with an inshore depth of 50 to 51 feet, and an offshore depth of 55 to 57 feet. This proposed project falls far short of those parameters and provides no utility to South Carolina's terminal expansion plans for the Savannah River.

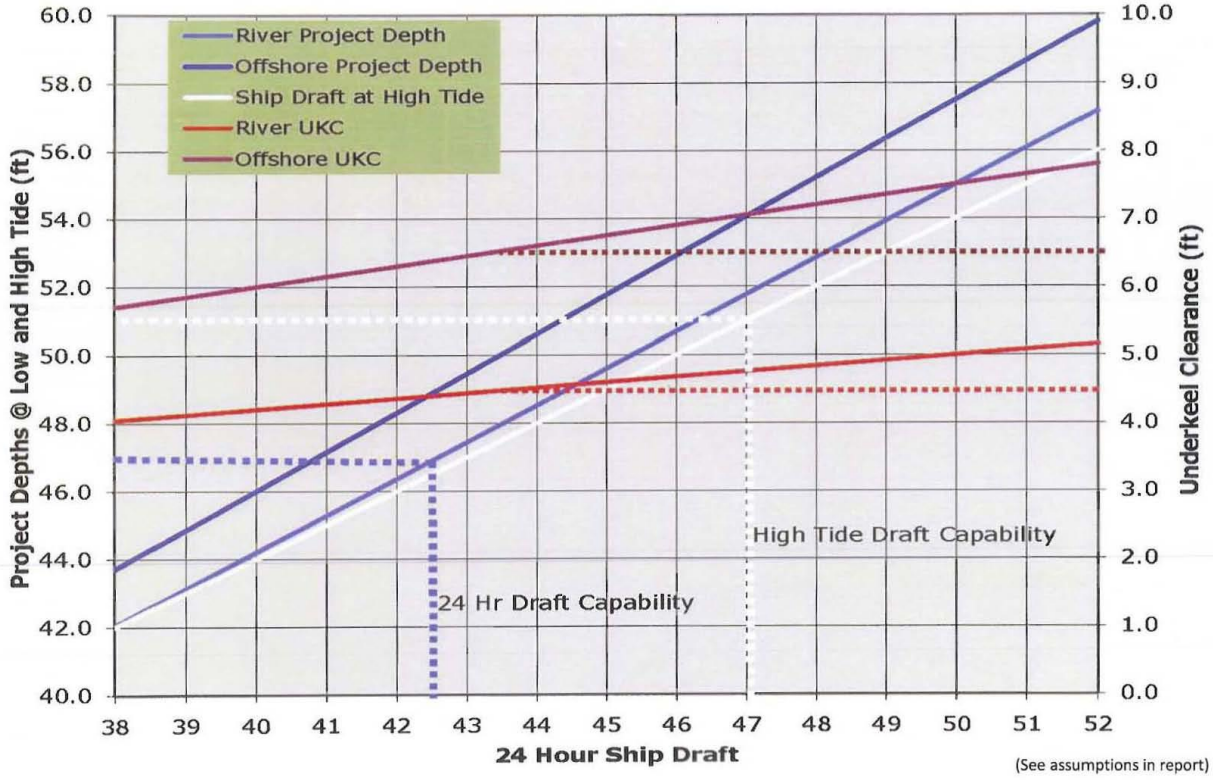
Figure 6-1 estimates draft and under keel clearance capability of various project depths at high and low tide for the Savannah River.

This chart depicts a difference of four feet between ship draft capability on any tide and on high tide based on the following assumptions:

1. Tide range at the seaward end of the project is four feet, at Fort Pulaski is six feet, and at Garden City is eight feet.
2. Tide lag from the sea buoy to Garden City is one hour.
3. Transit time from the sea buoy to Garden City would be three hours, on average.
4. The Army Corps of Engineers channel design standards per their engineering manual on channel design, which requires project depths to be 110 percent of the target ship draft in internal waters and 120 percent in exposed waters, is not being adhered to, as is apparent in the draft GRR and DEIS. Therefore, a lesser standard has been assumed to be 108 percent in internal waters and 115 percent in exposed waters for the purpose of these calculations. It should be noted that International Maritime Organization safe navigation standards for navigation mimic the USACE's standards of 110 percent and 120 percent respectively.
5. The result of the above assumptions is that an inbound ship will only be afforded 2/3 maximum tidal assistance at some point on their inbound voyage due to the duration of the voyage and the tide lag from the sea buoy to the terminal, and 1/3 of maximum tidal assistance on outbound voyages. The location of the ship at high tide, the speed of the ship, the length of a particular voyage within the project channel, and the actual tide range on a given day, determine actual tide assistance. The gross average of all these factors based on the above assumptions is 3 1/3 feet average benefit of high tide. For the purposes of this analysis, this has been rounded up to four feet, and therefore, this should be considered a liberal analysis, vice a conservative analysis. The USACE should report their findings and determinations on all of these factors and based economic projections on actual ship drafts this project can accommodate within Army Corps channel design standards.

FIGURE 6-1:

Savannah Draft vs Project



1.1.11 Savannah Harbor Entrance Channel Simulations 2010 Report; dated 9 March 2010

Pg.3, para 5: The ships modeled to investigate passing are a Panamax ship with a beam of 106 ft that no longer exists (this particular ship has been scrapped), and a less than post-panamax ship of only 140 ft beam (post-panamax beam is 160 ft). There is no testing done of two full post-panamax ships passing, so the channel has not been evaluated for post-panamax capacity. In some cases, they have considered a successful run where there was only 25 feet of clearance, indicating a true post-panamax ship would not have been successful.

Pg 3, para 7 & 8, Pg 4 Para 14.b & 15, Encl pg. 1 & 4: The inbound runs were reliable only when ranges were used, meaning the channel is only viable in clear visibility. Fog is prevalent in Savannah, as noted in the NOAA Coast Pilot, so dependence on ranges curtails the economic viability of the channel only to the extent of fair weather.

Pg 4, Para 13 & 14.c, Plates 12 & 14: The conclusion in paragraph 14c that two-way runs were successful is contradicted by paragraph 13 and Plates 12 & 14 that shows a ship left the channel in a passing run. It is also contradicted by the runs for one-way traffic that found that ranges were necessary for reliability.

Plate 5: While the ships outbound remained in the channel, the margin of safety was very thin. The report does not state a tolerance for satisfactory.

Encl, pg. 2, para 4 and 7: There are no simulations of steady steaming in the lengthy ranges offshore with limited width, especially considering the slow speeds necessary to limit squat per item 1.1.16, Vertical Motions. These notes indicate crabbing is common in "most transits". The width offshore is only 560ft. A post-panamax ship of 1050 ft length and 160 ft beam with 10 degrees crab takes up 330 ft of width, effectively doubling the beam. That leaves only 115 ft on each side. No runs evaluated the reliability of this channel in the long straight reaches, despite notes verifying crabbing is common. The narrow width of this lengthy offshore channel needs to be validated.

Summary: The offshore channel has not been validated as a safe channel for even one-way traffic of a full size post-panamax ship. Two way traffic has not been proven reliable in any segment of the channel, even with ships smaller than full post-panamax. The turn cannot be navigated safely inbound in limited visibility. The economic analysis needs to account for one-way traffic, high probability of ships leaving the channel, and closing the offshore channel in low visibility.

The channel needs to be simulated throughout the entire length with full size post-panamax ships both one way and passing.

1.1.12 Savannah Harbor Simulations Study 2009; 31 March 2009

Pg 2, para 5, Recommendations: The recommendation for an 8000 ft passing lane in Long Island Channel has not been studied. It is recommended by hypothesis based on the failure of the 7000 ft passing lane.

The Susan Maersk is only 140 ft beam. The project has not yet been studied for full post-panamax traffic. The population of ships greater than 140 ft beam is significant. Already, there are 347 container ships with a beam of greater than 140 ft in the world fleet. This represents 23 percent of the current post-panamax fleet. This population is certain to grow, and this project is not post-panamax capable without verifying the capability to handle full post Panama beam.

Enclosures: Almost every pilot recommended the entire Long Island Range be widened, vice just a segment of the Range, to allow for passing, citing that a minimal passing lane requires precise timing for each vessel to arrive in the lane, which is not realistic.

Plates 18 - 21 and Enclosures: Many pilots refuted the finding that passing in Oglethorpe Range is safe. The simulation runs do not show any appreciable margin of safety, even if the ships technically did not leave the channel. This reduces the passing opportunities to just the Long Island Range.

1.1.13 Navigation Study for Savannah Harbor Channel Improvements; September, 2004

This report is largely superseded by items 1.1.11 and 1.1.12. Shortcomings identified with the project in this report are reiterated and intensified in the two more recent reports noted above.

Pg 34, Plate 21: This study shows the Susan Maersk grounds in 6 ft seas in even a 52 ft deep offshore channel, verifying that the channel is not suitable for post-panamax drafts. At most, this simulation shows the channel is suitable for 44.5 foot drafts in 6 ft seas. At 44.5' (which would create only 2 feet of under keel clearance), the Susan Maersk is limited to some 600 fewer TEU's than fully loaded.

Pg 18 & Plates 3, 5, 7 & 11, 15, 17, 19, 23, 25, 27: Jones Island Range failed simulation runs.

Pg 25: Flats area failed simulation runs.

Pg 31: Jones Island Range failed even with a lightly loaded Susan Maersk.

Pg 32: Flats area failed even with a lightly loaded Susan Maersk.

Pg 36: Recommendations ignored that the Susan Maersk grounded in a 52 ft channel in 6 ft seas. The recommendation that the channel as proposed is satisfactory is unfounded.

Army Corps standards are that the offshore channel will provide for 120 percent depth compared to the target ship draft. On this measure, a 49 ft deep offshore channel will accommodate drafts up to 41 feet on low tide. Economic analyses must consider this limitation. The capacity of a typical 7000 TEU ship is some 200 TEU per foot of draft, so the capacity of a 7000 TEU ship limited to 6.5 less than full load draft foregoes 1300 TEU, or 19 percent of its cargo capacity.

1.1.16 Vertical Ship Motion Study for Savannah, GA, entrance channel; May 2010

This is a draft report. The project should be based on completed reports.

Pg 65: The simulated ship squats and grounds at speeds as low as 10 knots in channels deeper than the proposed. 10 knots has been found to be too slow to maintain control of a ship in a narrow channel subjected to ocean currents and waves. Maintaining control of the ship at 10 knots in a 550 ft wide channel needs to be studied carefully. 14 knots is widely considered the lowest safe speed to maintain control in confined offshore channels.

Pg 73: This shows that the channel only has viability for a fully loaded ship in a 49 ft channel 70 days a year at ten knots, an unsafe speed. A safer speed of 14 knots has zero days of viability.

This report verifies that the offshore channel cannot support 46 ft draft or 47.5 ft draft.

This report does not address channel depths as shallow as 49 feet, which is proposed. It does not evaluate the ability to maintain control of the vessels at slow speeds. It does not derive a maximum safe draft that is reliable most of the year (350 days plus).

This report does verify that this project is not suitable for post-panamax traffic.

A full-length simulation run needs to be conducted of a 160 ft wide ship at 47.5 feet draft at 6 knots as suggested here, or higher sped without inducing excessive squat, throughout the narrow 550 ft wide offshore channels. Controllability and under keel clearance must both be verified. A maximum safe draft for this channel should be derived and used as a basis for economic evaluations.

1.1.39 Dredged Material Management Plan; June 2010

Paragraph 1.1: The projection for how much maintenance material needs to be handled each year is not substantiated. Past actual volumes dredged are reported to be less than

the optimal volumes to keep pace with shoaling, but the amount reported for optimal maintenance, 6.225 million cubic yards (CY) is not substantiated.

The November 2010 ACOE Savannah District channel surveys show that all three offshore ranges have shallow quarters, as much as 1 ½ feet shy of project depth. Seven of thirteen river ranges have shallow quarters, as much as 4 feet shy of project. Over half of the Kings Island turning basin is 8 to 18 feet shy of project depth. This indicates that a significant amount of maintenance dredging is being deferred. It is entirely possible that some of this shoaling has reached equilibrium depth, having been deferred for so long, and, therefore, the current state does not indicate a linear progression of annual shoaling rates. It is safe to assume that with an improved channel, deferring maintenance as has been done in the past will no longer be tolerable, and therefore, annual maintenance dredged material will certainly increase. Due to the pattern of deferred maintenance and current shoaling, historical maintenance dredging data bears no credible indication of future annual demand, other than to indicate that proper maintenance dredging will greatly exceed historical dredging projects which have failed to keep pace with shoaling.

Table 3; Predicted O&M Volumes: This table projects maintenance dredging through 2060. It shows dependence on sites 13B, 14A, and 14B, which extend throughout the area notionally considered for an eventual Jasper County, SC marine terminal. The existing channel, unimproved, would likewise depend on the entire Jasper terminal site for annual maintenance perpetually. The Jasper terminal site is occupied by maintenance disposal demand indefinitely. With the increased maintenance load of a deeper channel, projected over an indefinite period, South Carolina's opportunities to develop a terminal on the Savannah River are even more obstructed.

Extended Notes Regarding Navigability:

The comparison to Charleston fails to take into account the salinity difference between the ports. Post –Panamax ships would sink approximately one foot as they enter the brackish water of the Savannah River. This phenomenon does not exist in Charleston where draft changes due to salinity are negligible. The other factor that differs is that the transit time is so long in Savannah that high tide only offers assistance for a portion of the transit. Even with the time lag between high tide at the sea buoy and high tide well into the port, and the higher amplitude of the tide inside the port, the ship will not be able to keep up with high tide throughout, and will be at half tide or worse at some point in the transit. Therefore, the tide only allows for an additional 4 1/2 feet of draft in optimal conditions. These factors contribute to the estimated potential of this channel project allowing only for the existing draft capability of the channel in Charleston, even though this project is two feet deeper.

The traffic density this project can support is severely constrained by the predominantly one-way capability. This limitation was documented in the Army Corps' letter to the

Savannah Pilots on March 28, 2002: "The channel was not designed for full two-way traffic for the design ship at all times." Given that the width is static, and is not afforded any benefit of tidal assistance, if the channel is only wide enough for one-way traffic some of the time, it is only wide enough for one-way traffic all the time for the design ship. It has also been noted, the design ship is not a full size post Panamx ship. The nearby Port of Charleston is currently wide enough for full post-panamax traffic all the time.

Therefore, the combined utility of this project would bring the ship handling capability of the Port of Savannah to roughly a one-way equivalent of the existing Port of Charleston. Economic and alternative studies should reflect this.

6.8. Environmental Justice

As noted in Section 5.20, Protection of Children and Environmental Justice, Federal agencies are required by Executive Order 12898 to identify and address "disproportionately high and adverse human health and environmental effects . . . on minority populations and low-income populations in the United States." Section 5.20, on Page 5-145, Paragraph 4 references figures that ". . . show the location of various poverty levels" in an area of Jasper County ". . . where the Garden City Terminal is located and most of the effects of the existing container terminal are experienced." The text further states ". . . that the closest area with the highest poverty level (40-100 percent) is located roughly a mile from the terminal", and this ". . . same area as being the closest one with the highest category of minorities (40-100 percent)." It is not clear in the text why this area is the focus of the analysis, rather than the area that may be potentially affected by the proposed action and alternatives. If the area identified on Figures 5-54 and 5-55 encompasses the region of influence, or area potentially affected by the proposed action and alternatives, it should be clearly stated as such in the text. If it does not, then the analysis needs to encompass that affected area, which needs to be defined based on the geographic extent of air quality and other impacts associated with the proposed action and alternatives that could potentially have adverse human health and environmental effects on minority populations and low-income populations.

Additionally, Section 5.20 does not define what low-income population was assessed as part of the environmental justice analysis. It would appear from the text to be the segment of the population with the highest category of people at or below the poverty level (40 – 100 percent), but that is not clear from the text. It is also not clear if the low-income population included in the environmental justice analysis comprised all people at or below the poverty level. The analysis should identify and assess disproportionately high and adverse effects on minority and low-income populations. Based on the mapping on Figures 5-54 and 5-55, it appears that minority and low-income populations may be closer to the project than one mile. What is not clear from the evaluation and needs to be included is an assessment (more than merely a statement) of whether or not minority and

low-income populations (not the highest category of minority and low-income populations) are disproportionately affected by any adverse human health and environmental effects of the proposed action and alternatives.

Section 5.20 also states that Executive Order 13045 requires that Federal agencies "identify and assess environmental health risks and safety risks that may disproportionately affect children;" and are required to "ensure that its . . . activities . . . address disproportionate risks to children that result from environmental health risks or safety risks." Figure 5-56 of the EIS shows the locations of schools, hospitals and child care facilities in the project area. It is presumed that the identification of these facilities is intended to represent locations where children would be exposed to environmental health risks or safety risks from the proposed action and alternatives. This is not clearly stated, however, but needs to be if that is the intent. There may be other locations in the affected area where children could be present and at risk, and they would include outdoor recreational areas (e.g., ball fields, playgrounds) and residential areas (for pre-school children not in child care facilities or all children present in residential areas if project activities would occur after school hours, for example, or during the weekend). If these areas exist in the area potentially affected by project activities, then they need to be included in the analysis.

Moreover, with regard to the evaluation under E.O. 13045, Section 5.20, Paragraph 1 on Page 148 states that ". . . schools, hospitals and child care facilities . . . are dispersed throughout the community and are not located disproportionately near the navigation channel." The disproportionate or non-disproportionate location of facilities, however, is not what needs to be evaluated. The analysis needs to identify and assess the effects of the proposed action on children and whether or not children may suffer disproportionately from environmental health risks and safety risks when compared to the adult portion of the population.

Section 5.20 concludes on Page 5-149, Paragraph 1 that "[t]he dredging activities, including deposition of the dredged sediment, will not have significant impacts on any populations, including minority populations and low-income populations." The basis for this conclusion is unclear from the text in Section 5.20 prior to this statement. The document needs to indicate the basis for this conclusion, i.e., whether it is from the results of air quality and other impact analyses of the proposed action and alternatives. If from air quality analyses, the document needs to explain how this conclusion was derived, as Section 5.6, Air Quality, indicates that the assessment of impacts on air quality ". . . did not include a detailed dispersion modeling assessment of air emissions of the alternatives", nor did it include " . . . a risk-based assessment of the health effects associated with the proposed project".

6.9. Cultural and Historic Resources

A South Carolina Department of Archives and History comment letter is provided in Appendix F of this comment document.

7. Comments on Proposed Mitigation

7.1. Wetlands

5.1.2.2 Impacts Without Mitigation – Pg 5-12, 2nd para – "Tidal freshwater marshes located outside the SNWR are subject to development threats and could be filled if the owner obtained a Department of the Army Permit". Please explain in detail the belief that those wetlands are threatened by development.

6.11 Executive Order 11990 (Protection of Wetlands) – Pg 6-3, 6th para – "A small amount of saltmarsh and brackish marsh (14.08 acres) would be lost through excavation of the turning basin and two wideners". The Corps estimates that approximately 1200 acres of tidal freshwater wetlands could be converted to another wetland type without mitigation, and over 300 acres of tidal freshwater wetlands will be impacted after mitigation. The Corps proposes as mitigation the preservation of existing tidal freshwater wetlands that are not under imminent threat of loss. How is that in compliance with Executive Order 11990, and how is that consistent with "no net loss"?

7.2. Water Quality

5.2.2 Mitigation for Impacts to Dissolved Oxygen – Pg 5-48, 2nd para – "Identified the use of Speece cones as the specific technique to inject oxygen into the water, although another land-based technique might be found later that could be more cost-effective." Where has this technology been employed to the degree needed for the SHEP and what was the result?

7.3. Fisheries

5.3.2 Mitigation for Impacts to Fisheries - Pg 5-91 – Adding a table to this section that identifies the quantity of fish habitat lost (by species) versus the quantity of habitat expected to be gained (by species) through mitigation would be helpful to understanding the magnitude of the potential impact.

6.04 Magnuson-Stevens Fishery Conservation and Management Act – Pg 6-2, 2nd para – "Conversion of freshwater marshes to brackish would require mitigation for all channel depths except the 44-foot project. Mitigation would be accomplished through the flow rerouting and preservation of wetlands in the Savannah River estuary". There appears to be no analysis of impacts to the plant and animal communities that reside in and adjacent to the streams that will have freshwater diverted from them, and no analysis of mitigation if impacts are likely to occur. Mitigation in the form of existing wetlands preservation

does not comply with "no net loss of function and value", a basic principal of the Corps' Section 404 regulatory program.

7.4. Other

5.22 Mitigation – Pg 5-157, 3rd para – "The project includes design features to avoid environmental impacts as well as features that reduce the amount of impacts that otherwise occur". The design features and features that reduce impacts should be identified in the text, or provide a reference to another section of the DEIS where those features are discussed in detail.

ATTACHMENT 1
COMMENTS ON DEIS APPENDICES

Comments on DEIS Appendix B –
Biological Assessments for Threatened and Endangered Species

Appendix B Comments

Biological Assessment of Threatened and Endangered Species for the
Proposed Savannah Harbor Expansion Project
Under the Endangered Species Act of 1973, As Amended
Draft Tier II Environmental Impact Statement for Savannah Harbor Expansion

1. Section 5.04.2.A. Line 5. How and to what degree will lighting affect sea turtles? Will it increase the likelihood of a take?

2. Section 5.04.2.D. Has the use of a bed leveler been cleared by NOAA? Endangered species surveys should be conducted prior to use. How will the project determine if use of a hopper dredge would result in equal or greater take of endangered species?

3. Section 5.04.2.E. The narrative states that noise above 150 dB is the level of a take. However, noise levels above 150 dB and below 180 dB are proposed to be allowed under monitoring even though they are above the level of a take. This is counterintuitive and against a tenant of the ESA, which is to prevent a take of an endangered species.

4. Section 6.00.f. Authorization of the sites through LTMS in 1996 does not preclude the need for study and assessment in this EIS. Since 1996, additional species have been listed as threatened or endangered. In addition, these areas may currently be used by protected species. If, in fact, the allowable timeframe in the LTMS was indeterminate, the LTMS process is flawed.

5. Page 46, 4th paragraph states "The proposed action *does not plan* to place any excavated sediment…on any upland beaches…" (*emphasis* added) The project should specify whether it will or will not. The words 'does not plan' suggest that it may occur at a later date if the plans change. This impact is not assessed in the EIS and should therefore be changed to either state that it will not occur or that it may occur and address the environmental impacts of the action.

6. Page 46, 2nd to last paragraph, line 2. ERDC Mearshore should be corrected to read ERDC Nearshore.

7. Section 7.01, 4th Paragraph. The text discusses how the increase in salinity and decreased DO will remain downstream of the I-95 bridge. How does this compare to existing levels? It is difficult to assess impact when the document does not state how this is a change from existing conditions.

8. Section 7.02.2 (c). The assessment does not account for the loss of salt marsh due to increased wave action from the larger ships that will be using the channel.

9. Section 7.02.5 (c & d). The last paragraph of section c and the first paragraph of section d are contradictory. Section c states that "[i]ncreases in ship traffic are expected to occur in the future…" Section d then states "the number of vessels…is expected to decrease…" Which is it? The data to back up this information should also be cited in order to substantiate the claim.

10. Section 7.02.7 (c). The document states that sediment deposition would be conducted in a manner to not interfere with nesting terns. There is no detail provided to substantiate this claim. Has a monitoring plan been developed in order to determine the location of nests prior to deposition of sediments? Will deposition occur near nesting terns? If so, how close? If CDF's are being used for breeding, feeding, and loafing for any listed species, the relevant laws related to protection of sensitive species would apply and mitigation should be required if the disturbance of the sensitive species habitats are not authorized by the specific law that protects the sensitive species.

11. Section 7.02.9 (d). Has a monitoring plan been developed? What monitoring protocol will be used and how will it be used in order to ensure adequate habitat is available during the project for nesting? If the entire area is disturbed in a short period of time, it is highly unlikely that any habitat will be available for nesting during the project.

12. Section 7.02.10 (c). Lines 6 and 7. There is nothing in the document to substantiate this claim. A reference should be cited.

13. Section 7.02.11 (c). Have any nest surveys been completed near the impact areas? Surveys should be completed prior to determination of no impact.

14. Section 7.02.14 (c). The document does not consider or mention the impacts from saltwater intrusion into freshwater, thereby reducing available habitat. The reduction in available freshwater habitats is an impact that must be considered.

15. Section 7.02.15 (c). The document states that sediment deposition would be conducted in a manner to not interfere with nesting yellow crowned night herons. There is no detail provided to substantiate this claim. Has a monitoring plan been developed in order to determine the location of nests prior to deposition of sediments? Will deposition occur near nesting areas? If so, how close?

16. Section 7.02.17 (b). The document states that no gopher frogs have been observed at the CDFs, but does not provide any reference to a study that has looked for the frogs. Information should be provided as to which studies would have been expected to document gopher frogs had they been present. Non-presence cannot be determined by a lack of study.

17. Section 7.02.20 (c). If the habitat requirement is similar to what is found in the estuary, then surveys should be conducted in impact areas to demonstrate absence from the habitats. It is impossible to determine impact without knowing whether or not it exists in the impact areas.

18. Section 7.02.21 (c). If the habitat requirement is similar to what is found in the estuary, then surveys should be conducted in impact areas to demonstrate absence from the habitats. It is impossible to determine impact without knowing whether or not it exists in the impact areas.

19. Section 7.02.22 (c). If the habitat requirement is similar to what is found in the estuary, then surveys should be conducted in impact areas to demonstrate absence from the habitats. It is impossible to determine impact without knowing whether or not it exists in the impact areas.

20. Section 7.03.Savannah River. The document states that the overall effect on the river and its fisheries are not expected to be significant. The impact on fisheries was not adequately addressed considering the fact that over 400 acres of habitat is expected to be lost to the shortnose sturgeon alone. In addition, the lost habitat may have been underrepresented by the modeling. For example, a baseline level of 4.5 mg/l of dissolved oxygen was used to determine if habitat was available for shortnose sturgeon. This is a minimum level at which the agencies determined shortnose sturgeon can survive, but does not necessarily indicate the dissolved oxygen level that is necessary for foraging, resting, and moving. For example, the Collins et al. (2001) study of shortnose sturgeon habitat use cited in Section 8.02.7 of this appendix, reported minimum mean dissolved oxygen levels of 6.36 and 6.45 in areas where adults and juveniles were found, respectively.

    The habitat use information, in conjunction with agency comments reported on page 128 #4, 2nd paragraph in Appendix N, again suggests the habitat modeling overrepresented the available habitat for sturgeon by denoting it all as equally beneficial at the 4.5 mg/l dissolved oxygen threshold and thus failed to quantify the intensity of the impact to the fisheries. In the Appendix N documentation, Prescott Brownell, from NMFS requested that a range of suitable habitat thresholds be used for modeling habitat availability. The agency panel then redacted his comments from the record without providing an adequate basis for the redaction. The panel decided the current methods were "acceptable for now." This comment would suggest that additional work would be necessary in the future in order to adequately asses the impacts. The narrative does not provide adequate discussion as to why the pass/fail approach was more adequate than the range approach suggested by Mr. Brownell.

    Additional questions as to the validity of the fisheries assessment are based on the habitat models and their interpretation for impact determination. On page 132 of Appendix N, the memorandum for the record states that other fish were not

modeled for habitat suitability because the Corps did not wish to spend the time modifying existing models and they would instead use other species as surrogates. Avoidance of spending time developing models is a suspect reason for not pursuing the assessment of some species. This is especially true when no documentation, reference, or justification was given as to the acceptability of using modeled species as surrogates for those species that were not modeled. Furthermore, the completed models were not used to extrapolate the potential impacts to species that were not modeled when determining potential impacts.

21. Section 7.04. The note on Rafinesque's big-eared bat states that some bottomland hardwood tress could be affected by salinity. Other sections of the document state that upland areas will not be affected by the project; however, this area highlights that effects may occur in upland areas. The potential effects should be investigated in greater detail in order to provide quantifiable impacts for the assessment of loss of habitat for this species.

22. Section 7.04.2 (c). If the habitat requirement is similar to what is found in the estuary, then surveys should be conducted in impact areas to demonstrate absence from the habitats. It is impossible to determine impact without knowing whether or not it exists in the impact areas.

23. Section 7.04.5 (c). If the habitat requirement is similar to what is found in the estuary, then surveys should be conducted in impact areas to demonstrate absence from the habitats. It is impossible to determine impact without knowing whether or not it exists in the impact areas.

24. Section 7.04.7 (c). 2nd paragraph. The narrative states that ship encounters with pygmy sperm whale are extremely rare, but do not provide a reference or other information to substantiate this claim. The data to back up this information should also be cited in order to substantiate the claim. The last paragraph of section c and the first paragraph of section d are contradictory. Section c states that "[i]ncreases in ship traffic are expected to occur in the future…" Section d then states "the number of vessels…is expected to decrease…" Which is it? The data to back up this information should also be cited in order to substantiate the claim.

25. Section 7.04.8 (c). If the habitat requirement is similar to what is found in the estuary, then surveys should be conducted in impact areas to demonstrate absence from the habitats. It is impossible to determine impact without knowing whether or not it exists in the impact areas.

    The narrative also provides 2 c sections and 2 d sections that have different impact and effect determinations. Which apply here?

26. Section 7.04.9 (c). If the habitat requirement is similar to what is found in the estuary, then surveys should be conducted in impact areas to demonstrate absence from the habitats. It is impossible to determine impact without knowing whether or not it exists in the impact areas.

27. Section 7.04.11 (c). If the habitat requirement is similar to what is found in the estuary, then surveys should be conducted in impact areas to demonstrate absence from the habitats. It is impossible to determine impact without knowing whether or not it exists in the impact areas.

28. Section 7.04.15 (c). If the habitat requirement is similar to what is found in the estuary, then surveys should be conducted in impact areas to demonstrate absence from the habitats. It is impossible to determine impact without knowing whether or not it exists in the impact areas.

29. Section 7.04.16 (c). If the habitat requirement is similar to what is found in the estuary, then surveys should be conducted in impact areas to demonstrate absence from the habitats. It is impossible to determine impact without knowing whether or not it exists in the impact areas.

30. Section 7.04.21 (c). If the habitat requirement is similar to what is found in the estuary, then surveys should be conducted in impact areas to demonstrate absence from the habitats. It is impossible to determine impact without knowing whether or not it exists in the impact areas.

31. Section 7.04.22 (c). If the habitat requirement is similar to what is found in the estuary, then surveys should be conducted in impact areas to demonstrate absence from the habitats. It is impossible to determine impact without knowing whether or not it exists in the impact areas.

32. Section 7.04.23 (c). If the habitat requirement is similar to what is found in the estuary, then surveys should be conducted in impact areas to demonstrate absence from the habitats. It is impossible to determine impact without knowing whether or not it exists in the impact areas.

33. Section 7.04.24 (c). If the habitat requirement is similar to what is found in the estuary, then surveys should be conducted in impact areas to demonstrate absence from the habitats. It is impossible to determine impact without knowing whether or not it exists in the impact areas.

34. Section 7.04.25 (c). If the habitat requirement is similar to what is found in the estuary, then surveys should be conducted in impact areas to demonstrate absence from the habitats. It is impossible to determine impact without knowing whether or not it exists in the impact areas.

35. Section 7.05.Savannah River. The document states that the overall effect on the river and its fisheries are not expected to be significant. The impact on fisheries was not adequately addressed considering the fact that over 400 acres of habitat is expected to be lost to the shortnose sturgeon alone. In addition, the lost habitat may have been underrepresented by the modeling. For example, baseline levels of 3.5 to 4.0 mg/l of dissolved oxygen was used to determine if habitat was available for adult shortnose sturgeon. This is a minimum level at which the agencies determined shortnose sturgeon can survive, but does not necessarily indicate the dissolved oxygen level that is necessary for foraging, resting, and moving. For example, the Collins et al. (2001) study of shortnose sturgeon habitat use cited in Section 8.02.7 of this appendix, reported minimum mean dissolved oxygen levels of 6.36 and 6.45 in areas where adults and juveniles were found, respectively.

    The habitat use information, in conjunction with agency comments reported on page 128 #4, 2nd paragraph in Appendix N, again suggests the habitat modeling overrepresented the available habitat for sturgeon by denoting it all as equally beneficial at the 4.0 mg/l dissolved oxygen threshold and thus failed to quantify the intensity of the impact to the fisheries. In the Appendix N documentation, Prescott Brownell, from NMFS requested that a range of suitable habitat thresholds be used for modeling habitat availability. The agency panel then redacted his comments from the record without providing an adequate basis for the redaction. The panel decided the current methods were "acceptable for now." This comment would suggest that additional work would be necessary in the future in order to adequately asses the impacts. The narrative does not provide adequate discussion as to why the pass/fail approach was more adequate than the range approach suggested by Mr. Brownell.

    Additional questions as to the validity of the fisheries assessment are based on the habitat models and their interpretation for impact determination. On page 132 of Appendix N, the memorandum for the record states that other fish were not modeled for habitat suitability because the Corps did not wish to spend the time modifying existing models and they would instead use other species as surrogates. Avoidance of spending time developing models is a suspect reason for not pursuing the assessment of some species. This is especially true when no documentation, reference, or justification was given as to the acceptability of using modeled species as surrogates for those species that were not modeled. Furthermore, the completed models were not used to extrapolate the potential impacts to species that were not modeled when determining potential impacts.

36. Section 8.02.1, The section header misspelled Bachman's warbler. Backman's should read Bachman's.

37. Section 8.02.1 (c). This sections states that no upland habitats will be adversely affected by the proposed action. This is contradictory to information provided in a note in section

38. Section 7.04. The note on Rafinesque's big-eared bat states that some bottomland hardwood tress could be affected by salinity. Will upland habitats be affected or not?

39. Section 8.02.2 (b). What does the term 'the areas' refer to in lines 7,8, and 9. It is unclear from the text and therefore impossible to determine what the impacts would be.

40. Section 8.02.2 (c). The document does not adequately address the impacts of the project on the wood stork. Impacts to the CDFs, which are currently being used as feeding areas for an endangered species should be quantified and mitigated. More detail should be provided about these impacts, the recovery period, and the habitats that will result from the project.

41. Section 8.02.3 (c) 1. The narrative is lacking in providing references that substantiate the factual claims in the document. The data to back up this information should be cited in order to substantiate the claims that impacts will be minimal.

    Additional detail should be provided to indicate the degree to which habitat would be affected during the project and the amount of habitat that will remain unimpacted at any one point in time. Phrases such as "[o]nly a small portion of the forging habitat is directly affected at any point in time during sediment placement and adjacent habitat is still available…" does not provide adequate specificity to assess impacts. Additional detail should be provided on benthic recolonization rates to substantiate the as yet unsubstantiated recolonization claims in the document.

42. Section 8.02.3 (d) 1. The word 'we' should be deleted.

43. Section 8.02.4 (d). The document does not consider the effects that the larger ship traffic, that will result because of this project, may have on manatees. In its current form, the impacts section is inadequate to address potential impacts.

44. Page 136. The narrative does not discuss how the increase in boat traffic or deposition of material in the nearshore area of Tybee Island will affect loggerhead sea turtles. Failing to discuss all potential impacts suggests this analysis is inadequate.

45. Page 148. Conservation Measures (a). 2nd Paragraph line 2. The document credits turtle deflecting dragheads with significantly minimizing the risk of sea turtle

take. No references or sources have been cited to substantiate this claim. Since the avoidance of take claims stated later depend upon this assertion, the avoidance claims are not valid unless this claim is substantiated.

46. Page 154. A. 4. Are the dates correct? Will the observer only be onboard in December and March? The first paragraph of Section A states the dredging will occur from December through March. If an observer is only present for 2 of the 4 months, how will compliance with protocol be ensured?

47. Page 155. C. first paragraph, last sentence. An assessment in 1996 is not valid today due to changes in the endangered species list and in the environment. The areas should again be assessed for potential endangered species impacts.

48. Section 8.02.7. Shortnose sturgeon and Atlantic sturgeon are grouped together for purposes of assessing impacts from the project. The narrative justifies the grouping due to their "similarities in habitat use, distribution throughout the proposed action area, foraging behavior and prey base, and subsequent risk of take relative to dredging and trawling operations…" No citations or other reference information was provided to substantiate this decision to group the species. Other information provided in the appendix provides information that contradicts the claim that the species are similar enough to group together for impact assessment purposes. For example, on Page 170, last paragraph, the narrative states that Atlantic sturgeon primarily lead a marine existence and are therefore more likely to be impacted by hopper dredges than the more estuarine based shortnose sturgeon. The first sentence of the second paragraph on Page 174 also states that the habitat ranges for shortnose and Atlantic sturgeon are slightly different. In addition, the SRT 2007 report states that not all rivers that support Atlantic sturgeon, support shortnose sturgeon. This information again reiterates the differences between the two species, the need to assess them independently, and the shortcomings of an assessment that assesses them together.

49. Page 157, 1st paragraph, Unsubstantiated claims are made throughout this paragraph without any reference materials, peer-reviewed or otherwise, cited.

50. Page 157, 2nd paragraph, specifically lines 1-7. Unsubstantiated claims are made throughout this paragraph without any reference materials, peer-reviewed or otherwise, cited.

51. Page 160, present conditions, 1st paragraph. The use of 4.0 mg/l continues to be used in spite of the information provided by Collins et al. 2001 that mean DO levels in sturgeon habitat use areas were 6.45 and greater. The claim that prolonged exposure to low oxygen levels may not produce acute impacts to fish is unsubstantiated by any outside reference materials. This use of 4.0 mg/l is a minimum level at which the agencies determined shortnose sturgeon can survive, but does not necessarily indicate the dissolved oxygen level that is necessary for

foraging, resting, and moving. The agency comments reported on page 128 #4, 2nd paragraph in Appendix N, again suggests the habitat modeling overrepresented the available habitat for sturgeon by denoting it all as equally beneficial at the minimum dissolved oxygen threshold and thus failed to quantify the intensity of the impact to the fisheries. In the Appendix N documentation, Prescott Brownell, from NMFS requested that a range of suitable habitat thresholds be used for modeling habitat availability. The agency panel then redacted his comments from the record without providing an adequate basis for the redaction. The panel decided the current methods were "acceptable for now." This comment would suggest that additional work would be necessary in the future in order to adequately asses the impacts. The narrative does not provide adequate discussion as to why the pass/fail approach was more adequate than the range approach suggested by Mr. Brownell.

52. Page 160, present conditions, paragraphs 2 and 3. Information provided is unsubstantiated by any outside reference materials and are therefore considered baseless for assessing impacts.

53. Page 164, threats, paragraph 1, line 2. Information provided is unsubstantiated by any outside reference materials and are therefore considered baseless for assessing impacts.

54. Page 170, Dredging methods and associated impacts, line 7. The SRT 2007 report states that habitat loss due to dredging is not just a short-term impact to foraging and refuge habitat. Atlantic sturgeon rely upon deep holes for refugia and are substrate dependent fish. If the bottom of the river is dredged to create an anoxic, uniform bottom without substrate diversity the effects on Atlantic sturgeon would be detrimental over a long-term period.

55. Page 171, Section B, Line 4. What does fairly low mean? The impacts should be quantified and substantiated. Even a single take is not allowed under the ESA unless a permit has been issued.

56. Page 171, Section B, Lines 4-6 state that eggs and larval sturgeons 100 miles upstream where hydraulic dredges are proposed? Are hydraulic dredges proposed upstream from the project area? If not and the sentence is inaccurate it should be corrected. If it is intended to state that eggs and larval sturgeon are located 100 miles upstream from the project area and therefore are outside of the area where hydraulic dredges are being used it is inaccurate.

57. Page 160 of this document, first paragraph, last line, states that an Atlantic sturgeon larva was found 6.7 km (4 miles) upstream of the project impact area. This information suggests that some larva may drift into the project area. Additional information should be collected to verify the actual location of Atlantic sturgeon spawning to ensure the project dredging and upstream

movement of salinity and decreases in DO will not deleteriously impact Atlantic Sturgeon.

58. Page 175. Indirect impacts. The impacts to refuge habitat are actually likely to be long-term impacts according to the SRT 2007 report. In addition, the loss of deep holes with sufficient levels of DO are likely to result in unavailable habitat in which sturgeon may be able to survive, but will not utilize due to inadequate levels of DO.

59. Page 175. Benthic foraging, First paragraph, Line 7. Unsubstantiated claim about benthic recolonization.

60. Page 175. Benthic foraging, First paragraph, Line 8. Unsubstantiated claim without a reference cited.

61. Page 175, Second paragraph, Lines 6 and 13. Unsubstantiated claim without a reference cited.

62. Page 176, Line 2. Unsubstantiated claim without a reference cited.

63. Page 176, Second paragraph, First sentence. Unsubstantiated claim without a reference cited.

64. Page 176, Second paragraph, Second and third sentences. A correlation between river flow and season does not equate to a correlation between natural community shifts and river flow rates. The logic is flawed in this assertion and it may not be accurate.

65. Page 176. Impacts from cadmium-laden sediment. 2nd paragraph. The text suggests that exposed clay would prohibit benthic recolonization. This statement contradicts earlier assertions that benthos would recolonize quickly.

66. Page 177. First paragraph, lines 5-7 suggest that 28% of the substrate surface is a minor fraction of the system. 28% of the channel bottom is not minor.

67. Page 177. Section B. First line. The line claims extensive studies have been conducted, but cites none. Only two studies are included below and neither appears to deal directly with fishes that may be found in the Savannah River.

68. Page 177. Section B, Second paragraph, second sentence. Unsubstantiated claim without a reference cited.

69. Page 179, second paragraph. Line 11 claims fish could use different habitat upstream in order to avoid increased salinity. The studies cited throughout the text and in literature cited by the text highlight the necessary use of estuarine

habitats by shortnose and Atlantic sturgeon. Excluding these fish from the necessary habitats is a substantial impact that cannot be mitigated by the assumption that the fish can simply avoid saline habitats.

70. Page 180. The document explains that since no additional habitat can be modified to make it suitable for sturgeon, the project can mitigate impacts by adding upstream habitats. The addition of upstream habitats may be beneficial for some of the life stages of sturgeon, but it is not a substitute for the necessary nursery areas that will be lost due to the project. There is no evidence to suggest the sturgeon will utilize or benefit from the upstream areas or that any benefits would mitigate deleterious impacts from the loss of estuarine habitats.

Appendix C Final Comments

Mitigation Planning Evaluation
Draft Tier II Environmental Impact Statement for Savannah Harbor Expansion

1. Section 2, Pages 1-5. Fails to discuss what steps were taken to avoid wetland and many other impacts described within Section 5 of the DEIS.

2. Section 3, Page 9, Summary Table. States that salt marsh impacts would be -15.68 acres. A negative impact suggests that there would be a net gain in salt marsh, which is not the case. In addition to the negative impact issue, the quantity of the impact does not match what is provided in Section 5 of the DEIS.

3. Section 4, Page 11. This project should not result in a net loss of wetlands of any type. Preserving existing wetlands should not count as part of the mitigation unless a direct threat can be shown for each and every site.

4. Section 4, Page 15, 2nd Paragraph. Flow rerouting was proposed as a method to reduce the impacts to freshwater marshes, but what are the direct and indirect impacts associated with the planned alternatives? Deepening existing cuts should be considered an impact to subaqueous bottoms. Filling cuts should be considered a fill of subaqueous bottoms and potentially a fill of intertidal wetlands adjacent to the open water. These impacts should be determined and enumerated. These impacts should be mitigated as part of this project.

5. Section 4, Page 30, 7th Paragraph. States "the Contractor shall provide an Environmental Monitoring Plan for the job site, including land, water, air, and noise monitoring. Special emphasis shall be provided for the monitoring of wildlife resources (manatees and marine mammals)." What about other wildlife resources (i.e. shortnose sturgeon)?

6. Section 4, Page 31, 1st Paragraph. Monitoring periods for manatee before after the blast should be lengthened.

7. Section 4, Page 32, 3rd Paragraph. The paragraph states that if a manatee or marine mammal is injured or killed during blasting, all blasting operations shall be suspended and shall not resume until the contractor obtains written permission from the Contracting Officer. The District will coordinate the take with the NMFS to determine the appropriate course of action." What preparations will be in place to save any manatee or marine mammal wounded during the blast?

8. Section 4, Page 33, 2nd Paragraph. The paragraph states that the Marsh Succession Models were not ultimately used to evaluate the mitigation proposals. If this model was used to predict the impacts, the same model should be used to predict the benefits of the mitigation proposals. How was the wetland mitigation

alternatives evaluated to confirm that the freshwater wetland impacts would be reduced from 1,212 acres to 337 acres without the use of the model?

9. Section 5, Page 49, 1st Paragraph. The paragraph states that the proposed restoration site is currently "high ground." Has a wetland delineation been confirmed for the proposed site to determine how much of the site is currently a wetland and how much is non-wetland? Portions of the site which are currently a wetland under normal conditions (the site was last filled at least 20 years ago) should not be included within the proposed restoration acreage. If wetlands exist within the proposed restoration area and were counted as part of the restoration acreage, then the proposed wetland restoration acreage should be reduced accordingly.

10. Section 5, Page 49, 2nd Paragraph. How will the proposed restoration site be protected from invasive species such as *Phragmites australis* if left to revegetate naturally?

11. Section 5, Page 53, 2nd Table. The table indicates that 730 acres of saltmarsh will be impacted by the project. However, the 3rd paragraph on page 110 indicates that the impacts are to brackish marshes. Both cannot be correct.

12. Section 5, Page 53, 2nd Table. What method was used to determine the location and quantity of impacts to brackish or saltmarsh (see previous comment)? This method should be discussed in the document and the location and quantity of impacts at each location should be made available for public review.

13. Section 5, Page 53, 2nd Table. The document clearly states that the natural resource agencies in Georgia require that "acceptable mitigation should consist of at least 50 percent restoration." If the impacts are actually to saltmarsh, then the proposed restoration is out-of-kind restoration. Is this acceptable to the State?

14. Section 5, Page 53, 1st Paragraph. How are the flow altering methods restoring 1,068 acres of brackish marsh? The mitigation plan details how these methods would reduce the impacts to freshwater wetlands, but makes no mention of how these methods also perform brackish marsh restoration. As mentioned in a previous comment, the proposed flow altering features would actually result in impacts themselves. The plans involve filling subaqueous bottoms, dredging subaqueous bottoms, and potential filling of intertidal wetlands adjacent to plugs and weirs. The document should clearly indicate how it was determined that these flow altering plans actually restore impacted marshland. The location of the proposed restoration areas should be included in the document and made available for public review. The restoration areas should be monitored as part of the mitigation plan.

15. Section 5, Page 69, 1st Paragraph. The agencies could not determine any impact that could restore or enhance sturgeon habitats. The proposed project will

undoubtedly result in a take of the endangered shortnose sturgeon and the candidate Atlantic sturgeon which is proposed to be listed as endangered. As a part of the Endangered Species Act, the project would likely need to receive an incidental take permit. If an incidental take permit was issued, the USACE would be required to submit a habitat conservation plan. The habitat conservation plan would have to address the likely impacts of the project, steps the USACE will take to minimize and mitigate the impact, alternative considered and why the USACE did not pursue them further.

16. Section 5, Page 69, 2nd and 3rd Paragraphs. The USACE proposes the installation of a fish passage structure around the New Savannah Bluff Lock and Dam (NSBLD) in order to provide additional available habitat to the shortnose sturgeon. However, the DEIS hasn't provided any assurances that shortnose sturgeon historically used the habitat upstream of the NSBLD, that the shortnose sturgeon can and would navigate the fish passage structure, or that, even if sturgeon had historically used the habitat, the habitat above the NSBLD is currently of the quality that would provide benefits to sturgeon. Of important note, the proposed listing rule for Atlantic sturgeon states that measures "such as fish passage have not proven beneficial to Atlantic sturgeon, as they do not regularly use existing fish passage devices, which are generally designed to pass pelagic fish. To date, only four Atlantic sturgeon have been documented to have passed via a fish lift." Thus, there is no indication that the fish passage structure would adequately mitigate for the inevitable harm caused to shortnose sturgeon.

17. Section 5, Page 98, 1st Paragraph. Neither the DEIS or this document provide any documentation that shortnose sturgeon used habitat above the NSBLD or that the availability of this habitat would adequately compensate for the lost habitat that is used by sturgeon during different seasons and during different life stages than more upstream habitats.

18. Section 5, Page 99, 1st Paragraph. The appendix states that the agencies noted the fish passage structure was the only method that could effectively compensate for the predicted loss in sturgeon habitats. On the contrary, the agencies didn't appear to state that the fish passage structure would effective compensate for impacts. The agencies seemed to state that they could not think of any other compensation in the estuary and that the fish passage structure was the only mitigation measure that had been proposed that may provide some compensation. In the documentation provided in the agency correspondence appendix, the agencies did not mention that the fish passage structure would effective compensate for the predicted loss in sturgeon habitats.

19. Section 5, Page 99, 2nd Paragraph. What if the fish passage structure is paid for by other funding and cannot be used by this project as mitigation? No other mitigation has been proposed. This constitutes a substantial risk that should be addressed.

20. Section 5, Page 103, 2nd Paragraph. The calculation of costs needed for the stocking program appears to be flawed and may underrepresent the actual amount of costs needed for the stocking program. The cost determination assumes that the start-up of the hatchery is directly proportional to the amount of fish that would be produced i.e., that only a percentage of the $3.1 million initial expense is required to get the stocking program underway. Has the GA DNR-WRD provided information to verify that the percentage assumption provides an adequate amount of payment for stocking? There are probably economies of scale that would preclude the direct ratio apportionment proposed by the Corps.

21. Section 9, Page 114, Monitoring shortnose sturgeon distribution. Both shortnose and Atlantic sturgeon should be monitored given their respective status under the Endangered Species Act and the take of these species that will occur as a result of this project. Monitoring should include distribution as well as abundance determinations. Monitoring that does not include abundance information will not provide adequate information to determine if the project is resulting in population decreases.

22. Section 9, Page 114, Monitoring fish passage at NSBLD. What would result if sturgeon do not use the fish passage structure? Adequate mitigation would not be provided.

23. Appendix A, Page 149, 2nd Table. The table indicates that a value of 0.3 was used for the threat category for the preservation sites. The document fails to justify the use of this elevated value. The second-to-last paragraph on page 123 indicates that "adjacent lands" are being logged and/or developed for residential use. The document does not indicate that these lands are directly adjacent to the tidal wetlands proposed for preservation or speaks of how these lands (if developed and/or logged) will directly affect the proposed preservation area. The document itself indicates that the threat must be demonstrable and it fails to do so. A value of 0, for no threat, or 0.1, for low threat, should be used in the preservation worksheet or the document should be revised to demonstrate how the proposed preservation areas, are themselves, at a moderate level of threat. A lower threat value would require that additional land be acquired for preservation.

24. Appendix A, Page 149, 2nd Table. The table indicates that the values for in-kind and out-of-kind replacement are 0.6 and 0.2, respectively. The previous table indicates that these are the only options available for use within the preservation worksheet. However, a value of 0.4 was used within the preservation worksheet. If there are uplands included within the preservation area (as page 123 indicates there are), their acreage should be excluded from the preservation total, or at least included as out-of-kind replacement. The preservation worksheet should be updated and the required acreage purchased as compensation for the project should be adjusted accordingly.

25. Numerous figures within Appendix C do not have essential components like north arrows, scales or legends.

Comments on DEIS Appendix D –
Monitoring Plan and Adaptive Management Program

Appendix D Comments

Monitoring and Adaptive Management Plan
Draft Tier II Environmental Impact Statement for Savannah Harbor Expansion

1. Section 3.Goals of an Adaptive Management Plan, p. 7, 2nd Paragraph: The document indicates that the first goal of the adaptive management plan is evaluating the accuracy of the predicted environmental impacts. Post-construction, the goal should be to determine if the mitigation features are adequate to compensate for the impacts. This should be achieved with field results and not with predictive models. In situ conditions indicate whether the mitigation features are adequate or inadequate.

2. Section 5.B.Physical, p. 7, 1st Paragraph: The document indicates that the pre-construction monitoring "will better define the complex interactions between the estuarine ecosystem and the quantity and quality of water available." If these interactions are unknown, how were the potential impacts determined in the Tier 2 EIS? These interactions should be understood prior to permit issuance as the potential impacts may still remain undetermined.

3. Section 5.B.Physical, p. 7, 2nd Paragraph: The document indicates that the hydrologic and water quality monitoring data will be used to update the models, pre-construction. Who would determine if the model warrants an update?

4. Section 5.B.Physical, p. 7, 2nd Paragraph: If a calibration is warranted of the predictive models, prior to construction, and the models predict greater impacts then permitted, would a permit modification be acquired prior to the beginning of impacts?

5. Section 5.B.Physical, p. 7, 3rd Paragraph: Would the State of South Carolina have a chance to determine the location of proposed groundwater monitoring wells, as the Floridan aquifer extends into southern South Carolina.

6. Section 5.B.Physical, p. 7, 3rd Paragraph: The document indicates that chloride levels will be monitored in "up to four" groundwater monitoring wells annually in the pre-construction phase. However, in section 5.C.5 on page 13, the document indicates that no fewer than "four" wells will be monitored. Also, section 5.C.5 indicates that the wells will be monitored four times a year, the text in section 5.B should indicate this fact.

7. Section 5.B.Physical, p. 8, 1st Paragraph: Do the applicants plan to monitor the distribution of Atlantic sturgeon as well? The Atlantic sturgeon has been confirmed in the Savannah River and has been proposed to be listed as endangered in the South Atlantic DPS which contains the project area.

8. Section 5.C.Biological, p. 13, 1st Paragraph: Do the applicants plan to monitor the distribution of Atlantic sturgeon as well? The Atlantic sturgeon has been confirmed in

the Savannah River and has been proposed to be listed as endangered in the South Atlantic DPS which contains the project area.

9. Section 5.C.Biological.2, p. 13, 1st Paragraph: The monitoring should also include drift larval surveys for larva entering the project area. With the proposed salinity increases, the larva entering the project area from upstream may not survive, and their loss should be considered an impact.

10. Section 5.C.Biological.2, p. 13, 1st Paragraph: Please indicate the amount implied when it is determine that sturgeon "intensively" use an area. If the substrate is not "intensively" used is it not recorded? The substrate type should be recorded for each observation.

11. Section 5.C.Biological.3, p. 14, 1st Paragraph: The document indicates that up to 25 shortnose sturgeon would be collected and implanted with transmitters. Is there a minimum number proposed? There should be imposed minimum used to provide validity to the data.

12. Section 5.C.Biological.3, p. 14, 2nd Paragraph: Substrate type should also be recorded for each observation.

13. Section 5.D.Reporting, p. 14, 1st Paragraph: The text should be revised to replace the word "which" for the word "where" and the word "become" for the word "becomes."

14. Section 6.C.Details of the Monitoring, p. 17, 1st Paragraph: The document indicates that "not all monitoring that was included in the Pre-Construction monitoring will be duplicated each year during the construction period." Please indicate which monitoring will not be included during the construction phase.

15. Section 6.C.Details of the Monitoring, p. 18, 2nd Paragraph: Please explain what constitutes a "large/unforeseen increase."

16. Section 6.D.Reporting, p. 19, 2nd Paragraph: If the monitoring indicates that unforeseen or unpermitted exceedences are occurring, this data should be made available for review by all applicable State and Federal agencies when the exceedences are observed and should not be held until the annual or final reports.

17. Section 7.A.Goals, p. 20, 5th and 6th Paragraphs: Does the monitoring at the nearshore sediment placement sites include monitoring of benthic repopulation for two or three years?

18. Section 7.D.Reporting, p. 25, 1st Paragraph: If the monitoring indicates that unforeseen or unpermitted exceedences are occurring, this data should be made available for review by all applicable State and Federal agencies when the exceedences are observed and should not be held until the annual or final reports.

reviewer was not able to calculate and confirm the accuracy of the emissions reported in many of the emission summary tables using the information provided in the descriptions preceding the emission summary tables. To facilitate a review of the emission estimates, an example calculation should be provided for each primary emission summary table. Additionally, the emission estimates are presented using various terminology to represent vessel trips (e.g., tons per transit, tons per vessel, and ton/call). The use of consistent terminology is recommended.

The following comments are based on review the Air Quality Section in the DEIS.

Page 5-105, Section 5.6 – the word "volume" is used in the third sentence and in the second to last sentence of the first paragraph. Because mass emission rates are being referred to in these instances, "amount" or "quantity" should be used in lieu of "volume".

Page 5-107, second sentence of the first paragraph - replace the word "volume" with "amount".

Page 5-108, second paragraph – Table 6-4 in Appendix K is referenced comparing port emissions to total emission in Chatham County. The percentages indicated in the second sentence of this paragraph do not match those presented in Table 6-4. The percentage values presented in Table 6-4 and the percentages indicated in this paragraph should be re-calculated or checked to confirm their accuracy.

Page 5-109, end of Air Quality section – a discussion is presented to explain why a conformity determination is not required for the project. Simply, a conformity determination is not required because the project location is in an attainment area (and the area is also not a designated maintenance area). This is well covered in the discussion under item a. It is suggested that item b. be deleted since it is not needed to support the conclusion that a conformity determination is not required. Further, a summary of project emissions is not provided in item b. for comparison with prescribed de minimus levels to confirm that the project emissions are below the de minimus levels. The following comment is made on the Draft GRR:

Page 142, Section 8.2.3 - in recognition that federal projects of this magnitude are typically subject to conformity determinations under the General Conformity or Transportation Conformity regulations, include an introductory statement to indicate that the project is exempt from conformity determination requirements because the project site is located in an area that is designated as an Attainment Area with respect to the National Ambient Air Quality Standards and the project area is not a maintenance area.

6.4. Tidal Intrusion

Issues regarding water quality impacts from tidal intrusion are addressed in section 5.3, Water Quality. Ecological impacts from tidal intrusion are addressed primarily in the Wetland Impacts Section.

6.5. Dredging and Deepening

5.7.1.1.C. Dredge Plume – Pg 5-112, 2nd para – "Another source of turbidity and sedimentation from hopper dredges is through the deposition of their sediment loads at the placement site". Please discuss the potential impact of this type of turbidity.

5.7.1.1.C. Dredge Plume – Pg 5-112, 5th para – "Dredge-induced water quality conditions will only be short-term and impact a small cross-sectional area of the Savannah River". Please quantify "short-term" and estimate the cross-sectional area to be impacted.

5.7.1.1.C. Dredge Plume – Pg 5-113, 3rd para – "All three shellfish harvesting areas are located a sufficient distance from the dredging in the Savannah River channel that sedimentation and high turbidity would not adversely impact these resources". Please state the distance from the dredging activity to the shellfish areas. Section 5.8.4.3 Confined Disposal Facilities (CDFs),

Page 5-118 – This section discusses the minimal impacts predicted on various resources that utilize the CDFs; however, there is no reference to the work that was done regarding identifying cadmium as a contaminant of potential concern (COPC), primarily presented in the DEIS Appendix M-Final Sediment Quality Evaluation.

Section 5.13 - Beneficial use of Dredged Sediment, Page 5- 142- "Impacts to fish (including larvae and eggs), shellfish and benthic communities within the near shore sediment placement areas are discussed in 5.7- Marine and Estuarine Resources. No long term adverse impacts are anticipated to any fishery resources or benthic communities from the near shore beneficial sediment placement." Section 5.7 does not provide adequate information to support this statement.

6.6. Sediment Quality

4.01.2.1 Sediment Quality (potential contaminant impacts) – Pg 4-9, 2nd paragraph – "The evaluation found that most of the sediments did not provide an concern for potential contaminant-related impacts associated with the proposed dredging and dredged sediment placement". What screening criteria were used to reach that conclusion?

4.01.2.1 Sediment Quality (potential contaminant impacts) – Pg 4-9, 3rd paragraph – "Polycyclic aromatic hydrocarbons (PAHs) and cadmium were detected in a sample

taken at about Station – 75+000B near the old RACON tower where a spill of fuel, batteries and paint lacquer occurred in November 1996. Subsequent sampling conducted in 2005 revealed that sediments at that location do not pose a potential for contaminant-related environmental impacts". What screening criteria were used to reach that conclusion?

5.4.2.3 Expected Results of Monitoring Cadmium-Laden Sediments – Pg 5-102, 2nd paragraph – "In light of the information summarized above, the dredging and the placement of cadmium-laden sediment in CDF 14A, CDF 14B and covering these sediments with 2 feet of clean sediment is not anticipated to result in adverse impacts to the aquatic environment or biota found in the CDFs". A discussion of the potential impacts on the river's biota from the dispersion of cadmium-laden sediments during dredging is needed.

6.7. Navigation

The Savannah Harbor Expansion Project, if completed as currently described at either 47 or 48 ft of depth, does not likely provide sufficient harbor depth and width necessary to make the Jasper Ocean Terminal a viable project. We now know that over 80 percent of container ship capacity on order is post-panamax in size and will require harbors with 50 feet mean low water and unrestricted two-way ship traffic capability, such as offered by New York, Baltimore, and Norfolk today, to reliably make Panama Canal appointments. Thus, it is likely that investment in the Jasper Ocean Terminal would require a further harbor deepening project to be cost-justified.

If the Savannah Harbor Expansion Project is approved, the cost of dredging the 48 ft channel to the Garden City Terminal and the resultant environmental damage would make it extremely difficult if not impossible to get the additional dredging to 50 ft needed to make Jasper Ocean Terminal viable.

DEIS Section 5.17 Aesthetics and Recreational, on page 5-143 fails to evaluate how increase ship traffic or speeds may affect recreational boaters and kayakers along the entire length of the project.

The following comments pertain to the documents contained in the GRR Attachment 3, Engineering Investigations Supplemental Materials. The documents are:

- 1.1.11 Savannah Harbor Entrance Channel Simulations 2010 Report; dated 9 March 2010
- 1.1.12 Savannah Harbor Simulations Study 2009; 31 March 2009
- 1.1.13 Navigation Study for Savannah Harbor Channel Improvements; September, 2004

- 1.1.14 Impacts of the Savannah Harbor Expansion Projects; October 2006
- 1.1.16 Vertical Ship Motion Study for Savannah, GA, entrance channel; May 2010
- 1.1.17 Ship Forces on the Shoreline of the Savannah Harbor Project; August 2006
- 1.1.24 Savannah Harbor Expansion Bank Erosion Study; November 2006
- 1.1.25 Savannah Harbor Expansion Bank Erosion Study Update; June 2010
- 1.1.34 Sensitivity Analysis of Proposed Navigation Meeting Areas; September 2009
- 1.1.39 Dredged Material Management Plan; June 2010
- 1.1.43 Correspondence Regarding Pipeline Crossings; May 2008

These reports and studies verify previous shortcomings regarding navigation and operational capability of the proposed project.

SHIP DRAFT CAPABILITY: The inshore project depth will not support post-panamax traffic except on high tide. The ship draft this project will accommodate will roughly equate to what Charleston can do now. Based on Army Corps channel design standards, which recommend channel depths of 110 percent of ship draft in protected waters, this project will support a 24 hour maximum draft of approximately 42 ½ feet, and 47 feet on high tide, in the inshore channels.

SHIP SPEED LIMITATIONS: The narrow offshore channels are proven to be untenable for ships at 46 ft draft and greater. The maximum draft these channels can accommodate may be much less, but simulations were only done for 46 ft and 47.5 ft drafts. Additional simulations should be done to determine a viable draft. The findings were that ships at the drafts simulated must maintain speeds not greater than 6 knots. These speeds also require a range of tide that is exaggerated. The study assumed tide range offshore is the same as tide range in the mouth of the river. This is false. Offshore tide lift in this area is roughly 2/3 of the tide lift at Fort Pulaski.

No simulations were done to verify that ships could maintain sufficient directional control at such slow speeds to safely negotiate the unusually narrow offshore channel design incorporated this project. Narrow offshore channels often require 14 to 18 knots to maintain safe directional control depending on weather and currents. The draft capability of the offshore channels must incorporate a coordinated study to determine vertical ship motions at sufficient navigational speed. Until this study is done, the viability of the offshore channel is indeterminate, except that this report proves it will not support drafts of 46 feet or deeper.

SHIP TRAFFIC: This project will not support two – way traffic of post-panamax traffic. No simulations were done with two full beam post-panamax ships, so passing has not

been verified anywhere in the project. Simulations with smaller ships only identified one passing lane as viable, at Long Island Range. This lane is roughly in the middle of the project, meaning that one inbound may pass one outbound, provided timing two ships 32 miles apart at the start of their planned passing rendezvous can be precisely executed for an exact meeting in a location not longer than 6 1/2 ship lengths. This one marginally adequate passing lane is only viable if lengthened to 8000 feet, according to pilot feedback, requiring additional study.

ECONOMIC BENEFIT LIMITATIONS: Economic benefit must account for accurate capabilities. Ships must be lightly loaded to 42 to 47 feet draft, and traffic density is limited to one-way traffic. Full economic benefit as estimated of Post-Panamax shipping is unattainable in this project. The economic limitations of predominantly one-way traffic and light loading would be significant.

JASPER TERMINAL BENEFIT: This project preempts availability of a South Carolina terminal on the Savannah River, because this project occupies the dredge disposal areas in way of the notionally proposed Jasper Terminal through 2060. No extra dredge material capacity is apparent in the operations and maintenance plan to free up these sites.

This project also will not support navigability parameters to support a viable Jasper Terminal. The Jasper Terminal would only be viable if it can support fully loaded post-panamax ships largely unrestricted. The draft limitations of this project would only allow post-panamax ships that are substantially less than fully loaded. One –way traffic competing with the other terminals in the river would limit ship arrivals such that berth utility at jasper would be severely curtailed. If this project goes forward, and ship traffic density reaches maximum capacity on a one-way channel, there would be no extra capacity to handle increased traffic to a Jasper Terminal, and permitting of a Jasper Terminal would be difficult justify.

Within this plan is a projection of some 19 ship arrivals per day. With many of them dependent on the tide given the limited depth, this may be an unsustainable traffic load. Adding the Jasper Terminal would likely overwhelm the traffic density a one-way channel can support. Proceeding with this project may approach the environmental limits this waterway can sustain, leaving little or no capacity to add width or depth necessary to support a truly post-panamax capable Jasper Terminal.

In order to make a Jasper Terminal viable, a dredging project would have to be designed for full two-way traffic from the terminal to the end of the cannel at sea, with an inshore depth of 50 to 51 feet, and an offshore depth of 55 to 57 feet. This proposed project falls far short of those parameters and provides no utility to South Carolina's terminal expansion plans for the Savannah River.

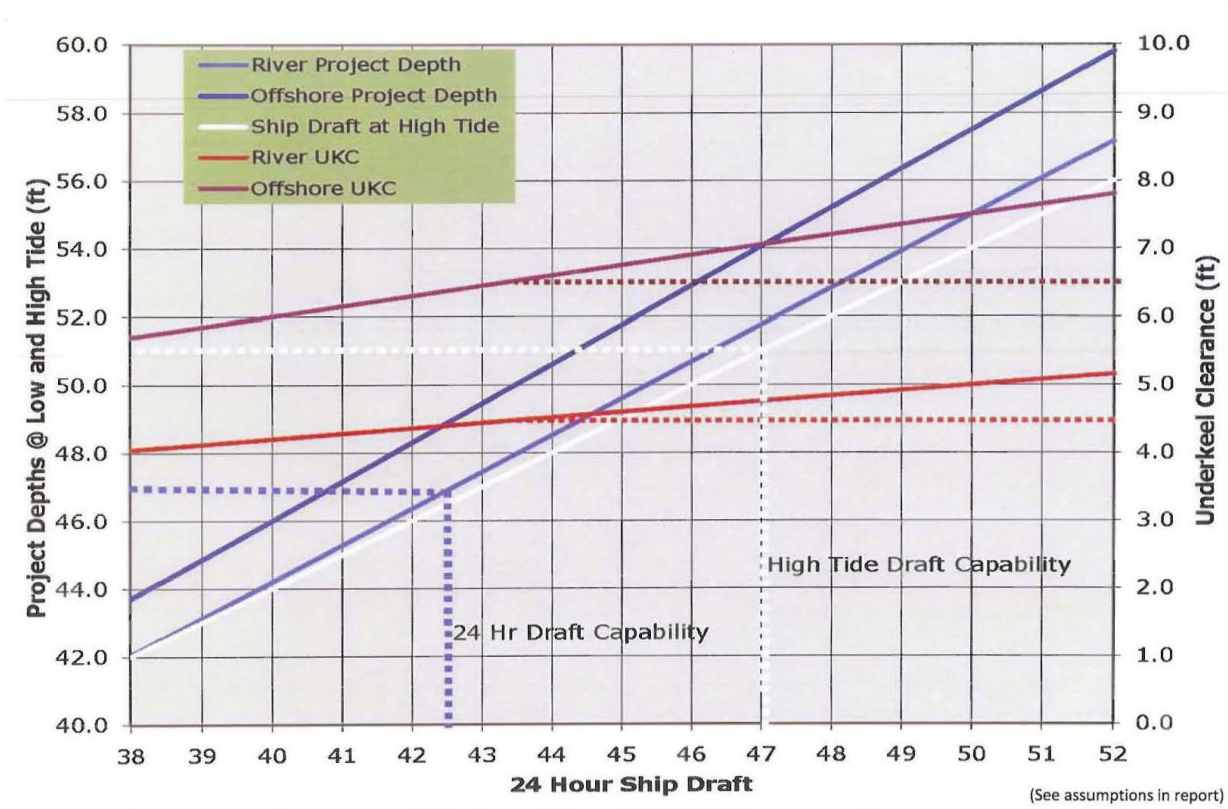
Figure 6-1 estimates draft and under keel clearance capability of various project depths at high and low tide for the Savannah River.

This chart depicts a difference of four feet between ship draft capability on any tide and on high tide based on the following assumptions:

1. Tide range at the seaward end of the project is four feet, at Fort Pulaski is six feet, and at Garden City is eight feet.
2. Tide lag from the sea buoy to Garden City is one hour.
3. Transit time from the sea buoy to Garden City would be three hours, on average.
4. The Army Corps of Engineers channel design standards per their engineering manual on channel design, which requires project depths to be 110 percent of the target ship draft in internal waters and 120 percent in exposed waters, is not being adhered to, as is apparent in the draft GRR and DEIS. Therefore, a lesser standard has been assumed to be 108 percent in internal waters and 115 percent in exposed waters for the purpose of these calculations. It should be noted that International Maritime Organization safe navigation standards for navigation mimic the USACE's standards of 110 percent and 120 percent respectively.
5. The result of the above assumptions is that an inbound ship will only be afforded 2/3 maximum tidal assistance at some point on their inbound voyage due to the duration of the voyage and the tide lag from the sea buoy to the terminal, and 1/3 of maximum tidal assistance on outbound voyages. The location of the ship at high tide, the speed of the ship, the length of a particular voyage within the project channel, and the actual tide range on a given day, determine actual tide assistance. The gross average of all these factors based on the above assumptions is 3 1/3 feet average benefit of high tide. For the purposes of this analysis, this has been rounded up to four feet, and therefore, this should be considered a liberal analysis, vice a conservative analysis. The USACE should report their findings and determinations on all of these factors and based economic projections on actual ship drafts this project can accommodate within Army Corps channel design standards.

FIGURE 6-1:

Savannah Draft vs Project



(See assumptions in report)

1.1.11 Savannah Harbor Entrance Channel Simulations 2010 Report; dated 9 March 2010

Pg.3, para 5: The ships modeled to investigate passing are a Panamax ship with a beam of 106 ft that no longer exists (this particular ship has been scrapped), and a less than post-panamax ship of only 140 ft beam (post-panamax beam is 160 ft). There is no testing done of two full post-panamax ships passing, so the channel has not been evaluated for post-panamax capacity. In some cases, they have considered a successful run where there was only 25 feet of clearance, indicating a true post-panamax ship would not have been successful.

Pg 3, para 7 & 8, Pg 4 Para 14.b & 15, Encl pg. 1 & 4: The inbound runs were reliable only when ranges were used, meaning the channel is only viable in clear visibility. Fog is prevalent in Savannah, as noted in the NOAA Coast Pilot, so dependence on ranges curtails the economic viability of the channel only to the extent of fair weather.

Pg 4, Para 13 & 14.c, Plates 12 & 14: The conclusion in paragraph 14c that two-way runs were successful is contradicted by paragraph 13 and Plates 12 & 14 that shows a ship left the channel in a passing run. It is also contradicted by the runs for one-way traffic that found that ranges were necessary for reliability.

Plate 5: While the ships outbound remained in the channel, the margin of safety was very thin. The report does not state a tolerance for satisfactory.

Encl, pg. 2, para 4 and 7: There are no simulations of steady steaming in the lengthy ranges offshore with limited width, especially considering the slow speeds necessary to limit squat per item 1.1.16, Vertical Motions. These notes indicate crabbing is common in "most transits". The width offshore is only 560ft. A post-panamax ship of 1050 ft length and 160 ft beam with 10 degrees crab takes up 330 ft of width, effectively doubling the beam. That leaves only 115 ft on each side. No runs evaluated the reliability of this channel in the long straight reaches, despite notes verifying crabbing is common. The narrow width of this lengthy offshore channel needs to be validated.

Summary: The offshore channel has not been validated as a safe channel for even one-way traffic of a full size post-panamax ship. Two way traffic has not been proven reliable in any segment of the channel, even with ships smaller than full post-panamax. The turn cannot be navigated safely inbound in limited visibility. The economic analysis needs to account for one-way traffic, high probability of ships leaving the channel, and closing the offshore channel in low visibility.

The channel needs to be simulated throughout the entire length with full size post-panamax ships both one way and passing.

1.1.12 Savannah Harbor Simulations Study 2009; 31 March 2009

Pg 2, para 5, Recommendations: The recommendation for an 8000 ft passing lane in Long Island Channel has not been studied. It is recommended by hypothesis based on the failure of the 7000 ft passing lane.

The Susan Maersk is only 140 ft beam. The project has not yet been studied for full post-panamax traffic. The population of ships greater than 140 ft beam is significant. Already, there are 347 container ships with a beam of greater than 140 ft in the world fleet. This represents 23 percent of the current post-panamax fleet. This population is certain to grow, and this project is not post-panamax capable without verifying the capability to handle full post Panama beam.

Enclosures: Almost every pilot recommended the entire Long Island Range be widened, vice just a segment of the Range, to allow for passing, citing that a minimal passing lane requires precise timing for each vessel to arrive in the lane, which is not realistic.

Plates 18 - 21 and Enclosures: Many pilots refuted the finding that passing in Oglethorpe Range is safe. The simulation runs do not show any appreciable margin of safety, even if the ships technically did not leave the channel. This reduces the passing opportunities to just the Long Island Range.

1.1.13 Navigation Study for Savannah Harbor Channel Improvements; September, 2004

This report is largely superseded by items 1.1.11 and 1.1.12. Shortcomings identified with the project in this report are reiterated and intensified in the two more recent reports noted above.

Pg 34, Plate 21: This study shows the Susan Maersk grounds in 6 ft seas in even a 52 ft deep offshore channel, verifying that the channel is not suitable for post-panamax drafts. At most, this simulation shows the channel is suitable for 44.5 foot drafts in 6 ft seas. At 44.5' (which would create only 2 feet of under keel clearance), the Susan Maersk is limited to some 600 fewer TEU's than fully loaded.

Pg 18 & Plates 3, 5, 7 & 11, 15, 17, 19, 23, 25, 27: Jones Island Range failed simulation runs.

Pg 25: Flats area failed simulation runs.

Pg 31: Jones Island Range failed even with a lightly loaded Susan Maersk.

Pg 32: Flats area failed even with a lightly loaded Susan Maersk.

Pg 36: Recommendations ignored that the Susan Maersk grounded in a 52 ft channel in 6 ft seas. The recommendation that the channel as proposed is satisfactory is unfounded.

Army Corps standards are that the offshore channel will provide for 120 percent depth compared to the target ship draft. On this measure, a 49 ft deep offshore channel will accommodate drafts up to 41 feet on low tide. Economic analyses must consider this limitation. The capacity of a typical 7000 TEU ship is some 200 TEU per foot of draft, so the capacity of a 7000 TEU ship limited to 6.5 less than full load draft foregoes 1300 TEU, or 19 percent of its cargo capacity.

1.1.16 Vertical Ship Motion Study for Savannah, GA, entrance channel; May 2010

This is a draft report. The project should be based on completed reports.

Pg 65: The simulated ship squats and grounds at speeds as low as 10 knots in channels deeper than the proposed. 10 knots has been found to be too slow to maintain control of a ship in a narrow channel subjected to ocean currents and waves. Maintaining control of the ship at 10 knots in a 550 ft wide channel needs to be studied carefully. 14 knots is widely considered the lowest safe speed to maintain control in confined offshore channels.

Pg 73: This shows that the channel only has viability for a fully loaded ship in a 49 ft channel 70 days a year at ten knots, an unsafe speed. A safer speed of 14 knots has zero days of viability.

This report verifies that the offshore channel cannot support 46 ft draft or 47.5 ft draft.

This report does not address channel depths as shallow as 49 feet, which is proposed. It does not evaluate the ability to maintain control of the vessels at slow speeds. It does not derive a maximum safe draft that is reliable most of the year (350 days plus).

This report does verify that this project is not suitable for post-panamax traffic.

A full-length simulation run needs to be conducted of a 160 ft wide ship at 47.5 feet draft at 6 knots as suggested here, or higher sped without inducing excessive squat, throughout the narrow 550 ft wide offshore channels. Controllability and under keel clearance must both be verified. A maximum safe draft for this channel should be derived and used as a basis for economic evaluations.

1.1.39 Dredged Material Management Plan; June 2010

Paragraph 1.1: The projection for how much maintenance material needs to be handled each year is not substantiated. Past actual volumes dredged are reported to be less than

the optimal volumes to keep pace with shoaling, but the amount reported for optimal maintenance, 6.225 million cubic yards (CY) is not substantiated.

The November 2010 ACOE Savannah District channel surveys show that all three offshore ranges have shallow quarters, as much as 1 ½ feet shy of project depth. Seven of thirteen river ranges have shallow quarters, as much as 4 feet shy of project. Over half of the Kings Island turning basin is 8 to 18 feet shy of project depth. This indicates that a significant amount of maintenance dredging is being deferred. It is entirely possible that some of this shoaling has reached equilibrium depth, having been deferred for so long, and, therefore, the current state does not indicate a linear progression of annual shoaling rates. It is safe to assume that with an improved channel, deferring maintenance as has been done in the past will no longer be tolerable, and therefore, annual maintenance dredged material will certainly increase. Due to the pattern of deferred maintenance and current shoaling, historical maintenance dredging data bears no credible indication of future annual demand, other than to indicate that proper maintenance dredging will greatly exceed historical dredging projects which have failed to keep pace with shoaling.

Table 3; Predicted O&M Volumes: This table projects maintenance dredging through 2060. It shows dependence on sites 13B, 14A, and 14B, which extend throughout the area notionally considered for an eventual Jasper County, SC marine terminal. The existing channel, unimproved, would likewise depend on the entire Jasper terminal site for annual maintenance perpetually. The Jasper terminal site is occupied by maintenance disposal demand indefinitely. With the increased maintenance load of a deeper channel, projected over an indefinite period, South Carolina's opportunities to develop a terminal on the Savannah River are even more obstructed.

Extended Notes Regarding Navigability:

The comparison to Charleston fails to take into account the salinity difference between the ports. Post –Panamax ships would sink approximately one foot as they enter the brackish water of the Savannah River. This phenomenon does not exist in Charleston where draft changes due to salinity are negligible. The other factor that differs is that the transit time is so long in Savannah that high tide only offers assistance for a portion of the transit. Even with the time lag between high tide at the sea buoy and high tide well into the port, and the higher amplitude of the tide inside the port, the ship will not be able to keep up with high tide throughout, and will be at half tide or worse at some point in the transit. Therefore, the tide only allows for an additional 4 1/2 feet of draft in optimal conditions. These factors contribute to the estimated potential of this channel project allowing only for the existing draft capability of the channel in Charleston, even though this project is two feet deeper.

The traffic density this project can support is severely constrained by the predominantly one-way capability. This limitation was documented in the Army Corps' letter to the

Savannah Pilots on March 28, 2002: "The channel was not designed for full two-way traffic for the design ship at all times." Given that the width is static, and is not afforded any benefit of tidal assistance, if the channel is only wide enough for one-way traffic some of the time, it is only wide enough for one-way traffic all the time for the design ship. It has also been noted, the design ship is not a full size post Panamx ship. The nearby Port of Charleston is currently wide enough for full post-panamax traffic all the time.

Therefore, the combined utility of this project would bring the ship handling capability of the Port of Savannah to roughly a one-way equivalent of the existing Port of Charleston. Economic and alternative studies should reflect this.

6.8. Environmental Justice

As noted in Section 5.20, Protection of Children and Environmental Justice, Federal agencies are required by Executive Order 12898 to identify and address "disproportionately high and adverse human health and environmental effects . . . on minority populations and low-income populations in the United States." Section 5.20, on Page 5-145, Paragraph 4 references figures that ". . . show the location of various poverty levels" in an area of Jasper County ". . . where the Garden City Terminal is located and most of the effects of the existing container terminal are experienced." The text further states ". . . that the closest area with the highest poverty level (40-100 percent) is located roughly a mile from the terminal", and this ". . . same area as being the closest one with the highest category of minorities (40-100 percent)." It is not clear in the text why this area is the focus of the analysis, rather than the area that may be potentially affected by the proposed action and alternatives. If the area identified on Figures 5-54 and 5-55 encompasses the region of influence, or area potentially affected by the proposed action and alternatives, it should be clearly stated as such in the text. If it does not, then the analysis needs to encompass that affected area, which needs to be defined based on the geographic extent of air quality and other impacts associated with the proposed action and alternatives that could potentially have adverse human health and environmental effects on minority populations and low-income populations.

Additionally, Section 5.20 does not define what low-income population was assessed as part of the environmental justice analysis. It would appear from the text to be the segment of the population with the highest category of people at or below the poverty level (40 – 100 percent), but that is not clear from the text. It is also not clear if the low-income population included in the environmental justice analysis comprised all people at or below the poverty level. The analysis should identify and assess disproportionately high and adverse effects on minority and low-income populations. Based on the mapping on Figures 5-54 and 5-55, it appears that minority and low-income populations may be closer to the project than one mile. What is not clear from the evaluation and needs to be included is an assessment (more than merely a statement) of whether or not minority and

low-income populations (not the highest category of minority and low-income populations) are disproportionately affected by any adverse human health and environmental effects of the proposed action and alternatives.

Section 5.20 also states that Executive Order 13045 requires that Federal agencies "identify and assess environmental health risks and safety risks that may disproportionately affect children;" and are required to "ensure that its . . . activities . . . address disproportionate risks to children that result from environmental health risks or safety risks." Figure 5-56 of the EIS shows the locations of schools, hospitals and child care facilities in the project area. It is presumed that the identification of these facilities is intended to represent locations where children would be exposed to environmental health risks or safety risks from the proposed action and alternatives. This is not clearly stated, however, but needs to be if that is the intent. There may be other locations in the affected area where children could be present and at risk, and they would include outdoor recreational areas (e.g., ball fields, playgrounds) and residential areas (for pre-school children not in child care facilities or all children present in residential areas if project activities would occur after school hours, for example, or during the weekend). If these areas exist in the area potentially affected by project activities, then they need to be included in the analysis.

Moreover, with regard to the evaluation under E.O. 13045, Section 5.20, Paragraph 1 on Page 148 states that ". . . schools, hospitals and child care facilities . . . are dispersed throughout the community and are not located disproportionately near the navigation channel." The disproportionate or non-disproportionate location of facilities, however, is not what needs to be evaluated. The analysis needs to identify and assess the effects of the proposed action on children and whether or not children may suffer disproportionately from environmental health risks and safety risks when compared to the adult portion of the population.

Section 5.20 concludes on Page 5-149, Paragraph 1 that "[t]he dredging activities, including deposition of the dredged sediment, will not have significant impacts on any populations, including minority populations and low-income populations." The basis for this conclusion is unclear from the text in Section 5.20 prior to this statement. The document needs to indicate the basis for this conclusion, i.e., whether it is from the results of air quality and other impact analyses of the proposed action and alternatives. If from air quality analyses, the document needs to explain how this conclusion was derived, as Section 5.6, Air Quality, indicates that the assessment of impacts on air quality ". . . did not include a detailed dispersion modeling assessment of air emissions of the alternatives", nor did it include " . . . a risk-based assessment of the health effects associated with the proposed project".

6.9. Cultural and Historic Resources

A South Carolina Department of Archives and History comment letter is provided in Appendix F of this comment document.

7. Comments on Proposed Mitigation

7.1. Wetlands

5.1.2.2 Impacts Without Mitigation – Pg 5-12, 2nd para – "Tidal freshwater marshes located outside the SNWR are subject to development threats and could be filled if the owner obtained a Department of the Army Permit". Please explain in detail the belief that those wetlands are threatened by development.

6.11 Executive Order 11990 (Protection of Wetlands) – Pg 6-3, 6th para – "A small amount of saltmarsh and brackish marsh (14.08 acres) would be lost through excavation of the turning basin and two wideners". The Corps estimates that approximately 1200 acres of tidal freshwater wetlands could be converted to another wetland type without mitigation, and over 300 acres of tidal freshwater wetlands will be impacted after mitigation. The Corps proposes as mitigation the preservation of existing tidal freshwater wetlands that are not under imminent threat of loss. How is that in compliance with Executive Order 11990, and how is that consistent with "no net loss"?

7.2. Water Quality

5.2.2 Mitigation for Impacts to Dissolved Oxygen – Pg 5-48, 2nd para – "Identified the use of Speece cones as the specific technique to inject oxygen into the water, although another land-based technique might be found later that could be more cost-effective." Where has this technology been employed to the degree needed for the SHEP and what was the result?

7.3. Fisheries

5.3.2 Mitigation for Impacts to Fisheries - Pg 5-91 – Adding a table to this section that identifies the quantity of fish habitat lost (by species) versus the quantity of habitat expected to be gained (by species) through mitigation would be helpful to understanding the magnitude of the potential impact.

6.04 Magnuson-Stevens Fishery Conservation and Management Act – Pg 6-2, 2nd para – "Conversion of freshwater marshes to brackish would require mitigation for all channel depths except the 44-foot project. Mitigation would be accomplished through the flow rerouting and preservation of wetlands in the Savannah River estuary". There appears to be no analysis of impacts to the plant and animal communities that reside in and adjacent to the streams that will have freshwater diverted from them, and no analysis of mitigation if impacts are likely to occur. Mitigation in the form of existing wetlands preservation

does not comply with "no net loss of function and value", a basic principal of the Corps' Section 404 regulatory program.

7.4. Other

5.22 Mitigation – Pg 5-157, 3rd para – "The project includes design features to avoid environmental impacts as well as features that reduce the amount of impacts that otherwise occur". The design features and features that reduce impacts should be identified in the text, or provide a reference to another section of the DEIS where those features are discussed in detail.

ATTACHMENT 1
COMMENTS ON DEIS APPENDICES

Comments on DEIS Appendix B –
Biological Assessments for Threatened and Endangered Species

Appendix B Comments

Biological Assessment of Threatened and Endangered Species for the
Proposed Savannah Harbor Expansion Project
Under the Endangered Species Act of 1973, As Amended
Draft Tier II Environmental Impact Statement for Savannah Harbor Expansion

1. Section 5.04.2.A. Line 5. How and to what degree will lighting affect sea turtles? Will it increase the likelihood of a take?

2. Section 5.04.2.D. Has the use of a bed leveler been cleared by NOAA? Endangered species surveys should be conducted prior to use. How will the project determine if use of a hopper dredge would result in equal or greater take of endangered species?

3. Section 5.04.2.E. The narrative states that noise above 150 dB is the level of a take. However, noise levels above 150 dB and below 180 dB are proposed to be allowed under monitoring even though they are above the level of a take. This is counterintuitive and against a tenant of the ESA, which is to prevent a take of an endangered species.

4. Section 6.00.f. Authorization of the sites through LTMS in 1996 does not preclude the need for study and assessment in this EIS. Since 1996, additional species have been listed as threatened or endangered. In addition, these areas may currently be used by protected species. If, in fact, the allowable timeframe in the LTMS was indeterminate, the LTMS process is flawed.

5. Page 46, 4th paragraph states "The proposed action *does not plan* to place any excavated sediment…on any upland beaches…" (*emphasis* added) The project should specify whether it will or will not. The words 'does not plan' suggest that it may occur at a later date if the plans change. This impact is not assessed in the EIS and should therefore be changed to either state that it will not occur or that it may occur and address the environmental impacts of the action.

6. Page 46, 2nd to last paragraph, line 2. ERDC Mearshore should be corrected to read ERDC Nearshore.

7. Section 7.01, 4th Paragraph. The text discusses how the increase in salinity and decreased DO will remain downstream of the I-95 bridge. How does this compare to existing levels? It is difficult to assess impact when the document does not state how this is a change from existing conditions.

8. Section 7.02.2 (c). The assessment does not account for the loss of salt marsh due to increased wave action from the larger ships that will be using the channel.

9. Section 7.02.5 (c & d). The last paragraph of section c and the first paragraph of section d are contradictory. Section c states that "[i]ncreases in ship traffic are expected to occur in the future…" Section d then states "the number of vessels…is expected to decrease…" Which is it? The data to back up this information should also be cited in order to substantiate the claim.

10. Section 7.02.7 (c). The document states that sediment deposition would be conducted in a manner to not interfere with nesting terns. There is no detail provided to substantiate this claim. Has a monitoring plan been developed in order to determine the location of nests prior to deposition of sediments? Will deposition occur near nesting terns? If so, how close? If CDF's are being used for breeding, feeding, and loafing for any listed species, the relevant laws related to protection of sensitive species would apply and mitigation should be required if the disturbance of the sensitive species habitats are not authorized by the specific law that protects the sensitive species.

11. Section 7.02.9 (d). Has a monitoring plan been developed? What monitoring protocol will be used and how will it be used in order to ensure adequate habitat is available during the project for nesting? If the entire area is disturbed in a short period of time, it is highly unlikely that any habitat will be available for nesting during the project.

12. Section 7.02.10 (c). Lines 6 and 7. There is nothing in the document to substantiate this claim. A reference should be cited.

13. Section 7.02.11 (c). Have any nest surveys been completed near the impact areas? Surveys should be completed prior to determination of no impact.

14. Section 7.02.14 (c). The document does not consider or mention the impacts from saltwater intrusion into freshwater, thereby reducing available habitat. The reduction in available freshwater habitats is an impact that must be considered.

15. Section 7.02.15 (c). The document states that sediment deposition would be conducted in a manner to not interfere with nesting yellow crowned night herons. There is no detail provided to substantiate this claim. Has a monitoring plan been developed in order to determine the location of nests prior to deposition of sediments? Will deposition occur near nesting areas? If so, how close?

16. Section 7.02.17 (b). The document states that no gopher frogs have been observed at the CDFs, but does not provide any reference to a study that has looked for the frogs. Information should be provided as to which studies would have been expected to document gopher frogs had they been present. Non-presence cannot be determined by a lack of study.

17. Section 7.02.20 (c). If the habitat requirement is similar to what is found in the estuary, then surveys should be conducted in impact areas to demonstrate absence from the habitats. It is impossible to determine impact without knowing whether or not it exists in the impact areas.

18. Section 7.02.21 (c). If the habitat requirement is similar to what is found in the estuary, then surveys should be conducted in impact areas to demonstrate absence from the habitats. It is impossible to determine impact without knowing whether or not it exists in the impact areas.

19. Section 7.02.22 (c). If the habitat requirement is similar to what is found in the estuary, then surveys should be conducted in impact areas to demonstrate absence from the habitats. It is impossible to determine impact without knowing whether or not it exists in the impact areas.

20. Section 7.03.Savannah River. The document states that the overall effect on the river and its fisheries are not expected to be significant. The impact on fisheries was not adequately addressed considering the fact that over 400 acres of habitat is expected to be lost to the shortnose sturgeon alone. In addition, the lost habitat may have been underrepresented by the modeling. For example, a baseline level of 4.5 mg/l of dissolved oxygen was used to determine if habitat was available for shortnose sturgeon. This is a minimum level at which the agencies determined shortnose sturgeon can survive, but does not necessarily indicate the dissolved oxygen level that is necessary for foraging, resting, and moving. For example, the Collins et al. (2001) study of shortnose sturgeon habitat use cited in Section 8.02.7 of this appendix, reported minimum mean dissolved oxygen levels of 6.36 and 6.45 in areas where adults and juveniles were found, respectively.

    The habitat use information, in conjunction with agency comments reported on page 128 #4, 2nd paragraph in Appendix N, again suggests the habitat modeling overrepresented the available habitat for sturgeon by denoting it all as equally beneficial at the 4.5 mg/l dissolved oxygen threshold and thus failed to quantify the intensity of the impact to the fisheries. In the Appendix N documentation, Prescott Brownell, from NMFS requested that a range of suitable habitat thresholds be used for modeling habitat availability. The agency panel then redacted his comments from the record without providing an adequate basis for the redaction. The panel decided the current methods were "acceptable for now." This comment would suggest that additional work would be necessary in the future in order to adequately asses the impacts. The narrative does not provide adequate discussion as to why the pass/fail approach was more adequate than the range approach suggested by Mr. Brownell.

    Additional questions as to the validity of the fisheries assessment are based on the habitat models and their interpretation for impact determination. On page 132 of Appendix N, the memorandum for the record states that other fish were not

modeled for habitat suitability because the Corps did not wish to spend the time modifying existing models and they would instead use other species as surrogates. Avoidance of spending time developing models is a suspect reason for not pursuing the assessment of some species. This is especially true when no documentation, reference, or justification was given as to the acceptability of using modeled species as surrogates for those species that were not modeled. Furthermore, the completed models were not used to extrapolate the potential impacts to species that were not modeled when determining potential impacts.

21. Section 7.04. The note on Rafinesque's big-eared bat states that some bottomland hardwood tress could be affected by salinity. Other sections of the document state that upland areas will not be affected by the project; however, this area highlights that effects may occur in upland areas. The potential effects should be investigated in greater detail in order to provide quantifiable impacts for the assessment of loss of habitat for this species.

22. Section 7.04.2 (c). If the habitat requirement is similar to what is found in the estuary, then surveys should be conducted in impact areas to demonstrate absence from the habitats. It is impossible to determine impact without knowing whether or not it exists in the impact areas.

23. Section 7.04.5 (c). If the habitat requirement is similar to what is found in the estuary, then surveys should be conducted in impact areas to demonstrate absence from the habitats. It is impossible to determine impact without knowing whether or not it exists in the impact areas.

24. Section 7.04.7 (c). 2nd paragraph. The narrative states that ship encounters with pygmy sperm whale are extremely rare, but do not provide a reference or other information to substantiate this claim. The data to back up this information should also be cited in order to substantiate the claim. The last paragraph of section c and the first paragraph of section d are contradictory. Section c states that "[i]ncreases in ship traffic are expected to occur in the future…" Section d then states "the number of vessels…is expected to decrease…" Which is it? The data to back up this information should also be cited in order to substantiate the claim.

25. Section 7.04.8 (c). If the habitat requirement is similar to what is found in the estuary, then surveys should be conducted in impact areas to demonstrate absence from the habitats. It is impossible to determine impact without knowing whether or not it exists in the impact areas.

    The narrative also provides 2 c sections and 2 d sections that have different impact and effect determinations. Which apply here?

26. Section 7.04.9 (c). If the habitat requirement is similar to what is found in the estuary, then surveys should be conducted in impact areas to demonstrate absence from the habitats. It is impossible to determine impact without knowing whether or not it exists in the impact areas.

27. Section 7.04.11 (c). If the habitat requirement is similar to what is found in the estuary, then surveys should be conducted in impact areas to demonstrate absence from the habitats. It is impossible to determine impact without knowing whether or not it exists in the impact areas.

28. Section 7.04.15 (c). If the habitat requirement is similar to what is found in the estuary, then surveys should be conducted in impact areas to demonstrate absence from the habitats. It is impossible to determine impact without knowing whether or not it exists in the impact areas.

29. Section 7.04.16 (c). If the habitat requirement is similar to what is found in the estuary, then surveys should be conducted in impact areas to demonstrate absence from the habitats. It is impossible to determine impact without knowing whether or not it exists in the impact areas.

30. Section 7.04.21 (c). If the habitat requirement is similar to what is found in the estuary, then surveys should be conducted in impact areas to demonstrate absence from the habitats. It is impossible to determine impact without knowing whether or not it exists in the impact areas.

31. Section 7.04.22 (c). If the habitat requirement is similar to what is found in the estuary, then surveys should be conducted in impact areas to demonstrate absence from the habitats. It is impossible to determine impact without knowing whether or not it exists in the impact areas.

32. Section 7.04.23 (c). If the habitat requirement is similar to what is found in the estuary, then surveys should be conducted in impact areas to demonstrate absence from the habitats. It is impossible to determine impact without knowing whether or not it exists in the impact areas.

33. Section 7.04.24 (c). If the habitat requirement is similar to what is found in the estuary, then surveys should be conducted in impact areas to demonstrate absence from the habitats. It is impossible to determine impact without knowing whether or not it exists in the impact areas.

34. Section 7.04.25 (c). If the habitat requirement is similar to what is found in the estuary, then surveys should be conducted in impact areas to demonstrate absence from the habitats. It is impossible to determine impact without knowing whether or not it exists in the impact areas.

35. Section 7.05.Savannah River. The document states that the overall effect on the river and its fisheries are not expected to be significant. The impact on fisheries was not adequately addressed considering the fact that over 400 acres of habitat is expected to be lost to the shortnose sturgeon alone. In addition, the lost habitat may have been underrepresented by the modeling. For example, baseline levels of 3.5 to 4.0 mg/l of dissolved oxygen was used to determine if habitat was available for adult shortnose sturgeon. This is a minimum level at which the agencies determined shortnose sturgeon can survive, but does not necessarily indicate the dissolved oxygen level that is necessary for foraging, resting, and moving. For example, the Collins et al. (2001) study of shortnose sturgeon habitat use cited in Section 8.02.7 of this appendix, reported minimum mean dissolved oxygen levels of 6.36 and 6.45 in areas where adults and juveniles were found, respectively.

    The habitat use information, in conjunction with agency comments reported on page 128 #4, 2nd paragraph in Appendix N, again suggests the habitat modeling overrepresented the available habitat for sturgeon by denoting it all as equally beneficial at the 4.0 mg/l dissolved oxygen threshold and thus failed to quantify the intensity of the impact to the fisheries. In the Appendix N documentation, Prescott Brownell, from NMFS requested that a range of suitable habitat thresholds be used for modeling habitat availability. The agency panel then redacted his comments from the record without providing an adequate basis for the redaction. The panel decided the current methods were "acceptable for now." This comment would suggest that additional work would be necessary in the future in order to adequately asses the impacts. The narrative does not provide adequate discussion as to why the pass/fail approach was more adequate than the range approach suggested by Mr. Brownell.

    Additional questions as to the validity of the fisheries assessment are based on the habitat models and their interpretation for impact determination. On page 132 of Appendix N, the memorandum for the record states that other fish were not modeled for habitat suitability because the Corps did not wish to spend the time modifying existing models and they would instead use other species as surrogates. Avoidance of spending time developing models is a suspect reason for not pursuing the assessment of some species. This is especially true when no documentation, reference, or justification was given as to the acceptability of using modeled species as surrogates for those species that were not modeled. Furthermore, the completed models were not used to extrapolate the potential impacts to species that were not modeled when determining potential impacts.

36. Section 8.02.1, The section header misspelled Bachman's warbler. Backman's should read Bachman's.

37. Section 8.02.1 (c). This sections states that no upland habitats will be adversely affected by the proposed action. This is contradictory to information provided in a note in section

38. Section 7.04. The note on Rafinesque's big-eared bat states that some bottomland hardwood tress could be affected by salinity. Will upland habitats be affected or not?

39. Section 8.02.2 (b). What does the term 'the areas' refer to in lines 7,8, and 9. It is unclear from the text and therefore impossible to determine what the impacts would be.

40. Section 8.02.2 (c). The document does not adequately address the impacts of the project on the wood stork. Impacts to the CDFs, which are currently being used as feeding areas for an endangered species should be quantified and mitigated. More detail should be provided about these impacts, the recovery period, and the habitats that will result from the project.

41. Section 8.02.3 (c) 1. The narrative is lacking in providing references that substantiate the factual claims in the document. The data to back up this information should be cited in order to substantiate the claims that impacts will be minimal.

    Additional detail should be provided to indicate the degree to which habitat would be affected during the project and the amount of habitat that will remain unimpacted at any one point in time. Phrases such as "[o]nly a small portion of the forging habitat is directly affected at any point in time during sediment placement and adjacent habitat is still available…" does not provide adequate specificity to assess impacts. Additional detail should be provided on benthic recolonization rates to substantiate the as yet unsubstantiated recolonization claims in the document.

42. Section 8.02.3 (d) 1. The word 'we' should be deleted.

43. Section 8.02.4 (d). The document does not consider the effects that the larger ship traffic, that will result because of this project, may have on manatees. In its current form, the impacts section is inadequate to address potential impacts.

44. Page 136. The narrative does not discuss how the increase in boat traffic or deposition of material in the nearshore area of Tybee Island will affect loggerhead sea turtles. Failing to discuss all potential impacts suggests this analysis is inadequate.

45. Page 148. Conservation Measures (a). 2nd Paragraph line 2. The document credits turtle deflecting dragheads with significantly minimizing the risk of sea turtle

take. No references or sources have been cited to substantiate this claim. Since the avoidance of take claims stated later depend upon this assertion, the avoidance claims are not valid unless this claim is substantiated.

46. Page 154. A. 4. Are the dates correct? Will the observer only be onboard in December and March? The first paragraph of Section A states the dredging will occur from December through March. If an observer is only present for 2 of the 4 months, how will compliance with protocol be ensured?

47. Page 155. C. first paragraph, last sentence. An assessment in 1996 is not valid today due to changes in the endangered species list and in the environment. The areas should again be assessed for potential endangered species impacts.

48. Section 8.02.7. Shortnose sturgeon and Atlantic sturgeon are grouped together for purposes of assessing impacts from the project. The narrative justifies the grouping due to their "similarities in habitat use, distribution throughout the proposed action area, foraging behavior and prey base, and subsequent risk of take relative to dredging and trawling operations…" No citations or other reference information was provided to substantiate this decision to group the species. Other information provided in the appendix provides information that contradicts the claim that the species are similar enough to group together for impact assessment purposes. For example, on Page 170, last paragraph, the narrative states that Atlantic sturgeon primarily lead a marine existence and are therefore more likely to be impacted by hopper dredges than the more estuarine based shortnose sturgeon. The first sentence of the second paragraph on Page 174 also states that the habitat ranges for shortnose and Atlantic sturgeon are slightly different. In addition, the SRT 2007 report states that not all rivers that support Atlantic sturgeon, support shortnose sturgeon. This information again reiterates the differences between the two species, the need to assess them independently, and the shortcomings of an assessment that assesses them together.

49. Page 157, 1st paragraph, Unsubstantiated claims are made throughout this paragraph without any reference materials, peer-reviewed or otherwise, cited.

50. Page 157, 2nd paragraph, specifically lines 1-7. Unsubstantiated claims are made throughout this paragraph without any reference materials, peer-reviewed or otherwise, cited.

51. Page 160, present conditions, 1st paragraph. The use of 4.0 mg/l continues to be used in spite of the information provided by Collins et al. 2001 that mean DO levels in sturgeon habitat use areas were 6.45 and greater. The claim that prolonged exposure to low oxygen levels may not produce acute impacts to fish is unsubstantiated by any outside reference materials. This use of 4.0 mg/l is a minimum level at which the agencies determined shortnose sturgeon can survive, but does not necessarily indicate the dissolved oxygen level that is necessary for

foraging, resting, and moving. The agency comments reported on page 128 #4, 2nd paragraph in Appendix N, again suggests the habitat modeling overrepresented the available habitat for sturgeon by denoting it all as equally beneficial at the minimum dissolved oxygen threshold and thus failed to quantify the intensity of the impact to the fisheries. In the Appendix N documentation, Prescott Brownell, from NMFS requested that a range of suitable habitat thresholds be used for modeling habitat availability. The agency panel then redacted his comments from the record without providing an adequate basis for the redaction. The panel decided the current methods were "acceptable for now." This comment would suggest that additional work would be necessary in the future in order to adequately asses the impacts. The narrative does not provide adequate discussion as to why the pass/fail approach was more adequate than the range approach suggested by Mr. Brownell.

52. Page 160, present conditions, paragraphs 2 and 3. Information provided is unsubstantiated by any outside reference materials and are therefore considered baseless for assessing impacts.

53. Page 164, threats, paragraph 1, line 2. Information provided is unsubstantiated by any outside reference materials and are therefore considered baseless for assessing impacts.

54. Page 170, Dredging methods and associated impacts, line 7. The SRT 2007 report states that habitat loss due to dredging is not just a short-term impact to foraging and refuge habitat. Atlantic sturgeon rely upon deep holes for refugia and are substrate dependent fish. If the bottom of the river is dredged to create an anoxic, uniform bottom without substrate diversity the effects on Atlantic sturgeon would be detrimental over a long-term period.

55. Page 171, Section B, Line 4. What does fairly low mean? The impacts should be quantified and substantiated. Even a single take is not allowed under the ESA unless a permit has been issued.

56. Page 171, Section B, Lines 4-6 state that eggs and larval sturgeons 100 miles upstream where hydraulic dredges are proposed? Are hydraulic dredges proposed upstream from the project area? If not and the sentence is inaccurate it should be corrected. If it is intended to state that eggs and larval sturgeon are located 100 miles upstream from the project area and therefore are outside of the area where hydraulic dredges are being used it is inaccurate.

57. Page 160 of this document, first paragraph, last line, states that an Atlantic sturgeon larva was found 6.7 km (4 miles) upstream of the project impact area. This information suggests that some larva may drift into the project area. Additional information should be collected to verify the actual location of Atlantic sturgeon spawning to ensure the project dredging and upstream

movement of salinity and decreases in DO will not deleteriously impact Atlantic Sturgeon.

58. Page 175. Indirect impacts. The impacts to refuge habitat are actually likely to be long-term impacts according to the SRT 2007 report. In addition, the loss of deep holes with sufficient levels of DO are likely to result in unavailable habitat in which sturgeon may be able to survive, but will not utilize due to inadequate levels of DO.

59. Page 175. Benthic foraging, First paragraph, Line 7. Unsubstantiated claim about benthic recolonization.

60. Page 175. Benthic foraging, First paragraph, Line 8. Unsubstantiated claim without a reference cited.

61. Page 175, Second paragraph, Lines 6 and 13. Unsubstantiated claim without a reference cited.

62. Page 176, Line 2. Unsubstantiated claim without a reference cited.

63. Page 176, Second paragraph, First sentence. Unsubstantiated claim without a reference cited.

64. Page 176, Second paragraph, Second and third sentences. A correlation between river flow and season does not equate to a correlation between natural community shifts and river flow rates. The logic is flawed in this assertion and it may not be accurate.

65. Page 176. Impacts from cadmium-laden sediment. 2nd paragraph. The text suggests that exposed clay would prohibit benthic recolonization. This statement contradicts earlier assertions that benthos would recolonize quickly.

66. Page 177. First paragraph, lines 5-7 suggest that 28% of the substrate surface is a minor fraction of the system. 28% of the channel bottom is not minor.

67. Page 177. Section B. First line. The line claims extensive studies have been conducted, but cites none. Only two studies are included below and neither appears to deal directly with fishes that may be found in the Savannah River.

68. Page 177. Section B, Second paragraph, second sentence. Unsubstantiated claim without a reference cited.

69. Page 179, second paragraph. Line 11 claims fish could use different habitat upstream in order to avoid increased salinity. The studies cited throughout the text and in literature cited by the text highlight the necessary use of estuarine

habitats by shortnose and Atlantic sturgeon. Excluding these fish from the necessary habitats is a substantial impact that cannot be mitigated by the assumption that the fish can simply avoid saline habitats.

70. Page 180. The document explains that since no additional habitat can be modified to make it suitable for sturgeon, the project can mitigate impacts by adding upstream habitats. The addition of upstream habitats may be beneficial for some of the life stages of sturgeon, but it is not a substitute for the necessary nursery areas that will be lost due to the project. There is no evidence to suggest the sturgeon will utilize or benefit from the upstream areas or that any benefits would mitigate deleterious impacts from the loss of estuarine habitats.

Appendix C Final Comments

Mitigation Planning Evaluation
Draft Tier II Environmental Impact Statement for Savannah Harbor Expansion

1. Section 2, Pages 1-5. Fails to discuss what steps were taken to avoid wetland and many other impacts described within Section 5 of the DEIS.

2. Section 3, Page 9, Summary Table. States that salt marsh impacts would be -15.68 acres. A negative impact suggests that there would be a net gain in salt marsh, which is not the case. In addition to the negative impact issue, the quantity of the impact does not match what is provided in Section 5 of the DEIS.

3. Section 4, Page 11. This project should not result in a net loss of wetlands of any type. Preserving existing wetlands should not count as part of the mitigation unless a direct threat can be shown for each and every site.

4. Section 4, Page 15, 2nd Paragraph. Flow rerouting was proposed as a method to reduce the impacts to freshwater marshes, but what are the direct and indirect impacts associated with the planned alternatives? Deepening existing cuts should be considered an impact to subaqueous bottoms. Filling cuts should be considered a fill of subaqueous bottoms and potentially a fill of intertidal wetlands adjacent to the open water. These impacts should be determined and enumerated. These impacts should be mitigated as part of this project.

5. Section 4, Page 30, 7th Paragraph. States "the Contractor shall provide an Environmental Monitoring Plan for the job site, including land, water, air, and noise monitoring. Special emphasis shall be provided for the monitoring of wildlife resources (manatees and marine mammals)." What about other wildlife resources (i.e. shortnose sturgeon)?

6. Section 4, Page 31, 1st Paragraph. Monitoring periods for manatee before after the blast should be lengthened.

7. Section 4, Page 32, 3rd Paragraph. The paragraph states that if a manatee or marine mammal is injured or killed during blasting, all blasting operations shall be suspended and shall not resume until the contractor obtains written permission from the Contracting Officer. The District will coordinate the take with the NMFS to determine the appropriate course of action." What preparations will be in place to save any manatee or marine mammal wounded during the blast?

8. Section 4, Page 33, 2nd Paragraph. The paragraph states that the Marsh Succession Models were not ultimately used to evaluate the mitigation proposals. If this model was used to predict the impacts, the same model should be used to predict the benefits of the mitigation proposals. How was the wetland mitigation

alternatives evaluated to confirm that the freshwater wetland impacts would be reduced from 1,212 acres to 337 acres without the use of the model?

9. Section 5, Page 49, 1st Paragraph. The paragraph states that the proposed restoration site is currently "high ground." Has a wetland delineation been confirmed for the proposed site to determine how much of the site is currently a wetland and how much is non-wetland? Portions of the site which are currently a wetland under normal conditions (the site was last filled at least 20 years ago) should not be included within the proposed restoration acreage. If wetlands exist within the proposed restoration area and were counted as part of the restoration acreage, then the proposed wetland restoration acreage should be reduced accordingly.

10. Section 5, Page 49, 2nd Paragraph. How will the proposed restoration site be protected from invasive species such as *Phragmites australis* if left to revegetate naturally?

11. Section 5, Page 53, 2nd Table. The table indicates that 730 acres of saltmarsh will be impacted by the project. However, the 3rd paragraph on page 110 indicates that the impacts are to brackish marshes. Both cannot be correct.

12. Section 5, Page 53, 2nd Table. What method was used to determine the location and quantity of impacts to brackish or saltmarsh (see previous comment)? This method should be discussed in the document and the location and quantity of impacts at each location should be made available for public review.

13. Section 5, Page 53, 2nd Table. The document clearly states that the natural resource agencies in Georgia require that "acceptable mitigation should consist of at least 50 percent restoration." If the impacts are actually to saltmarsh, then the proposed restoration is out-of-kind restoration. Is this acceptable to the State?

14. Section 5, Page 53, 1st Paragraph. How are the flow altering methods restoring 1,068 acres of brackish marsh? The mitigation plan details how these methods would reduce the impacts to freshwater wetlands, but makes no mention of how these methods also perform brackish marsh restoration. As mentioned in a previous comment, the proposed flow altering features would actually result in impacts themselves. The plans involve filling subaqueous bottoms, dredging subaqueous bottoms, and potential filling of intertidal wetlands adjacent to plugs and weirs. The document should clearly indicate how it was determined that these flow altering plans actually restore impacted marshland. The location of the proposed restoration areas should be included in the document and made available for public review. The restoration areas should be monitored as part of the mitigation plan.

15. Section 5, Page 69, 1st Paragraph. The agencies could not determine any impact that could restore or enhance sturgeon habitats. The proposed project will

undoubtedly result in a take of the endangered shortnose sturgeon and the candidate Atlantic sturgeon which is proposed to be listed as endangered. As a part of the Endangered Species Act, the project would likely need to receive an incidental take permit. If an incidental take permit was issued, the USACE would be required to submit a habitat conservation plan. The habitat conservation plan would have to address the likely impacts of the project, steps the USACE will take to minimize and mitigate the impact, alternative considered and why the USACE did not pursue them further.

16. Section 5, Page 69, 2nd and 3rd Paragraphs. The USACE proposes the installation of a fish passage structure around the New Savannah Bluff Lock and Dam (NSBLD) in order to provide additional available habitat to the shortnose sturgeon. However, the DEIS hasn't provided any assurances that shortnose sturgeon historically used the habitat upstream of the NSBLD, that the shortnose sturgeon can and would navigate the fish passage structure, or that, even if sturgeon had historically used the habitat, the habitat above the NSBLD is currently of the quality that would provide benefits to sturgeon. Of important note, the proposed listing rule for Atlantic sturgeon states that measures "such as fish passage have not proven beneficial to Atlantic sturgeon, as they do not regularly use existing fish passage devices, which are generally designed to pass pelagic fish. To date, only four Atlantic sturgeon have been documented to have passed via a fish lift." Thus, there is no indication that the fish passage structure would adequately mitigate for the inevitable harm caused to shortnose sturgeon.

17. Section 5, Page 98, 1st Paragraph. Neither the DEIS or this document provide any documentation that shortnose sturgeon used habitat above the NSBLD or that the availability of this habitat would adequately compensate for the lost habitat that is used by sturgeon during different seasons and during different life stages than more upstream habitats.

18. Section 5, Page 99, 1st Paragraph. The appendix states that the agencies noted the fish passage structure was the only method that could effectively compensate for the predicted loss in sturgeon habitats. On the contrary, the agencies didn't appear to state that the fish passage structure would effective compensate for impacts. The agencies seemed to state that they could not think of any other compensation in the estuary and that the fish passage structure was the only mitigation measure that had been proposed that may provide some compensation. In the documentation provided in the agency correspondence appendix, the agencies did not mention that the fish passage structure would effective compensate for the predicted loss in sturgeon habitats.

19. Section 5, Page 99, 2nd Paragraph. What if the fish passage structure is paid for by other funding and cannot be used by this project as mitigation? No other mitigation has been proposed. This constitutes a substantial risk that should be addressed.

20. Section 5, Page 103, 2nd Paragraph. The calculation of costs needed for the stocking program appears to be flawed and may underrepresent the actual amount of costs needed for the stocking program. The cost determination assumes that the start-up of the hatchery is directly proportional to the amount of fish that would be produced i.e., that only a percentage of the $3.1 million initial expense is required to get the stocking program underway. Has the GA DNR-WRD provided information to verify that the percentage assumption provides an adequate amount of payment for stocking? There are probably economies of scale that would preclude the direct ratio apportionment proposed by the Corps.

21. Section 9, Page 114, Monitoring shortnose sturgeon distribution. Both shortnose and Atlantic sturgeon should be monitored given their respective status under the Endangered Species Act and the take of these species that will occur as a result of this project. Monitoring should include distribution as well as abundance determinations. Monitoring that does not include abundance information will not provide adequate information to determine if the project is resulting in population decreases.

22. Section 9, Page 114, Monitoring fish passage at NSBLD. What would result if sturgeon do not use the fish passage structure? Adequate mitigation would not be provided.

23. Appendix A, Page 149, 2nd Table. The table indicates that a value of 0.3 was used for the threat category for the preservation sites. The document fails to justify the use of this elevated value. The second-to-last paragraph on page 123 indicates that "adjacent lands" are being logged and/or developed for residential use. The document does not indicate that these lands are directly adjacent to the tidal wetlands proposed for preservation or speaks of how these lands (if developed and/or logged) will directly affect the proposed preservation area. The document itself indicates that the threat must be demonstrable and it fails to do so. A value of 0, for no threat, or 0.1, for low threat, should be used in the preservation worksheet or the document should be revised to demonstrate how the proposed preservation areas, are themselves, at a moderate level of threat. A lower threat value would require that additional land be acquired for preservation.

24. Appendix A, Page 149, 2nd Table. The table indicates that the values for in-kind and out-of-kind replacement are 0.6 and 0.2, respectively. The previous table indicates that these are the only options available for use within the preservation worksheet. However, a value of 0.4 was used within the preservation worksheet. If there are uplands included within the preservation area (as page 123 indicates there are), their acreage should be excluded from the preservation total, or at least included as out-of-kind replacement. The preservation worksheet should be updated and the required acreage purchased as compensation for the project should be adjusted accordingly.

25. Numerous figures within Appendix C do not have essential components like north arrows, scales or legends.

Comments on DEIS Appendix D –
Monitoring Plan and Adaptive Management Program

Appendix D Comments

Monitoring and Adaptive Management Plan
Draft Tier II Environmental Impact Statement for Savannah Harbor Expansion

1. Section 3.Goals of an Adaptive Management Plan, p. 7, 2nd Paragraph: The document indicates that the first goal of the adaptive management plan is evaluating the accuracy of the predicted environmental impacts. Post-construction, the goal should be to determine if the mitigation features are adequate to compensate for the impacts. This should be achieved with field results and not with predictive models. In situ conditions indicate whether the mitigation features are adequate or inadequate.

2. Section 5.B.Physical, p. 7, 1st Paragraph: The document indicates that the pre-construction monitoring "will better define the complex interactions between the estuarine ecosystem and the quantity and quality of water available." If these interactions are unknown, how were the potential impacts determined in the Tier 2 EIS? These interactions should be understood prior to permit issuance as the potential impacts may still remain undetermined.

3. Section 5.B.Physical, p. 7, 2nd Paragraph: The document indicates that the hydrologic and water quality monitoring data will be used to update the models, pre-construction. Who would determine if the model warrants an update?

4. Section 5.B.Physical, p. 7, 2nd Paragraph: If a calibration is warranted of the predictive models, prior to construction, and the models predict greater impacts then permitted, would a permit modification be acquired prior to the beginning of impacts?

5. Section 5.B.Physical, p. 7, 3rd Paragraph: Would the State of South Carolina have a chance to determine the location of proposed groundwater monitoring wells, as the Floridan aquifer extends into southern South Carolina.

6. Section 5.B.Physical, p. 7, 3rd Paragraph: The document indicates that chloride levels will be monitored in "up to four" groundwater monitoring wells annually in the pre-construction phase. However, in section 5.C.5 on page 13, the document indicates that no fewer than "four" wells will be monitored. Also, section 5.C.5 indicates that the wells will be monitored four times a year, the text in section 5.B should indicate this fact.

7. Section 5.B.Physical, p. 8, 1st Paragraph: Do the applicants plan to monitor the distribution of Atlantic sturgeon as well? The Atlantic sturgeon has been confirmed in the Savannah River and has been proposed to be listed as endangered in the South Atlantic DPS which contains the project area.

8. Section 5.C.Biological, p. 13, 1st Paragraph: Do the applicants plan to monitor the distribution of Atlantic sturgeon as well? The Atlantic sturgeon has been confirmed in

the Savannah River and has been proposed to be listed as endangered in the South Atlantic DPS which contains the project area.

9. Section 5.C.Biological.2, p. 13, 1st Paragraph: The monitoring should also include drift larval surveys for larva entering the project area. With the proposed salinity increases, the larva entering the project area from upstream may not survive, and their loss should be considered an impact.

10. Section 5.C.Biological.2, p. 13, 1st Paragraph: Please indicate the amount implied when it is determine that sturgeon "intensively" use an area. If the substrate is not "intensively" used is it not recorded? The substrate type should be recorded for each observation.

11. Section 5.C.Biological.3, p. 14, 1st Paragraph: The document indicates that up to 25 shortnose sturgeon would be collected and implanted with transmitters. Is there a minimum number proposed? There should be imposed minimum used to provide validity to the data.

12. Section 5.C.Biological.3, p. 14, 2nd Paragraph: Substrate type should also be recorded for each observation.

13. Section 5.D.Reporting, p. 14, 1st Paragraph: The text should be revised to replace the word "which" for the word "where" and the word "become" for the word "becomes."

14. Section 6.C.Details of the Monitoring, p. 17, 1st Paragraph: The document indicates that "not all monitoring that was included in the Pre-Construction monitoring will be duplicated each year during the construction period." Please indicate which monitoring will not be included during the construction phase.

15. Section 6.C.Details of the Monitoring, p. 18, 2nd Paragraph: Please explain what constitutes a "large/unforeseen increase."

16. Section 6.D.Reporting, p. 19, 2nd Paragraph: If the monitoring indicates that unforeseen or unpermitted exceedences are occurring, this data should be made available for review by all applicable State and Federal agencies when the exceedences are observed and should not be held until the annual or final reports.

17. Section 7.A.Goals, p. 20, 5th and 6th Paragraphs: Does the monitoring at the nearshore sediment placement sites include monitoring of benthic repopulation for two or three years?

18. Section 7.D.Reporting, p. 25, 1st Paragraph: If the monitoring indicates that unforeseen or unpermitted exceedences are occurring, this data should be made available for review by all applicable State and Federal agencies when the exceedences are observed and should not be held until the annual or final reports.

19. Section 8.B.Monitoring During Construction, p. 28, 2nd Paragraph: Please define "well outside." If the impacts are exceeding those permitted then these exceedences should be reported to all applicable State and Federal agencies when the exceedences are observed.

20. Section 8.B.Post-Construction Monitoring, p. 28, 2nd Paragraph: Establishing a threshold values during and post-construction would better protect natural resources and preserve water quality. They should be a goal or standard and they would provide all applicable State and Federal agencies with an "action" threshold and may reduce cumulative impacts.

21. Section 8.B.Post-Construction Monitoring, p. 29, 3rd Paragraph: Additional mitigation should be required if losses are greater than those described in the EIS, and not dependent on the observed flow conditions.

22. Section 9.B.Decision Process, p. 30, 1st Paragraph: The paragraph states that if through monitoring it is determined that impacts are "well outside the range of those expected" then the Corps would consult with the Cooperating Agencies to identify what actions may be appropriate. What amount constitutes "well outside?" If the permitted impacts are exceeded then addition mitigation should be proposed. The threshold amount should be the permitted amount and not the "expected" amount. Finally, the Corps should revaluate the impacts if they are exceeding the permitted amount and not wait for the Cooperating Agencies to begin the process. The Cooperating Agencies should be notified if exceedences are observed after each monitoring period.

23. Section 9.B.Decision Process, p. 30, 2nd Paragraph: Response should not be delayed until the post-construction monitoring period is completed if impacts exceed those permitted. If the mitigation features are not meeting their goals during the monitoring period action should be taken when deficiencies are observed. The applicants should not delay 4 years to act for exceedences which are observed in year 1.

24. Section 9.B.Decision Process, p. 31, 2nd Paragraph: Expecting complete agreement by the Cooperating Agencies for an adaptive measure to be implemented is unrealistic. The text indicates that an additional year of monitoring is possible but that it would reduce the funds to implement the adaptive measures. If the project has impacts which exceed those permitted, or if the final impacts remain unclear, then monitoring should continue. If the cost of the monitoring or adaptive measures exceeds the funds reserved then additional funds should be secured by the applicant. Monitoring or mitigation should not be reduced if permitted impacts have been exceeded or a determination on exceedences is reasonably attainable.

25. Section 9.B.Decision Criteria, p. 31, 1st Paragraph: This section should be changed to section 9.C Decision Criteria. The section titled Decision Process is section 9.B.

26. Section 10.B.Components of Approved Adaptive Management Plan, p. 33, 2nd Paragraph: The fish passage improvements at the NSBL&D does not provide greater habitat for the sturgeon as compensation for the impacts. It provides a means to which the sturgeon could access potential habitat if they navigate the NSBL&D correctly.

27. Section 10.B.Components of Approved Adaptive Management Plan, p. 33, 2nd Paragraph: The text indicates that "acquisition of additional bottomland hardwoods/freshwater wetlands would compensate for additional impacts to freshwater marshes beyond those that are predicted in the EIS." This is "out-of-kind" mitigation and does not constitute replacement. This form of mitigation does not satisfy "no net loss" as the preservation of non-threatened wetlands does not compensate for those impacted by the project.

28. Section 10.B.Components of Approved Adaptive Management Plan, p. 34, 2nd Paragraph: If the impacts from the project have exceeded those permitted, and the adaptive management funds listed on page 34 have been exhausted, then additional funds should be made available by the applicant to provide additional mitigation. The funds listed on page 34 should not limit the response if impacts exceed those permitted.

Comments on DEIS Appendix H –
Section 404(b)(1) Evaluation

Appendix H Comments

404(B)(1) Evaluation
Draft Tier II Environmental Impact Statement for Savannah Harbor Expansion

1. This Appendix was formatted following 40 CFR 230, the 404(b)1 Guidelines. It generally contains all the necessary components of this regulation except for a mitigation component, which may be contained elsewhere in the Project's documentation.

2. Page 15, para. 6 – Refers to other fill activities on the project "…are associated with the various mitigation features of the project." "which is designed to minimize the increase in upstream salinity levels resulting from harbor deepening." Thus, espousing the value of the discharges as mitigative measures. The negative impacts of these fill activities are not considered. Is there mitigation proposed for impacts caused by the mitigation?

3. Page 17, para. 3 – Again, measures proposed to minimize impacts of increased salinity up the river, i.e., discharged of dredged material, are lauded as largely beneficial….

   "The discharge of dredged and fill sediments associated with the Savannah Harbor Expansion Project will actually be an integral part of minimizing these impacts."

4. Page 20, para. 3 – A number of references are made to significant changes in substrate elevation in the nine nearshore areas. Have these depth modifications been modeled regarding hydrodynamics and sediment transport at the mouth of the river?

5. Page 20, para. 6 – "Net loss of environmental value is expected to be minimal."- Regard the discharge of dredged material back into waters as part of the mitigation, this has not been shown.

6. Page 21, para. 1 – Refers to conducting benthic studies on the Tybee shelf prior to performing proposed discharges associated with habitat modifications here as part of the proposed mitigation. This is the first mention of conducting a site specific study on an area proposed for impact as part of the mitigation plan and should be a practice carried out on all other discharge locations.

7. Page 21, para. 5 – Discussion of berm construction off Tybee Island and "no significant changes in current patterns and water circulation are expected". Have adequate studies been done to support this statement? Are these berms resources that where historically located here but have eroded because of anthropogenic or storm activity?

8. Page 22, para. 2 and 3 – Again, statements such as, "No net loss of environmental value" and "The discharge of dredged and fill material into waters of the United States associated with the Mitigation Plan would minimize the upstream salinity increases…" appear to be unsubstantiated and do not adequate address impacts caused by the mitigation itself, respectively.

9. Page 23, para. 7 – CONTAMINATION DETERMINATION – See comments in the Appendix M (Sediment Quality Evaluation).

10. Page 24, para. 1 – CONTAMINATION DETERMINATION – References three rounds of sediment sampling but starts out summarizing the second round that was conducted in 2005 with no summary of the first round. Please summarize the first round (i.e., 1997) here as well for comprehension/organization purposes.

11. Page 32, para. 7 - AQUATIC ECOSYSTEM AND ORGANISM DETERMINATIONS – See comments on T&E and fisheries/sturgeon from Travis and JPD.

12. Page 33, para. 1 - AQUATIC ECOSYSTEM AND ORGANISM DETERMINATIONS, Fish, Crustaceans, Mollusks and Other Aquatic Organisms in Food Web – "The project would not involve any discharge of dredged or fill material into areas with high concentrations of shellfish." "Side scan sonar and benthic surveys would be conducted during the design phase to confirm this initial conclusion." These measures seem adequately protective. How and who will review the results of the additional studies and determine if impacts to benthics will be minimal?

13. Page 33, para. 4 - AQUATIC ECOSYSTEM AND ORGANISM DETERMINATIONS, Special Aquatic Sites – What alternatives were evaluated regarding replacement of the 337 acres of tidal freshwater marsh besides other than preservation?

14. Page 34, para. 4 – Potential Effects of Human Use Characteristics – This section should address the relocation of the municipal water intake and effects of the project on commercial and recreational fisheries. Alternatively, refer to sections where these issues are addressed.

15. Page 35, para. 1 - 8.0 DETERMINATION OF CUMULATIVE EFFECTS ON THE AQUATIC ECOSYSTEM – This section defers to Appendix L for the write up on cumulative impacts. This presentation is inconsistent with other sections in this Appendix that makes following the flow (and thus comprehension) of the data very difficult. Contamination Determination (6.4), for example, provides significant discussion on the ecorisk assessment performed as well as referencing Appendix M "Sediment Quality Evaluation."

16. The 404(b)1 Appendix does not contain the following information, as applicable, nor does it refer to other DEIS documentation that address the following material required under 40 CFR Part 230, Subpart J "Compensatory Mitigation for Losses of Aquatic Resources"

§ 230.91 Purpose and general considerations.
§ 230.92 Definitions.
§ 230.93 General compensatory mitigation requirements.
§ 230.94 Planning and documentation.
§ 230.95 Ecological performance standards.
§ 230.96 Monitoring.
§ 230.97 Management.
§ 230.98 Mitigation banks and in-lieu fee programs.

The Water Quality Monitoring Plan Attachment in the Appendix fulfills part of the Monitoring requirement under 230.97, above. Practically speaking, however, this plan should be contained within Appendix D, "Monitoring & Adaptive Management Plan".

Comments on DEIS Appendix K –
Air Emission Inventory

Appendix K Final Comments

Air Emission Inventory
Draft Tier II Environmental Impact Statement for Savannah Harbor Expansion

General Appendix K comments:

1. On pages 14 – 32, the reviewer was not able to calculate the emissions reported in many of the emission summary tables using the information provided in the descriptions preceding the emission summary tables. To facilitate a review of the emission estimates, an example calculation should be provided for Tables 5-10, 5-11, 5-12, 5-13, 5-19, 5-20, 5-21, 5-26, 5-29, 5-31 and 5-38.

2. Nitrogen oxides are referred to as "NOX", "NOx", "NO_x" and "NO2" throughout the appendix in various text sections, tables, and figures. A single acronym (e.g., "NO_x") should be used throughout the appendix.

3. The word "volume" is used numerous times starting on page 36 and through the end of the appendix to refer to the amount or quantity of mass emissions estimated (e.g., second sentence in the last paragraph on page 36, first and second paragraphs on page 45, and second sentence of the second paragraph on page 72, etc.). Because mass emission rates are being referred to in these instances, "amount" or "quantity" should be used in lieu of "volume".

Specific Appendix K comments:

1. Page 13 – the "Slow / Dead Slow" mode presented in Table 5-8 does not correspond with any of the mode categories presented in Table 5-6. The same mode terminology or designations should be used throughout both tables.

2. Pages 14 - 16 – the emission estimates shown in Tables 5-10 through 5-13 are presented as "tons per transit" or "tons per vessel". Also, the term "vessel call" is used in the preceding sections (e.g., Tables 4-1 through 4-4) and tug emissions are presented on a "ton/call" basis in Tables 5-19, 5-20 and 5-21. The use of consistent terminology is recommended to avoid confusion.

3. Page 18 – the emission formula presented on this page to calculate tug emissions is not clear and should be reformatted or revised.

4. Page 38 – CHE emissions for 2010 are presented in Table 5-48 and 5-49; however, the estimates for the Toplifts and the Empty Container Handlers indicate FY07 estimates. Most likely the reference to FY07 is incorrect and should be deleted.

5. Page 43 – a unit designation for the emission estimates provided in Table 5-60 is not provided as part of the table heading.

6. Page 44 – GPA vehicle fleet emissions are summarized in Table 5-62 for Calendar Year 2007. The tons of emissions indicated for the vehicle fleet are very low. It is recommended that the vehicle fleet emission calculations be checked to ensure they are not in error.

7. Page 45 – in the first paragraph, Table 5-61 is incorrectly referenced as showing the relationship of air toxic pollutants to other pollutants. Table 5-61 is presented on Page 44 and summarizes GPA's vehicle fleet by vehicle category.

8. Page 46 – 58 – the emission tables presented as Table 5-64 through 5-76 summarize emissions of 28 individual pollutants designated as air toxic pollutants. In the last row of these tables, the air toxic emissions are summed and reported as totals for each equipment category. This last row should be deleted since air toxic pollutants are normally viewed on an individual basis and not collectively with respect to air quality considerations. However, it would be appropriate (if desired), to sum the rows to show the totals for each individual air toxic pollutant.

9. Page 59, Section 5.18 – in the third paragraph, the method used to generate emission estimates are described for methane (CH4) and nitrous oxide (N2O), which are greenhouse gases (GHGs). Emissions of these GHGs are incorrectly calculated from the CO_2 estimates by applying their respective global warming potential factors of 21 and 310. Theses global warming factors are used to quantify CO_2 equivalent (CO_{2e}) emissions when emission rates of CH4 and N2O are known. Considering that CH4 and N2O emissions are not quantified in the preceding sections and are expected to be only 2 percent of the total GHG emissions, it is suggested to revise and simplify this section (Section 5.18) by including only the CO_2 emission estimates in the discussion and in Table 5-77 shown on pages 60-61.

10. Page 66, Section 6.0 – the last sentence of the first paragraph indicates a total of 10 emission sources were evaluated. However, the table which follows this sentence shows a total of 14 entries and one of these entries, "air toxics," should be removed because air toxics are pollutants and not an emission source nor an emission generating activity. This sentence should be revised to indicate 13 emission sources and the "air toxics" entry should be deleted from the table.

11. Page 70 and Page 71 – Figure 6-4 and Figure 6-5 appear to be identical yet they are supposed to present emissions under different conditions (i.e., with and without the 47/48-foot harbor deepening).

12. Page 96 – the first paragraph below Table 6-7 provides the total CO_2 emissions for a steam electric plant in Savannah. However, no direct comparison is made between the CO_2 emissions associated with this facility and the Port.

Comments on DEIS Appendix L –
Cumulative Impact Analysis

Appendix L Final Comments

Cumulative Impact Analysis
Draft Tier II Environmental Impact Statement for Savannah Harbor Expansion

Overall, the assessment of cumulative impacts presented in Appendix L is thorough and well prepared for the issues and resources addressed. In a number of instances it briefly points out that a terminal in Jasper County would have minimal adverse impacts on a number of resources, i.e. salinity intrusion, oxygen depletion, shortnose sturgeon, in comparison to the significant adverse impacts on these resources related to the deepening to the GCT. Further, it discloses the difficulty of developing a reliable mitigation approach to ameliorating the adverse impacts of the proposed deepening to the GCT on the endangered shortnose sturgeon. This issue remains unresolved. There several additional issues/resources that would lend themselves to cumulative impact assessment which could benefit the decision making process:

- With the projected large scale port expansion that may be implemented, it would be advisable to assess the effects on induced growth within the Savannah area. The area will likely require enhanced transportation but also will require increased community service support plus a growth of local industrial and commercial activity. A cumulative analysis of how growth was stimulated by port development in the past, currently and will be in the future could affect upcoming planning decisions.
- While the cumulative impacts to the shortnose sturgeon are analyzed, it would be advisable to perform a similar analysis for the Atlantic sturgeon as well. This species may be under considerable stress and may qualify for threatened or endangered status in the near future.
- The cumulative impacts of the Confined Disposal Facilities may be warranted. The specific concern is that if the CDFs in Jasper County are continued in use there may be a point in time when these sites would become unsuitable or infeasible for other uses. In particular, future development at one of these sites for a marine terminal as an environmentally preferable option could be obviated by onerous reclamation requirements owing to a need to remove or treat very large amounts of disposed dredge materials.

CEQ Guidance on the preparation of Cumulative Impacts Analysis states that "the analyst's primary goal is to determine the magnitude and significance of the environmental consequences of the proposed action in the context of the cumulative effects of other past, present, and future actions." Appendix L addresses seven major resources or issues of concern with regard to cumulative impacts. However, the analysis of each of the resources/issues lacks a statement of the magnitude and significance of the cumulative impact.

Specific Comments

1. Historic Basis - Pg 10, 2nd para – "Federal and State natural resource agencies agreed that 1999 would provide the baseline condition for wetlands under which this harbor deepening should be considered." What is the basis for establishing 1999 as the base year? Large acreages of wetlands within the project area experienced substantial impacts from a variety of actions prior to 1999, and they need to be considered in the cumulative affects analysis.

2. Past Actions/Stresses – Pg 10, 3rd para – "All of these deepening projects allowed the freshwater interface to migrate farther upstream." Given this statement, why would the cumulative loss of wetlands due to channel deepening not be included in the Cumulative Affects analysis?

3. Present Actions/Stresses – Pg 13, 4th para – "The District expects to begin the rehabilitation in the summer of 2010 and complete it in FY 2012." The rehabilitation refers to the water control structures in the Freshwater Control System. Has that work begun yet?

4. Future Actions/Stresses – Pg 14, 3rd para – "Another potential impact to upstream salinity levels and thus the SNWR is the proposed Jasper County Marine Terminal." If this proposed project is considered to be feasible enough for inclusion in the cumulative impacts analysis, then why is it not feasible enough to be considered an alternative to the SHEP?

5. Incremental Impact – Pg 14, 4th para – This discussion on the effects of past harbor deepening projects and their resultant increases in upstream salinity levels should include statements regarding the magnitude and significance of those cumulative impacts.

6. Past Actions/Stresses – Pg 23, 2nd para – "Over time some tidal freshwater marsh has been converted to either brackish or saltmarsh because of increased upstream salinity levels caused by deepening of the harbor." The use of the word "some" to quantify the historic losses of tidal freshwater marsh within Savannah Harbor that actually numbers in the hundreds of acres understates the magnitude and significance of the cumulative impacts.

7. Present Actions/Stresses – Pg 26, 4th para – "Those areas of tidal freshwater marsh outside of the SNWR could be filled after obtaining a Department of the Army Permit; such a permit would require mitigation for these impacts but not replacement of tidal marsh." Why would the Corps of Engineers issue permits for filling remaining tidal freshwater marsh within the Savannah River estuary knowing the history of that resources' considerable destruction and the value of the remaining resource to the ecology of the watershed? Also, given the Corps'

tenant of "no net loss of function or value" for wetland losses, why would wetlands replacement not be required?

8. Capacity to Withstand Stress – Pg 27, 2nd para – "Tidal freshwater marshes exist in a very specific environment and are greatly controlled by ground elevation, river and tidal flows, and salinity levels. Maintaining salinity levels that are 0.5 ppt or less is critical to their survival" Please explain how the above statement relates to the subject heading of Capacity to Withstand Stress.

9. Present Actions/Stresses – Pg 33, 4th para – "All marsh in the Savannah estuary is protected from development by the provisions of Section 404 of the Clean Water Act." This statement appears contradictory to the assertion that preservation of freshwater wetlands is appropriate mitigation for expected wetland losses within SNWR because they (the wetlands that would be preserved) are under threat of development. Please explain.

10. Present Actions/Stresses – Pg 34, 1st para – "Those who have obtained permits have been required to avoid wetland impacts where practicable and to provide in-kind mitigation where wetland losses are unavoidable." For its unavoidable wetland impacts from SHEP, the Corps is proposing to purchase existing wetlands that are under no threat of development and preserve them by having the acreage incorporated into SNWR. Why would the Corps consider that to be in-kind mitigation?

11. Capacity to Withstand Stress – Pg 34, 3rd para – "The philosophy of the Corps of Engineers and state wetland protection programs is a "no net loss" of wetlands policy. Please explain how the Corps' use of wetland preservation in its proposed mitigation plan for SHEP is consistent with its philosophy of "no net loss".

12. Incremental Impact – Pg 34, 5th para – "The SHEP would result in the loss of 3.0 acres of brackish marsh and 12.68 acres of saltmarsh. When compared to the total amount of brackish marsh and saltmarsh in the Savannah Harbor estuary, this loss might seem insignificant. However, it is the incremental impact of many small losses over time that can lead to significant adverse impacts to a resource." Please include a statement of the magnitude and significance of this incremental impact.

13. Mitigation – Salt Marsh and Brackish Marsh – Pg 35, 1st para – "Over time this site would be expected to re-vegetate with estuarine emergent wetlands (brackish marsh). Not planting the site with appropriate marsh vegetation leaves open the distinct possibility that the site will be colonized by Common Reed (Phragmites sp) or other undesirable plants. Please explain why planting with appropriate vegetation is not being proposed.

14. Pre-construction Monitoring – Pg 35, 5th para – "Monitoring of wetland vegetation for one year". Please explain the purpose and expected value of monitoring for one year.

15. Monitoring During Construction – Pg 35, 6th para – "The same monitoring activities described above would be continued throughout the construction process, which is estimated to take 3-4 years". The Corps has indicated in other sections of this DEIS that construction of the SHEP is dependent upon receipt of funding from Congress. Given the uncertainty of a continuous funding stream that would allow the project to be completed in 3-4 years, how would the monitoring plan and costs be adjusted if construction were to stretch over a longer period of time?

16. Past Actions/Stresses – Pg 39, 2nd para – "In addition to loss of riverine habitat, much of the fishery habitat in the Savannah River estuary has also been lost or adversely affected". This statement is in stark contrast to the last paragraph on Pg 41 where results of a UGA study on the temporal and spatial distribution of estuarine fishes in the Savannah River estuary showed that the estuary supports a diverse and abundant fish community. Please clarify the apparent discrepancy.

17. Present Condition – Pg 41, 1st para – "The shortnose sturgeon is the only endangered fish in the Savannah Harbor estuary". While that is a true statement at the moment, the National Marine Fisheries Service proposed in November 2010 that the Atlantic Sturgeon be listed as an endangered species under the Endangered Species Act. The Public Comment Period on the proposed listing closes in early January 2011, and the Atlantic Sturgeon may well be added to the Endangered Species List before the SHEP completes the NEPA and permitting processes. The potential impacts on Atlantic Sturgeon from the SHEP should be addressed in this DEIS (the Atlantic Sturgeon is acknowledged as an imperiled species in the 1st paragraph of page 43 in this appendix), or in a supplemental EIS at a later date when the species is listed.

18. Future Actions/Stresses – Pg 46, 3rd para – "A marine terminal has been proposed for Jasper County, South Carolina". Including the proposed Jasper Terminal in the discussion of cumulative impacts acknowledges that it is a reasonably foreseeable activity. Why then is it not also appropriate to evaluate the Jasper Terminal as a reasonable and feasible alternative to the SHEP?

19. Incremental Impact – Pg 47, 2nd para – "Average river flows were determined to be the most representative of conditions that would be expected over the long-term". Why would a modeling analysis of predicted impacts not be more meaningful based on low flow rather than on average flow?

20. Incremental Impact – Pg 47, 2nd para – "Fish habitat modeling was used to identify areas in the harbor where suitable habitat exists as well as how that habitat would change under various harbor deepening alternatives". Was any ground-truthing of areas in the harbor predicted by the model to be suitable fish habitat to confirm the model's accuracy?

21. Incremental Impact – Pg 48, 1st para – "Without mitigation, model studies indicate that there would be no effect on American shad habitat". What was done to confirm the accuracy of model predictions?

22. Incremental Impact – Pg 48 – The discussion on Incremental Impact ends on this page with no conclusion offered on the magnitude and significance of the cumulative impacts of the river's fisheries. Please add a discussion on this.

23. Alternatives to Mitigate for Cumulative Impacts – Pg 48, 2nd para, 5th bullet – "Restoring conditions in the estuary that are favorable to spawning of Striped bass to support the recovery of that species". How does stocking of striped bass achieve this objective, since the incremental loss of striped bass spawning habitat is unaffected by stocking?

24. Alternatives to Mitigate for Cumulative Impacts – Pg 51, 6th para – "Consequently, implementation of a stocking program was deemed to be the most effective means of mitigating for the remaining loss of Striped bass habitat associated with each alternative deepening plan". Its unclear how adding striped bass to a river with reduced Striped bass habitat will be able to sustain the fishery, and how that is considered to be acceptable mitigation. Please explain.

25. Alternatives to Mitigate for Cumulative Impacts – Pg 52, 2nd para – "Determining the appropriate level of stocking was accomplished by the SHEP study team in coordination with the Georgia DNR-WRD". Fishery resources in a river that is the common boundary between two states are shared resources of both states. Was the SC DNR involved in Striped bass mitigation development?

26. Issue – Pg 54, 3rd para – "These issues are addressed in Section 5 of the EIS, and while they are major issues, the SHEP study team did not believe they warranted a cumulative impact type of analysis". Both NEPA and CEQ guidelines on cumulative impacts analysis requires that issues identified during Project Scoping as being major need to be included in the cumulative impacts analysis. Temperature gradients in the estuary and chloride levels in Abercorn Creek were identified as major issues during Scoping. Therefore they need to be included in the discussion of cumulative impacts.
27. Issue – Pg 54, 5th para – "Dissolved oxygen concerns relating to harbor deepening can be divided into three issues: (1) as the channel depth increases, the ability of oxygen to reach the river bottom decreases, causing lower average concentrations of dissolved oxygen at the bottom, (2) as the channel prism.....throughout the water column". The decrease in DO levels at the river bottom has the potential to change both the benthic and plankton communities, which in turn may negatively impact the fish community. These impacts and their linkage should be discussed.

28. Issue – Pg 54, 5th para – "Lower dissolved oxygen concentrations also reduce the ability of the estuary to handle the point and non-point source loads of pollutants

entering the estuary". The SHEP's lowering of dissolved oxygen levels in the harbor effectively reduces the harbor's ability to sustain a higher aggregate TMDL. That could result in higher costs to point-source dischargers who would have their TMDL lowered because of SHEP's impact on the harbor DO levels. This point should be discussed.

29. Geographic Scope – Pg 55, 1st para – "Evaluation of impacts to the dissolved oxygen regime is critical because this segment of the river is on the State of Georgia's Section 303(d) list as impaired for dissolved oxygen". What is the status of that river segment under SC water quality criteria for dissolved oxygen?

30. Historic – Pg 55, 5th para – "In addition, since water quality in the harbor is – at a minimum not degrading – but likely to be stable or improving as tighter discharge standards are instituted and new industrial controls implemented, the present day conditions will be used as the baseline for this analysis". This does not follow NEPA nor CEQ guidelines on how impacts to specific resources are to be evaluated for cumulative impacts.

31. Past Actioons/Stresses – Pg 57, 1st para – "Monitoring indicates that the effects of this resuspension on dissolved oxygen levels are small, temporary, and localized". What monitoring? What is the reference for this statement?

32. Past Actions/Stresses – Pg 57, 4th para – "Overall, the studies revealed that this procedure does not degrade the quality of the river to unacceptable levels". The studies need to be referenced. Are state water quality standards (either Georgia or SC) violated?

33. Past Actions/Stresses – Pg 57, 4th para – "This procedure is not performed when background dissolved oxygen levels in the river are at or below Georgia water quality standards". Is the procedure performed when dissolved oxygen levels in the river are at or below SC water quality standards?

34. Present Condition – Pg 57, 5th para – "Water quality in the harbor is generally good". This statement is inconsistent with the another sentence in that paragraph that says "The dissolved oxygen levels can drop to concentrations that do not adequately support aquatic life". This discrepancy should be rectified.

35. Present Condition – Pg 58, 1st para – "This segment of the river failed to meet the dissolved oxygen use designation based on data collected in the summers of 1997 and 1999 (EPA 2006)." If there is recent data on summertime DO levels in that segment of the river, it should be referenced.

36. Present Actions/Stresses – Pg 59, 3rd para – "Model results from the EPA TMDL study for Savannah Harbor indicate that the Savannah Harbor Navigation Project has resulted in a 1 mg/l depression of dissolved oxygen in the upper water column". What is the magnitude of DO depression in the lower water column?

37. Present Actions/Stresses – Pg 59, 4th para – "If the background levels are at or below Georgia water quality standards, the dredging is not performed. This ensures that activities will not be conducted which would further exacerbate stressful conditions for wildlife". There seems to be an inconsistency here. Maintenance dredging is not performed if the DO is near or below water quality standards, but the Corps proposes to construct a project that (without mitigation, and maybe even with mitigation) would permanently worsen the DO problem.

38. Incremental Impact – Pg 66 - The discussion on Incremental Impact ends on this page with no conclusion offered on the magnitude and significance of cumulative impacts to the river's dissolved oxygen from past, present and future projects. Please add a discussion on this.

39. Alternatives to Mitigate for Cumulative Impacts – Pg 66, 3rd para – "Basically, these plans reduce the anticipated increase in salinity levels by reducing salt water flows into Back, Little Back , and Middle Rivers, while providing more freshwater inflow to these streams". Was consideration given to the likelihood that the freshwater inflow could include high oxygen-demanding organic materials from the large acreages of wetlands in the upstream part of the basin?

40. Alternatives to Mitigate for Cumulative Impacts – Pg 67, 2nd para – "This device was originally used to add oxygen to the bottom of lakes to enhance downstream fisheries". Where has this technology been successfully used on a scale commensurate with the SHEP? If it hasn't, then reliability is a significant issue, and the mitigation plan, which relies so heavily on the speece-cone technology for the success of other mitigation plan elements, is also significant issue.

41. Alternatives to Mitigate for Cumulative Impacts – Pg 67, 4th para – "The costs for operating the oxygen injection systems are based on their continued operation for a period of 4 months per year". However, the modeling results show that DO levels are expected to be below standards for more than 4 months a year. Why wouldn't the oxygen injection system be operated during each month that oxygen is expected to be below state standards?

42. Alternatives to Mitigate for Cumulative Impacts – Pg 68, Table 11 – Under the column labeled Scenario Description, the various incremental depth projects are listed, from a deepening project of 2 feet (44-foot depth in the channel), to a deepening project of 6 feet (48-foot depth in the channel). However, the DEIS acknowledges that under any of the channel deepening alternatives being considered, there would be 2 feet of allowable over-depth dredging and 4 feet of advanced maintenance added to each alternative. This means that the 44-foot channel alternative is actually a 50-foot channel, and the 48-foot alternative is actually a 54-foot channel. None of these depths were modeled with respect to their anticipated impacts on DO, fisheries, sediment disposal, etc. This should be done to accurately assess the project's true impacts to the Savannah Harbor.

43. Incremental Impact – Pg 78 – The discussion on Incremental Impact ends on this page with no conclusion offered on the magnitude and significance of cumulative impacts to the groundwater resources from past, present and future projects. Please add a discussion on this.

44. Issue – Pg 79, 1st para - "Right whales, sea turtles, West Indian manatee and Shortnose sturgeon are species that are protected by Federal law that are commonly thought of as being at risk from harbor operations". Atlantic sturgeon should also be acknowledged here since NMFS has proposed listing the species as Endangered under the Endangered Species Act.

45. Present Condition – Pg 82, 3rd para – "Although the Savannah River Shortnose population is considered to be improving since the species was placed on the endangered species list in 1967, the apparent low level of recruitment remains a major concern". What is the reference for the shortnose sturgeon population being considered to be improving?

46. Present Actions/Stresses – Pg 86, 2nd para – "Maintenance of the Savannah Harbor Project is believed to have only minimal impacts on the Shortnose sturgeon in Savannah Harbor". What is the reference for this statement?

47. Capacity to Withstand Stress – Pg 86, 3rd para – Given the uncertainties expressed in this paragraph on the proposed project's multiple potential impacts on the Shortnose sturgeon, why would the project not have a high likelihood of violating the Endangered Species Act? Where is the discussion of SHEP compliance with the Endangered Species Act?

48. Incremental Impact – Pg 88, 8th para – "A. Conceptual plans have been developed to construct a major container terminal in Jasper County, South Carolina". Since the Jasper Terminal has been developed to the conceptual level, why is it not considered a reasonable and feasible alternative to the SHEP?

49. Incremental Impact – Pg 89 - The discussion on Incremental Impact ends on this page with no conclusion offered on the magnitude and significance of cumulative impacts to endangered species resources from past, present and future projects. Please add a discussion on this.

Comments on DEIS Appendix M –
Sediment Quality Evaluation

Draft Review Comments Appendix M

Sediment Quality Evaluation
Draft Tier II Environmental Impact Statement for Savannah Harbor Expansion

The investigation appears consistent with guidance and comes to what would be considered reasonable conclusions. The document uses standard ecological risk assessment methodologies to assess the potential adverse effects from exposure to cadmium in sediment in four scenarios, including:

1) Cadmium in residual surface sediments exposed in the bottom of the channel after dredging activities that provide habitat for benthic and aquatic species.
2) Release of sediments impacted with cadmium to water column as a result of dredging activities.
3) Cadmium in "wet" spoils within a Dredge Material Containment Area that provide potential habitat for wetland/aquatic species, also fate and transport (leaching to groundwater, entrainment in stormwater runoff, air dispersion).
4) Cadmium in dried sediments used for construction/maintenance of existing levee and embankment structures that provide potential habitat for both upland and wet land species.

Taking each of these:

1) The risk evaluation of residual cadmium in the bottom of the water way after dredging required several "tiers" of evaluation to get to an acceptable risk conclusion. They needed to advance their risk assessment approach to a Tier III bioavailability study in benthic organisms to determine the site-specific uptake of cadmium from sediments. The reported body burdens of cadmium and nickel increased in a dose-response type relationship. Table 37 provides summary of the toxicity reference value (TRV) derivation to identify a No Observable Adverse Effect Level (NOAEL) concentration to support a 1.12 mg/kg concentrations in benthos as protective. The TRV derivation presented in the document does not present a strong case for selection of the species used to basis for TRV selection. A detailed description of the results of the benthic survey supporting the selection of representative species would strengthen this section. The NOAEL TRV selection currently appears to be the weakest portion of the evaluation. The ecological risk assessment used standard methodology to estimate potential adverse effects to the surrounding ecosystem. Estimates of potential exposure to fish and upper-trophic aquatic receptors were calculated from concentrations in benthic tissue. The risk assessment concluded that cadmium in benthos do not pose a risk to upper trophic receptors.
2) The evaluation uses standard practices. Concentrations of elutriate testing had elevated total concentrations of cadmium; however, surface water quality criterion for cadmium is based on dissolved, which as below chronic criterion, and well below the acute criterion for cadmium.

3) The evaluation of the "wet" sediments in the MDCA used standard practices as well. Once again, cadmium is not in the dissolved aqueous phase, so groundwater impacts are not a driving concern. Cadmium is not volatile and wet sediments are not generating dust, so these pathways are also adequately addressed. The ecological exposure of terrestrial wetland species was driven by the spotted sand-piper using traditional eco-risk assessment methodology. Specific assumptions for exposure factors, toxicity factors, body weights, etc., were not evaluated at this time but the overall approach used is sound. The report concluded that cadmium may pose a risk to avian populations that use the area for nesting and foraging (sand-pipers poking their beaks into sediments pulling out invertebrates is a reasonable conclusion for cadmium concentrations ranging from 14 to 31 ppm). The report addresses the risk in the recommendations by managing MDCA to minimize bird use of the facility (e.g., could use sound cannons or other disturbances to discourage bird use).
4) The last major eco-risk assessment evaluation was on dry sediments used for levee and flood control construction. Cadmium in dried sediments appear much more bio available to plants and animals. Capping is the approach for control for "wet" sediments and keeping cadmium sediments out of the rotation management plan for use in levee and food control structure construction and repair is the mitigation. The plan proposes monitoring to evaluate the potential uptake of cadmium into plants, the monitoring plan should be carefully planned with respect to decision triggers. EA and the Corps of Engineers has differences in the calculation and interpretation of Ecological Quotients (EQs). The Corps (CENOW-HX-S) defines their approach to interpreting the EQ based on USEPA Interim Superfund Guidance in Section 4.2.3.7. of the report, however, a detailed description of the EA interpretation of the EQ is not provided. A detailed review of the approach applied by EA would need to be made to offer an opinion on the difference in interpretations between the approaches used by CENOW-HX-S and EA.

Overall the evaluation is comprehensive, but does not appear to be overly in depth in the toxicity assessment for benthics.

Comments on DEIS Appendix N –
Record of Interagency Coordination

Draft Review Comments Appendix N

Record of Interagency Coordination
Draft Tier II Environmental Impact Statement for Savannah Harbor Expansion

An email between Heinz Mueller and Brenda Willet at the Corps on 3/29/2010 (page 32-33) suggests that the model to marsh proposal may not have been approved by the Water Division, but simply approved based on the lack of a response. Is this the case? Was the proposal ever approved or formally disapproved? The final approval status should be part of the public record.

Comments on DEIS Appendix Q –
Risk and Uncertainty in Environmental Evaluation and Approach

Appendix Q Comments

Risk and Uncertainty in Environmental Evaluation Approach
Draft Tier II Environmental Impact Statement for Savannah Harbor Expansion

1. Page 1. Section 2A. The DEIS did not include field studies to gather more information on Atlantic sturgeon even though the DEIS admitted there was a paucity of information about the sturgeon and it is a candidate species that has a proposed listing of endangered.

2. Page 2, 1st Paragraph. The appendix states that abundance information was satisfied by the studies. On the contrary, no solid estimates of shortnose sturgeon abundance was determined by the studies in the Savannah River even though varying abundance estimates have been proposed. In addition, no abundance information is known for Atlantic sturgeon in the Savannah River.

3. Page 2. Section B, 1st Paragraph. The appendix states that the agencies approved all of the models as acceptable for determining environmental impacts. However, the NMFS did express concern about the use of "acceptable vs. unacceptable" for determining available habitat for fish in the river and in the alternative proposed a gradient of scores in order to indicate the varying level of impact and available habitats. After much discussion NMFS conceded that the use of "acceptable vs. unacceptable" was okay for now. This would indicate that NMFS deemed it to be insufficient for a final determination of impacts to the fisheries resources in the river.

4. Page 3, Last paragraph. The appendix states that the use of multiple species will eliminate reliance on a narrow view of the ecosystem, thereby reducing the risk of not identifying a critical impact. The use of multiple species for impact assessment does provide breadth and depth of impact analysis. However, if the biological variables used in the impact assessment are flawed, the impact assessment is not an accurate representation of the total impacts. For example, the DO levels used to assess the acceptable habitat for shortnose sturgeon were determined as those levels at which shortnose sturgeon could survive in a laboratory setting. The DO values were much lower than DO values collected in a shortnose sturgeon habitat association study conducted in the Savannah River. Thus, the use of lower DO values than what the shortnose sturgeon would utilize would overestimate the acceptable habitat in the river after the project is constructed.

5. In Section 3 page 6. With the exception USFWS none of the resource agencies provided specific comments on the uncertainties associated with the salinity model. Why? The USFWS stated, "… we believe that salinity prediction performance is adequate to use in project planning. However, we must reiterate that there continues to be a limited understanding and modeling ability of the velocity and flow dynamics in the Middle River, Little Back River and Back River. This limitation will cause some uncertainty regarding salinity and water quality predictions for mitigation alternatives that involve channel modifications in the Savannah River system." We concur with the USFWS statement and believe this opinion is likely shared by other resource agencies. The Corps

should consider refining the model, collecting additional data and developing a more specific contingency plan.

6. Page 4, 2nd Paragraph, line 17. The appendix states that criteria used to determine the acceptability of fish habitat were on the conservative side. As stated in the comment above, the use of lower DO values than were documented in known fish use areas is not a conservative estimate, but instead provides an overrepresentation of available fish habitat.

7. Page 4, Section 3, 1st Paragraph. This will provide information that tells you how bad one dredging alternative is compared to other dredging alternatives, but it doesn't tell you how bad a dredging alternative is compared to a different non-dredging project. The DEIS doesn't consider other true alternatives that would allow shipping, but with less impacts. For example, there is no mention of any other ports that could be used without the need for the extensive upriver dredging.

8. Page 6. USFWS quote. The USFWS has accepted the use of the salinity model in project planning. Note: project planning should not include the detailed impact determination and mitigation modeling and monitoring that will need to be completed for endangered species consultation and incidental take permitting process, which is likely to be necessary due to the likelihood that the project will impact instream habitat to the degree that it will result in the take of a threatened or endangered species.

9. Page 11, 1st Paragraph. Did the USGS review the supplemental report to ensure the report addressed the concerns the USGS expressed about the previous draft. No mention is made that the USGS received the supplemental report or agreed with the findings.

10. Page 11, Section B, 3rd Paragraph. How much was the DO improved? Did the DO improvement corroborate the levels proffered in the DEIS? No mention is made as to how the DO improvement compared to that which has been provided as a basis for adequate mitigation.

11. Page 11, Section B, 4th Paragraph. The text claims that monitoring will reduce the risks associated with the effectiveness of the DO improvement system. Monitoring will not reduce the risk of the effectiveness of the DO improvement system. It will reduce the risk of not noticing a non-functional DO improvement system. A reduction in risk associated with effectiveness would be reduced via a proposal of alternative technologies that would also be effective. None have been discussed here as a fallback.

12. Page 12, Section 7A, 2nd Paragraph. Second to last sentence re: acceptable vs. unacceptable. In the case of shortnose sturgeon, the team ignored the field data collected on shortnose sturgeon habitat use in the Savannah River when determining acceptable DO levels. Ignoring the data from the river resulted in a DO threshold level far below that in which sturgeon are typically found thus creating undue risk that the models underestimated the impacts to fish, specifically demersal sturgeon that are potentially the most at risk to depressed DO levels.

13. In the last sentence of Section 4A, The Corps states that they consider the wetland impact acreages to be valid within +/- 50 acres. This is too large of a margin of error. The models should be refined and or additional data needs to be collected to reduce the margin of error.

Comments on DEIS Appendix R –
Section 103 Evaluation

Appendix R Comments

Section 103 Evaluation
Draft Tier II Environmental Impact Statement for Savannah Harbor Expansion

1. Section 8, Page 18, 1st Paragraph. The document states that the District believes there will be no significant environmental impact; however, the use of the disposal area was not reviewed in the DEIS. The DEIS simply states that the area was approved in 1996 and therefore environmental review of the disposal area was not necessary. Dependence upon an environmental review completed in 1996 is not adequate given the probability of changed circumstances as well as the new listing of a substantial number of threatened and endangered species since 1996.

2. Page 19, Subsection b(i). See above comment.

Comments on DEIS Appendix S –
Essential Fish Habitat Evaluation

Appendix S Final Comments

Essential Fish Habitat Evaluation
Draft Tier II Environmental Impact Statement for Savannah Harbor Expansion

1. Page 5, Section 2. Unsubstantiated claims about the absence of habitats in the project impact area. References or field work should be cited to corroborate this claim.

2. Table 3-1. The column headings are unclear. Column 2 appear to be total acres affected. Column 3 appears to be non-wetland acres affected. However, it is not readily discernible based on the information.

3. Page 6. First line. The narrative states that 14.08 acres could be considered wetlands. Are they or aren't they wetlands? Has a study been completed to verify any of the information? How do you know that the remaining 15.92 acres is high ground if no wetland delineation has been performed.

4. Figure 3-1. The image is of such poor quality that it is not legible for review.

5. Figure 3-2. Most of the image is missing precluding review.

6. Figure 3-3 is not cited in the text and does not include a legend. It is impossible to tell what this figure is trying to convey.

7. Page 10. Section 3.2- The document skips any discussion of avoidance or minimization of impacts. It does not discuss how the project was assessed for modifications to avoid or minimize impacts. Rather it assumes the project will move forward and begins a discussion of how it will be mitigated.

8. Typically, part of the NEPA process involves an alternative project that does not involve that which is proposed, but still accomplishes some or all of the project purpose. In this DEIS, the only options that are presented are variants of the same project. The presentation of a single project does not allow for sufficient evaluation of the environmental impact of a project under NEPA.

9. Page 11. Will the mitigation area provide fish access at an adequate level to replace the value of the essential fish habitat lost due to project impacts?

10. A common thread throughout this document is the failure to relate the project impacts and mitigation to the actual effects on fish and fish access to these areas.

11. Figure 3-4. poor quality figure, no key. No discussion of water elevations in ditch versus the wetland. Difficult to determine exactly where this area is located without an inset map.

12. Page 13, Section 4.1 - This section actually only provides one full sentence and one table discussion of project impacts. The narrative avoids discussion of the degree to which salinity will move upstream, any avoidance or minimization efforts, or methods of determining the amount of impact. The narrative's focus on mitigation measures without discussing impacts, avoidance, and minimization suggests the Corps has not adequately addressed ways to reduce impacts and it simply using the DEIS to justify the project that it has been authorized to construct.

13. Page 15. Table 4-3 is not referenced in the text.

14. Page 16. Under what flow scenarios was the model conducted? Did it account for field-truthed conditions? Did it account for boat wake effects?

15. Page 17. The bullet points intermix impact and mitigation discussions. Much of this text actually describes the impact, but the unclear delineation of the two makes this document difficult to read and understand.

16. Pages 28-30. Table 4-5 through 4-11 are labeled as x-foot deepening alternative. This is misleading and difficult to follow given the balance of the appendix and the DEIS refers to the alternatives as 4x-foot alternative.

17. Page 32. Paragraph 2, line 8. The mitigation includes enlarging a creek. The document should include this as an impact that should be mitigated by the mitigation plan. No discussion of mitigation for impacts due to mitigation is offered.

18. Page 34, Paragraph 1, lines 11-13. The text discusses using the Corps standard operating procedures (SOP) in order to quantify the ecological impacts including the type, duration, and preventability. Very little detail, if any, is provided in the document to show the type, duration, and preventability of any impacts proposed by this project.

19. Page 35. The text discusses how the SOP was used to assess the impact to wetlands and the acres of mitigation realized in the model. It does not, however, at any time put the loss of wetland or the replacement of wetland in the context of fisheries. The entire purpose of this section is to address essential fish habitat and at no time does the document discuss how fish populations will be affected by the destruction of essential fish habitat or the accessibility of the newly created essential fish habitat.

20. Page 37, 2nd to last line. The text should reference Figure 4-12. It is difficult to follow the text and figures without proper citations.

21. Page 39. Section 5.1

22. First line. The line claims extensive studies have been conducted, but cites none. Only two studies are included below and neither appears to deal directly with fishes that may be found in the Savannah River.

23. The lack of information on sturgeon is a critical information gap that precludes adequate assessment of the potential for impact.

24. Section 5.1, 2nd paragraph, lines 9 - 13. The information included in this sentence are unsubstantiated by any other study or reference material. Citations should be included. For example, how can the inference be made that the suspended sediment loads would likely be uniform without having data to corroborate that information? How would the sediment interact with the salt wedge that otherwise restricts mixing?

25. Page 40, 1st full paragraph. How far upstream will the salinity increase? This is crucial information for assessing impacts on essential fish habitat, but it is impossible to determine this information from the text.

26. Page 41, 1st full paragraph. The dates listed in lines 7 and 10 do not appear to be accurate. It is difficult to know which dates were actually modeled and what the respective dates are intended to represent.

27. Page 45. The Corps used a 0.25 mg/l decrease in DO as the determination of DO violations. However, this document is intended to asses essential fish habitat. The Corps has not shown how a 0.25 mg/l decrease relates to essential fish habitat and the fish that the habitat is intended to harbor. This is an example of the continual disconnect between use of the model to calculate a result with little discussion as to the meaning of the inputs or outputs as they relate to fish in the harbor.

28. Tables 5-3 through 5-7 do not appear to be referenced correctly in the corresponding text. The disorganization of the document makes review difficult.

29. Page 51, Section 5.3, 3rd paragraph. Line 7. - The screens should also be size to minimize impingement of fish. No sources have been cited to substantiate the velocity of flow being proposed. No estimates have been made of the species that may be entrained or impinged by the system and the mitigation that would be required for that mortality.

30. Page 52. Line 1. The text references Table 5-4 for the desirable oxygen levels. Table 5-4 does not include oxygen levels. It is impossible to asses this information with incorrect citations.

31. Page 54, 1st paragraph, last line. Table appears to be incorrectly cited in the text.

32. Page 57. Section 9.0. The text dismisses the mapped hardbottom areas without completing any assessments prior to doing so and does not provide any remedial

actions that will be taken if a hardbottom area is found. Will the channel be moved? Avoidance should be considered prior to mitigation.

33. Page 60. Section I. - The text dismisses the mapped hardbottom areas without completing any assessments prior to doing so and does not provide any remedial actions that will be taken if a hardbottom area is found. Will the channel be moved? Avoidance should be considered prior to mitigation.

34. Page 63. Section 11.0 - The impact summary states that the proposed action would have adverse impacts on an endangered species, an important game fish species, and two types of marshes, presumably upon which many species of fish depend. Nonetheless, the text dismisses the adverse impacts as non-significant without providing sufficient detail as to how the non-signficant status had been applied. Furthermore, the assessment provided little information as to how the project will impact essential fish habitat from an accessibility perspective. The mitigation of essential fish habitat through the restoration of inaccessible marsh habitats or the purchase of woodland does not provide adequate replacement for the essential fish habitats that will be lost due to this project.

ATTACHMENT 2
VERBATIM AGENCY COMMENTS

South Carolina Department of Natural Resources Comments

DRAFT TIER II ENVIRONMENTAL IMPACT STATEMENT
FOR THE SAVANNAH HARBOR EXPANSION

Major points addressed in the DEIS and DNR responses:

The stated purpose of the proposed Savannah Harbor Expansion Project (SHEP) is to save current and future shipping costs due to draft restrictions on larger vessels. The DEIS presents an analysis of the impacts of project depth alternatives ranging from 42 ft (the "no action" alternative) through 48 ft. The US Army Corps of Engineers (USACE) has tentatively identified the 47-ft depth alternative as the National Economic Development (NED) Plan, i.e., *"the plan that maximizes net economic benefits to the Nation and fully complies with Army policy."* The Maximum Authorized Plan of -48 ft is supported by the non-Federal cost share sponsor. Although it is acknowledged in the DEIS that environmental impacts associated with shallower depths would be less than those associated with the NED plan, the DEIS concludes that *"the lesser impacts of the 44-foot depth, 45-foot depth, and 46-foot depth alternatives are not considered sufficient to justify recommendation of these alternatives instead of the NED Plan"*. The DEIS further concludes that all depth alternatives, with the inclusion of proposed mitigation features, are *"environmentally acceptable."*

- DNR disagrees with this conclusion, and believes that the only two deepening alternatives that might be considered environmentally acceptable are the 44-ft and the 45-ft alternatives, provided the proposed mitigation is effective in minimizing any adverse impacts of these alternatives. Obviously, the "no action" alternative (i.e., maintaining the channel at the currently authorized depth of 42 ft) would have the fewest adverse environmental impacts.

- The NED Plan (i.e., the 47-ft alternative) would involve the initial excavation of about 28 million cubic yards of dredged sediment, and would result in both direct and indirect impacts to natural resources. Direct impacts would result from the physical removal and disposal of sediments, while indirect impacts would result from increased salinity intrusion and reduced dissolved oxygen levels. These impacts include adverse effects on managed freshwater wetlands in the Savannah National Wildlife Refuge; loss of tidal freshwater wetlands; loss of foraging and nursery habitat for the endangered shortnose sturgeon (SNS); loss of fringing brackish marsh; and loss of striped bass habitat.

- As stated in the DEIS, the extent of direct wetland impacts resulting from the excavation of bend wideners would not differ substantially among the five deepening alternatives considered. In each case, a total of 14.08 acres of salt and brackish marsh would be affected. In the absence of an approved saltwater mitigation bank in the Savannah River Basin, the USACE proposes to mitigate for these direct losses by grading down approximately 42 acres of a former confined dredge spoil disposal site (CDF 1S) near the confluence of the Front and Middle rivers to an elevation that would support *Spartina alterniflora*. A "feeder" creek system would also be constructed toward the interior of the restored marsh. This area would then be allowed to revegetate naturally. Active planting of *Spartina* would only be conducted if the area did not revegetate naturally at a rate that would provide 15% vegetative

cover after 1 year and 80% vegetative cover after 5 years (with interim goals of 25, 40, and 60% cover at the end of two, three and four years, respectively). Conceptually, DNR concurs with this approach to mitigating for the direct loss of brackish and saltwater wetlands resulting from any of the deepening alternatives; however, DNR's overriding concern about the indirect effects of harbor deepening should be given greater weight.

- As stated in Chapter 5 of the DEIS, *"All of the deepening alternatives would adversely impact tidal freshwater marsh."* Model predictions indicate that, without mitigation, deepening the harbor would result in the conversion of tidal freshwater marsh to brackish marsh as a result of increased salinity intrusion. Under conditions of average flow and low sea level rise, the acreage of freshwater marsh that would be lost as a result of deepening is predicted to range from 551 acres for the 44-ft alternative to 1,212 acres for the 48-ft alternative, assuming no mitigation is implemented. With the flow-altering modifications proposed as mitigation by the USACE, however, the acreage of freshwater marsh is actually projected to *increase* by 332 acres with the 44-ft alternative; whereas, a net *loss* of freshwater marsh (ranging from 32 acres for the 45-ft alternative to 337 acres for the 48-ft alternative) would still result from the other deepening alternatives, even with mitigation. Considering the substantial loss of tidal freshwater wetlands that has already occurred as a result of past dredging operations and other modifications to the system, the DNR considers anything more than a *de minimis* loss of freshwater wetlands to be a significant adverse impact of the proposed deepening project.

- The USACE proposes to minimize indirect impacts due to increased salinity intrusion by implementing several flow-altering modifications of the Savannah River system. These include diverting more fresh water down the Little Back River at McCoy Cut; removing the Tidegate abutments and piers in the lower Back River; allowing the sediment basin below the Tidegate to fill in by constructing a submerged sill at the lower end of the basin; and closing Rifle Cut.

- As discussed in the DEIS, there are significant concerns related to the predicted decrease in dissolved oxygen that would result from the proposed deepening project. The primary area of concern for dissolved oxygen is the portion of the Savannah River between Fort Pulaski (River Mile 0.0) and the Seaboard Coastline Railroad Bridge (Mile 27.4). This is the section of the Savannah River estuary that would be directly affected by the deepening project. As noted in the DEIS, this segment of the river is on Georgia's Section 303(d) list as impaired for dissolved oxygen. Modeling studies conducted in support of the development of a Total Maximum Daily Load (TMDL) for dissolved oxygen in Savannah Harbor estimate that the existing dissolved oxygen concentration in Savannah Harbor is 1 mg/l lower than it was during the baseline year (1854) and condition (12-foot controlling depth) because of dredging operations that have been conducted since then. Model predictions from the SHEP studies indicate that further deepening will have additional impacts on the dissolved oxygen regime in Savannah Harbor.

- The USACE proposes to minimize impacts due to the incremental decrease in dissolved oxygen (DO) levels by installing several land-based oxygen injection

systems ("Speece Cones") at three locations in the estuary where DO levels are predicted to be lower as a result of deepening. The number of cones installed would range from eight to ten, depending on the depth alternative selected. Water would be withdrawn from the river through pipes, then super-saturated with oxygen and returned to the river. The systems would be operated to provide the needed amount of oxygen for the depth alternative selected during the summer months (July, August, and September). The DO system configuration is designed to remove the incremental effect of a deeper channel in 97 percent of the cells in the hydrodynamic model.

- As reported in the DEIS, hydrodynamic and water quality modeling conducted in support of the deepening project suggest that the proposed mitigation features (i.e., the flow-altering plans discussed above and the DO injection systems) would substantially reduce project impacts to freshwater wetlands and some species of fish. While DNR does not necessarily dispute the hydrodynamic and water quality modeling results, we are concerned that there is still substantial uncertainty regarding the predicted magnitude of adverse impacts and the effectiveness of the proposed mitigation measures, particularly, the oxygen injection system. The results of a demonstration project conducted to determine the effectiveness of the system in Savannah Harbor were inconclusive. The slight increase in dissolved oxygen in the vicinity of the Speece Cones was shown to be within the normal range of natural variability due to tidal influences, and could not be definitively attributed to the oxygen injection system itself. Furthermore, the long-term effectiveness and viability of this system in a tidal brackish water environment is highly questionable. The minimal net improvement in DO predicted by the model may not be sufficient to warrant the initial cost of the system or the long-term maintenance costs. Instead, DNR recommends that adverse impacts to dissolved oxygen levels be minimized by deepening to no more than -45 ft.

- DNR also is concerned that some or all of the flow-altering modifications could have unintended consequences that result in additional adverse impacts to natural resources. Significantly, the modifications proposed to reduce salinity intrusion into the Back River to protect tidal and managed freshwater wetlands could result in increased salinity intrusion into the Front and lower Middle rivers, where both juvenile and adult SNS have been found to concentrate, particularly during the winter when temperatures are below 22° C (Collins et al., 2001). In fact, Table 5-30 shows that the loss of adult SNS habitat in winter would be much greater *with* the flow alterations (maximum loss of 439 acres for the 48-ft alternative) than *without* them (maximum loss of 44 acres for the 48-ft alternative). Conversely, the loss of adult SNS habitat in summer and juvenile SNS habitat in winter is predicted to be *less* with the proposed flow-alterations than without them.

- The deepening alternative that is predicted to have the least negative impact on SNS habitat *overall* (including adults and juveniles during winter and summer) is the 44-ft alternative, which would result in a net loss of approximately 60 acres of SNS habitat with flow-altering mitigation, and 151 acres without flow alterations. By comparison, the NED Plan (i.e., the 47-ft alternative) is predicted to result in a net loss of 473 acres of SNS habitat overall with flow alterations (or a loss of 545 acres without flow alterations). The locally preferred plan (i.e., the 48-ft alternative) would result in even

greater net losses of SNS habitat overall. DNR considers magnitude of these impacts to the habitat of shortnose sturgeon to be unacceptable, with or without mitigation.

- Other unintended consequences of flow alterations could also occur. Recent and ongoing tagging studies suggest that SNS may move freely between the Front, Middle and Back rivers via Steamboat Cut and Rifle Cut *(cite report, in prep)*. If this proves to be the case, closing Rifle Cut could impede this movement, and limit SNS access to suitable foraging and nursery habitat. In addition, DNR field biologists have recently reported that the sediment basin in the lower Back River has already filled in to a large extent, and that any further deposition of sediments in this area could present another impediment to SNS migration throughout the system.

- The USACE proposes to provide compensatory mitigation for unavoidable impacts to SNS foraging and nursery habitat by constructing a fish passage structure around the New Savannah Bluff Lock and Dam (NSBLD) near Augusta, at a projected cost of $6.3 million. The structure (a rock ramp) would be located on the South Carolina side of the river, and would theoretically provide SNS access to approximately 20 miles of upstream spawning habitat. DNR believes the likelihood that this approach would be successful in passing SNS is highly doubtful. While such a fish passage structure might benefit other migratory fish, its success in passing SNS has never been demonstrated. Because of its unproven success, DNR is opposed to implementing active fish passage as mitigation for unavoidable impacts to SNS habitat, and believes that the best approach to protecting shortnose sturgeon habitat would be to minimize those impacts by selecting either the "no action" alternative or the 44-ft deepening alternative (with flow-altering mitigation).

- While impacts to SNS would be minimized by selecting either the no action alternative or the 44-ft alternative, modeling results presented in the DEIS suggest that the overall net loss of striped bass habitat (including suitable habitat for spawning, eggs and larvae) would be less with the 45-ft alternative. Because of this apparent benefit to striped bass, an important recreational species whose population in the lower Savannah River has been drastically reduced by earlier dredging operations and flow-altering modifications to the system, DNR would consider the 45-ft deepening alternative (with flow-altering mitigation) to be acceptable, as well.

- The USACE also proposes to provide compensatory mitigation for unavoidable impacts to tidal freshwater wetlands. Initially, an attempt was made to identify other sites in the Savannah River estuary that could be used for restoration or creation of tidal freshwater marsh; however, neither the USACE nor any of the stakeholders could find any suitable sites that were available within the Savannah River Basin. In the absence of any such sites, the USACE (in consultation with the USFWS and other natural resource agencies) used the Savannah District Standard Operating Procedures (SOP) to calculate the minimum number of acres that would need to be acquired and preserved to acceptably mitigate for unavoidable freshwater wetland impacts. Using this procedure, it was determined that the total acreage of wetlands that would need to be preserved ranged from 0 acres for the 44-ft deepening alternative (with flow-altering mitigation) to 2,683 acres for the 48-ft alternative (with flow-altering mitigation). The USACE proposes to acquire lands identified in the latest version of

the Savannah National Wildlife Refuge Acquisition Plan (dated July 2007), and provide them to the USFWS to manage as additions to the Refuge as compensatory mitigation for unavoidable wetland impacts from the deepening project. Priority will be given to acquiring properties that are dominated by freshwater wetlands. DNR concurs with this approach to mitigating for any unavoidable impacts to tidal freshwater wetlands, particularly since most of the indirect impacts of deepening would occur within the Savannah National Wildlife Refuge. DNR recommends that any such acquired properties be made accessible to the public for educational and recreational activities that are consistent with the wildlife management goals of the Refuge.

South Carolina Archives & History Center,
State Historic Preservation Office Comments

RECEIVED DEC 9 2010

December 7, 2010

Mr. William Bailey
ATTN: PD
Corps of Engineers, Savannah District
100 W. Oglethorpe Ave.
Savannah, GA 31401-3640

Re: Savannah Harbor Deepening
Tier II Environmental Impact Statement, draft
Jasper County, South Carolina
SHPO Project No. 03-VM0063

Dear Mr. Bailey:

Thank you for your letter of November 15, which we received on November 17, regarding the above-referenced project. We also received a copy of the draft Tier II Environmental Impact Statement (DEIS) as supporting documentation for this undertaking. The State Historic Preservation Office is providing comments to the Corps of Engineers pursuant to Section 106 of the National Historic Preservation Act and its implementing regulations, 36 CFR 800. Consultation with the SHPO is not a substitution for consultation with Tribal Historic Preservation Offices, other Native American tribes, local governments, or the public.

As the proposed project will occur in both South Carolina and Georgia, we understand that all Section 106 consultation will be coordinated between our office and the Georgia State Historic Preservation Office (SHPO). Therefore, the comments in this letter only reference those portions of the overall project that have an area of potential effect (APE) in South Carolina.

Our office concurs with the determination in the DEIS on the "Previously Disturbed Areas within the Area of Potential Effect for which No Historic Property Investigations are Proposed" (sections 4.10.3 and 5.12.2). We understand that the following cultural resources investigations will be coordinated with our office:

- Full-channel-width Dredging Area (SC waters)—Stations +41+500 to +49+500: Previous underwater archaeological survey identified two anomalies/targets that will be relocated and assessed for their eligibility for the National Register of Historic Places. These targets are SH-R16-2 and SH-R17N-1.
- Meeting Areas (GA and SC Waters—Stations +55+000 to +68+500): Two Confederate crib obstructions were identified in a 2005 underwater archaeological survey of this portion of the project. Our office concurs that these crib obstructions are eligible for listing in the National Register. It is not clear from the DEIS if these historic properties will be affected by the project. Additional consultation with our office is needed on this portion of the project.

- o New Savannah Bluff Lock and Dam Fish Ladder: The Corps will construct a fish ladder at the New Savannah Bluff Lock and Dam as part of the environmental mitigation of this project. The Corps will conduct a cultural resources survey prior to construction. Additional consultation with our office is needed on this portion of the project.

Our office concurs with the determination that the proposed Savannah Harbor Deepening project will have an adverse effect on the *CSS Georgia*, a Confederate naval vessel listed in the National Register and located in the waters of both Georgia and South Carolina. We also concur with the Corps' proposal to mitigate the adverse effects on the *CSS Georgia* by conducting data recovery and conservation of the ship and associated artifacts. A draft timeline of the steps in mitigation is included in the DEIS.

In preparation for this complex undertaking, our office consulted with the Corps of Engineers in 2005 and 2006 on a programmatic agreement designed to manage the effects to historic properties. We request that the Corps update our office and consult with us on a revised programmatic agreement that encompasses the studies and the revised project area.

We look forward to continuing to work with the Corps on this project. If you have any questions, please contact me at (803) 896-6183 or dobrasko@scdah.state.sc.us.

Sincerely,

Rebekah Dobrasko

Rebekah Dobrasko
Supervisor of Compliance, Tax Incentives, and Survey
State Historic Preservation Office

cc: Chris Amer, SCIAA
Barbara Neal, SCDHEC-OCRM
Dean Moss, Savannah River Maritime Commission
Elizabeth Shirk, GA SHPO

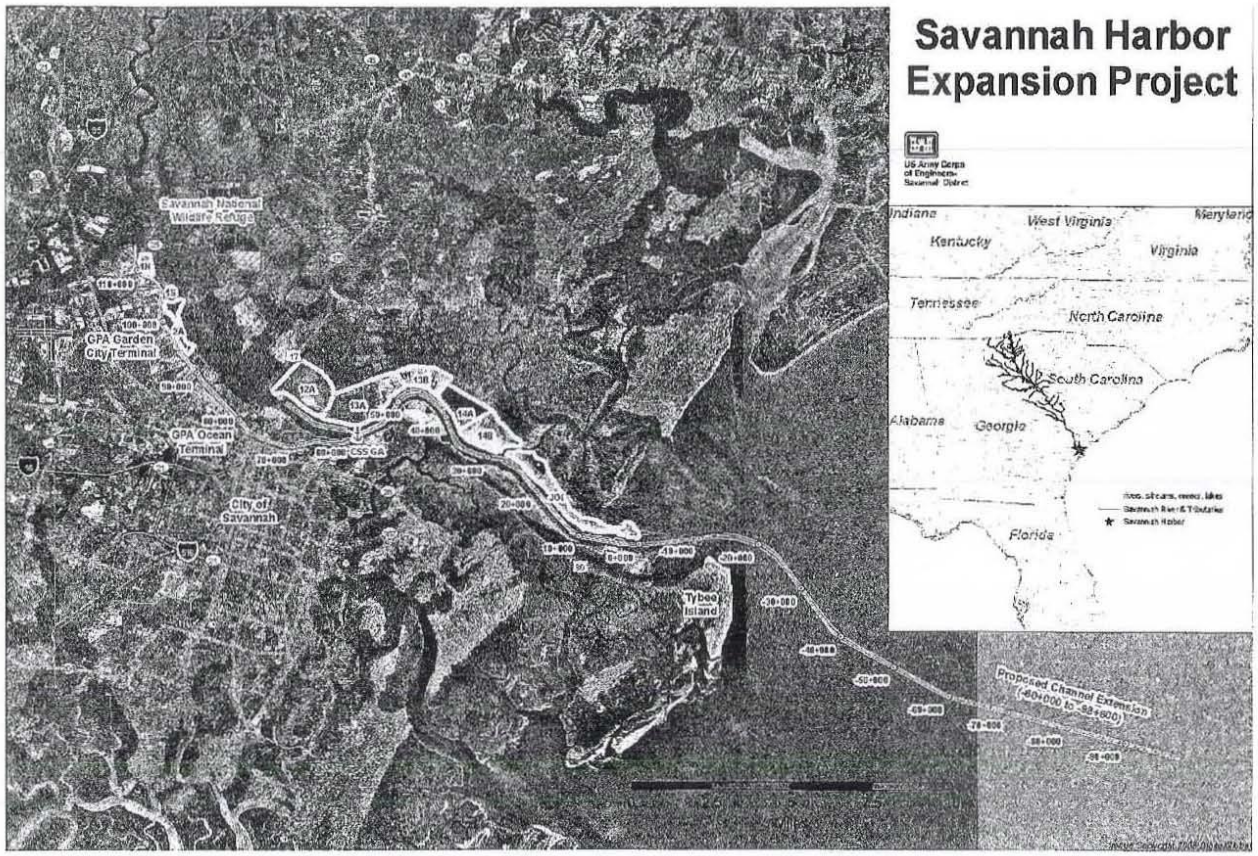


Figure 3-1. Project Area

South Carolina State Ports Authority Comments

South Carolina State **PORTS AUTHORITY**

P.O. Box 22287
Charleston, S.C. 29413-2287 USA
(843) 577-8600
Fax: (843) 577-8626

December 17, 2010

Mr. Dean Moss
Chairman, Savannah River Maritime Commission
c/o Beaufort-Jasper Water & Sewer Authority
6 Snake Road
Okatie, SC 29909

Dear Chairman Moss:

Please accept the following comments, to the Draft Environmental Impact Statement on the Savannah Harbor Expansion Project, in response to your request for input from member representatives on the Savannah River Maritime Commission.

As a co-owner of approximately 1500 acres of property in Jasper County with the State of Georgia Department of Transportation, the South Carolina State Ports Authority has certain interest in the disposition of this harbor deepening project.

The Savannah Harbor Expansion Project, if completed as currently described at either 47 or 48 Ft of depth, does not likely provide sufficient harbor depth and width necessary to make the Jasper Ocean Terminal a viable project. We now know that over 80 percent of container ship capacity on order is post-Panamax in size and will require harbors with 50 feet mean low water and unrestricted two-way ship traffic capability, such as offered by New York, Baltimore, and Norfolk today, to reliably make Panama Canal appointments. It is thus likely that investment in the Jasper Ocean Terminal would require a further harbor deepening project to be cost-justified.

If the Savannah Harbor Expansion Project is approved, the cost of dredging the 48 ft channel to the Garden City Terminal and the resultant environmental damage would make it extremely difficult if not impossible to get the additional dredging to 50 ft needed to make Jasper Ocean Terminal viable.

Additionally, if the disposal cells on which the Jasper Ocean Terminal is presently sited are used, as is currently in the Savannah Harbor Expansion Project, then this would preclude the construction of the terminal.

Since both Georgia and South Carolina have agreed to proceed with the Jasper Ocean Terminal we believe that the Jasper Ocean Terminal must be considered in the review process.

Sincerely,

Colden R. Battey, Jr.

Lowcountry Economic Alliance Comments

lowcountry
economic alliance

917 bay street, suite 207, beaufort, sc 2990
phone 843.379.0055 fax 843.379.005
www.lowcountrynet.or

January 7, 2011

Mr. William Bailey
ATTN: PD, US Army Corps of Engineers, Savannah District,
100 West Oglethorpe Avenue
Savannah, Georgia 31401-3640

Dear Mr. Bailey,
Thank you for the opportunity to review and submit comments relating to the Environmental Impact Statement (EIS) of the Savannah Harbor Expansion Project (SHEP). As the neighboring region, we certainly appreciate the significance of this project and massive scope of the work presented.

The Lowcountry Economic Alliance (LEA) is a regional economic development group jointly formed by Beaufort and Jasper counties to promote the region and create a format for evaluating and supporting projects of significance to our area.

To that, we have reviewed the SHEP EIS and specifically the Economic Impact Section and have consulted with Dr. James Kleckley of East Carolina University for additional review.

In summary, we did not find any fatal flaws in the economic analysis contained in the EIS. We can conclude from the data that the project will create a more competitive shipping environment, but the report stops short of translating that eventual cost savings into relevant economic impact data for the purpose of community stakeholder review.

The analysis does not provide us with information whereby we can determine the value of the project to our region. Additional economic review must be done in order to properly understand the economic value of this project on counties in South Carolina and Georgia.

This project is critical to our economic development efforts. The market is clearly demonstrating that to us in our business recruitment efforts. The residents of both states need to be aware of the immediate and long-term benefits.

We respectfully request your consideration of more in-depth economic analysis as we move forward with our regional partners to do the same.

Sincerely,

Kim Statler

Summary of Findings: Review of Savannah Port Studies

January 5, 2011

James W. Kleckley, PhD

This memorandum summarizes the findings of my review of an economic impact study prepared by the University of Georgia (GA Study) and an economic appendix prepared by the U.S. Army Corps of Engineers (Corps Study). I have examined these documents with respect to data, analysis, statements, and implications contained therein with respect to the impact of a proposed dredging project for the port of Savannah, Georgia (Savannah Port) on the economy of South Carolina and, in particular, Jasper County, South Carolina.

More fully described, the documents under review are:

1. The Economic Impact of Georgia's Deepwater Ports on South Carolina's Economy in FY 2009, Selig Center for Economic Growth, The University of Georgia, April 2010 (GA Study)

2. Economics Appendix: Savannah Harbor Expansion Project, US Army Corps of Engineers, Savannah District, South Atlantic Division, November 5, 2010 DRAFT (Corps Study)

Based on my review of the two studies, I did not find any "fatal flaws" in these analyses. However, the economic impacts found in the studies are either inadequate or incomplete.

I have identified several shortcomings with respect to my area of focus, which is the measurement and forecasting of economic impacts in the region that is served by and serves the Savannah Port, with particular emphasis on impacts that may occur in Jasper and Beaufort Counties and other parts of the State of South Carolina. Based on my review of these studies it is clear that neither document does an adequate job of assessing the operational economic impacts of the Savannah Port upon the South Carolina economy. The GA Study makes no attempt to measure such an impact. The Corps Study does explore the impact of port operations in Savannah, however the methodology is weak and the region of study is improperly defined. Although the latter report does include a brief discussion of planned port improvements, neither study provides insights or analyses with respect to the stimulative economic impact of construction and equipping of new port facilities that have been planned by the Georgia Ports Authority (GPA) in connection with the Savannah dredging project.

I will provide brief overviews of these documents later in this summary, but first I think that I need to explain what I was searching for in the reports.

Impact Background

I would argue that there are two types of economic impacts that can be measured in regard to a deepwater port. The first would be the Port Client/User Impacts. These impacts are best measured in terms of the trade flow generated by consignees and shippers that are dependent upon the port as a transshipment point. The second impact category is seen in measures of ongoing port operations, or activities and expenditures associated with port services and capital improvements.

These two categories of impacts go hand-in-hand. Increased trade activity associated with the port should generate more activity at the port (and more jobs). Moreover, the larger or better the port facilities, the more likely that firms will use the facilities. Again, more use translates into more activity and jobs.

A good example of a study that explored both user and operational impacts was produced by Wilber Smith and Associates for the South Carolina Ports Authority (SCPA) in October 2008. Although I have not evaluated its conclusions, I find that the approach that the report's authors took to complete a comprehensive evaluation of the impacts of a port was methodologically sound. The SCPA report also addressed substate or regional impacts, which I would argue are important with regard to understanding operations (i.e., how many workers are directly and indirectly supported by port activities) associated trade activity.

For example, if one looks at the available commuting pattern data[1] they will see that the counties of Jasper and Beaufort impact and are impacted by Chatham County, the location of the Savannah Port. We know from these data that 1,135 Beaufort residents commuted to Chatham County while the number from Jasper was 820. One would suspect that a good portion of these commuters work at the port or for service companies associated with the port. Thus, the regional impact of the business (i.e., the port) should be included in the assessment.

The Wilber Smith Study, which used IMPLAN to measure impacts, divided the State's 46 counties into six regions. The port operations are contained within the *Tri-County Region* (Berkeley, Charleston, and Dorchester Counties). Jasper and Beaufort Counties are contained within the *Lowcountry Region* along with the counties of Colleton and Hampton. As one would expect, most of the operational impacts (i.e., the jobs) are close to the port (the Tri-County Region). Still, operational impacts occur throughout the state, according to the authors. The majority of the Port User Impacts are associated with the Piedmont (i.e., Greenville, Spartanburg, and surrounding counties). This result is not unexpected, as the upstate is a principal manufacturing region of South Carolina, so this region should logically ship more goods to other areas (i.e., to other countries via the Charleston port).

The SCPA report identifies the economic activity around port operations and demonstrates how different parts of South Carolina benefit from the Authority's Charleston and Georgetown operations. In a similar fashion, an impact report addressing Savannah Port operations should include the impact upon Chatham County (GA) and its surrounding communities, including those in South Carolina. Further, and as an extension to the work done by Wilber Smith, a separate and distinct report should be generated to understand the regional impact of a large capital investment like the proposed Savannah dredging project.

(1) The Economic Impact of Georgia's Deepwater Ports on South Carolina's Economy in FY 2009

It is my opinion that the authors of the GA Study have adequately presented historical trade flows (imports and exports) from the Georgia ports to and from South Carolina. The report also appears to have relied on credible sources for the data presented. Like the South Carolina Ports report, this study uses IMPLAN to conduct the analysis. However, the focus of this study is directed solely at the trade flow component, or Port User Impact as defined in the SCPA study. There are no regional impacts

[1] The most reliable commuting pattern data currently available comes from the 2000 Census. While the numbers will change with the 2010 update, the share of commuters to surrounding counties should be fairly consistent.

defined within South Carolina, although I suspect that the authors could have produced such a report if asked. The major shortcoming of this analysis, with respect to my task, is the fact that the operational impact of the Savannah Port upon the South Carolina economy was omitted from the study. Additionally, these authors do not address any of the investment or construction activity impacts that can reasonably be expected to occur in connection with the proposed Savannah dredging project.

(2) Economics Appendix: Savannah Harbor Expansion Project

On the cover of the report by the US Army Corps of Engineers it is explicitly stated that the expansion project is in Chatham County, Georgia and Jasper County, South Carolina. However, the report ignores any economic impact that would occur in South Carolina, thereby telling me that the economic analysis is seriously flawed.

The majority of this report I will call a transportation feasibility study. In other words, the content is primarily centered on shipping and the arguments for expanding the port to capture additional cargo demand. The exception is Chapter 8, Regional Economic Impact Analysis. Here, the authors make an attempt to model the impact of operations solely within Georgia and some of its counties. The omission of South Carolina and its counties (particularly Jasper) from the analysis makes no sense if part of the capital improvements associated with the dredging project will be located in Jasper County, South Carolina. Moreover, the inadequate regional definition is not the only problem I have with the Corp's assessment.

The Corp's methodology uses a multivariate least-squares regression analysis to forecast impacts. It argues that additional tonnage at the port should generate additional income. While I agree with the correlation of activity, I feel that it is difficult to reach a reasonable conclusion about impacts in this manner due to the oversimplification that is inherent in the authors' approach. Realistically, the growth of income (or Domestic Product) should be highly correlated with additional tonnage but with variations that reflect local conditions, such as workforce make-up, availability of transportation and the presence or lack thereof of certain industries. Thus, an increase in tonnage may or may not have an impact upon the state or substate areas. The economic impacts of a project will be determined by the mix of activity within a study area – which is the reason most economists use an input-output model such as IMPLAN to measure operational impacts.

The regional impact in the Corps study is defined for Chatham and its surrounding counties in Georgia. There is an inner ring of Chatham's Contiguous neighbors (Effingham, Bryan, and Liberty) and an outer ring of the seven counties contiguous to the inner ring (Bulloch, Evans, MacIntosh, Long, Tattnall, Candler, and Screven).

It is interesting that the Corps would omit the South Carolina County that is contiguous to Chatham to the north, Jasper. Even though there is a river between the land masses, there are bridges that provide good access for transportation of people and goods between Savannah and Chatham County, Georgia,

on one side of the Savannah River and Jasper County and other South Carolina points of origin and destinations, on the other. Moreover, from a statistical point of view, it has been shown that Beaufort County (Jasper County's northern neighbor) experiences a greater employment impact from the Port of Savannah home (Chatham County) than six of the Georgia counties in Savannah's "outer ring," so there is no methodologically-sound argument for omitting Beaufort from the Corp's analysis either. In fact, given the commuting pattern data mentioned earlier, one could easily argue to include two other South Carolina counties, Hampton and Colleton, in the Corp's report. It is noteworthy that Standard & Poor's cites the importance of the Savannah economy to the credit of Jasper County in its rationale for the ratings of Jasper's bonds (Standard & Poor's).

Summary and Conclusion

From this economist's point of view, the inherherent weaknesses of data, scope and analytical focus contained in the two reports make it impossible to obtain a reasonable understanding of the economic impact of port operations at Savannah on the affected communities from a reading of either document. As mentioned at the beginning of my review, I do not believe that either the GA Study or the Corps Study has done an adequate job of assessing the operational economic impacts of the Savannah Port or the construction and installation-related economic impacts of the planned dredging-dependent port facilities improvements at Savannah. I do believe that the University of Georgia study, The Economic Impact of Georgia's Deepwater Ports on South Carolina's Economy in FY 2009, does a reasonable job of exploring existing trade patterns with South Carolina, but does not take this analysis to the level of providing an adequate economic impact analysis and conclusions with respect to impacted communities on the South Carolina side of the Savannah River.

The Corps Study makes an attempt to look at the regional impact of the dredging project. However, I believe that the methodology is weak and that the regional definition is inappropriate – especially given the fact that the Savannah Port expansion will physically affect Jasper County. Additionally, any impact model should include the impacts of capital investment. Although Section 3 of the Corps Study contains a description of planned improvements that go hand-in hand with the proposed dredging project, there is no discussion of the stimulative economic impact of such investments in that document or the impact on the tax bases of the impacted South Carolina communities.

I have several suggestions for the modeling improvement by assessing the impact of Port Operations.

1. Produce a stand-alone construction impact analysis. While the Corp's report includes a brief mention of capital investment and improvement, these aspects of the expansion of the port demand a separate study. Because the footprint of the planned port expansion improvements will include Jasper County, it is extremely important to correctly include Jasper in the analysis. One should note that the direct construction impact will be short lived. That is because when the construction is completed, the construction workers on the project will go work elsewhere, and no additional direct construction impact will ensue. (Additional construction-related impacts that result from the new and expanded port will be realized over a number of years. These impacts should be included below in the second suggestion).

2. Produce an on-going operational impact analysis. This type of analysis was performed by Wilber Smith in its analysis of South Carolina Port operations. Since Chatham County sits on the South Carolina state line and we know workers already commute from South Carolina to jobs in Savannah and Chatham County, one would expect that the appropriate analysis would include

the impact upon South Carolina counties from expansion of port operations at Savannah. Further, and importantly, this analysis should be explored over a number of years. In addition to the current impact, the impact following construction of new and expanded services should be assessed within the on-going impact modeling scheme.

3. Use IMPLAN (or another input-output type model) to assess the impacts noted above. These models, which directly incorporate the industrial structure of the regions within their structure, include direct and indirect effects in the analysis. The indirect effects (which also are often called induced effects) take into account the spending of households and secondary industries. And importantly, the properly defined regional impact in any model should include (at a minimum) the South Carolina counties of Jasper and Beaufort.

In summary and with respect to South Carolina and Jasper County, I believe that the Savannah Port operations currently have an important economic impact upon these areas. While the studied reports did not address these impacts, guidance as to what could be achieved in one or more thorough studies of the economic impact of the Savannah Port dredging project and port expansion can be seen in a number regional economic impact studies that are readily available in the public domain. A common feature of these reports, several of which I have reviewed in connection with the preparation of this summary, is that they credibly demonstrate that the affect of expansion by a large employer upon a contiguous region would be substantial. Additionally, many of the data that I have reviewed indicate that a major construction project should have a substantial stimulative impact upon the construction industry in both Jasper and Chatham Counties – even though these neighbors are in two different states. And, given the current depressed state of the construction industry, the dredging project should be a godsend for the unemployed/underemployed construction workers, whose services can be expected to be required in connection with the construction and installation of the improvements listed in Chapter 8 of the Corps Study. The extent of the impacts that I have discussed here can only be measured within the framework of a properly defined economic impact study that, to my knowledge, has yet to be undertaken.

References

The Economic Impact of Georgia's Deepwater Ports on South Carolina's Economy in FY 2009, Selig Center for Economic Growth, The University of Georgia, April 2010.

Economics Appendix: Savannah Harbor Expansion Project, US Army Corps of Engineers, Savannah District, South Atlantic Division, November 5, 2010, DRAFT.

South Carolina State Ports Authority Economic Impact Study, Prepared for the South Carolina State Ports Authority, Wilbur Smith Associates, Inc., October 2008

Summary: St. Peter's Parish/Jasper County, Public Facilities Corp., South Carolina; General Obligation; Note, Global Credit Portal, Standard & Poor's, June 23, 2010.

Journey to Work and Place of Work, Census 2000, US Census Bureau.

IMPLAN, MIG, Inc., Hudson, WI.

Lowcountry Office of Government, Planning Department Comments

Ginny Kozak
12/10/10
LCOG

Review: Savannah Harbor Expansion Project—Draft GRR

Introduction

These brief comments will concentrate only on the Grant Re-Evaluation Report, especially Section 12, "Uncertainty Considerations." They will deal with land transportation and economics because those are the two areas in which the LCOG Planning Department has expertise and experience.

In those areas, it seems that some key subject areas are either not addressed, or addressed unconvincingly.

Competition

I could find nothing in the document that addresses the competition among Southeastern US ports to provide docking facilities and services to the upcoming generation of very large ships that will be coming through the enlarged Panama Canal in approximately five years. This is a very important consideration for the Lowcountry Region's economic future. If one of the other key competitors (namely Norfolk, Miami or Jacksonville) beats an enlarged Savannah and/or new Jasper County port to the "punch," it will have an adverse effect not just on future economic growth but also on existing economic conditions.

Interestingly, on Sunday, December 12, the *New York Times* had an article in the Business section about the proposed Savannah deepening and expansion and the competition. http://www.nytimes.com/2010/12/12/us/12port.html?pagewanted=2&sq=PortofSavannah&st=Search&scp=1

The article implies that Charleston is not even in the running.

At the SRBAC meeting last week, consultant William Bailey seemed unfamiliar with this matter when asked about it.

Land Transportation as a Growth Limitation

I could also find no mention of the fact that at the current time one of the major inhibitors on expansion of the Port of Savannah is the road network (it is definitely NOT a system) that serves the port's operations. Trucks pulling the larger containers directly off the ships to the import distribution centers located within five miles of the port's gates have no choice but to travel on an old street and road network built to handle the residential and commercial traffic of at least 30 years ago. As a result, it is both inconvenient and unsafe for the trucks and also for the people who still live in the small homes along the streets. Passenger vs. freight conflicts are a problem.

As well, there are freight train grade crossings that hold up other both cars and commercial truck traffic near the port.

The Savannah MPO reports that they are working on plans to alleviate some of the problems, but the investment that will be required is extremely large, and no commitments for funding have been made at any level of government. In addition to the financial costs, adding new highways will result in residential and small commercial dislocation and relocation, which will likely be considered environmental justice issues.

This was another subject that the consultant admitted he knew nothing about.

Economic Analysis

I assume that the Economic "Uncertainty" analysis in the report represents only the summary of all the work done, but I could not find the economic and marketing justifications, sources of data or assumptions used in their sensitivity analyses. While I also assume that the model that they used is a reliable one, the results are only as credible as the data and the assumptions that serve as input. Therefore, I have a lack of confidence in the consultants' economic analysis. This was increased at the SRBAC meeting when the consultant responded to a question about the economic impact of the port expansion on South Carolina, saying, "The only thing I can think of is that it will keep consumer prices low."

Savannah River Maritime Commission

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760-JK-400-EV01
Comment: *CEQ NEPA Regulations (1502.13) require that the section on Purpose and Need "specify the underlying purpose and need to which the agency is responding in proposing the alternatives including the proposed action." The DEIS section on Purpose and Need describes existing conditions and presumed benefits of the proposed action, and is vague on whether these individually or collectively comprise the underlying purpose and need. There is no clear statement of the proposed action's purpose and need.*

Response: EIS-Section 2 clearly describes the project's purpose and need.

760-JK-400-EV02
Comment: *CEQ NEPA Regulations (1502.14(a)) require that the proponent agency "rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated", The DEIS section on Alternatives evaluates no "build" alternatives other than deepening the channel to Garden City (i.e. no other locations for a marine terminal were given serious consideration). There is no discussion of alternatives that were eliminated from detailed study, and no reasons are given for their elimination.*

Response: The Corps has satisfied its obligations under NEPA and the CWA to consider reasonable and practicable alternatives. The SHEP NEPA alternatives analysis ranged from considering other potential options or sites for the project, including other South Atlantic ports, to evaluating potential specific locations for disposal of dredged or fill material along Savannah Harbor and in the Atlantic Ocean along the entrance channel. The SHEP NEPA alternatives analysis is found in various places in the EIS and GRR, including EIS Section 2.0, Purpose and Need for Action; EIS Section 3.0, Alternatives; EIS Appendix H, Section 404(b)(1) Evaluation (Practicable Alternatives); EIS Appendix O, Formulation of Alternatives; GRR Section 6, Formulation of Alternatives; various other sections in the GRR; GRR Appendix A, Economics; GRR Appendix A, Attachment 6 (Regional Port Analysis); GRR Appendix A, Attachment 4 (Multiport Analysis); and GRR Appendix D, Plan Formulation Appendix.

The SHEP NEPA alternatives analysis includes the following key elements: (1) the statement of project purpose and need (EIS Section 2.0); (2) a Regional Port Analysis (GRR, Appendix A, Attachment 6); (3) a Multiport Analysis (GRR, Appendix A, Attachment 4); (4) analysis of various structural and non-structural alternatives (EIS, Section 3.0; GRR, Appendix D); (5) analysis of deepening to eight alternative locations or sites for a port/terminal along the Savannah River (EIS, Section 3.0 and Appendix O; GRR Section 6 and Appendix D); (6) analysis of six different depths of harbor deepening along the Savannah River (EIS, Section 3.0 and Appendix O; GRR, various sections); (7) analysis of alternative disposal sites, methods, or beneficial use of dredged sediments (EIS, Section 3.01.1 and 3.07); (8) analysis of related maintenance dredging requirements (EIS, Section 3.08-3.10); and (9) analysis of the no-action alternative (EIS, Section 3.01.1and Appendix O; GRR Section 6.12.1).

In addition, the Corps considered practicable alternatives under the Clean Water Act (CWA), as explained in EIS Appendix H, 404(b)(1) evaluation. The practicable alternatives analysis was largely co-extensive with the SHEP NEPA alternatives analysis.

Although NEPA requires that all reasonable alternatives be evaluated, it does not require detailed study of options eliminated early in the planning process. As described in various places in the EIS/GRR, the Corps considered numerous potential alternatives and methods [structural/nonstructural] to address the project purpose and need. The evaluations were conducted in accordance with criteria established by the Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies (U.S. Water Resources Council, 1983) and the policies and procedures established by ER 1105-2-100, Planning Guidance Notebook [April 22, 2000].

Alternative terminal locations were determined and then evaluated. Sites in Georgia and South Carolina within the environs of Savannah Harbor, as well as more remote locations [Brunswick, GA] were examined. The District assessed three locations in Jasper County, SC that were being considered for a "Jasper Terminal". Modifications to the existing harbor (meeting areas, bend wideners, aids to navigation, etc.) were also reviewed.

The analyses conducted in these early stages of project formulation resulted in several conceptual alternatives being eliminated from further consideration. The District prepared a document that described this work and its conclusions (Formulation of Alternatives, May 2005, Appendix O). It was circulated to interested state/federal agencies as well as the public for review/comment. Four terminal locations were judged as having either MEDIUM or HIGH potential and were compared on their economics (including mitigation costs). When the landside development costs are included, deepening to the Garden City Terminal proved to be the most cost effective. The next site option was 45 percent more expensive. Therefore, the Garden City Terminal was the only option [along with no-action] considered in the detailed evaluations.

760-JK-400-EV03

Comment: *Section 1502.14 of the CEQ NEPA Regulations states that the Alternatives section of the DEIS "should present the environmental impacts of the proposal and the alternatives in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decision-maker and the public". This is not done.*

Response: GRR-Section 11 contains a system of accounts' analysis, which was used to identify and compare the impacts of the alternatives, including the no-action plan. A reference to this system of accounts' analysis will be added to the beginning of FEIS-Section 3.00. Additionally, [EIS-Section 3.03] Tables 3-7 and 3-8, "Summary of Project-Related Impacts Without Mitigation" and Summary of Project-Related Impacts with Mitigation" include a comparison of hydrodynamic-related impacts (with and without mitigation) to numerous resources for each of the subject alternative harbor depths. EIS-Section 5 contains numerous tables that show the environmental impacts of the various alternatives considered. These tables clearly show the potential impacts of the proposed project with and without mitigation.

760-JK-400-EV04

Comment: *In the Introduction to the 2010 General Re-Evaluation Report (GRR) it states that "the Panama Canal Expansion Project will be fully operational by 2014, which will allow passage for vessels with up to 50 feet of draft. The Georgia Ports Authority has planned and funded improvements at Garden City Terminal to coincide with the Panama Canal Expansion Project." Would the GPA be making this major investment in the Garden City Terminal if it were concerned about the risk of some other alternative (perhaps a different Terminal site) being proposed in the DEIS?*

Response: Savannah District believes that GPA will expand the GCT to 6.5 million TEUs/annually by about 2030, regardless of whether the Savannah Harbor navigation channel is deepened. This capacity [6.5 million TEU] is the maximum number of containers that could reasonably be processed based on the size of the terminal, the number of gates that provide access to the property, the number and size of the berths, the number and size of the container cranes, the number of jockey trucks that move the containers within the terminal, how the containers are stacked within the terminal, the number of railroads that service the terminal and the frequency of their trains. It is projected that without deepening, more vessels will be required to transport the cargo expected to call at the port. With deepening, the total number of vessels would decrease (when compared to without project condition) as vessels would be able to load/unload without the current constraints of draft.

: The Georgia Ports Authority (GPA) has embarked on a 10-year capital improvement program to increase container capacity at the Garden City Terminal (GCT) to a maximum capacity of 6.5 million TEUs annually by the year 2020. This program includes equipment purchases and upgrades, transportation infrastructure improvements, and container area expansion. The GPA capital improvement program is not tied to deepening the navigation channel, but instead is based on projected growth in volume of shipping traffic in the South Atlantic region over time.

The improvements to the Garden City Terminal and associated highway infrastructure have been ongoing for some time independent of the SHEP studies and preparation of the EIS.

760-JK-400-EV05

Comment: *The DEIS states that the Harbor Expansion Project will likely result in impacts to over 1,200 acres of tidal freshwater wetlands, marc than 1,000 acres of brackish water wetlands, and several acres of tidal saltwater wetlands. Mitigation (by rerouting freshwater flow from adjacent streams and offering to purchase and preserve more than 2,000 acres of existing wetlands) is estimated to reduce the permanent wetlands impacts to 330 acres of freshwater wetlands and 730 acres of brackish water wetlands. The re-routing of freshwater flow would have its own impact (which may be significant) on the environment and this impact was not evaluated in the DEIS. Further, the use of preservation (for wetlands that are under no current threat of development) as mitigation for the permanent loss of hundreds of acres of wetlands is inconsistent with Federal "no net loss" policy.*

Response: Re-routing freshwater flow was evaluated [comprehensively] as part of the hydrodynamic studies conducted for the harbor deepening. The studies included the assessment of numerous potential alterations to water flow (brackish and freshwater) within the estuary. The District analyzed a total of 38 modifications at seven locations [Figure 3 of Appendix C – Mitigation Planning]. Natural resource agencies reviewed initial modeling results [July 2006] and identified those revisions which should be pursued more thoroughly.

As detailed in other agency responses and the EIS, deepening the harbor to a 47-foot operating depth would convert 223 acres of freshwater marsh to its brackish marsh counterpart. It is important to note that many of the emergent plant species associated with these freshwater marsh systems would still be readily observed in environments then defined as brackish marsh (Latham et. al., 1994). A comparison of wetland function elements for freshwater marsh versus brackish marsh indicates that there are only negligible differences with respect to water purification, flood protection, shoreline stabilization, groundwater recharge, stream flow maintenance, retention of particles, surface water storage, subsurface storage, nutrient cycling, and values to society.

Likewise, the 47-foot operating depth [with mitigation] could eventually convert 740 acres of saltmarsh communities to brackish marsh. Once again, dominant saltmarsh species like *Spartina alterniflora* would still be observed in areas which have salinities that would define them as brackish marshes. However, the overall basic wetland functions typically associated with these systems would not change. A comparison of potential changes in wetland function for both conversion scenarios is provided below.

Changes in Wetland Function as a Result of Wetland Conversion

Elements of Wetland Function	Freshwater to Brackish Marsh (Approximately 223 acres)	Saltmarsh to Brackish Marsh (Approximately 740 acres)
Water Purification	Negligible	Negligible
Flood Protection	Negligible	Negligible
Shoreline Stabilization	Negligible	Negligible
Groundwater Recharge	Negligible	Negligible
Stream flow Maintenance	Negligible	Negligible
Retention of Particles	Negligible	Negligible
Surface Water Storage	Negligible	Negligible
Subsurface Storage	Negligible	Negligible
Nutrient Cycling	Negligible	Negligible
Values to Society	Negligible	Negligible
Fish and Wildlife Habitat	Minor Adverse	Negligible

As illustrated above, the only indirect effect the 44-foot project would have on the function of these wetlands systems would be associated with fish and wildlife habitat values. All other elements of wetland function associated with predicted shifts in wetlands categorization would be negligible as a result of the anticipated increase in salinity. Previous studies have noted that areas of the Savannah Harbor identified as saltmarsh or brackish marsh often support similar fish and wildlife assemblages. Any anticipated conversion of saltmarsh to a brackish marsh system is expected to have a negligible impact on the overall wetland functioning from a long-term perspective. The District recognizes that a comparison of fish and wildlife habitat between freshwater and brackish marsh systems yields fewer similarities, but this difference would still be quantitatively minor.

The proposed preservation lands consist of various community types, viz., bottomland hardwoods, maritime forest, and uplands dominated by deciduous forest and re-growth. The bottomland hardwoods are categorized as palustrine, forested, broad-leaved deciduous systems that are both temporarily and/or seasonally flooded. Preserving these areas would ensure this wildlife habitat is preserved in perpetuity. Moreover, the additional lands would buffer the Savannah National Wildlife Refuge from future threats of development. Hence, changes in land use would not occur immediately adjacent to existing areas of the Refuge that do contain emergent wetlands. The acquisition/preservation of wetland and upland buffer would provide a functional replacement for the minor conversion of the only wetland function [fish and wildlife habitat] that would be expected when freshwater marsh converts to a brackish counterpart. Based on these determinations, the District's functional assessment concluded that the noted preservation satisfies the intent of the no-net-loss of function criterion.

All adverse impacts to tidal freshwater marsh would occur in the State of Georgia. With the flow diversion measures in place, the State of South Carolina should experience an area increase in tidal freshwater marsh along Little Back River in the vicinity of the SNWR.

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760-JK-400-EV06

Comment: *The DEIS contains a paucity of information about impacts to essential fish habitat or how the project will impact essential fish habitat from a fish accessibility perspective. Instead the DEIS focused on the mitigation of essential fish habitat in the majority of the discussion. The lack of detail on the impacts or consideration of realistic options that would avoid the impacts suggests that the "full disclosure" intent of NEPA may not have been met.*

Response: EFH is discussed in EIS-Sections 4.05 and 5.14. Also EFH is discussed in more detail in Appendix S, which is referenced in EIS-Sections 4.05 and 5.14.

760-JK-400-EV-07

Comment: *Extensive areas of essential fish habitat will be lost because of the project. The mitigation of essential fish habitat through the restoration of inaccessible marsh habitats or the purchase of woodland does not provide adequate replacement for the essential fish habitat.*

Response: EFH discussions cover much more information than indicated in the comment. EFH is addressed in EIS-Sections 4.05 and 5.14. EFH is also discussed in more detail in Appendix S, which is referenced in EIS-Sections 4.05 and 5.14.

760-JK-400-EV08

Comment: *Regarding Shortnose sturgeon, a federally-listed Endangered Species, the Corps conducted a preliminary review of the 2001 fishway design and confirmed that conditions had not changed that would reduce its effectiveness or implementability. Does the Corps have documentation that Shortnose sturgeons have used fishways in the Savannah River, or any other river of similar characteristics?*

Response: The Shortnose sturgeon has not been documented using constructed rapids fish ways for the simple fact that there are none within this species' current geographic range. However Lake sturgeon have been observed negotiating both constructed and natural rapids [entire river width] in the upper mid-west [US]. Some were observed at more shallow water depths than would be the case [3.5 to 5.5 feet] for the fish passage at the New Savannah Bluff Lock and Dam (Aadland 2010). Since the Lake sturgeon is a larger species than the Shortnose, the latter should have little difficulty [physically] passing the constructed fish bypass.

760-JK-400-EV09

Comment: *There was a lack of discussion and a lack of recent evaluation of the project's impacts on commercial and non-commercial pelagic and benthic invertebrates. In that this trophic level serves as the base of the food chain, more analysis is needed to determine the impacts on these resources.*

Response: DEIS-Section 4.12 discusses recreational/commercial fishing, while DEIS-Section 5.17 explains the project's impact[s] on these activities. Shellfish harvesting areas (figure 4-3), spawning sites of Black Drum, Weakfish, and Spotted Seatrout (figure 4-4), spawning seasons of Spotted Seatrout, Red Drum, Weakfish, and Black Drum are shown in the documentation. Habitat locations of American shad, Southern flounder, Stripped bass, and Shortnose sturgeon are provided in DEIS-Section 5. DEIS-Sections

4.04 and 5.07 discuss impacts to marine and estuarine resources. DEIS-Section 4.05 and 5.14 [essential fish habitat] discuss these same issues in more detail.

Originally, dredged sediments would have been placed within the nearshore of Tybee Island and adjacent to the deepened channel as depicted in Figure 3.2. However, the State of Georgia expressed concerns with this proposal; so the subject excavated material would now be placed either in existing upland disposal areas and/or the EPA approved ODMDS. As stated in the EIS : *Commercial and sport fishing within Savannah Harbor is low due to heavy vessel traffic levels and high shoaling rates which limit benthic communities and requires recurring maintenance dredging.*

The proposed action would primarily take place within the confines of the existing navigation channel. Moreover, all sediments dredged from the entrance channel would be placed either within the upland CDFs and/or the ODMDS. Therefore, any adverse impacts to commercial or non-commercial fish [shell/fin] and/or benthic invertebrates would not be significant.

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760-JK-400-EV10

Comment: *Some of the conclusions made in the documents were sound; however, many were based on unsubstantiated claims. In some cases conclusions were based on existing conditions without determining the impacts of the proposed conditions. Comparisons were made between alternatives which were not the proposed alternative, while ignoring differences in impacts between the existing condition and the proposed alternative. Data which could be used to allow peer review of some of the models was missing or omitted. Some conclusions were based on incomplete models and impacts to some resources were not determined because they were not under the scope of the current study. It remains unclear whether impacts to these resources were determined. Finally, none of the studies examined the impacts resulting from the use of Generation 2 post-panamax vessels within the deepened channel.*

Response: These are general comments that will be addressed later in the responses to the more specific comments (on the same subjects) received by SRMC.

760-JK-400-EV11

Comment: *The documentation does not clearly quantify the impacts to the Confined Sediment Placement/Disposal Facilities, City Front, Ft. Pulaski, and Tybee Island. The conclusions drawn from these studies have not been substantiated and continuation of the NEPA process without disclosing the potential impacts to these resources would be in error.*

Response: The CDFs are existing sediment disposal areas and the recurrent impacts they receive have already been addressed in previous NEPA documents. The District is working with the Georgia Department of Transportation to extend the useful life of these dredged material placement areas [EIS-Section 3.01.1]. As an overall strategy, beneficial uses are sought for the dredged sediment to (1) reduce the ultimate storage volume required for existing sites, and (2) increase secondary benefits resulting from beach disposal or habitat creation. Impacts [or the lack thereof] to Fort Pulaski and Tybee Island are addressed in EIS-Section 5.09. There would be no channel widening in the vicinity of the City Front, therefore impacts are not expected to be measureable in that area.

760-JK-400-EV12, 760-JK-400-EV13

Comment: *The DEIS lacked information that is critical to make an assessment on listed and candidate species, did not substantiate its determination of non-significant impacts when adverse impacts were acknowledged, and often relied upon unsubstantiated assumptions and conclusions to make its determinations. If the assumptions and conclusions were based on peer-reviewed or project related studies, the DEIS should cite that source as a basis upon which the assessment occurred.*

Response: The evaluation of project impacts on threatened and endangered species is in compliance with ESA [see FEIS-Sections 4.09, 5.11 and Appendix B].

The discussion on threatened and endangered species is in compliance with ESA [see FEIS-Sections 4.09, 5.11 and Appendix B]. All appropriate citations have been added to the FEIS including Appendix B.

760-JK-400-EV14, 760-JK-400-EV15, 760-JK-400-EV16

Comment: *The shortnose and Atlantic sturgeon are examples of the incompleteness of the assessment. Shortnose sturgeon and Atlantic sturgeon were grouped together for purposes of assessing impacts from the project. The DEIS justifies the grouping due to their "similarities in habitat use, distribution throughout the proposed action area, foraging behavior and prey base and subsequent risk of take relative to dredging and trawling operations ... " No citations or other reference information was provided to substantiate this decision to group the species. Other information provided in the DEIS provides information that contradicts the claim that the species are similar enough to group together for impact assessment purposes. For example, the narrative states that Atlantic sturgeon primarily lead a marine existence and are therefore more likely to be impacted by hopper dredges than the more estuarine-based shortnose sturgeon. The document states that shortnose sturgeon spawn 100 miles upstream of the project area, but also states that an Atlantic sturgeon larva was found 6.7 km (4 miles) upstream of the project impact area. This information not only suggests that shortnose and Atlantic sturgeon spawn in different areas, it also highlights the possibility that some larva may drift into the project area and may be affected by the upstream increases in salinity that would occur as a part of this project. Additional information should be collected to verify the actual location of Atlantic sturgeon spawning to ensure the project dredging and upstream movement of salinity and decreases in DO will not deleteriously impact Atlantic Sturgeon.*

Response: The Shortnose and Atlantic sturgeon can be grouped together based on their similarities in habitat use, distribution throughout the proposed action area, foraging behavior, prey base, and subsequent risk of take in the course of dredging and trawling operations. Information on these species can be obtained from the following link. http://sero.nmfs.noaa.gov/pr/sturgeon.htm

The District recognizes there is not a complete overlap in the habitat, distribution, foraging behavior, and prey base of these two species. However, there are substantial similarities between these two species in their habitat use, distribution throughout the proposed action area, foraging behavior, and prey base. Potential impacts to both species from hopper dredges are addressed in the EIS-Appendix B.

With the proposed mitigation, NOAA determined that the project would have acceptable impacts on both Atlantic and Shortnose sturgeon. The BO in Appendix Z provides reasonable and prudent measures to be implemented for SHEP to protect these species.

In addition to information presented in the EIS, an extensive five-year monitoring study on the Atlantic and Shortnose sturgeon is being conducted in the southeastern US. It is being funded by NOAA and began in the spring of 2011. The work in the Savannah River segment is being conducted by SC DNR. http://www.nmfs.noaa.gov/pr/conservation/states/funded.htm. NOAA and the Corps will consider the new information as it becomes available.

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760-JK-400-EV17, 760-JK-400-EV18, 760-JK-400-EV19

Comment: *The impact summary to the Essential Fish Habitat in Appendix S, acknowledges that the proposed action would have adverse impacts on shortnose sturgeon, an endangered species. Nonetheless, the text dismisses the adverse impacts as non-significant without providing sufficient detail as to how the non-significant status had been applied. Over 400 acres of habitat is expected to be lost to the shortnose sturgeon alone. Moreover, the lost habitat may have been underrepresented by the modeling. For example, a baseline level of 3.0 to 4.0 mg/l of dissolved oxygen was used to determine if habitat was available for shortnose sturgeon. This is a minimum level at which the agencies determined shortnose sturgeon can survive, but does not necessarily indicate the dissolved oxygen level that is necessary for foraging, resting, and moving. For example, the Collins et al. (2001) study of shortnose sturgeon habitat use cited in the DEIS, reported minimum mean dissolved oxygen levels of 6.36 and 6.45 in areas where adults and juveniles were found, respectively. In the Appendix N documentation, Prescott Brownell, from NMFS requested that a range of suitable habitat thresholds be used for modeling habitat availability. The agency panel then redacted his comments from the record without providing an adequate basis for the redaction. The panel decided the current methods were "acceptable for now." This comment would suggest that additional work would be necessary in the future in order to adequately asses the impacts. The narrative does not provide adequate discussion as to why the pass/fail approach was more adequate than the range approach suggested by Mr. Brownell.*

Response: This section is only a summary and is not intended to provide detailed information. The particulars of this issue are provided in the body of EIS and Appendices B, C, and S.

The observed dissolved oxygen values of 6.36 and 6.45 mg/l are just that, observed values, not life requisites. The values used by the Corps were those recommended by the Fisheries Interagency Coordination Team as defining acceptable habitat for SNS.

Mr. Brownell's comments have not been redacted from the record. In fact, they are still available for inspection, if desired, as evidenced by your comment. The Fisheries Interagency Coordination Team considered Mr. Brownell's comments, but decided not to recommend them to the Corps for use. NOAA Fisheries did not separately request that information when they provided their agency comments on the Draft EIS.

760-JK-400-EV20, 760-JK-400-EV21

Comment: *A number of the state-listed sensitive species were dismissed from further discussion without sufficiently detailed information to determine if any impacts would occur and how impacts would be avoided. As an example, the DEIS often stated that sediment deposition would be conducted in a manner to not interfere with nesting of various sensitive species. There was no detail provided to substantiate this claim. There was DO monitoring plan cited nor detailed deposition plan cited to document that the sensitive species will be avoided. Modification of presently licensed or future licensed disposal areas will require endangered species review in with a sufficient level of detail to ensure impacts will be avoided.*

Moreover, other sensitive species were dismissed because they were not known to exist in the project area even when habitat existed that may support the species. If the habitat requirement is similar to what is found in the estuary, then surveys should be conducted in impact areas to demonstrate absence from the habitats. It is impossible to determine impact without knowing whether or not it exists in the impact areas.

Response: State-listed sensitive species have ecological value, but since they are not federally listed as threatened or endangered species, a detailed survey was not conducted [limitations of scope/documentation]. In addition, all areas that would be physically impacted during deepening (CDFs, ship channels) have been previously/routinely disturbed and are not likely to harbor extensive populations of sensitive species. The Corps would continue its routine monitoring of its sediment deposition operations in the confined disposal facilities during the spring nesting season.

As required under the Endangered Species Act, the District continues to coordinate with the National Marine Fisheries Service and US Fish and Wildlife Service on all aspects of the proposed project. Threatened and endangered species compliance [ESA] is discussed in Sections 4.09, 5.11 and FEIS-Appendix B. The report of the US Fish and Wildlife Service for species for which they have responsibility and the Biological Opinion prepared by the National Marine Fisheries Service are included in Appendix Z.

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760-JK-400-EN01, 760-JK-400-EN02

Comment: *Regulatory officials from both South Carolina and Georgia agree that future pumping from the Upper Floridan aquifer must decrease in order to limit the impacts of salt-water intrusion in the coastal area. A recently-released GAEPD document entitled Coastal Georgia Water and Waste Water Permitting Plan for Managing Salt-Water Intrusion (2006) indicates that Georgia will reduce withdrawals from the Upper Floridan aquifer by 5 MGD by the end of 2008; therefore keeping the pumping rate constant provided a conservative assessment of future ground-water production in the area.*
Has groundwater use in the Upper Floridan aquifer decreased in Georgia and South Carolina as assumed in the model and analysis?
Did groundwater withdrawals from the Upper Floridan aquifer decrease by at least 5 MGD between 2006 and 2008 in Georgia?

Response: According to USGS data (USGS SIR 2009-5251), groundwater withdrawals from the Upper Floridan aquifer in the "Red Zone" counties of Chatham and Effingham in Georgia, and Beaufort and Jasper Counties in South Carolina [2000/2004] were as follows [high/low in mgd]:

Chatham	68.15 / 67.00
Effingham	4.62 / 6.85
Jasper	3.34 / 2.65
Beaufort	21.44 / 19.74

Data from the City of Savannah [city wells only] indicate that withdrawals from 2005 through 2010 have remained fairly constant [from 23.5 to 25.5 mgd].

Data for the Upper Floridan [2006-2008] for the Georgia "Red Zone" was unavailable.

760-JK-400-EN03

Comment: *Groundwater use trends and restrictions by GAEPD are discussed in various sections of the GRR and supporting appendices. There appears to be a lack of corresponding discussion on groundwater use and restrictions by SDHEC in South Carolina.*

Response: According to the annual South Carolina Water Use Reports [2001- 2009], groundwater withdrawal in Beaufort and Jasper Counties has remained rather steady. Namely, Beaufort County had a high of 6.9 billion gallons [2001], a low of 5.9 billion gallons (2005), and an annual average of 6.4 billion gallons. Over the same period, Jasper County had a high withdrawal of 1.09 billion gallons [2007], a low of 706.6 million gallons [2004], and an annual average of 903.6 million gallons. This would put the low for Beaufort County at about 16 mgd and the high at about 19 mgd. The low for Jasper County is about 1.9 mgd and the high at about 2.5 mgd.

Beaufort, Jasper, Hampton, and Colleton Counties in South Carolina comprise the *Low Country Capacity Use Area*. In order to regulate groundwater withdrawals in the capacity use areas, any withdrawal greater than or equal to 3 million gallons in **any** month requires a permit from SCDHEC.

760-JK-400-EN04

Comment: *While the overall conclusion that the impacts to groundwater are not expected to be significant appear reasonably well substantiated, quantifying the increased flow through the confining unit to 3-4% does not appear to be well substantiated given the uncertainty in leakage though this unit.*

Response: The intent of groundwater modeling was to bracket a range of vertical hydraulic conductivities which would produce a '*best fit*' with observed/ simulated groundwater heads [and gradients] on a calibrated USGS groundwater scale. Notably, simulated migration of chlorides through the Miocene confining layer appeared to be most sensitive to the vertical hydraulic conductivity assigned to the clay layer. After deliberation, a range of vertical hydraulic conductivity [which *best-fit* actual data] was chosen. As verification, both lower and higher conductivity values produced unrealistic heads and chloride concentrations when compared to actual data. [As discussed in the General Re-Evaluation Report for SHEP, Appendix C: Engineering, Supplemental Studies, Potential Ground-Water Impacts to the Upper Floridan Aquifer, June 2007]

Applying the derived range of vertical hydraulic conductivities to the proposed deepened channel length would yield an increase of 3 to 4% vertical flow through the confining clay unit. Importantly, this increased flow applies **only** to the confining unit below/along the actual width of deepened channel. The increased flow would be insignificant when compared to the much larger horizontal flow in the aquifer.

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760-JK-400-EV22

Comment: *Acquire but not use a permit from the State to withdrawal fresh water from the Upper Floridan aquifer.*
Reduce pumping of groundwater by acquiring - but not using – permitted rights from industries to remove freshwater from the Upper Floridan aquifer.
These potential mitigation measures, in particular the last two, have significant ramifications on water use in the region by reducing overall water availability. The ability to acquire permitted rights in Georgia and presumably South Carolina, including existing permitted rights without replacing them with an alternate source raise significant questions regarding the viability of these conceptual alternatives.

Response: The potential mitigation alternatives referred to in the comment were *conceptual*, as noted in the preceding paragraph of the GRR. As demonstrated later in the GRR-Section 9 and EIS-Section 5, the impacts to the aquifer are minimal and do not warrant mitigation.

760-JK-400-EN05

Comment: *Available input data relating to chloride/salinity changes over tidal cycles and over cross-sectional areas of critical river reaches appear to be sparse to absent. There is reference to proposed or on-going chloride / salinity monitoring, however these does not appear to be any detail on this monitoring effort. Given the highly stratified nature of the chloride distribution in conjunction with tidal effects, understanding the temporal and spatial distribution throughout the estuary may prove critical to evaluating peak chloride levels at the Abercorn Creek intake. Clarification on the existing data and any proposed monitoring would be useful in evaluating potential future impacts at the intake.*

Response: Additional data are included in the final report. From information collected to date, it appears that chlorides do not stratify in the vicinity of Abercorn Creek. Conversely, stratification is a factor in the lower harbor and upstream through Houlihan Bridge. However, as the river shallows further upstream [in the vicinity of I-95], the chloride stratification is no longer significant.

760-JK-400-EN06

Comment: *As a potential mitigation measure, cost for a supplemental water intake approximately 10-miles upstream from the current intake was presented in a document titled "Review and Costs for Supplemental Water Supply - City of Savannah intake at Abercorn Creek" dated 17 Sep 2009. It is not clear if environmental impacts from this proposed new intake have been evaluated, including the potential in increase salinity in Abercorn Creek further upstream from the current intake location.*

Response: The Corps has revised the mitigation plan in the FEIS to address impacts at the City's water intake. The project now includes construction of a raw water storage impoundment, one of the measures evaluated in the DEIS. The impoundment would be located on high ground. Appendix C of the FEIS describes procedures the Corps would undertake as the design phase progresses to address additional mitigation that may be needed.

760-JK-400-EV23, 760-JK-400-EV24

Comment: *The water quality-related sections of the DEIS include detailed assessments of the project's impacts on dissolved oxygen and chloride concentrations. The analysis relied on models and field testing of mitigation techniques. Much of this information is useful for identifying the potential water quality impacts and mitigation strategies. However, the DEIS understates that uncertainty and risks associated with both the water quality impacts and the proposed mitigation. The DEIS also does not explicitly consider the manner in which the water quality of the harbor is currently being managed and regulated. For example, the DEIS does not address impact of the project on the 20 I 0 draft TMDL for oxygen demanding substances, nor the related regulatory framework for achieving full compliance of water quality standards.*

Response: In EIS-Section 5.01.2 [Procedures] notes: *The Water Quality Interagency Coordination Team assisted in the application of EPA's model on this project. EPA, USFWS, NMFS, USGS, SC DHEC, GA DNR-EPD and the Corps agreed in 2006 that the enhanced model was suitable for use in evaluating potential impacts from this proposed harbor deepening project. The Corps had an Independent Technical Review performed of the model by ERDC. Their review focused on the model grid representation, input parameters, and existing conditions calibration. The reviewer stated that the model was acceptable for*

impact evaluation purposes on this project. The ERDC ITR did not include analysis of the model programming but rather the application of the model to Savannah Harbor. The EFDC and WASP models are on a Corps' "allowed for use" list of approved engineering models.

The Corps used these state-of-the-art hydrodynamic models because it did not want to underestimate the degree of risk and uncertainty associated with the project's water quality impacts or the necessary mitigation thereof.

The DEIS is replete with discussion regarding the uncertainties attendant to using models. GRR-Section 12 contains the following examples for inspection: Economic Analysis Uncertainty , Jasper County Terminal Sensitivity Analysis, Alternative Sensitivity Analyses Cost Risk Analysis, Chloride Mitigation Costs, Environmental Impact and Mitigation Uncertainty, Uncertainty in Salinity Predictions, Risk with Salinity Predictions, Uncertainty in Dissolved Oxygen Predictions , Risk with Dissolved Oxygen Predictions, Uncertainty in Biological Responses, Risk in Biological Responses, Risk in Sea Level Change Assumptions. Engineering Appendix-Tables 15-1 and 15-2 also discusses risk and uncertainties associated with model use.

The EIS does address the Draft 2010 TMDL. Approved hydrodynamic and water quality models were used to design a dissolved oxygen system that would compensate for each alternative's incremental [adverse] impact on this parameter. Modeling results indicate this objective has been realized, together with a modest net improvement in DO levels in the project's impact area. DEIS-Table 5-28 [Incidental Effects of DO Improvement Systems - Bottom Half of Water Column] shows the extent of improvement to the harbor DO levels. It should be emphasized that this mitigation was never intended to restore historical DO levels in the harbor and/or bring the harbor into compliance with state water quality standards.

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760-JK-400-EN07, 760-JK-400-EV25, 760-JK-400-EV26

Comment: *Much of the DEIS 's analysis of potential water quality is based on models that are have some capability to predict "average" dissolved oxygen or chloride conditions, but limited ability to characterize the trends and variability in water quality. Therefore, it is unclear whether the models arc accurately predicting the critical conditions for water quality protection. The DEIS provided little indication that model uncertainties were explicitly considered in either predicting impacts or designing mitigation strategies. This is an especially important concern for the mitigation of dissolved oxygen impacts, because the proposed technology is somewhat experimental and of highly uncertain benefit.*

Response: The models used to identify project impacts and develop mitigation plans were calibrated and validated [multiple times] prior to their approval. The approved, calibrated, and validated models are appropriate to identify project impacts and develop mitigation plans. The hydrodynamic and water quality models simulate the complex estuarine dynamics, viz., hourly, daily, and monthly tidal variations, salinity and dissolved oxygen dynamics together with their spatial distribution within the system. The models are applicable over a wide range of conditions including low and high freshwater flow. The model grid incorporates surveyed bathymetry and includes point and non-point pollution sources in the watershed. The grid extends from Clyo, Georgia (river mile 61, USGS stream gage 02198500) downstream through the harbor to Fort Pulaski (river mile 0), and out to 17 miles offshore [Atlantic Ocean]. The model was calibrated and validated using observed data from 1997 to 2006 and has been designed to meet the expectations of the SHEP Water Quality Interagency Coordination Team, which followed in the footsteps of the modeling technical review group that was established in the late 1990s

to oversee development of a technically valid model for determining SHEP's environmental impacts and attendant mitigation features. The group included representatives from the District, US EPA Region 4, USGS, Georgia DNR-EPD, South Carolina DHEC, and private sector technical modeling experts [tasked with actual model development]. An independent technical review and uncertainty analysis have been conducted on the models and the resulting comments/concerns were incorporated into the final version. Details regarding the hydrodynamic and water quality model development process, extensive reviews, and uncertainty analysis can be found in the report, "Development of the Hydrodynamic and Water Quality Models for the Savannah Harbor Expansion Project" dated January 2006 [included in the Supplemental Materials to the Engineering Appendix]. Acceptance letters from agencies involved in the modeling technical review group can be found in the document, "Correspondence Regarding Hydrodynamic & Water Quality Model Acceptability" [included the Supplemental Materials to the Engineering Appendix]. The models were used to evaluate conditions specified by the SHEP Water Quality Interagency Coordination Team, including the critical conditions defined by the States.

The EIS is replete with discussion regarding the uncertainties attendant to using models. GRR-Section 12 contains the following examples for inspection: Economic Analysis Uncertainty , Jasper County Terminal Sensitivity Analysis, Alternative Sensitivity Analyses Cost Risk Analysis, Chloride Mitigation Costs, Environmental Impact and Mitigation Uncertainty, Uncertainty in Salinity Predictions, Risk with Salinity Predictions, Uncertainty in Dissolved Oxygen Predictions , Risk with Dissolved Oxygen Predictions, Uncertainty in Biological Responses, Risk in Biological Responses, Risk in Sea Level Change Assumptions. The Engineering Appendix also discusses risk and uncertainties associated with model use.

Studies by independent engineering firms identified oxygen injection as the most cost-effective method to raise DO levels in the harbor [post-project]. The approved hydrodynamic and water quality models were used to design a dissolved oxygen system that would compensate for each alternative's incremental [adverse] impact on this parameter. Modeling results indicate this objective has been realized, together with a modest net improvement in DO levels in the project's impact area. EIS-Table 5-28 [Incidental Effects of DO Improvement Systems - Bottom Half of Water Column] shows the extent of improvement to the harbor DO levels. The District would conduct post-construction monitoring to ensure that the model predictions [oxygen levels at/above the status quo ante] are realized.

760-JK-400-EV27, 760-JK-400-EV28, 760-JK-400-EV29

Comment: *The pending dissolved oxygen TMDL is expected to have a major regulatory and economic impact on both industrial and municipal dischargers, many of which will have to make large capital investments to reduce wasteloads. It tends to be controlled by the location in which attainment of dissolved oxygen concentrations is most difficult. From this perspective, it would not matter if 97% of the system experienced oxygen improvements if the critical location(s) experienced degradation, or if the wasteload allocations to achieve full attainment would be lower. The DEIS currently does not allow this determination. Similarly, it is unclear if how the proposed mitigation approach would affect the ability of point source dischargers to use the same technology for TMDL compliance.*

Response: Implementation of the TMDL is intended to produce substantial effects on DO levels in the harbor. Depending on how it is implemented, it could have substantial effects on some industrial and municipal dischargers.

The project includes mitigation (oxygen injection) to offset reduced dissolved oxygen levels that would result from deepening [all alternative depths] without mitigation. Hence, concern about ramifications to the Savannah Harbor Draft TMDL is misplaced.

The applicability [and value] of dissolved oxygen injection to other users of the Savannah River would have to be determined by each discharger, possibly in consultation with the Georgia DNR-EPD and South Carolina DHEC.

760-JK-400-EV30, 760-JK-400-EV31, 760-JK-400-EV32
Comment: *The analysis should be revised to (I) more accurately characterize the uncertainties associated with water quality impacts; (2) more explicitly consider those uncertainties in designing environmentally conservative mitigation strategies; and (3) specifically examine the impact on the project on water quality management of the estuary under the draft 2010 TMDL.*

Response: These risks and uncertainties have already been addressed for water quality impacts. See response to previous comment, above.

The risks and uncertainties with all project elements were considered during the design of SHEP's mitigation strategies. See response to previous comment, above.

The EIS did address the Draft 2010 TMDL. See response to previous comments, above.

760-JK-400-EV33
Comment: *Abstract - Pg I, 2nd para - "The Corps of Engineers issued a Chief of Engineers' Report later in 1999 which provided further direction on the additional studies that needed to be conducted". Please include the Chiefs Report as an Appendix to the EIS.*

Response: The 1999 Chief of Engineers' Report has been added as an appendix to the FEIS.

760-JK-400-EV34
Comment: *Section 1.02 Areas of Concern and Issues - Pg 1-4, 1st para - "The proposed deepening of the Savannah River Federal Navigation Channel would impact the endangered Shortnose sturgeon and Striped bass habitat. tidal freshwater wetlands, brackish marsh, increase salinity at the City of Savannah's Water Intake at Abercorn Creek, and decrease dissolved oxygen in the harbor". Atlantic sturgeon, recently proposed for listing as an endangered species by NMFS, should also be identified as a resource that would be impacted by the SHEP.*

Response: Impacts to the Atlantic sturgeon and mitigation are addressed in EIS Section 5.11, EIS Appendix B (BATES), and the NMFS Biological Opinion, EIS Appendix Z.

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760-JK-400-EV35
Comment: *Section 2.04 Study Authority - Pg 2-3, 4th para - " (ii) the Secretary of the Interior, the Secretary of Commerce, the Administrator of the Environmental Protection Agency and the Secretary approve the selected plan and determine that the associated mitigation plan adequately addresses the potential environmental impacts of the project". The mitigation plan needs to adequately compensate (not just address) for the potential environmental impacts.*

Response: The EIS/GRR demonstrate that the proposed mitigation would adequately compensate for the project's potential environmental impacts.

760-JK-400-EV36

Comment: *Section 5.16 Cumulative Effects of the Proposed Action - Pg 5- 142, 6th para - "The cumulative effects analysis is found in Appendix L of the EIS". A summary of the findings of the cumulative impacts analysis, that includes text on the magnitude and significance of the collective impacts, would be appropriate for inclusion in this section of the DEIS.*

Response: A summary of the findings of the Cumulative Impact Analysis has been added to Chapter 5.0.

760-JK-400-EC01

Comment: *Section 5.19 Socio-Economic Resources - Pg 5-144, 1st para - "The harbor deepening project is expected to reduce the cost of shipping containerized goods through the port". This statement needs elaboration with specific details, or a reference to a document that contains those details.*

Response: The Economic Appendix describes the transportation cost savings computations. The analyses were performed in accordance with Corps guidelines and policies and underwent rigorous internal as well as independent technical review. The FEIS has been revised to refer to the GRR Economics Appendix.

760-JK-400-EC02

Comment: *Section 5.19 Socio-Economic Resources - Pg 5-144, 2nd para - "'None of the alternatives conflicts with long term land use plans outlined in 1987 Special Area Management Plan for the Lower Savannah River which was prepared by the SC Coastal Council (SCCC)". The referenced document is more than 20 years old and has almost certainly been updated or replaced with a more current land use plan. To be accurate, the Corps' impact analysis should be based on the most recent land use planning information available.*

Response: The FEIS has been revised to state that SC DHEC-OCRM does not currently have a Special Area Management Plan for the Savannah River, Savannah Harbor, or Jasper County.

760-JK-400-EV37

Comment: *Section 5.20 Protection of Children and Environmental Justice, Overview - Pg 5- 144, 6th para - "The Corps collected and analyzed information concerning the potential impact on minority populations, low-income populations, and children from the proposed Savannah Harbor Expansion Project. The information shows that the proposed action would not cause disproportionately high and adverse impacts on minority populations". What specific information lead the Corps to this conclusion and where is the analysis located?*

Response: This section of the document has been expanded in the FEIS to provide greater detail.

760-JK-400-EC03

Comment: *Section 5.21.E. Community and Regional Growth - Pg 5-155, 2nd para - "No additional cargo is expected to pass through the harbor as a result of the proposed project". This statement appears to be inconsistent with recent and future planned actions taken by the GPA to increase the container through-put capabilities of their Garden City Terminal. The Corps should elaborate on their statement above, and reconcile the disparity.*

Response: The GPA, the Corps and independent economic forecasting firms predict that significant cargo growth will continue at Savannah Harbor. The Corps believes that the same volume of cargo would move through Savannah with or without a harbor deepening project.

A multi-port analysis of alternate ports and networks indicated that most of the cargo imported and exported out of Savannah serves a distinct hinterland with little cargo being rerouted from other ports. A deepening project would allow the same volume of cargo to be moved more efficiently via larger or more fully-loaded vessels. This basic position is supported by the fact that PPX 1 vessels are calling at Savannah in increasing numbers and are anticipated to call in greater numbers once the Panama Canal is enlarged.

760-JK-400-EV38

Comment: *Section 7.01 Public Involvement and Review - Pg 71-, 1st para - "Comments on these scoping meetings were received from the following;" Were no scoping comments received from South Carolina interests?*

Response: The FEIS-Section 7.01 has been revised to further describe the public's involvement in this project.

Representatives from Jasper County provided comments on the SHEP at the initial public meeting [2000]. Further, the record reveals that SC DHEC, SCDNR, and SC DHEC-OCRM as well as the SC Conservation League participated in the NEPA scoping meeting [2002]. Numerous South Carolina residents were also in attendance at this meeting. FEIS-Section 7.01 was updated to discuss more thoroughly how the public was given the opportunity to become involved and provide review/comment on the proposed harbor deepening.

760-JK-400-EV39

Comment: *The maximum authorized plan of -48 ft is supported by the non-Federal cost share sponsor. Although it is acknowledged in the DEIS that environmental impacts associated with shallower depths would be less than those associated with the NED plan, the DEIS concludes that "the lesser impacts of the 44-foot depth. 45-foot depth and 46- foot depth alternatives are not considered sufficient to justify recommendation of these alternatives instead of the NED Plan". The DEIS further concludes that all depth alternatives, with the inclusion of proposed mitigation features, are "environmentally acceptable." DNR disagrees with this conclusion and believes that the only two deepening alternatives that might be considered environmentally acceptable are the 44-ft and the 45-ft alternatives, provided the proposed mitigation is effective in minimizing any adverse impacts of these alternatives. Obviously, the "no action" alternative (i.e., maintaining the channel at the currently authorized depth of 42 ft) would have the fewest adverse environmental impacts.*

Response: The term "environmentally acceptable" generally means that, among other items, that the plan/action meets all federal laws and Corps policies. However, for clarity purposes, the term "environmentally acceptable" has been removed from the document. The Corps recognizes the plans with lesser environmental impacts would be preferred from an environmental perspective; however, the Corps must consider multiple factors when evaluating proposed actions. For this project, when considered as a whole, the benefits derived with greater incremental depths outweigh the other incremental adverse impacts, especially considering mitigation.

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760-JK-400-EV40

Comment: *As stated in the DEIS, the extent of direct wetland impacts resulting from the excavation of bend wideners would not differ substantially among the five deepening alternatives considered. In each case, a total of 14.08 acres of salt and brackish marsh would be affected. In the absence of an approved saltwater mitigation bank in the Savannah River Basin, the USACE proposes to mitigate for these direct losses by grading down approximately 42 acres of a former confined dredge spoil disposal site (CDF I S) near the confluence of the Front and Middle rivers to an elevation that would support Spartina alterniflora. A "feeder" creek system would also be constructed toward the interior of the restored marsh. This area would then be allowed to revegetate naturally. Active planting of Spartina would only be conducted if the area did not revegetate naturally at a rate that would provide 15 percent vegetative cover after I year and 80 percent vegetative cover after 5 years (with interim goals of 25, 40, and 60 percent cover at the end of two, three and four years, respectively). Conceptually, DNR concurs with this approach to mitigating for the direct loss of brackish and saltwater wetlands resulting from any of the deepening alternatives; however, DNR's overriding concern about the indirect effects of harbor deepening should be given greater weight.*

Response: The District considered DNR's concerns about the indirect effects of the harbor deepening and addressed them in responses to their comments.

760-JK-400-EV41

Comment: *As stated in Chapter 5 of the DEIS, "All of the deepening alternatives would adversely impact tidal freshwater marsh." Model predictions indicate that, without mitigation, deepening the harbor would result in the conversion of tidal freshwater marsh to brackish marsh as a result of increased salinity intrusion. Under conditions of average flow and low sea level rise, the acreage of freshwater marsh that would be lost as a result of deepening is predicted to range from 551 acres for the 44-ft alternative to 1,21 2 acres for the 48-ft alternative, assuming no mitigation is implemented. With the flow-altering modifications proposed as mitigation by the USACE, however, the acreage of freshwater marsh is actually projected to increase by 332 acres with the 44-ft alternative; whereas, a net loss of freshwater marsh (ranging from 32 acres for the 45-ft alternative to 337 acres for the 48-ft alternative) would still result from the other deepening alternatives, even with mitigation. Considering the substantial loss of tidal freshwater wetlands that has already occurred as a result of past dredging operations and other modifications to the system, the DNR considers anything more than a de minimis loss of freshwater wetlands to be a significant adverse impact of the proposed deepening project.*

Response: The conversion of 223 acres of freshwater wetland to brackish marsh [outside of the SNWR] represents the only major [functionally quantifiable] wetland change resulting from deepening the harbor to 47-feet. As noted previously, the subject freshwater wetlands would retain most of their current functional characteristics. The District's calculation of the number of acres of freshwater wetland potentially converting to brackish marsh is based on a shift of 0.5 ppt salinity, a traditional rule-of-thumb for differentiating between freshwater marsh and brackish marsh. However, data in literature for Savannah Harbor suggest that a shift in vegetation [from freshwater marsh to brackish marsh] in this estuary does not occur until salinity concentrations approach 2.5 ppt (Latham et al., 1994). Even at oligohaline marsh sites with average salinity concentration of 2.1 ppt, a discriminant function analysis revealed that only 47% of cases resulted in the correct pairing of environmental variables with vegetative species composition and dominance. At those same oligohaline sites, 37% of the vegetative

species composition and dominance were more closely aligned with a freshwater classification (Latham et al., 1994).

The 0.5 ppt salinity threshold [to define a shift from freshwater to brackish marsh] is approximately 5 times lower than often observed with 100% vegetative shifts *in situ* within the Lower Savannah Watershed (Latham et al., 1994) and other coastal marsh systems in the southeastern United States (NOAA, 2010). Thus, many of the existing freshwater emergent plant species, and associated ecological parameters, would likely be sustained in areas predicted to experience salinity concentrations in the range of 2.5 ppt. Those areas that do transition to more brackish characteristics would still continue to provide the traditional ecological functions associated with all emergent wetland systems. See also other responses on this issue.

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760-JK-400-EV42

Comment: *As discussed in the DEIS, there are significant concerns related to the predicted decrease in dissolved oxygen that would result from the proposed deepening project. The primary area of concern for dissolved oxygen is the portion of the Savannah River between Fort Pulaski (River Mile 0.0) and the Seaboard Coastline Railroad Bridge (Mile 27.4). This is the section of the Savannah River estuary that would be directly affected by the deepening project. As noted in the DEIS, this segment of the river is on Georgia's Section 303(d) list as impaired for dissolved oxygen. Modeling studies conducted in support of the development of a Total Maximum Daily Load (TMDL) for dissolved oxygen in Savannah Harbor estimate that the existing dissolved oxygen concentration in Savannah Harbor is I mg/I lower than it was during the baseline year (1854) and condition (12-foot controlling depth) because of dredging operations that have been conducted since then. Model predictions from the SHEP studies indicate that further deepening will have additional impacts on the dissolved oxygen regime in Savannah Harbor.*

Response: The SHEP's impacts on the dissolved oxygen regime in the environs of Savannah Harbor are discussed in the EIS, but are described in greater detail in the GRR-Engineering Appendix. Based on the potential adverse impacts to dissolved oxygen caused by harbor deepening, the project's mitigation includes an oxygen injection system. This system has been designed to compensate for the incremental impacts on the dissolved oxygen regime. Due to the spacing of the system's "Speece Cones", the dissolved oxygen regime would improve in over 90 percent of the project effect's area compared to the status quo.

760-JK-400-EV43

Comment: *As reported in the DEIS, hydrodynamic and water quality modeling conducted in support of the deepening project suggest that the proposed mitigation features (i.e., the flow altering plans discussed above and the DO injection systems) would substantially reduce project impacts to freshwater wetlands and some species of fish. While DNR does not necessarily dispute the hydrodynamic and water quality modeling results, we are concerned that there is still substantial uncertainty regarding the predicted magnitude of adverse impacts and the effectiveness of the proposed mitigation measures, particularly, the oxygen injection system. The results of a demonstration project conducted to determine the effectiveness of the system in Savannah Harbor were inconclusive. The slight increase in dissolved oxygen in the vicinity of the Speece Cones was shown to be within the normal range of natural variability due to tidal influences, and could not be definitively attributed to the oxygen injection system itself. Furthermore, the long term effectiveness and viability of this system in a tidal brackish water environment is highly questionable. The minimal net improvement in DO predicted by the model may not be sufficient to warrant the initial cost of the system or the long-term maintenance costs. Instead, DNR*

recommends that adverse impacts to dissolved oxygen levels be minimized by deepening to no more than -45 ft.

Response: While the injection of oxygen into an estuary [to improve dissolved oxygen levels] is a relatively new concept, the technology is not. There is little objective doubt that oxygen injection can add oxygen to the water column, the concern is whether the injected oxygen would spread throughout the estuary. An oxygen injection demonstration verified the efficacy of the Speece cones to add oxygen to estuarine waters. The Transfer Efficiency Study will identify the rate at which the oxygen injection system is able to add oxygen to the receiving water. The post-construction monitoring plan includes a comparison of the observed effects on dissolved oxygen levels with those expected to occur. The Adaptive Management Plan contains provisions to modify the oxygen injection system [as necessary]. These changes could include increasing the amount of injected oxygen, use of different equipment, altering the locations/number of the oxygen injections sites, etc.

760-JK-400-EN08

Comment: *ONR also is concerned that some or all of the flow-altering modifications could have unintended consequences that result in additional adverse impacts to natural resources. Significantly, the modifications proposed to red.uce salinity intrusion into the Back River to protect tidal and managed freshwater wetlands could result in increased salinity intrusion into the Front and lower Middle rivers, where both juvenile and adult SNS have been found to concentrate, particularly during the winter when temperatures are below 22' C (Collins et al., 2001). In fact, Table 5-30 shows that the loss of adult SNS habitat in winter would be much greater with the flow alterations (maximum loss of 439 acres for the 48-ft alternative) than without them (maximum loss of 44 acres for the 48-ft alternative). Conversely, the loss of adult SNS habitat in summer and juvenile SNS habitat in winter is predicted to be less with the proposed flow-alterations than without them.*

Response: Shortnose sturgeon habitat impacts are evaluated for both winter and summer periods and for juvenile and adult life-stages. The coordination efforts between the District and National Marine Fisheries Service [member of the SHEP Fisheries Interagency Coordination Team], have been extensive. Special attention was given to ensure habitat suitability criteria are appropriate for species life-stage and time of year. Moreover, care was taken to structure the modeling so that it accurately reflects observed Shortnose sturgeon habitat in the Savannah River estuary [under existing conditions].

Regarding mitigation for Shortnose sturgeon, there was consensus that impacts to this species are difficult to mitigate completely. EIS Section 5.03.1 addresses this and states: The adverse impacts that would remain to Shortnose sturgeon and Striped bass after the flow altering and dissolved oxygen components of the mitigation plan are included remain at levels which warrant further mitigation. The Fisheries Interagency Coordination Team was queried about potential ways that habitats within the harbor could be improved for these two species. For Striped bass, structural modifications, such as timber or rock flow diverters, were discussed. In the end, agency fishery experts could not identify measures that would improve its habitat over the wide range of river flow conditions. Similarly, no structural measures could be identified within the estuary to compensate for Shortnose sturgeon habitat losses.

The decline of Shortnose sturgeon is attributable to many factors, but none is more important than the loss of its upstream spawning habitat. Appendix L provides an historic account of this and other endangered species in Savannah Harbor and details the reason[s] for their decline. Harbor deepening would not affect the Shortnose sturgeon's spawning habitat since it is located over 100 miles upstream

from the SHEP's effects area. Rather, this project would have a long-term positive impact on adult sturgeon summer habitat in the lower Savannah River and an adverse impact on sturgeon winter habitat [Appendix L-page 89]. Most of the project-induced impact is caused by an increase in upstream salinity levels and a decrease in dissolved oxygen levels. While no critical habitat for Shortnose sturgeon has been designated in the Savannah River, the importance of protecting [and even improving] the habitat for all resident species in the lower Savannah River is obvious.

Of course, there are uncertainties with any project, but the Cooperating Agencies and the Fisheries Interagency Coordination Team all support providing fish passage beyond the lock and dam, since anadromous fish such as SNS would have access to their historic spawning areas at the Augusta Shoals. The expectation of the agency fishery experts is that increasing the spawning habitat of anadromous fish like SNS would increase their population levels.

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760-JK-400-EN09

Comment: *The deepening alternative that is predicted to have the least negative impact on SNS habitat overall (including adults and juveniles during winter and summer) is the 44-ft alternative, which would result in a net loss of approximately 60 acres of SNS habitat with flow-altering mitigation, and 151 acres without flow alterations. By comparison, the NED Plan (i.e., the 47-ft alternative) is predicted to result in a net loss of 473 acres of SNS habitat overall with flow alterations (or a loss of 545 acres without flow alterations). The locally preferred plan (i.e., the 48-ft alternative) would result in even greater net losses of SNS habitat overall, DNR considers magnitude of these impacts to the habitat of shortnose sturgeon to be unacceptable, with or without mitigation.*

Response: The District has worked closely with technical staff of NOAA's National Marine Fisheries Service to ensure accuracy in identifying and quantifying impacts to Shortnose sturgeon habitat within the Savannah River estuary. Since publication of the DEIS and GRR [November 2010], these impact predictions have been updated as a result of adjustments in the modeling parameters, specifically inclusion of point source loadings, dissolved oxygen injection, and the Middle River sill mitigation feature. The changes have been approved by technical staff of NOAA's National Marine Fisheries Service.

For the -47 foot project depth, there would be an 89-acre gain (6.5%) in adult habitat [summer] in the estuary largely resulting from improvements in dissolved oxygen levels in the Back and Middle Rivers. In the winter, modeling predicts a 278-acre loss of adult habitat (7.2% loss). Model predictions also show a loss of juvenile habitat [winter] of 326 acres [9.9%] in the harbor. The forecast losses to adult/ juvenile habitat [winter] result from increases in salinity on Front River.

Regarding mitigation for Shortnose sturgeon, there was consensus that impacts to this species are difficult to mitigate completely. EIS Section 5.03.1 addresses this and states: The adverse impacts that would remain to Shortnose sturgeon and Striped bass after the flow altering and dissolved oxygen components of the mitigation plan are included remain at levels which warrant further mitigation. The Fisheries Interagency Coordination Team was queried about potential ways that habitats within the harbor could be improved for these two species. For Striped bass, structural modifications, such as timber or rock flow diverters, were discussed. In the end, agency fishery experts could not identify measures that would improve its habitat over the wide range of river flow conditions. Similarly, no structural measures could be identified within the estuary that would compensate for Shortnose sturgeon habitat losses. As a result, the Team agreed [2007] that a fish bypass around the New

Savannah Bluff Lock and Dam would compensate for losses within the estuary by providing 20 additional miles of upstream spawning/foraging habitat.

760-JK-400-EV44

Comment: *Other unintended consequences of flow alterations could also occur. Recent and ongoing tagging studies suggest that SNS may move freely between the Front, Middle and Back rivers via Steamboat Cut and Rifle Cut. If this proves to be the case, closing Rifle Cut could impede this movement, and limit SNS access to suitable foraging and nursery habitat. In addition, DNR field biologists have recently reported that the sediment basin in the lower Back River has already filled in to a large extent, and that any further deposition of sediments in this area could present another impediment to SNS migration throughout the system.*

Response: After careful deliberation, the Cooperating Agencies and the Fisheries Interagency Coordination Team [SCDNR is a member] developed the SNS habitat criteria. Closure of Rifle Cut is part of the flow diversion mitigation and is designed to impede [reduce] saline flows from Middle River into Little Back River. Although Shortnose sturgeon would be blocked [post-construction] from using this passage from Middle River to Little Back River, individuals would still have access via other routes, as well as entry to all other waterways in the study area.

760-JK-400-EV45, 760-JK-400-EV46

Comment: *The USACE proposes to provide compensatory mitigation for unavoidable impacts to SNS foraging and nursery habitat by constructing a fish passage structure around the New Savannah Bluff Lock and Dam (NSBLD) near Augusta, at a projected cost of $6.3 million. The structure (a rock ramp) would be located on the South Carolina side of the river, and would theoretically provide SNS access to approximately 20 miles of upstream spawning habitat. DNR believes the likelihood that this approach would be successful in passing SNS is highly doubtful. While such a fish passage structure might benefit other migratory fish, its success in passing SNS has never been demonstrated. Because of its unproven success, DNR is opposed to implementing active fish passage as mitigation for unavoidable impacts to SNS habitat, and believes that the best approach to protecting shortnose sturgeon habitat would be to minimize those impacts by selecting either the "no action" alternative or the 44-ft deepening alternative (with flow-altering mitigation). While impacts to SNS would be minimized by selecting either the no action alternative or the 44-ft alternative, modeling results presented in the DEIS suggest that the overall net loss of striped bass habitat (including suitable habitat for spawning, eggs and larvae) would be less with the 45-ft alternative. Because of this apparent benefit to striped bass, an important recreational species whose population in the lower Savannah River has been drastically reduced by earlier dredging operations and flow-altering modifications to the system, DNR would consider the 45-ft deepening alternative (with flow-altering mitigation) to be acceptable, as well.*

Response: The Fisheries Interagency Coordination Team concluded that construction of a fish bypass at the New Savannah Bluff Lock and Dam would be acceptable mitigation for the adverse impacts of the SHEP on the Shortnose sturgeon. The horseshoe rock ramp was selected as the best design to allow passage of Shortnose sturgeon, as well as be able to pass other anadromous fish [American shad]. Based on comments received on the DEIS and input from an April 2011 workshop, the off-channel rock ramp design has been selected as the design for this mitigation feature. The use of fish passage structures has a successful history. Lake sturgeon have been observed negotiating both constructed/natural rapids [entire river width] in the upper mid-west [US]. Some of these observations were made at more shallow water depths than would be the case [3.5 to 5.5 feet] for the fish bypass at

the New Savannah Bluff Lock and Dam (Aadland 2010). Since the Lake sturgeon is a larger species than the shortnose, the latter should have little difficulty [physically] passing the constructed bypass.

The Monitoring Plan includes provisions to ascertain Shortnose sturgeon use of the bypass and their overall success in moving to upstream spawning grounds. The Adaptive Management Plan provides the means to modify the fish bypass if required.

The potential acceptability of the 45-foot project to the SC DNR is based on the predicted increase in suitable habitat for Striped bass eggs and larvae. However, this prospective concurrence is predicated on implementation of the project's mitigation plan, including flow diversion features along with annual payments to the GA DNR for stocking of Striped bass fingerlings.

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760-JK-400-EV47

Comment: *The USACE also proposes to provide compensatory mitigation for unavoidable impacts to tidal freshwater wetlands. Initially an attempt was made to identify other sites in the Savannah River estuary that could be used for restoration or creation of tidal freshwater marsh; however, neither the USACE nor any of the stakeholders could find any suitable sites that were available within the Savannah River Basin. In the absence of any such sites, the USACE (in consultation with the USFWS and other natural resource agencies) used the Savannah District Standard Operating Procedures (SOP) to calculate the minimum number of acres that would need to be acquired and preserved to acceptably mitigate for unavoidable freshwater wetland impacts. Using this procedure, it was determined that the total acreage of wetlands that would need to be preserved ranged from 0 acres for the 44-ft deepening alternative (with flow-altering mitigation) to 2,683 acres for the 48-ft alternative (with flow-altering mitigation). The USACE proposes to acquire lands identified in the latest version of the Savannah National Wildlife Refuge Acquisition Plan (dated July 2007), and provide them to the USFWS to manage as additions to the Refuge as compensatory mitigation for unavoidable wetland impacts from the deepening project. Priority will be given to acquiring properties that are dominated by freshwater wetlands. DNR concurs with this approach to mitigating for any unavoidable impacts to tidal freshwater wetlands, particularly since most of the indirect impacts of deepening would occur within the Savannah National Wildlife Refuge. DNR recommends that any such acquired properties be made accessible to the public for educational and recreational activities that are consistent with the wildlife management goals of the Refuge.*

Response: As part of the project's mitigation plan, the District proposes to purchase property [2,245 acres] for inclusion in the Savannah National Wildlife Refuge. The USFWS has the authority to accept these lands since they are already listed in the Refuge's approved acquisition plan. The USFWS would manage these properties [for education/recreation] using funds obtained through the Department of Interior's normal budget process.

760-JK-400-EN10

Comment: *Channels: The channel is shallower and narrower than Army Corps design standards for fully loaded post-panamax ships. This indicates margins of safety for navigation will be lower than normal. The Engineering Investigations section promotes accepting greater than normal levels of risk without further justification (page 59).*

Response: The preliminary channel design was determined using the Corps of Engineers' design standards and procedures outlined in EM-1110-2-1613, Hydraulic Design of Deep Draft Navigation Projects. In accordance with ER-1110-2-1403, the District developed final channel dimensions and

navigation requirements using the Corps' state-of-the-art Ship Simulator, with input from the Savannah Harbor Pilots Association (SHPA). The use of ship simulators to establish final design parameters for deep-draft navigation channels is standard practice worldwide. It ensures that channels are safe and economical and minimizes environmental impact and long term maintenance requirements. The use of ship simulators also provides the harbor pilots who will actually use the channel with the opportunity to provide input into the design and ensure the navigability and safety of the channel.

The existing channel dimensions can accommodate meeting between the deepening design vessel (post-panamax Generation 2; 140' beam) and a smaller vessel. Ship simulation verified that the channel could be deepened and widened at 2 bends in the inner harbor to maintain two-way traffic capability for the design vessel and a smaller vessel. Two meeting areas are also included to provide for meeting of two design vessels.

In reference to "Army Corps design standards" for depth of channel, the Corps, ASCE, and PIANC recommend a preliminary or concept design of channel depth in exposed entrance channels using the ratio of channel depth(h) to ship draft (T)of at least h/T =1.2. However, this standard is empirically derived and very conservative. For Savannah Harbor, a detailed design study was performed using more extensive laboratory models, field measurements, numerical model simulations, and probabilistic models to refine the required channel depths.

Currently the Savannah Harbor Pilots safely bring in vessels with a minimum of 4' underkeel clearance (UKC). This practice would continue with the deepened channel. Depending on the draft of the vessel, use of tide may be required to maintain that UKC throughout transit. The vertical ship motion study conducted for this study used a ratio channel depth h to ship draft T of h/T =1.09, which for the light-loaded vessel drafting 46' corresponds to a channel depth of 50'. This condition matches the SHPA policy of 4' UKC. The vertical motion study confirmed that the light-loaded vessel would not touch bottom if sailing with 4' UKC and if vessel speed does not exceed 12 knots (kt). The study also showed that given additional water depth, and therefore higher h/T values, ships could travel at higher speeds without causing enough squat to cause grounding. Vertical ship motions including squat and waves are discussed in subsequent responses.

For the fully loaded 47.5 draft, using a channel depth (h) to ship draft (T) of h/T =1.09, would correspond to a water depth of 52' requiring at least a 3' tidal advantage for the 49' entrance channel depth (47' project). The vertical motion study showed that a ship speed of 14 kts or less would not cause grounding due to squat for this condition. Greater speeds would require additional depth to prevent grounding due to squat.

Documentation for both the ship simulation and vertical motion studies can be found in Engineering Appendix Supplemental Materials.

The margin of safety for the project is in accordance with Corps of Engineers Guidance for Channel Design. We do not agree that there is a greater than normal risk for the project. Although there is always a degree of "risk" inherent with any project, this project was designed by sound engineering practices to minimize the risk to the maximum extent practicable.

760-JK-400-EN11

Comment: *Channel Depth and ship draft: The project will not accommodate post-panamax draft even on high tide. It will most likely handle drafts of 43 feet on any tide, and 47 feet on high tide, well under post-panamax. Tide range in the offshore channel is reported at 50 to 75 percent in excess of the actual tide range offshore, distorting estimates.*

Response: Savannah Harbor Pilots Association (SHPA) policy is to move vessels through the harbor provided 4 feet of underkeel clearance is available throughout the transit. This policy would be maintained for the deepened channel. Depending on the draft of a particular vessel, use of the tide may be required to maintain 4 feet of underkeel clearance throughout transit. In reference to "Army Corps design standards" for depth of channel, the Corps, ASCE, and PIANC all recommend a preliminary or concept design of channel depth in exposed entrance channels using the ratio of channel depth (h) to ship draft (T) of at least h/T =1.2. However, this h/T=1.2 standard is very conservative. A detailed design is recommended using more extensive laboratory models, field measurements, numerical model simulations, and/or probabilistic models to refine the required channel depths. The Corps conducted a vertical ship motion study (performed by ERDC) specifically for the entrance channel, including the channel extension from Station -60+000 to -98+600. Documentation of this study can be found in the Engineering Appendix Supplemental Materials. The CADET program used in this study for the vertical ship motion predictions is a probabilistic or risk-based model which includes probabilities of waves over a 20-year wave hindcast.

NOAA confirmed that at the most distant extent of the design channel, tidal range is equivalent to tidal range at Ft. Pulaski multiplied by 0.91-0.94. The CADET risk-based model used to predict vertical ship motion indicates that a total depth of 50 to 52 feet (gross underkeel clearance of 4 to 4.5 feet) should be acceptable for T=46 and 47.5 ft draft *Susan Maersk*, respectively. The tide range in the offshore portion of channel would provide the equivalent to 53+ feet for 365 days per year for durations of 4 hours if needed.

Economics analyses took into consideration that ships will not always operate fully loaded and at times might require use of a tidal advantage.

760-JK-400-EN12

Comment: *Channel Width and Ship Width: The proposed channel width will be narrower than present, and therefore will decrease the number of ships the project can handle. This is contrary to the objectives. The channel is only wide enough for ships up to 11 7 feet wide, and then only in one-way traffic, according to Army Corps channel design standards. Post-panamax beam is 160 feet.*

Response: The deepened channel would be slightly narrower than the status quo. The District used the *Susan Maersk* (post-panamax Generation 2) as the design vessel. Final channel dimensions and navigation requirements were developed using the Corps' state-of-the-art Ship Simulator along with input from the Savannah Harbor Pilots Association. These data supersede guidance from Corps of Engineers', Design Standards and Procedures outlined in EM-1110-2-1613. The ship simulation confirmed that the new channel could safely accommodate transit of this vessel. The longer design vessel would result in the need for bend wideners in multiple locations. The new channel would allow the design vessel to meet a Panamax vessel at all locations along the channel. Two meeting lanes are included in the inner harbor to provide places where two design vessels could meet when transiting the harbor.

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760-JK-400-EN13

Comment: *One-Way Traffic: The channel is not satisfactory for two-way traffic of any appreciably sized ships, per Anny Corps standards. Navigational simulation studies only simulated ships up to 140 feet wide, less than post-panamax and problems presented in these simulations. There were no simulations of a full sized post-panamax ship reported.*

Response: The preliminary channel design was determined using the Corps of Engineers' design standards and procedures outlined in EM-1110-2-1613, Hydraulic Design of Deep Draft Navigation Projects. In accordance with ER-1110-2-1403, the Corps developed final channel dimensions and navigation requirements using the Corps' state-of-the-art Ship Simulator, with input from the Savannah Harbor Pilots Association (SHPA). The use of ship simulators to establish final design parameters for deep-draft navigation channels is the standard practice worldwide and ensures that channels are safe and economical, and minimizes environmental impact and long term maintenance requirements. The use of ship simulators also provides the harbor pilots who will actually use the channel with the opportunity to provide input into the design and ensure the navigability and safety of the channel. The existing channel dimensions can accommodate meeting between the deepening design vessel (post-panamax Generation 2; 140' beam) and a smaller vessel. Ship simulation verified that the channel could be deepened and widened at 2 bends in the inner harbor to maintain two-way traffic capability for the design vessel and a smaller vessel. Two meeting areas are also included to provide for meeting of two design vessels at the Long Island and Oglethorpe Ranges.

Documentation for both the ship simulation and meeting area studies can be found in Engineering Appendix Supplemental Materials.

760-JK-400-EN14

Comment: *Passing Lanes: One passing lane was found to be inadequate, leaving one viable passing lane throughout the length of the project.*

Response: As stated in the Engineering Appendix Section 6.3.3, the two meeting areas included in the project are designed to allow the meeting of 2 SHEP design vessels (*Susan Maersk)*. Meeting areas provide areas for the design vessels to be able to meet in transit to avoid delays that would otherwise be incurred if a vessel had to either wait in the entrance channel or at dock until a design vessel had exited the channel. For Savannah Harbor, all "passing" lanes are defined as meeting areas. "Passing" is typically defined as ships overtaking each other. "Passing" in this sense is not practiced in Savannah Harbor; therefore any subsequent reference to "passing" shall be understood as "meeting". The two meeting areas are located at Long Island Range and Oglethorpe Range. Through model runs and pilot input, ERDC determined that a 100-foot wide and 8,000 foot long meeting area would be required for vessels to meet safely in the Long Island Range with 1,000 foot transitions back to the navigation channel width. The final location (center of range) was determined by consultation with pilots. The location was determined to be from Station 14+000 to Station 22+000 for the full 100-foot meeting area (Station 13+000 to 23+000 including transitions). For the Oglethorpe Range, a width of 100 feet from Station 54+800 to Station 58+800 (Station 54+800 – Station 60+700 with transitions) was used in simulation runs and determined to be adequate. Track plots showed that pilots required the full length, so no further restriction in length was tested. Details of ship simulation for these two meeting areas can be found in the Engineering Appendix Supplemental Materials.

760-JK-400-EN15

Comment: *Offshore Channel Bend: This critical point was found to be navigationally sound only when ranges are visible, limiting use to days when the visibility is good.*

Response: Although infrequent, if visibility becomes restricted to the point that safe transit of the channel is threatened, ship traffic is prohibited. Given the potential for closure exists under current conditions, it is reasonable to assume this would be the case for the deepened channel as well.

760-JK-400-EC04

Comment: *Traffic Load: The project cannot accommodate the number of ships projected to be calling on the port with only one-way traffic. No traffic density study was reported verifying the number of ships the port might handle daily.*

Response: Section 3 of the Economics Appendix describes the GPA's present operations, capital improvement plans and other transportation infrastructure improvements and storage area expansions, all which play a part in the Corps' determination of a maximum capacity. A follow-up letter prepared by Moffatt & Nichol verified the reasonableness of the estimated capacity. It is reasonable for GPA to be able to accommodate the number of ships estimated to call over the study period.

760-JK-400-EN17

Comment: *Maintenance Dredging: The GRR suggests maintenance dredging will not increase in cost or volume over present levels, though four other ACOE studies indicate the contrary. Maintenance at present levels is lacking, as the existing channel is less than project depth across seven ranges of the channel. Basing future maintenance on inadequate present maintenance of a shallower project is likely to prove inaccurate.*

Response: The commenter did not provide sufficient information on the "other ACOE studies" for the District to comment on their potential applicability to this project and situation. The Corps agrees that at times the existing channel contains sediment above the authorized depth. That occurrence is standard practice throughout the country. The advance maintenance that the District has implemented in various reaches of the existing project is one means of minimizing the extent of that situation before maintenance dredging is performed. The GRR-Engineering Appendix, Supplemental Materials contains the evaluation that the Corps performed of sedimentation in the harbor. That analysis identified the changes in shoaling amounts and locations that should be expected with harbor deepening.

760-JK-400-EN18

Comment: *Dredge Spoil Disposal: Even with artificially low estimates of dredge spoil volume, the project relies on the availability of the site considered for a Jasper County terminal for 60 years. The actual amount of dredge spoil disposal volumes is likely to be much higher than estimated in the report, creating further reliance on the Jasper site for decades.*

Response: There may be some obvious impediments to its implementation, but given sufficient motivation a container terminal in Jasper County could become a viable port operation. Nonetheless, as noted in the EIS, the SHEP would use CDFs 14A/14B [the latest proposed Jasper Terminal site] to deposit excavated material since it is the least-cost, environmentally acceptable alternative. However, this decision does not necessarily preclude these areas from being used to construct a terminal within the SHEP's 50-year economic life. The Georgia Department of Transportation has requested the District release its sediment disposal rights in the subject sites. The District is providing technical information to

Joint Project Office (JPO) for a Jasper Terminal to identify a means to replace disposal capacity that would be lost, as well as mitigation features [marsh restoration] within the footprint of the proposed JOT. The Corps has informed the JPO that it will release those easements if the Federal Government's costs are not increased (the Government is "made whole") and all environmental requirements are met and development of the property is imminent, i.e. the developer obtains a Section 404 permit for an alternate use of the site. It should be noted that a consultant working for the JPO has stated that the proposed placement of new work sediments [from SHEP construction] on CDFs 14A and 14B would save the JOT development project over $400 million by raising its elevation to a workable height. Therefore, if SHEP is constructed, it would benefit the development of a Jasper Terminal by significantly reducing initial construction costs.

760-JK-400-EC05

Comment: *Economic Benefit: The economic analysis did not account for limitations on draft, width, speed, and two-way traffic, but rather assumed the project could actually handle post-panamax ships at unlimited density. Actual ship activity is unlikely to meet economic benefit estimates.*

Response: The Economics Appendix did in fact consider limitations on vessel draft, beam and speed. The Transportation Cost Savings Model reveals that a large distribution of vessel classes is used in the calculations. The HarborSym modeling evaluated how the vessel fleets (with and without project) could call at the Port. As a result, that analysis did include consideration of the density of vessels expected to call at Savannah.

760-JK-400-EC06

Comment: *The DGRR states that the Garden City Container will handle up to 6.5 million twenty foot containers (TEU) being on or off loaded at this facility annually. Using several methods to analyze potential capacity with their proposed capital improvements, a more realistic capacity for the facility would be about 3.5 million TEUs annually.*

Response: Section 3 of the Economics Appendix describes the GPA's present operations, capital improvement plans and other transportation infrastructure improvements and storage area expansions, all which play a part in the Corps' determination of a maximum capacity. A follow-up letter prepared by Moffatt & Nichol verified the reasonableness of the estimated capacity. It is reasonable for GPA to be able to accommodate the number of ships estimated to call over the study period.

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760-JK-400-EC07

Comment: *The Savannah Maritime Association recommends a 2 ft minimum water clearance under vessels transiting the Port of Savannah. The GRR uses clearances of over 4 ft for certain classes of vessels in the analysis. There should be general agreement between operational practices at the port and assumptions used in the report.*

Response: The underkeel clearances stated in the Appendix also account for the dynamic condition, and include squat, trim, and freshwater sinkage. Once these factors are netted out, the underkeel clearance requirements are representative of the standard practice.

760-JK-400-EC08

Comment: *Given forecasts for the year 2030 in the report, it is assumed there will be 3,500 container ships calling at Savannah Harbor, along with about 3,000 general cargo ships and 167 LNG tankers. This equates to over 13,000 commercial vessel transits in or out of Savannah Harbor annually. Given:*

- *Multi-mile wide safety zone required for LNG transits,*
- *Recreational boating at the cross point of the channel and the ICWW,*
- *Large size of vessels expected to call Savannah, and*
- *Complexity of navigation within the Savannah River complex.*

The report offers no details on how Savannah Harbor can accommodate so many vessel calls.

Response: The HarborSym modeling evaluated how the vessel fleets (with and without project) could call at the Port. That analysis included consideration of factors such as the number of vessels, their size, the LNG exclusion zone, the duration of a transit, etc.

760-JK-400-EC09

Comment: *Most of the anticipated traffic increase forecasted for Savannah Harbor in the future is imports with a large increase forecasted for imports from the Far East. The report does not effectively address the impact of a significant increase in import cargo versus U.S. exports. By 2030, given the forecasts in the report, there will be over 1.5 million TEUs of empty containers going out of Savannah harbor, due to the imbalance between import volumes and export volumes. This forecasted imbalance in trade flows has an effect on outbound vessel loading and draft requirements that do not seem to change over time. For some trade routes, the depth of outbound vessels is the main source of benefits.*

Response: While it may appear that there is an imbalanced loading for exports and imports, there are unique cargo distribution patterns in the Southeast. It is quite likely that a particular container may enter Savannah from overseas, be taken to a distribution center in central Georgia, then reloaded and exported at Jacksonville. Also, just because you have more empty containers doesn't mean the draft requirements will change significantly, since weight, stowage factors, port rotations and a host of other factors influence the amount carried on a vessel at a given time. The value of an empty container is not as great as a loaded one, and there could be a large level of container "leakage" from the region.

760-JK-400-EC10

Comment: *There is only minimal analysis of the effect deepening Savannah Harbor may have on other Southeast US and Gulf ports. It is acknowledged in the report that there are plans for potential port capacity expansion of l2 million TEUs at Southeastern US ports. Market service areas of ports can often overlap. Rather than looking at each port as a singular entity, they need to be evaluated in a regional as well as national scope, to optimize potential public investment in this industry.*

Response: The study team was well aware of the need to perform a multiport analysis given that there were several competing ports in proximity to Savannah. In 2006, GEC performed a multiport analysis on various hinterland origins and destinations for several South Atlantic and Gulf ports, including Savannah, Charleston and Jacksonville. The savings per TEU for the ocean voyage costs range from about $10 to $60 depending on the trade route distance, percentage of Savannah cargo and other factors. This is derived by dividing the "benefiting tonnes" on each trade route, by the ocean voyage transportation costs for the respective routes. At these levels of savings, and with landside trucking costs within the local area of Savannah are estimated to range from $100 to $150 each round trip, and movements outside of the local area are estimated to average $1.50 to $2.00 per round trip mile, there is not a sufficient differential to attract large amounts of cargo diverted from or to other ports. It is further

believed that there are numerous other factors involved in port developments that would have a greater effect on cargo diversions such as new container yard developments, location of distribution centers, and landside transportation improvements. The findings suggest that deepening Savannah Harbor would not result in substantial changes in the origins and destinations of imports and exports to key US markets served by the Port. Given this study's findings, the economic analysis includes the position that there would be no substantial changes in hinterland service area and therefore no change in overall cargo volume without and with channel improvements at Savannah Harbor.

In the draft report, it was assumed that PPX 2 vessels would call only if the channel were deepened to at least 44 feet. However, since that time PPX 2 vessels have called at Savannah. Recent developments and carrier announcements indicate that even in the without project condition, PPX 2 vessels will continue to call at the Port.

760-JK-400-EC11

Comment: *One argument for the expansion project is the need of greater depth within the river or tonnage will move elsewhere, but the GDRR claims lower shipping costs all the way from China. Benefits would be much lower if the transportation benefits were measured from a likely alternative U.S. port.*

Response: See prior Response to Comment 760-JK-400-EC10, which describes the multi-port analysis and assumed same volume of cargo. Also, per the Principles & Guidelines for Water Resource Projects, all economic benefits are based on willingness to pay which is the basis on which value is determined in any standard benefit-cost analysis. In the case of navigation improvement projects, the proxy for willingness to pay is "transportation savings." All economic benefits from navigation improvements ultimately accrue to individuals, and no attempt is made to distribute the benefits in accord their location or the extent of their participation in the economic cycle that includes production, transportation, distribution, wholesale and retail selling and consumption. The study team included only portions of the voyage costs for Savannah's leg.

Page 2-15

760-JK-400-EC12

Comment: *The NED channel depth to Garden City seems to be about 44 ft. Reducing under-keel clearance alone reduces the optimal channel depth by one to two feet. As depth increases, fewer and fewer vessels draft deep enough to save money.*

Response: The Principles & Guidelines defines the Federal objective as "contributing to National Economic Development (NED) consistent with protecting the environment". The NED Plan represents the plan that reasonably maximizes the NED benefits to the nation over the economic costs.

In the case of Savannah Harbor, the underkeel clearances also account for the dynamic condition, and include squat, trim, and freshwater sinkage. Once these factors are netted out, the underkeel clearance requirements are representative of the standard practice. The District reviewed the underkeel clearance that the pilots have typically used to move containerships through the harbor and the economic analysis is based on those numbers.

Savannah District consulted with the Savannah Harbor Pilots Association about underkeel clearance. The pilots indicated that there is no additional information (real-time information on weather, tides, etc) that would allow them to change their underkeel clearance policies.

Page 3-1

760-JK-400-EV48

Comment: *Section 1502.10 of the CEQ NEPA regulations (40 CFR Part 1500) and 32 CFR Part 651, Environmental Analysis of Army Actions; Final Rule prescribe the format of an £IS. The Savannah Harbor EIS does not follow this format and should be revised accordingly. Specifically, Section 2.00 should be entitled Purpose of and Need for the Action; Section 3.00 needs to be titled Alternatives including Proposed Action; a List of Preparers section should be added (presently the list of preparers appears in Appendix V) and should include persons who were primarily responsible for "significant background papers" per 1502.17; the List of Preparers section should be followed by a section entitled Distribution List, which would be the list of agencies, organizations and persons to whom copies of the statement are sent (this list is currently in Section 7.00); and an Index (there is no index in the EIS).*

Response: The EIS follows the format of and sections [in prescribed order] required by 32 CFR 65.43. The Distribution List is the only exception, which is located in Section 7, Public Involvement, Review and Coordination. Appendix W contains the Index.

760-JK-400-EV49

Comment: *CEQ NEPA Regulations (1502.13) require that the Purpose of and need for action section of an EIS "specify the underlying purpose and need to which the agency is responding in proposing the alternatives including the proposed action." Section 2.00 includes statements that describe existing conditions and presumed benefits of the proposed action, but it is not clear if these individually or collectively comprise the underlying purpose and need. The purpose and need needs to be clearly and concisely presented.*

Response: Section 2 of the EIS has been revised to clarify the navigation problems, and it clearly states the project purpose and need.

760-JK-400-EV50

Comment: *CEQ NEPA regulations (1502.14(a)) require that agencies "Rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated." Paragraph 4 on page 3-2 in Section 3.00 states that "The Corps considered three locations in Jasper County, SC that were considered by others for a 'Jasper Terminal'." Paragraph 5 states that the " ... analyses ... resulted in several conceptual alternatives being eliminated from further consideration." 11 references Formulation of Alternatives, May 2005, found in Appendix 0" as the document describing that work. However, Appendix 0 contains no evaluation of the three locations in Jasper County that were considered for a "Jasper Terminal." A Plan Formulation Appendix that discussed the Jasper Terminal locations is included in the General Reevaluation Report, but there is no reference to this in Section 3.00. Additionally, Section 3.00 of the EIS does not identity the alternatives which were eliminated from detailed study, nor does it discuss the reasons for elimination of those alternatives. This deficiency in the document needs to be corrected for the EIS to comply with CEQ NEPA regulation Section 1502.14(a).*

Response: The SHEP NEPA alternatives analysis and Clean Water Act practicable alternatives analysis fully considered a proposed Jasper County Marine Terminal. Among other things, the Regional Port Analysis specifically evaluated current and projected port capacity, demand, and growth, and environmental impacts and constraints for other South Atlantic ports (Norfolk, VA; Wilmington, NC; Charleston, SC; Savannah, GA; and Jacksonville, FL) and a proposed Jasper County Marine Terminal

(GRR, Appendix A, Attachment 6, Final Report). In addition, the information regarding analysis of the Jasper County Marine Terminal was analyzed in a study of the potential costs and environmental impacts of locating the project at one of eight different sites along the Savannah River (four on the South Carolina side, four on the Georgia side). EIS Section 3.0 and Appendix O. Among the conclusions reached as a result of the Regional Port Analysis, the Multiport Analysis, and the analysis of eight alternative sites for the project along the Savannah River were the following: a Jasper County Marine Terminal would not be cost effective when compared to improving Savannah Harbor based on the high cost involved (now estimated at $4 billion including the cost of constructing the new transportation infrastructure that would have to be built), and the timing (a Jasper Terminal does not exist at present and cannot be constructed in time to meet the growth in demand occurring through Savannah Harbor).

Appendix O [2005] makes no reference to the "Jasper Terminal" because the document was completed before the term "Jasper" was used in its description. The following locations for a new terminal were evaluated in Appendix O:

Georgia - Garden City Terminal, East Coast Terminal, Ocean Terminal, Elba Island, Brunswick;

South Carolina- Disposal Area 12A, Disposal Areas 14A/B (this is the site of what is now currently proposed for a Jasper Terminal), Tybee Island National Wildlife Refuge (NWR), and other locations.

It should also be noted that the SHEP and a Jasper Terminal are not viewed by the Joint Project Office as opposing alternatives. Rather, the JPO believes both ports are needed. A March 11, 2011 "Update" from the Jasper Ocean Terminal Joint Project Office, contains numerous statements that SHEP is necessary and beneficial for a Jasper Terminal project ("The development of the Jasper site is predicated on the success of ports in Savannah and Charleston. A completed SHEP and the planned expansion of Charleston are the first steps . . . ."). The Update states that the Jasper Terminal will handle container volumes in excess of what an improved (deepened) Savannah Harbor or Charleston Harbor could handle. The Update also confirms that the Jasper Ocean Terminal will cost $4 billion (a more recent estimate by the SCSPA is $5 billion).

See also other responses regarding alternatives issues including 760-JK-400-EV02, 765-DC-149-EV28, and 765-DC-149-EV46.

Page 3-2

760-JK-400-EV51

Comment: *Section 1502.14 of the CEQ NEPA regulations states that the Alternatives secrion of an EJS "... should present the environmental impacts of the proposal and the alternatives in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decision maker and the public." Section 3.03, however, does not present a comparison of the impacts of alternatives as recommended in the NEPA regulations.*

Response: GRR-Section 11 contains a system of accounts analysis. This was used to identify/compare the impacts of all alternatives [including the no-action plan]. A reference to this system of accounts analysis has been added to the beginning of FEIS-Section 3.00. Additionally, DEIS-Section 3.03 [Tables 3-7 and 3-8] "Comparative Impacts of the Alternatives" provides a comparison of hydrodynamic-related impacts [with and without mitigation] to important estuarine resources for each of the alternative depths considered in detail. EIS-Section 5 addresses the environmental consequences of the proposed action and contains numerous tables that show the individual environmental impacts of the considered

alternatives. These tables clearly demonstrate the potential impacts of the proposed project with and without mitigation.

760-JK-400-EV52

Comment: *CEQ NEPA regulations IS02.14(t) requires the alternatives section of an EIS to "include appropriate mitigation measures nO[already included in the proposed action or alternatives." A review of Section 3.00 indicates that the alternatives section does not discuss mitigation of identified adverse impacts listed in the abstract and in other sections of the EIS, including adverse impacts on the endangered shortnose sturgeon and striped bass habitat, tidal freshwater wetlands, fringe brackish wetlands, and water quality (lowered dissolved oxygen in the inner harbor). For example, the acquisition of lands to mitigate for freshwater wetland impacts is discussed in Appendix C but is not included in the Alternatives section. A mitigation subsection should be added to the Alternatives section which clearly describes mitigation measures not already included in the proposed action or alternatives.*

Response: The EIS's alternative section includes [by reference] a discussion of mitigation. EIS-Section 3.02 specifically notes: "A more detailed impact analysis for these five alternatives is described in Section 5-Environmental Consequences of the Proposed Action and the Mitigation Plan in Appendix C of the DEIS." EIS-Section 5 is the more appropriate location for a full discussion of project impacts [all options] and their individual mitigation requirements.

760-JK-400-EV53

Comment: *CEQ NEPA regulations (IS02.1S) require that the affected environment section of an EIS "concentrate effort and attention on important issues." It is unclear if Project Economics, for example, which is identified in Table 1-1, is an important issue. If so, it should be discussed in the Affected Environment section.*

Response: Table 1-1 lists "Issues Identified for the Savannah Harbor Expansion Project" and includes project economics. Project "issues" are not necessarily part of the affected environment; therefore, Table 1-1 does not directly correlate with those resources discussed in the Affected Environment Section of the EIS. Project economics, although very important to the implementation of the project, are not considered part of the affected environment. A detailed discussion of the project economics is included in the GRR-Economics Appendix. Socioeconomic resources (not included in Table 1-1) are considered part of the affected environment and are discussed in EIS-Section 4.13.

760-JK-400-EV54

Comment: *CEQ NEPA regulations (IS02.24) requires that agencies "shall identify any methodologies used ... " in analyses in environmental impact statements. In many instances, the Environmental Consequences Section S.OO of the EIS clearly states the methodologies that were used to complete the analysis of impacts (e.g., wetlands), but in other instances, such as Environmental Justice, the methodology used to conduct the analysis is not clear and needs to be described.*

Response: EIS-Section 5 includes information on income levels, school locations, hospitals, and child care facilities, proposed road improvement, as well as GPA programs that avoid, minimize and mitigate air quality, traffic, noise, and lighting impacts on the surrounding communities. The District expanded the demographic information about the communities adjacent to the port [to include transportation corridors]. Compliance with EO 12898 and EO 13045 is based on review/analysis of all the information mentioned above. FEIS-Section 5.19 and 5.20 haves been revised to include a list of the types of information collected/analyzed in addressing EO 12898 and EO 13045.

Page 4-1

760-JK-400-EV55, 760-JK-400-EV56

Comment: *In reviewing the DEIS it becomes apparent that the actual purpose of the proposed action is to implement a channel deepening program to mainly support the expansion objectives of the Georgia Ports Authority's (GPA) Garden City Terminal (GCT). In the Introduction to the 2010 General Reevaluation Report (GRR) it states that "... the Panama Canal Expansion Project will be fully operational by 2014, which will allow passage for vessels with up to 50 feet of draft. The Georgia Ports Authority has planned and funded improvements at Garden City Terminal to coincide with the Panama Canal Expansion Project." This would indicate that the GPA has already made and will continue to plan/make modifications to the GCT facilities in clear anticipation that the deepening of the Savannah Harbor to enable larger vessels to reach the GCT will be approved and implemented. Would the GPA be making this major investment in GCT modifications (about $130 million according to the 2005 version of the GRR) if it were concerned about the risk of some other option being chosen? Would the improvements to the GCT be carried out if another alternative, perhaps involving a different terminal site, was selected in the FEIS as a preferred action?*

Response: See response to comment 760-JK-400-EV04. Savannah District expects GPA to expand the GCT to 6.5 million TEUs/annually by 2030 regardless of whether the Savannah Harbor navigation channel is deepened [without project condition]. This capacity [6.5 million TEU] is the maximum number of containers that could reasonably be processed based on factors such as the size of the terminal, the number of gates that provide access to the property, the number and size of the berths, the number and size of the container cranes, the number of jockey trucks that move the containers within the terminal, how the containers are stacked within the terminal, and the number of railroads that service the terminal and the frequency of their trains. It is anticipated that without deepening, more vessels would be required to transport the cargo expected to transit the port. With deepening, the total number of vessels would decrease (compared to without project scenario), as vessels would be able to load/unload without the current constraints of draft.

Page 5-1

760-JK-400-EV57

Comment: *CEQ NEPA regulations (1502.14(a)) require that agencies "Rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated." Paragraph 4 on page 3-2 in Section 3.00 states that "The Corps considered three locations in Jasper County, SC that were considered by others for a 'Jasper Terminal'." Paragraph 5 states that the "...analyses ... resulted in several conceptual alternatives being eliminated from further consideration." It references "Formulation of Alternatives, May 2005, found in Appendix 0" as the document describing that work. However, Appendix 0 contains no evaluation of the three locations in Jasper County that were considered for a "Jasper Terminal." A Plan formulation Appendix that discussed the Jasper Terminal locations is included in the General Reevaluation Report, but there is no reference to this in Section 3.00. Additionally, Section 3.00 of the DEIS does not identify the alternatives which were eliminated from detailed study, nor does it discuss the reasons for elimination of those alternatives. This deficiency in the document needs to be corrected for the DEIS 10 comply with CEQ NEPA regulation Section 1502.14(a).*

Response: See responses to other comments including 760-JK-400-EV02, 760-JK-400-EV50, 765-DC-149-EV28, and 765-DC-149-EV46.

760-JK-400-EV58

Comment: *Paragraph 5, line 5 on page 3·2 of Section 3.00 discusses "Four alternate terminal locations ..." The section continues by stating that "Those four sites were then compared on their economics ...", implying that economics was a reason for eliminating alternatives from detailed study. However, if economics was a reason for eliminating alternatives from detailed study, it is not clearly stated. Moreover, if there were other reasons for eliminating alternatives from detailed study, the DEIS does not state so. Additionally, the DEIS should identify the criteria that were used to compare the feasibility of alternatives for further consideration in the DEIS.*

Response: Several factors, including economics, were evaluated during the screening of alternatives. These factors and the criteria used to compare the alternatives are detailed in Appendix O [referenced in DEIS-Section 3.00]. See also responses to other comments including 760-JK-400-EV02, 760-JK-400-EV 50, 765-DC-149-EV28, and 765-DC-149-EV46.

760-JK-400-EV59

Comment: *Section 3.03, Comparative Impacts of Alternatives. Section \502.14 of the CEQ NEPA regulations states that the Alternatives section of an EIS.....should present the environmental impacts of the proposal and the alternatives in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decision maker and the public." Section 3.03, however, does not present a comparison of the impacts of alternatives as recommended in the NEPA regulations.*

Response: See response to comment 760-JK-400-EV03. GRR-Section 11 contains a system of accounts analysis. This was used to identify/compare the impacts of all alternatives [including the No-Action plan]. A reference to this system of accounts analysis has been added to the beginning of FEIS-Section 3.00.

760-JK-400-EV60, 760-JK-400-EV61

Comment: *Section 3.04, Rationale for Plan Selection. Paragraph 1, line 2 of this section references two pages of the DEIS following the Section 3.04 text that "... summarize the results of the impact analyses." However, the two pages (Table 3·6 and Table 3· 7) only summarize the hydrodynamic· related impacts of the five depth alternatives and do not summarize the impacts of the No Action Alternative, nor deepening only the Garden City Terminal site, which Section 3.00 states in Paragraph 5 on page 3-2 " ... was considered in the detailed evaluations. Section 3.04 of the DEIS, therefore, should be revised to present the environmental impacts of the No Action and Garden City Terminal site alternatives with the five depth alternatives in comparative form 10 provide a clear basis for choice among options. Moreover, the comparison of alternatives should include all environmental impacts that arc discussed in Section 5, Environmental Consequences. In addition to those impacts currently included in Tables 3-6 and 3-7, the summary of impacts should include the following: sediment quality, air quality, marine and estuarine resources, terrestrial resources, floodplains, threatened and endangered species, cultural resources, essential fish habitat, cumulative effects, aesthetics and recreational, recreational and commercial fishing, socioeconomic resources, environmental justice, and other items and factors.*

Response: See response to comment 760-JK-400-EV03. GRR-Section 11 contains a system of accounts analysis. This was used to identify/compare the impacts of all alternatives [including the No-Action plan]. A reference to this system of accounts analysis has been added to the beginning of FEIS-Section 3.00. EIS-Section 5 addresses the environmental consequences of the proposed action and contains numerous tables that show the individual environmental impacts of the considered alternatives. These tables clearly demonstrate the potential impacts of the proposed project with and without mitigation. A

sentence will be added in FEIS-Section 3.04 to clarify this point. The sentence that references deepening only the GCT has been revised to state: "Therefore, deepening only to the Garden City Terminal site was considered in the detailed evaluations."

Page 5-2

760-JK-400-EV62

Comment: *Section 3.07, Alternative Methods or Beneficial Use of Dredged Sediments. Paragraph 1on page 3-23 of this Section identifies that "... Savannah Harbor ODMDS is the least cost disposal alternative for long term maintenance of the proposed harbor deepening project." It is not clear whether or not maintenance dredging is part of the proposed action. If it is part of the proposed action and alternatives, the DEIS must present the environmental consequences of the disposal alternatives and should present these in a comparative form so that the decision maker and the public are presented with a comprehensive evaluation of the short-term and long-term impacts of each alternative.*

Response: The requirements for maintenance dredging the deepened harbor are addressed throughout the in EIS including Section 3, Appendix B, Appendix H, Appendix I, the GRR, and the DMMP. The Georgia DOT (non-Federal sponsor) has provided seven confined upland disposal facilities (CDFs) which would be used to maintain the inner harbor channel. Maintenance material from the entrance channel would normally be placed in either the Savannah Harbor ODMDS or an existing CDF. Impacts associated with the CDFs and the ODMDS have been addressed in previous NEPA documents.

As authorized in the LTMS, maintenance material from the completed project may be put onto Tybee Beach or into nearshore areas off Tybee Island and adjacent to the entrance channel (See Figure 3-3). The environmental impacts of placing maintenance material from the first portion of the inner harbor or the entrance channel into these areas was addressed in the EIS for the LTMS. Prior to the initial placement of material in these sites, the Corps would conduct hard bottom surveys and cultural resource surveys. The Corps would also coordinate with the GADNR-CRD prior to using these sites.

760-JK-400-EV63, 760-JK-400-EV64

Comment: *Paragraph I on page 3-24 of Section 3.07 discusses a "sediment placement plan" that was developed by the Savannah District for the new dredging work associated with the proposed action and alternatives. The text in paragraph I. line 2 on page 3-24 indicates that "The plan was reviewed from an environmental perspective ... ". However, the text does not present the results of that review nor indicate if a complete analysis of impacts of the plan was completed. Since placement of sediment is part of the proposed action, an evaluation of the environmental impact of that component of the proposed action needs to be included in the DEIS. Additionally, Paragraph 3 of Section 3.07 indicates that the " . . . currently proposed plan is based ... ", in part, on " ... general environmental acceptability issues." These issues need to be explained and presented for the proposed plan and any reasonable alternatives to allow a comparison of the impacts of alternatives.*

Response: EIS-Figure 3-2 shows the locations of the sediment placement areas that were initially proposed for new work material. The impacts which would accrue from use of these disposal areas are addressed throughout the EIS. However, as a result of comments provided by GA DNR-CRD and the City of Tybee Island, the sediment placement plan was significantly changed. The FEIS states that all new work sediments excavated from the entrance channel would be placed in either the Savannah Harbor ODMDS or an existing CDF.

As authorized in the LTMS, maintenance material from the completed project may be put onto Tybee Beach or into nearshore areas off Tybee Island and adjacent to the entrance channel (See Figure 3-3). The environmental impacts of placing maintenance material from the first portion of the inner harbor or the entrance channel into these areas was addressed in the EIS for the LTMS. If these sites are used, the Corps would conduct hard bottom surveys and cultural resource surveys prior to any use of these sites. The Corps would also coordinate with the GADNR-CRD prior to using these sites.

EIS-Appendix O, as well as other portions of the EIS (see other responses regarding alternative issues) describes the Corps' consideration of a "range of alternatives", which included non-structural and structural measures to address the identified navigation problems.

760-JK-400-EC13

Comment: *As stated in the 2005 GRR, the preferred terminal was the GCT and it was selected on the basis of construction costs only (page 34). The comparison of these construction costs is skewed to the GCT. Table 6 compares the construction costs of the various potential terminal alternatives. For the GCT there 0$ cost shown in the column for facilities costs. Yet in the succeeding discussion there are $130 million in cost's to modify the GCT to achieve a 1.5 m TEUs. This $130 m is considered in the ORR as part of the without Project Condition and not part of the cost of the SHEP. How can that be when the modifications are to accommodate the larger ships from the Panama Canal Expansion? Facility costs for all the other terminals which range from S250m to $370 m and as they are included in the cost comparison, all of the other alternatives are more costly than the GCT. For example the total facility, dredging and mitigation costs are $326 m for the GCT compared to the Jasper County 14A/14B terminal site of $484 m. However, if the $130 m in facility costs are included for the GCT, its total would be $426 m making the actual cost comparisons among the terminal alternatives more equitable. This analysis was repeated in the 2010 GRR with slightly altered numbers in Table 6-3 but again without including any facility costs for the GCT and thus again the conclusion is that the GCT is the best terminal alternative.*

Response: GPA plans to upgrade the Garden City Terminal in the future with or without a harbor deepening. Since those costs would be incurred independent of the proposed project, they should not be included in the SHEP economic analysis as a cost of the deepening.

Page 5-3

760-JK-400-EC14

Comment: *On pages 105-106 of the 2010 GRR the stated goal for the GCT build-out will be 65 m TEUs. The costs to achieve this to the GCT would be expected to be substantial yet they are never included in the cost comparison of the terminal alternatives.*

Response: The costs to expand the Garden City Terminal to its 6.5 m TEU capacity would occur with or without a harbor deepening project. These costs are already being incurred and are not associated with the project.

760-JK-400-EN19

Comment: *In addition, the cost comparisons of the terminal alternatives do not include operations and maintenance costs. From the dredging maintenance required these costs would be expected to be much higher for the GCT than the other alternatives since the GCT is much further upstream.*

Response: A container terminal in Jasper County was not shown to be a lower-cost alternative. The investigations described previously (e.g., EIS-Appendix O) included a conceptual-level cost analysis to that effect. Although channel maintenance costs were not specifically included, it is only the incremental costs that would need to be assessed. Some increase in O&M costs would be incurred by any of the Savannah port deepening locations, as the entrance channel would need to be extended no matter where the upstream terminus of the deeper inner harbor channel. Further, regardless of the location of any new terminals along the Savannah River, the Corps would still maintain the entire length of the currently authorized project, which extends to Station 112+500. Similarly, the costs to operate a new terminal were not included in the conceptual-level cost analysis. Those operating costs would only lessen the cost effectiveness of a new terminal in those conceptual alternatives. Sensitivity analyses performed by the Corps indicate that, if a Jasper Terminal were operational, it would still be economically justified to deepen the navigation channel to Garden City Terminal.

760-JK-400-EC15

Comment: *All of this would indicate that a more thorough and comprehensive cost analysis is warranted. Furthermore, a construction cost comparison alone is not the complete picture. There has been no benefit/cost financial analysis performed for any of the terminal alternatives and it is recommended that one be carried out to provide a more equitable comparison.*

Response: At the conceptual-level analysis at which the alternate terminal locations were examined, it is reasonable to assume that terminal operating costs would be the same for a given size terminal no matter where that terminal is located. As a result, terminal operating costs would be the same with all sites considered and would not affect a cost comparison between sites.

760-JK-400-EV65

Comment: *The comparison of potential adverse environmental impacts among the terminal alternatives is further evidence of the bias favoring the GCT. Table 5 in the 2005 GRR and discussions in the 20 I 0 ORR clearly demonstrate that the adverse impacts associated with deepening all the way to the GCT are much more significant than those for any other terminal alternative. Yet the economic "efficiency" of the GCT is considered the controlling variable in selecting it as the preferred alternative. The large discrepancy in the degree of adverse impacts attributable to the deepening to service the GCT as compared to the oilier terminal alternatives and the subsequent elimination of all the other terminal options from further consideration in the DEIS implies an inadequacy of the DEIS to provide a tru1y rigorous assessment of reasonable terminal alternatives.*

Response: The adverse impacts of channel deepening to GCT are not more significant than those for other terminal alternatives. Appendix O includes an analysis/comparison of costs [avoidance/mitigation] and impacts for each terminal site. The analysis considered expense of terminal development/improvement, landside transportation, and dredging in comparison with the resultant impacts of each. Other potential issues assessed included wetlands, DO, chlorides, salinity intrusion, Shortnose sturgeon, and Striped bass, debris removal, aids to navigation, etc. The GCT option received the highest composite score. [Appendix O contains more detailed information].

Additionally, the District evaluated the sensitivity of the plan formulation conclusions to wetland mitigation costs by raising wetland mitigation from $20,000 to $100,000/acre. The results of this increase can be seen in Appendix O-Table 31. The increase did not alter the rankings of the top sites, but it did narrow their cost differential. However, the cost disparity remained 23% [mitigation costs

included] and it was unlikely that detailed studies would have changed the ranking. Therefore, the team again concluded only the GCT alternative would be evaluated in detail.

Lastly, all three MEDIUM rated alternative terminal sites (Tybee NWR, DA 12A, and DA 14A/14B) are active CDFs. In fact, the Tybee NWR contains a CDF currently used for disposal of material from Savannah Harbor. This being the case, its lost storage capacity must be replaced elsewhere along the river. Ideal replacement would be in the lower reaches of the river and proximate to its lost counterpart to keep pumping costs comparable. Expansion of the existing CDFs to the north into saltmarsh habitat would be relatively easy to accomplish, but the resultant primary/secondary wetland impacts would be cost prohibitive to mitigate. To avoid these extensive impacts, the US Fish and Wildlife Service suggested the option of taking the O&M sediments to the ODMDS. Two previous studies in Savannah Harbor compared the cost of normal dredging and deposition operations to that of ocean disposal for the same reach and sediment volume. Based on that historical information coupled with the most recent costs for O&M dredging, a cost estimate was developed. Admittedly, they are planning-level estimates, but nevertheless are useful for sensitivity analyses and scenario screening. The cost of taking the subject dredged material to the ODMDS is more than double that of disposal in the CDFs.

See also other responses regarding alternatives issues.

760-JK-400-EV66

Comment: *What is left in the DEIS is not a range of reasonable alternatives but a range of alternatives to deepen the approach to the GCT. The comparative effects of possible terminal alternatives have been effectively removed from consideration m the DEIS. They have been segmented out of the alternatives analysis and segmentation of this nature can be a basis for inadequacy of the DEIS. The analysis presented only addresses comparative impacts of the deepening alternatives, not of the combined total potential impacts of both terminals (new or modified) and deepening options. Some alternatives to consider…*

Response: The EIS addresses the full range of alternatives considered for the Savannah Harbor deepening project. NEPA requires all reasonable alternatives be evaluated with the exception of those eliminated early in the planning process. As described in detail in Appendix O and summarized below, the EIS for the Savannah Harbor project considered numerous potential methods [structural/non-structural] of solving its navigation problems. Management measures with the potential to address navigation inefficiencies were evaluated based on technical, economic, and environmental considerations. The evaluations were conducted in accordance with criteria established by the Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies (U.S. Water Resources Council, 1983) and the policies and procedures established by ER 1105-2-100, Planning Guidance Notebook, April 2000.

Alternative terminal locations were discussed and evaluated. Those included sites in Georgia and South Carolina in the Savannah Harbor environs, as well as more remote locations (Brunswick, GA and Port Royal, SC). The District considered three locations in Jasper County, SC, i.e., the “Jasper Terminal” sites. Modifications to the existing harbor [meeting areas, bend wideners, aids to navigation, etc.] were also reviewed.

The analyses conducted in these early stages of the project resulted in several conceptual alternatives being eliminated from further consideration. Appendix O describes this work and the conclusions. The documentation was circulated to state/federal agencies along with the public for review and comment.

Four terminal locations were judged as having either a MEDIUM or HIGH potential. These four sites were then compared on their economics (including mitigation costs). When the landside development costs are included, deepening to the Garden City Terminal proved to be the most cost effective. The next site option was 45 percent more expensive. Therefore, the Garden City Terminal was the only option [along with no-action] considered in the detailed evaluations.

Additionally, the District evaluated the sensitivity of the plan formulation conclusions to wetland mitigation costs by raising wetland mitigation from $20,000 to $100,000/acre. The results of this increase can be seen in Appendix O-Table 31. The increase did not alter the rankings of the top sites, but it did narrow their cost differential. However, the cost disparity remained 23% [mitigation costs included] and it was unlikely that detailed studies would have changed the ranking. Therefore, the team again concluded only the GCT alternative [and no-action] would be evaluated in detail.

See other responses regarding alternatives issues.

Page 5-4

60-JK-400-EV67

Comment: *Clearly a thorough analysis of comparative impacts of at least some of the terminal options in concert with the deepening options should be included other than only the GCT. It would appear that the alternatives for a Jasper County terminal would merit inclusion since it appears that many of the most serious environmental adverse impacts would be eliminated or minimized with those options. The possibility of a Jasper County terminal is discussed in the GRR, but it requires a more rigorous comparison of impacts with the GCT and other alternatives. This position is supported in Appendix L: Cumulative Impacts where there a number brief mentions of the minimal adverse impacts (to salinity intrusion, oxygen depletion, shortnose sturgeon) associated with a Jasper County terminal location in comparison with the deepening to the GCT.*

Response: Appendix L does mention "minimal adverse impacts" to certain resources, but clearly states that no detailed studies have been conducted. In this absence, it should be obvious that the potential impacts associated with these notional terminal locations are only known at a conceptual level. See other responses regarding alternatives issues, including a Jasper County terminal location.

760-JK-400-EV68

Comment: *In fact, the degree of adverse impacts associated with deepening to the GCT and the respective major investments required for mitigation calls into question whether the GCT is located optimally. Some of these impacts, specifically related to the endangered shortnose sturgeon, cannot be well mitigated. Perhaps an alternative that removes the GCT from the SHEP or maintains it as a companion facility to a more optimally located terminal with substantially less adverse environmental effects could be evaluated.*

Response: See previous responses regarding alternatives issues, Appendix B (Biological Assessment of Threatened and Endangered Species), and NMFS' Biological Opinion in Appendix Z.

760-JK-400-EV69

Comment: *With regard to the deepening alternatives that are presented within the DEIS a question arises as to the need for evaluations at one foot intervals since the overdraft is estimated at two feet. Why not evaluate alternatives that are two or more feet between them? Further, why is there no*

deepening alternative of 50 feet? Or even 52 or 55 feet? It would seem reasonable to include alternatives of 50 feet or more since that is the deepest depth of draft for the ships that will traversing the Panama Canal in 2014? As stated in the GRR, economic benefits increase with deeper alternatives. This may also possibly necessitate other terminal options than only the GCT.

Response: The study authority had no mandate to consider depths greater than -48 feet. As stated in Section 2.04 of the report, this study was conducted pursuant to the Water Resources Development Act of 1999 (Public Law 106-53, Section 102(b)(9)). The wording of the authorization is as follows:

(A) IN GENERAL- Subject to subparagraph (B), the project for navigation, Savannah Harbor expansion, Georgia, including implementation of the mitigation plan, with such modifications as the Secretary considers appropriate, at a total cost of $230,174,000 (of which amount a portion is authorized for implementation of the mitigation plan), with an estimated Federal cost of $145,160,000 and an estimated non-Federal cost of $85,014,000.

(B) CONDITIONS- The project authorized by subparagraph (A) may be carried out only after— (i) the Secretary, in consultation with affected Federal, State of Georgia, State of South Carolina, regional, and local entities, reviews and approves an environmental impact statement for the project that includes—
(I) an analysis of the impacts of project depth alternatives ranging from 42 feet through 48 feet; and
(II) a selected plan for navigation and an associated mitigation plan as required under section 906(a) of the Water Resources Development Act of 1986 (33 U.S.C. 2283(a)); and
(ii) the Secretary of the Interior, the Secretary of Commerce, the Administrator of the Environmental Protection Agency, and the Secretary approve the selected plan and determine that the associated mitigation plan adequately addresses the potential environmental impacts of the project.

(C) MITIGATION REQUIREMENTS- The mitigation plan shall be implemented before or concurrently with construction of the project.

760-JK-400-EV70

Comment: *3.0 Alternatives - Pg 3·3, 2nd para - "The studies found that (1) the expected growth of container cargo over the next 20 years would exceed the capability of any single existing or future (Greenfield) deepwater container terminal along the East Coast, (2) expansion of any existing container terminal or creation of a new terminal would cause environmental impacts, and (3) improving Savannah Harbor would not cause cargoes to shift from other ports to Savannah. Dismissing as an alternative the creation of a new terminal because it would cause environmental impacts is shortsighted and premature. Only after investigating the potential impacts of a new terminal to a level that would allow them to be directly compared against potential impacts of other alternatives such as incremental deepening, would it be possible to determine if the new terminal alternative were the least environmentally damaging practicable alternative.*

Response: See other responses regarding alternatives issues, including a Jasper County terminal location. The formulation of alternatives was conducted in accordance with criteria established in the Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies (US Water Resources Council, 1983) and the policies and procedures established by ER 1105-2-100, Planning Guidance Notebook, [April 22, 2000]. Appendix O demonstrates that numerous terminal locations were rigorously considered and evaluated.

Page 5-5

760-JK-400-EV71

Comment: *3.0 Alternatives - Pg 3-4, 3rd para - "For all dredging alternatives, the proposed dredging depths would include an additional 2 feet of allowable overdepth to ensure the contractor obtains the required dredging template. The dredging depths also include advanced maintenance that help the project remain at the authorized project depth between maintenance events. The existing amounts of advanced maintenance are shown in Table 3-2". The project alternatives that are being considered in detail within this DEIS are channel deepening activities ranging from authorized depths of -44 feet to -48 feet. Based on the above reference to allowable overdepth and advanced maintenance (shown in Table 3-2), the final channel depths for each deepening alternative could actually range from -52 feet (i.e., -44 feet of authorized depth plus 2 additional feet of depth for allowable overdepth, plus up to 6 additional feet of depth for advanced maintenance) to -56 feet (-48 feet of authorized depth plus 2 additional feet of depth for allowable overdepth, plus up to 6 additional feet of depth for advanced maintenance). This needs to be more clearly identified in the text describing each alternative and in a table that compares the final depths of each alternative.*

Response: The text in FEIS-Section 3.01 has been revised to better explain the overdepth and advance maintenance considerations associated with each depth alternative.

760-JK-400-EV72

Comment: *3.01.1 No Action Alternative - Pg 3-4, 5th para - "Previous investigations indicate that demand for goods moving through Savannah Harbor, particularly as containerized cargoes, will increase in the future". What is/are the references for this statement?*

Response: A reference to the “previous investigations” mentioned on page 3-4 has been added to the FEIS.

760-JK-400-EN20

Comment: *d. Annual Maintenance Dredging - Pg 3-8, 2nd para ~ "Approximately 7 million cubic yards of sediments are removed each year from Savannah Harbor Navigation Project by the Corps". What is the calculated increase/decrease in maintenance dredging due to the SHEP? Does the calculation include the effects of a navigation channel that could be as deep as -56 feet?*

Response: Approximately 6.2 million cubic yards of sediment are [naturally] deposited in the harbor annually. This volume is forecast to remain constant after deepening. The prediction [of the degree of shoaling for the deepened channel] was based on an inspection of long-term records for the harbor as well as the results of hydrodynamic modeling. Through numerous widening and deepening projects, the shoaling rate has not increased over the past 40 years. This trend was verified by early hydraulic studies of the harbor and a review of dredging records. However, during operation of the Tidegate, a substantial portion of material settled out in the Sediment Basin (as designed). This phenomenon resulted in lower shoaling rates in the river channel and lower dredging costs since this material could be subsequently placed in the disposal areas adjacent to the sediment basin. When the Sediment Basin was taken out of operation, more material moved into the channel with a concomitant increase in dredging costs. With the proposed deepening and construction of its associated mitigation features, a sill will be placed at the mouth of the Sediment Basin which will allow it to become partially filled. When the Sediment Basin is no longer capturing sediments, the excess will be deposited into the channel. There will be increased cost for removing this material since it more distant from the dredged material

containment areas. Regardless, the increased funding required for this maintenance has been identified is included in the SHEP's O&M costs and project economic analysis.

The only part of the harbor that would be at -56 feet depth is the Kings Island Turning Basin [which has an approved advanced maintenance of 8 feet]. Because of its size, the basin functions as a sediment trap for much of the sediment shoaling in the upper harbor. Therefore, this level of advance maintenance is necessary to keep the basin functional [without the need for costly, repeated dredging]. This advance maintenance component was factored into the overall economic/engineering evaluation.

760-JK-400-EV73

Comment: *h. Unconfined Placement Sites - Pg 3- 14, 2nd para - "Moreover, the results of this survey indicated that no cultural resources would be adversely impacted by the proposed placement of dredged sediment within these areas". Was there SHPO concurrence with this finding?*

Response: The sediment placement plan has significantly changed since publication of the DEIS based on input from GA DNR-CRD and the City of Tybee Island. The FEIS has been modified to reflect these changes. At this time, with the exception of the ODMDS, there are no plans to use any of the nearshore sites for new work material (shown in Figure 3-2). Please see previous response (760-JK-400-EV63 and EV64) concerning future maintenance dredging.

760-JK-400-EC16

Comment: *3.04 Rationale for Plan Selection - Pg 3-19, 4th para - "Environmental impacts associated with a shallower depth would be less than those associated with the NED plan, but the lesser impacts of the 44-foot depth, 45-foot depth and 46-foot depth alternatives are not considered sufficient to justify recommendation of these alternatives instead of the NED plan". There is no explanation as to why the Corps considers the lesser impacts of the 44, 45 and 46 foot channels to be sufficient to justify their recommendation instead of the NED plan. This rationale needs to be discussed in detail.*

Response: The Principles & Guidelines defines the Federal objective as "contributing to National Economic Development (NED) consistent with protecting the environment". The NED Plan represents the plan that reasonably maximizes the NED benefits to the nation over the economic costs. The NEPA process is a separate, but concurrent process that is intended to address the environmental concerns of the project.

The section must have been unclear because the Corps was not and is not recommending construction of all depth alternatives, as intimated by the comment. The Corps' assessment of an alternative includes its accompanying mitigation measures. If an acceptable mitigation plan can be developed for a given alternative, then that alternative is judged to be very similar in net environmental impacts to other plans that also have acceptable mitigation plans.

Page 5-6

760-JK-400-EV74

Comment: *3.04 Rationale for Plan Selection - Pg 3-20, Table 3-6 - Regarding Fisheries, and the impacts of each Depth Alternative, what does It-Loss of Acceptable Habitat" mean?*

Response: Suitable habitat was defined by the Fisheries ICT. Loss of acceptable habitat is defined as grid cells in the model outputs that do not meet the suitability criteria. Acceptable habitat was determined using suitability criteria for each species. The suitability criteria (acceptable habitat) for all species were developed via interagency collaboration and Appendix P has been revised to include the suitability criteria for each species and a definition of acceptable habitat.

760-JK-400-EV75

Comment: *3.05 Tentatively Recommended Plan - Pg 3-22, 5th para - "Two feel of allowable overdepth and up to 6 feet of advanced maintenance in selected areas (see Table 3-2, above) would also be included for the proposed action". This apparently means that the actual depth of the navigation channel in much of the Savannah River would be either 55 feet deep (for a 47-foot project) or 56 feet deep (for a 48-foot project). This being the case, the water quality and hydrodynamic model results for the 47-foot and 48-foot alternatives don't correctly predict the impacts on dissolved oxygen and salinity. In turn, the discussion of impacts on the river's resources is inaccurate for the 47-foot and 48-foot alternatives. Since the mitigation plan was developed to address the impacts predicted by the models, it too would need to be revised to address impacts of the actual channel depths.*

Response: Over-depth and advance maintenance were considered in the water quality and hydrodynamic model development, as outlined in the GRR-Appendix C . In addition, the Supplemental Study to the EN Appendix (see "Development of the Hydrodynamic and Water Quality Models", January 2006) includes detailed information [Section 4.2-page 21] on the model's grid bathymetry. Specifically, for each channel depth alternative the model grid was lowered by the appropriate amount. Namely, the 48' project depth required adjusting the model grid bathymetry by 6', the 47' project depth required adjusting the model grid bathymetry by 5', etc. The original model grid was based on actual annual surveys, which include the advance maintenance/over depth component. These data were directly included in the model design to capture/evaluate the depths involved.

760-JK-400-EV76

Comment: *3.12 Relationship of Proposed Action to Other Federal Projects - Pg 3-29, 5th para - «As indicated in Section 3.01 of this Draft EIS, the proposed action assumes that the project feathures associated with the LTMS (USACE 1996), Bank Protection for CDFs 13A and 138, and the realignment of the Federal Navigation Channel (USACE 2006) have been completed". Given the historic uncertainty in the federal funding stream, what would be the environmental and economic impacts if the above mentioned project features have not been completed when the proposed SHEP project is ready to be constructed? Would the Corps proceed with constructing SHEP?*

Response: The features (CDF 14A) addressed in the LTMS have already been constructed and the channel realignment is finished. Bank protection for CDFs 13A and 13B are funded under the Operations and Maintenance Program for the harbor and have no direct bearing on the SHEP's construction.

Page 6-1

760-JK-400-EV77

Comment: *The sections of the report discussing impacts to wetlands and floodplains are generally without consistent references to the numerous support documents, making the discussion difficult to follow. The document has numerous figures without legends, scales and north arrows; this combined with the actual size of the figures makes them difficult to interpret.*

Response: Improvements to the figures, legends, scales, etc, were incorporated as needed to understand the graphic.

760-JK-400-EV78

Comment: *The USACE proposes to allow the wetland restoration site (Disposal Area I S) to revegetate naturally. Slow vegetative establishment within the restoration site allows for the establishment of invasive species and would allow more temporal loss in wetland functions and values than is necessary. Planting the site with appropriate wetland vegetation would minimize the potential for invasives to colonize the area.*

Response: The criteria which would be used to determine if wetland restoration/growth rates at Disposal Site 1S meet projections are located in Appendix C, Mitigation Planning, and Appendix D Monitoring and Adaptive Management Plan. The plan has been expanded to include monitoring for invasive species [especially common reed and Chinese tallow tree], together with measures to control such species should they prove problematic.

760-JK-400-EV79

Comment: *The USACE is depending on the models to estimate proposed impacts and potential mitigation alternatives. Despite these models being independently verified, the US ACE is putting too much reliance on their results.*

Response: The models were used as a predictive tool to assess future impacts expected to occur with the various depth alternatives. Their use employed state-of-the-art techniques that were independently reviewed and verified. This work was part of a comprehensive study approach that was refined over a 13-year period to ensure all impacts were adequately assessed. All of the analyses performed and their derived data were coordinated with the interagency teams, the non-federal sponsor, and stakeholders for review/comment. The end result is a product which more than adequately evaluates the impacts of the various project alternatives.

760-JK-400-EV80

Comment: *A comprehensive investigation is needed to quantify the impacts of the project and the amount of mitigation proposed to ensure no net loss of wetland functions and values.*

Response: The District conducted a comprehensive investigation that quantifies the project-related impacts on wetland function and values. This analysis also evaluated mitigation options within the Lower Savannah Watershed. Additional information may also be found in Appendix C – Mitigation Planning, Section VII Consideration of 2008 Mitigation Rule.

760-JK-400-EV81

Comment: *Section 4.08, page 4-62. The first sentence under the wetlands sub heading references a 1992 Planning Aid Report for the Savannah Comprehensive Study but does not provide an author. Later in the section, references are made to "that USFWS report" or "the UFWS report." Arc these the same report? If so what is the correct date? The reference section contains a 1982 and a 1983 report of the same title by USFWS.*

Response: A reference has been added to explain that the USFWS prepared the 1992 Planning Aid Report for the Savannah Harbor Comprehensive Study.

760-JK-400-EV82

Comment: *The imagery used in the report discussed above was taken in 1979 (31 years ago) and is too old to accurately reflect existing conditions.*

Response: The information on EIS-Pages 4-62 to 4-65 was included to provide the reader with a general characterization of wetland communities in the Savannah Harbor estuary. This information is still valid. The EIS also contains recent, specific information on the types and amounts of wetland communities in the study area [I-95 Bridge to the mouth of Back River].

760-JK-400-EV83

Comment: *Section 4.08, page 4-63, item 14 "Scrub-shrub." The community description only lists one shrub and 4 tree species. Should this more appropriately be classified as a forested community?*

Response: To reiterate, the 1992 Planning Aid Report had the following caveat, *"the data reflect a wetland system that was likely still in a state of transition. However, the findings still provide value in their general characterization of wetland communities in the Savannah estuary."* At that point, the observed scrub-shrub communities were dominated by species such as the *Cephalanthus occidentalis. Nonetheless,* it is valid to include tree species like *Taxodium* spp., *Nyssa* spp., *Acer rubrum,* and *Salix* spp. that often inhabit these transitional, scrub-shrub environments. Table 4-12 illustrates that areas identified as scrub-shrub wetlands comprise 25.7 percent of the forested wetlands occurring in the Savannah Harbor area.

760-JK-400-EV84

Comment: *Section 4.08, page 4-63. Are there no pine dominated wetlands along the transition between marsh and forested communities?*

Response: The information in the EIS regarding wetland community types is based primarily on the USFWS 1992 Planning Aid Report and *as emphasized* in Section 4.08, the wetland system remains successional in nature. More recent studies have not been conducted of those areas. There may be some transitional [between marsh and forested communities] pine-dominated wetlands, but this has not been documented. However, the EIS discussion focuses primarily on the emergent wetland areas within the project effect's area.

Page 6-2

760-JK-400-EV85
Comment: *Section 4.08, page 4-65 cites "Tidal Wetland Studies, USFWS, 2003". This reference cannot be found in Section 9.0 References.*

Response: A reference for the USFWS, 2003 Tidal Wetland Studies has been added to FEIS-Section 9.00, References.

760-JK-400-EV86,760-JK-400-EV87
Comment: *Section 4.08, page 4-64 states: "It is likely that the percentages of those various wetland community types have changed over time. However, the Corps is not aware of similar information that is more recent.*

No project specific wetlands data is provided in this Section. Has a wetland delineation using the Corps 1987 Manual and regional supplement been done for the Project Area? The exact location of wetlands should be shown and each wetland should be characterized based size and dominant flora. If not, an "on-the-ground" delineation is needed. Alternatively, appropriate remote sensing techniques may be used.

Response: Detailed wetland field studies were performed by the USGS Florida Fish and Wildlife Cooperative Research Unit (2003) and ATM, Inc (2003) to characterize emergent wetlands in the potential impact area. These data, coupled with the modeling results, were used to quantify indirect impacts to freshwater and saltmarsh. These areas will again be studied for one year as part of the pre-construction phase of the project. Monitoring of marsh vegetation would occur during the period of construction and after construction. The marsh sites would be evaluated with respect to vegetation composition for more than ten years. Tidal monitoring stations installed at these marsh sites would also record water surface elevation, specific conductance of surface waters that flood the marsh and its root zone, and water depth. The recorded data would be downloaded monthly. The District expects to fund the USGS Florida Fish and Wildlife Cooperative Research Unit to perform this work. The District used an inclusive, elevation-based GIS analysis and site reconnaissance to determine the initial 15.68 acres of wetlands that will be excavated as a result of the SHEP. Prior to the start of construction, the District will verify the reported impact acreage via a wetland delineation. Even if there is a minor adjustment in the impact acreage, the “sum of r” factors reported in the SOP calculation (See Appendix A of Appendix C- Mitigation Planning) would remain the same. However, the acreage of required saltmarsh restoration would have to be recalculated. The available acreage for saltmarsh restoration at DA 1S (40+ acres) would be more than sufficient to compensate for any slight adjustment that might occur.

760-JK-400-EV88
Comment: *Based on Table 5-1 page 5-2, wetland impacts appear to be based solely on elevation. An explanation is appropriate. Have these impact's been field verified? If so, this needs to be stated.*

Response: The District used an inclusive, elevation-based GIS analysis and site reconnaissance to determine the initial 15.68 acres of wetlands that will be excavated as a result of the SHEP. Prior to the start of construction, the District will verify the reported impact acreage via a wetland delineation. Even if there is a minor adjustment in the impact acreage, the “sum of r” factors reported in the SOP calculation (See Appendix A of Appendix C- Mitigation Planning) would remain the same. However, the acreage of required saltmarsh restoration would have to be recalculated. The available acreage for

saltmarsh restoration at DA 1S (40+ acres) would be more than sufficient to compensate for any slight adjustment that might occur.

760-JK-400-EV89

Comment: *Table 5-1, page 5-2. The use of a single elevation in evaluating wetland impacts throughout the project area is in appropriate. The lower and upper limits within a single wetland community (i.e. Spartino alterniflorCl) will change moving further upstream or downstream. These changes may be small but given the length of this project, the acreage could be significant.*

Response: The District used an inclusive, elevation-based GIS analysis and site reconnaissance to determine the initial 15.68 acres of wetlands that will be excavated as a result of the SHEP. Prior to the start of construction, the District will verify the reported impact acreage via a wetlands' delineation. Even if there is a minor adjustment in the impact acreage, the "sum of r" factors reported in the SOP calculation (See Appendix A of Appendix C- Mitigation Planning) would remain the same. However, the acreage of required saltmarsh restoration would have to be recalculated. The available acreage for saltmarsh restoration at DA 1S (40+ acres) would be more than sufficient to compensate for any slight adjustment that might occur.

760-JK-400-EV90

Comment: *Section 5.1.1.2 Mitigation, identifies Spartina alfemiflora as occurring at +7.6 to +7.8 MLLW but Table 5-1 is based on MLW. A single vertical datum and tidal stage should be used to reference all elevations or the relationship between each one used needs to be defined within the document.*

Response: The FEIS will not be updated and normalized to reflect a single vertical datum and/or tidal scale. However, it does contain the following table to help readers convert referenced datum, if desired.

Relationship between Mean High Water and other vertical datum in the Savannah region.*

Vertical datum	*Difference to MHW*
NGVD29	-0.660
NAVD88a	-0.939
MSL	-1.009
MLW	-2.108
MLLW	-2.174

* Datum relationships determined by tidal station #8670870 at Fort Pulaski, Savannah, Georgia.

Information obtained from NOAA Technical Memorandum NESDIS NGDC-6, DIGITAL ELEVATION MODEL OF SAVANNAH, GEORGIA: PROCEDURES, DATA SOURCES AND ANALYSIS, National Geophysical Data Center Marine Geology and Geophysics Division, Boulder, Colorado January 2008

760-JK-400-EV91

Comment: *Figure 5-1, page 5-3. No scale or north arrow provided. Text on background image is illegible. No aerial image. Scale of drawing prevents an evaluation of the two excavation areas planned at the Kings Island Turning Basin.*

Response: Figure 5-1 has been revised to improve viewing.

760-JK-400-EV92
Comment: *Figure 5-2, page 5-4. Level of detail and scale of the Figure prevents evaluation of planned wetland impacts.*

Response: Figure 5-2 has been revised to improve viewing.

760-JK-400-EV93

Comment: *Figure 5-3, page 5-5 No scale bar, north arrow or legend. The lack of a legend prevents reviewers from determining what exactly is happening at this location.*

Response: Figure 5-3 has been revised to improve viewing.

760-JK-400-EV94
Comment: *The fourth sentence on page 5-6 states; "CDF I S is located adjacent to the confluence of Front River and Middle River, and it is located within the boundaries of the Savannah National Wildlife Refuge (see Figure 5-52)." However; Figure 5-52 on page 5-134 is a photograph of Old Fort Jackson (Upstream Bank Protection).*

Response: The text has been revised to reference Figure 5-4 instead of Figure 5-52.

Page 6-3

760-JK-400-EV95
Comment: *This project will result in a net loss of wetlands within South Carolina and the Charleston District, based on the fourth sentence on page 5-5 describing the location of the proposed mitigation site*

Response: The 2008 Final Mitigation Rule encourages a watershed approach when evaluating impacts to aquatic resources as well as the selection of appropriate mitigation. The District has conducted a functional assessment of the impact areas and proposed mitigation sites. A watershed assessment was also conducted which confirmed that the proposed mitigation was appropriate [see earlier responses that detail information concerning the functional and watershed assessments]. SHEP would require the excavation of 0.85 acres of saltmarsh in South Carolina waters. However, restoration of saltmarsh at Disposal Area 1S would provide “in-kind/in-basin” replacement for noted marsh excavation. For the type and magnitude of impact, the DA 1S restoration site represents the most practical option for mitigation. Although the mitigation site would be located in Georgia waters, the wetland functions attributed to the site would service all of the Lower Savannah Watershed [both Georgia and South Carolina waters]. See also numerous other responses to comments on this issue.

760-JK-400-EV96
Comment: *The last sentence of the first paragraph on page 5-6 states "excess mitigation would be credited to the Savannah Harbor Navigation Project." How will this "excess" mitigation be credited and debited to ensure no additional loss of wetland acreage? Establishment of a wetland mitigation bank with the Corps as the sponsor and overseen by the remaining agencies that make up the Wetlands Interagency Coordination Team may be a plausible approach.*

Response: The District used the SOP to determine the total number of credits that would be generated at Disposal Area 1S. Present calculations determined 28.75 acres would compensate for the 15.68 acres of saltmarsh lost [details in Appendix C-Mitigation Planning]. Release of any excess credits [only for use on the Savannah Harbor Navigation Project] would occur after the long-term health/productivity of the restoration site is verified by the Federal Cooperating Agencies.

760-JK-400-EV97

Comment: *In Section 5.1. 1.2, page 5-6, the USACE proposes to allow the wetland restoration site (Disposal Area IS) to revegetate naturally, provided that the minimum percent vegetative cover shown in Table 5-2 is met in each of the first 5 years shown.*

Based on the text below Table 5-2, it is uncertain when the USACE would plant, at the end of any year or at the end of the 5 year period? By allowing natural revegetation the Corps is ensuring that the plants that establish within the site are genetically appropriate for the region. However the slow vegetative establishment within the restoration allows for the colonization of invasive species and would allow more temporal loss in wetland functions and values than is necessary. Planting would be more appropriate.

Response: After preparation, the restoration site would be allowed to vegetate naturally. It is unlikely that invasive species [*Phragmites australis]* would significantly colonize the 40+-acre restoration site given the density of *Spartina alterniflora* and associated seed stock in the immediate vicinity. Likewise, the site's salinity/tidal range are conducive to supporting a robust growth of *Spartina alterniflora*. The Adaptive Management Plan includes sprigging *Spartina alterniflora* if the site does not colonize at the rate indicated in FEIS-Table 5-2, as well as adjustment of the ground elevation by either excavation or filling. The plan also includes measures for removal of invasive species. Annual monitoring reports would be generated over a period of seven years and provided to the Wetland Interagency Coordination Team (ICT). If the restored marsh does not meet the success criteria illustrated in Table 5-2, then the ICT would identify corrective actions for the Corps to implement to achieve the compliance objectives. The need for corrective action(s) would be determined annually with agency involvement/concurrence. At the end of seven years, if the site's plant density is not within 10% of the reference site, the ICT would be consulted for a determination on how to proceed (see updated Appendix C-Mitigation Planning).

760-JK-400-EV98

Comment: *Figure 5-4, page 5-7 No scale bar or legend presented. Level of detail and scale of the Figure prevents evaluation of restoration site.*

Response: Figure 5-4 will be enlarged so that it can be seen more clearly; a scale bar and legend have also been added.

760-JK-400-EV99

Comment: *"Section 5.1.2.2, page 5-1 1, Applied Technology and Management (March 2003) was cited; however this reference does not appear in Section 9 References."*

Response: A reference for Applied Technology and Management, March 2003 (referenced in Section 5.1.2.2) has been added to Section 9.00, References.

760-JK-400-EV100
Comment: *Section 5.1.2.2, page 5-1 1, USFWS (Welch and Kitchens 2006) was cited; however this reference does not appear in Section 9 References.*

Response: Welch and Kitchens 2006 (cited in Section 5.1.2.2) was added to Section 9.00, References.

760-JK-400-EV101
Comment: *Table 5-2, page 5-7. Table title does not match with what IS provided 10 Table of Contents.*

Response: In the List of Tables the title of Table 5-2, has been changed from "Marsh Revegetation Rate" to "Revegetation Rate for Created Marsh" to lessen confusion.

760-JK-400-EV102
Comment: *Section 5.1.2.1, page 5-8. The accuracy of the models will not be known until years after all of the work is complete. This fact is supported by the internal Corps documents found in Appendix N on page 44.*

Response: It is unclear what the comment is referencing on DEIS-p. 5-8. Model accuracy is dependent on calibration with existing conditions, not future completion of the project. The "work" referred to in Appendix N-p. 44 is the effort necessary to complete the modeling analyses rather than SHEP construction.

760-JK-400-EV103
Comment: *Table 5-3, page 5-1 1 Table title does not match with what is provided in the Table of Contents.*

Response: The title of this table (now Table 5-5), has been changed from "Marsh Distribution" to "Marsh Distribution From EFDC Model" to lessen confusion.

760-JK-400-EV104
Comment: *Table 5-4, page 5-13 Table title does not match with what is provided in the Table of Contents.*

Response: In the List of Tables, the title of this table (now Table 5-6) has been changed from "Summary of Hydrodynamic-Related Fishery Impacts Without Mitigation" to "Summary of Project-Related Impacts Without Mitigation".

Page 6-4

760-JK-400-EV105
Comment: *In Section 5.1.2.3 page 5-13, The Corps introduces a component of the mitigation package, "Flow Routing". What are the direct and secondary impacts from Flow Routing?*

Response: The SHEP's flow routing elements provide a means to avoid and minimize indirect wetland impacts to the maximum extent practicable. Direct impacts associated with flow routing structures include construction of the diversion structure at McCoys Cut,and the submerged berm in Back River. All of these fill-related activities would result in placement of material on unconsolidated water bottoms. Mitigation would not be required for fill which is not intrusive with the water surface since there is essentially no functional change, i.e., the water depth is just less. The plug in Rifle Cut would

result in the creation of a mudflat and marsh habitat. This would constitute a net gain in aquatic function and the values associated with essential fish habitat. The flow routing structures are an indirect means to avoid and minimize wetland impacts (see Appendix C). Without these structures, approximately 1,177, acres of freshwater marsh would convert to brackish marsh with the 47-feet alternative. With flow-routing measure 6A, there would only be 223 acres of freshwater marsh at risk. Thus, flow routing measure 6A satisfies both avoidance and minimization elements by maintaining 954 acres of freshwater marsh that would otherwise experience some degree of species shift.

760-JK-400-EV106

Comment: *Table 5-7, page 5- \6. Table title does not match with what is provided in the Table of Contents.*

Response: The title of that table (now Table 5-9) has been changed to match the title shown in the Table of Contents.

760-JK-400-EV107

Comment: *Figure 5-5, page 5-15. Table title does not match with what is provided in the Table of Contents.*

Response: The title of that table has been revised to match the title in the Table of Contents.

760-JK-400-EV108

Comment: *The following figures have no scale bars or north arrows (not inclusive):*

- *Figure 5-6, page 5-1S*
- *Figure 5-7, page 5-19*
- *Figure 5-8, page 5-20*
- *Figure 5-9, page 5-21*
- *Figure 5-10, page 5-22*
- *Figure 5-11, page 5-23*
- *Figure 5-12, page 5-24*
- *Figure 5-13, page 5-25*
- *Figure 5-14, page 5-26*

Response: The FEIS includes revisions to figures that allow the reader to more clearly present the information the Corps intends to convey.

760-JK-400-EV109

Comment: *Table 5-16, Page 535. Channel Depth Alternatives 46, 47 and 4S-Foot have freshwater wetland impacts too large to go without at least a 1: 1 restoration component within the same river basin or at a larger ratio in another river basin.*

Response: The District conducted a watershed assessment in the Lower Savannah River Harbor to evaluate specific mitigation measures which could compensate for the potential conversion of freshwater wetlands [223 acres] to its brackish marsh counterpart. This functional assessment concluded the only element of wetland function that would be affected by this conversion is the fish and wildlife habitat component. To rectify these losses, the District reviewed approved mitigation banks in the Lower Savannah River Watershed, and determined there were none with the appropriate tidal, freshwater wetland characteristics. The District determined that the “In-Lieu Fee” program is also functionally unable to provide the requisite compensation. The District considered the creation of

freshwater, tidal wetlands. However, it was ultimately concluded by the study group that this was not a long-term solution given the unacceptable potential for failure.

The District consulted the Wetland Interagency Coordination Team (ICT) [technical experts from USACE and federal/state natural resource agencies assembled to provide guidance on SHEP wetland impacts and mitigation]. The USFWS stated that mitigation actions must be performed within the basin for impacts to wetlands located within the SNWR. The Service suggested preservation of lands as a possible solution and recommended sites that are part of its long-term lands acquisition strategy to compliment the SNWR. The District then consulted with the Stakeholder Evaluation Group, including its non-governmental organizations members, to see if they had identified any suitable mitigation options. Over the 10-year study period, no agency/organization could identify another feasible alternative as mitigation for impacts that would occur as a result of the wetland species shifts. Therefore, the District proceeded with the identification of preservation sites.

The Corps' Agency Technical Review (ATR) assessed the use of Savannah District's SOP to develop a mitigation plan for SHEP. The ATR was lead by the Corps' National Deep-Draft Navigation Planning Center of Expertise; technical work was performed by Corps experts at the Engineering Research and Development Center in Vicksburg, MS. The ATR evaluated the SOP to determine if it was an appropriate method of ascertaining the preservation acreage needed to compensate for SHEP impacts. The ATR also commented on the underlying assumptions used in the application of the SOP for the SHEP. It should be emphasized that the SOP was only used to determine the amount of preservation acreage necessary to offset the remaining impacts after development of avoidance, minimization, and restoration features. The ATR concurred with use of the SOP to determine the amount of preservation acreage needed and considered Savannah District's application of the SOP to be reasonable in quantifying impacts and the required mitigation.

The USFWS provided a Fish and Wildlife Coordination Act Report, dated August 2010. In that report, the USFWS concurred with use of the SOP, which calculated a need to preserve 2,245 acres of land adjacent to the SNWR for the 47-foot alternative . The Service provided updates to the SOP calculations in Appendix A of the report. The District concurred with use of the updated SOP worksheets and adopted their results for use in the DEIS. In its Adaptive Management Program, the District also proposed acquisition of additional wetlands if monitoring demonstrates wetland impacts are under-predicted.

In summary, the most appropriate and practicable means of mitigating the resultant species shift is the preservation of 2,245 acres of bottomland hardwoods and upland buffer. USFWS and the Savannah National Wildlife Refuge (SNWR) have already prepared a prioritized acquisition list of ecologically-valuable properties within the estuary which can further Refuge's goals and enhance the basin's fish and wildlife resources.

760-JK-400-EV110

Comment: *There is no discussion on potential impacts associated with elements of this project including a new boat ramp and new water intakes. Are there wetland (or other resource) impacts associated with these components of the project?*

Response: The boat ramp would be constructed within the property boundaries of the existing Tidegate [See Appendix C – Mitigation Planning]. Construction of the boat ramp would not require the filling of jurisdictional wetlands, however some fill material (concrete, rock) would be discharged into unconsolidated river bottom in Back River.

Based on additional studies, a supplemental raw water storage impoundment would be constructed to provide the City of Savannah with a dependable source of water during high chloride spikes. The initial site plans for this impoundment provide for it to be located in an existing industrial park. As such, the District does not expect construction of this impoundment to impact any non-tidal jurisdictional wetlands. However, the site would be surveyed prior to construction. If jurisdictional wetlands are present and impacts to wetlands are unavoidable, additional mitigation would be provided.

760-JK-400-EV111, 760-JK-400-EV112

Comment: *The Essential Fish Habitat portion of the DEIS was difficult to follow. Tables and figures were mislabeled, lacked legends, or were of poor quality. In addition, the DEIS contained a paucity of information about impacts to essential fish habitat or how the project will impact essential fish habitat from a fish accessibility perspective. Instead the DEIS focused on the mitigation of essential fish habitat in the majority of the discussion. The lack of information about the impacts or consideration of realistic options that would avoid the impacts suggests the requirements of NEPA may not have been satisfied. Extensive areas of essential fish habitat will be lost because of the project. The mitigation of essential fish habitat through the restoration of inaccessible marsh habitats or the purchase of woodland does not provide adequate replacement for the essential fish habitats that will be lost due to this project. The inaccessibility of mitigation areas renders the essential fish habitats, non-fish habitats and, therefore, non-essential and nonexistent from a fisheries perspective.*

Response: EFH is discussed in DEIS-Sections 4.05 and 5.14, as well as in Appendix S.

Page 6-5

760-JK-400-EV113

Comment: *Table 4-8 highlights potential impacts to essential fish habitats due to the project. The table does not include potential impacts due to the increased wave activity caused by the larger ships for which the project is being constructed. The absence of this information is likely to underestimate the loss of essential fish habitats.*

Response: The Fisheries Interagency Coordination Team did not incorporate wave activity into the criteria for evaluating potential impacts to essential fish habitat. However, the District did examine how wave activity would affect the shoreline within the project effects' area [GRR, Appendix C, Section 9.0]. The habitat suitability criteria used to evaluate impacts to essential fish habitat, critical species, and life stages were defined and agreed upon [after a great deal of deliberation] by the Cooperating Agencies and the Fisheries Interagency Coordination Team. The District believes that the criteria and data used, as well as the modeling conducted are sufficient to evaluate impacts posed by each of the different project alternatives.

760-JK-400-EV114

Comment: *Table 4-8 also highlights a potential loss of live/hard bottoms. Actual loss could be determined by a study of the proposed channel extension or sediment deposit areas. It is difficult to assess the impacts of a project if the proper studies have not been completed to determine the likely impacts of the project.*

Response: The potential live/hard bottom impacts shown in Table 4-8 are related to placement of sediment in the nearshore. However, based on input from GA DNR-CRD and the City of Tybee Island, the sediment placement plan has changed since publication of the DEIS. With the exception of the ODMDS, there are no plans to use any of the nearshore sites (shown in Figure 3-2) for the placement of

new work material resulting from construction of the project. In response to the specific comment regarding impacts to live/hard bottoms, it is unlikely that any hard-bottom communities occur within the nearshore sediment placement sites or in the channel extension area. However, a side scan sonar and/or magnetometer investigation would be performed prior to dredging the channel extension to verify this belief. Please see previous response to maintence dredging and placement of material into the nearshore sites off Tybee Island (760-JK-400-EV63 and EV64).

760-JK-400-EV115
Comment: *Table 4-10 does not, but should include the Atlantic Sturgeon as a candidate species.*

Response: Table 4-10 (now Table 4-14) is not intended to identify candidate species.

760-JK-400-EV116
Comment: *Section 5.3.2.A.Shortnose sturgeon - Pg 5-91, 3rd para - The Corps conducted a preliminary review of the 2001 fishway design and confirmed that conditions had not changed that would reduce its effectiveness or implementability". Does the Corps have documentation that Shortnose sturgeons have used fishways in the Savannah River, or any other river of similar characteristics?*

Response: The Shortnose sturgeon has not been documented using constructed rapids fishways because there are none within its population range. In the upper mid-west US, Lake sturgeon have been observed passing both constructed and natural rapids. Some of these observations were at lesser water depths than are proposed (3.5 to 5.5 feet) for the fish passage at the New Savannah Bluff Lock and Dam (Aadland 2010). The Lake sturgeon is a larger species than the Shortnose so physical passage of the latter should not pose a problem. Adaptive management, attraction flow measures, cost estimates/commitments, and monitoring are described in detail in Appendix D. Post-project, the District would monitor the passage of Shortnose sturgeon across the structure to ensure it performs successfully (Appendix D).

760-JK-400-EV117
Comment: *GRR Section 4.8.4 Marine and Estuarine Resources - Pg 61, 4th para - "The recreational fishery for striped bass was recently reopened in the harbor, as a response to restored population levels." ... "the Savannah River was the location of Georgia's most important striped bass fishery." This is a critical statement. Where is the citation for this?*

Response: In the EIS in Section 4.04 Marine and Estuarine Resources the following is noted: *More recent studies on striped bass (Will and Jennings 2001) indicate that historically the Savannah River was Georgia's most important striped bass fishery.*

760-JK-400-EV118
Comment: *DEIS Section 4-12, P. 4-79, 5th para. -Shrimp fishing common at the mouth of the River. May be more in the spring when females are moving toward the ocean to release their eggs. As queried above, shrimp fishing is a significant commercial venture but there appears to be no recent survey data to characterize population or health of this resource.*

Response: Section 4.12 [Recreational and Commercial Fishing] states: Commercial shrimp trawling is common in the immediate vicinity of the dredged entrance channel, since this is a natural corridor for emigrating shrimp. The Georgia DNR Coastal Resources Division (Personal Communication, 26 February 2007, Mr. Spud Woodard, Assistant Director for Marine Fisheries) indicates that Georgia's territorial waters south of the channel are open to food shrimp trawling during the established season, which is

typically mid-June through December. Trawling occurs off the beach at Tybee Island, but is limited because of water depth.

760-JK-400-EV119
Comment: *The report contained extensive amounts of information on a wide variety of issues. The DEIS would be more understandable if proper citations were made. As currently organized, significant issues are difficult to follow.*

Response: Additional references have been included

760-JK-400-EV120
Comment: *Overall, there was a lack of discussion and a lack of recent evaluation of the project's impacts on commercial and non-commercial pelagic and benthic invertebrates. In that this trophic level serves as the base of the food chain more information should be provided on the impacts to these assemblages.*

Response: The EIS-Sections 4, 5 and Appendices D, P, and S adequately characterize/evaluate the project's impacts on commercial and non-commercial fish [fin/shell] and benthic invertebrates.

Page 6-6

760-JK-400-EN21
Comment: *Section 3.07 - Page 3-23, Para. 4-"Savannah District followed an iterative process to develop a plan for the new work entrance channel sediments. The work started with an engineering determination of sediment quantities to be removed at various channel depths and the composition (i.e., percent fines and percent sands) of those sediments. A review of previous information was conducted, including: the Draft 2003 ERDC Report on Nearshore Placement at Tybee Island; ... ". What is the citation for this document? It is not listed in the References.*

Response: The subject document is included in Supplemental Materials (Attachment 3 of Appendix C of the GRR), "Savannah Harbor Entrance Channel Near Shore Placement of Dredged Material Study", July 2003.

760-JK-400-EV121
Comment: *Section 4.04 Marine and Estuarine Resources - Pg 4-20, 1st para - "Shad spawn in the main river, further upriver than do striped bass". Where do American shad spawn in the main river with respect to the limits of the SHEP?*

Response: The sentence in the FEIS-Section 4.04 has been changed: "American shad spawn in the freshwater portion of the main river [further upstream than do striped bass] well outside the impact limits of SHEP."

760-JK-400-EV122
Comment: *Section 4.04 Marine and Estuarine Resources - Pg 4-20, 3rd para - "However population levels have been much lower in the last 20 years and a higher proportion of the spawning now appears to be occurring in the Savannah River a few miles upstream of the harbor (over 21 miles upstream from the mouth of the Savannah River}." Over what type of bottom does striped bass spawning in the Savannah River occur?*

Response: The referenced paragraph indicates "the eggs must be suspended in the water, as they float with the river currents before they hatch 36-72 hours after being laid." Since the eggs float in the river currents, the type of bottom is not critical to egg survival. However, after spawning a greater percentage of eggs will rise in the water column in those reaches of active currents [often associated with a sandy bottom].

760-JK-400-EV123

Comment: *Section 4.04, Page 4-2 1, Para. 3- Invertebrates s of commercial import- cited from 1974 report (Johnson et a1.) «e.g., crabs, oysters, and shrimp). Cites data back to 1955. Provided an unreferenced, undated Shellfish Harvest Area Map from Mr. Dominic Guadagnoli, Shellfish Program Leader with the Georgia Department of Natural Resources - Coastal Resources Division. Is there more recent data available on the state of invertebrates of commercial importance?*

Response: As noted, Mr. Guadagnoli, the Shellfish Program Leader with the Georgia Department of Natural Resources [Coastal Resources Division], provided the source information for Figure 4-3-Shellfish areas. Given his position, Mr. Guadagnoli is not considered an "unreferenced" source, but the FEIS will provide additional details regarding the source/dates of the information in the subject figure. [see response to Comment 760-JK-400-EV09]

760-JK-400-EV124

Comment: *Page.4-38 . Para. 1. Information was taken from Collins et al. (2001). Also, discusses plankton in two studies from 200 I and 1988. Not sure of the geographic extent of these studies and they are very qualitative. Simply references species caught in tows. This may indicated that a better understanding of the resource is needed.*

Response: DEIS-Section 9 references the geographic extent of Collins et al (2001). The title indicates the research area, viz., "Distribution of Shortnose sturgeon in the lower Savannah River". A perusal of the document will verify the resource is well understood.

760-JK-400-EV125

Comment: *5.7 Marine and Estuarine Resources, Page 5-111, Section 5.7. 1.1, C - Example of unreferenced critical statement, "Marc recent dam indicate that present-day dredging operations are conducted in ways that do not increase suspended sediment concentrations to such a degree." No reference. Is this real data specific to Savannah River or an industry-wide generalization?*

Response: A reference has been added to Section 5.07.1 for the statement regarding the relationship [impacts] of dredging on suspended sediment concentrations.

760-JK-400-EV126

Comment: *5.7 Marine and Estuarine Resources, Page 5- 11 3, Section 5.7. 1. 1, C - Example of unreferenced critical statement, "Moreover, the Savannah River already has a very high sediment load and turbidity caused during the new work dredging would not adversely impact shellfish areas." There is no reference or a discussion in the DEIS that supports this. Has it been quantified?*

Response: Section 5.07.1 has been revised for clarity.

Page 6-7

760-JK-400-EV127

Comment: *Section 5.7 Marine and Estuarine Resources, Page 5-114, Section 5.7.2, A - "The sediments to be deposited in the nearshore area consist primarily of sands. The sand content of the sediments generally exceed 70 percent and in most reaches exceed 80 percent." Where is the support for these data? It should be cited.*

Response: The data to support the statement are located in EIS Section 4.00 and in the GRR Engineering Appendix (Appendix C, Attachment 3).

760-JK-400-EV128

Comment: *Also, the DEIS states "Eggs and larval fish are not as mobile as adults, so there is a higher potential for those early life stages to be impacted being physically damaged by sediment or materials in the dredge plume. However, the near shore areas off Tybee Island have a very high sediment load since the Savannah River discharges at the north end of the island. Also the wind and wave climate in the near shore area tends to have a naturally high sediment content and high turbidity. The placement activities would be much localized and therefore not impact a large area."-These are very broad, uncited, unquantified statements that, if inaccurate, could have very significant impacts on these life forms in the vicinity of these proposed.*

Response: As discussed in previous responses, no new work sediment would be placed in the nearshore area at Tybee Island. Placement of all sediments excavated from the entrance channel would now be deposited in previously-approved areas, i.e., the Offshore Dredged Material Disposal Site or an upland confined disposal site. The FEIS details the revised sediment placement plan. Please see previous response concerning maintenance dredging (760-JK-400-EV63 and EV64).

760-JK-400-EV129

Comment: *5.7.2 Sediment Placement Impacts, B. Turbidity, p.5-115. Para 5 - "The turbidity in effluent from diked sediment placement is controlled by adjustable spillways. The SC standard for turbidity is that discharges not to exceed 25 NTUs provided the existing uses of the water body are maintained. Savannah District imposes a 500 mg/l limit on suspended solids in the CDF discharges. This limit is believed to be sufficient to reduce turbidity impacts in the receiving waters to acceptable levels."- What is this based on?*

Response: Both Georgia and South Carolina require a Section 401 Water Quality Certification (WQC) for the discharge of effluent from the upland confined disposal areas into state waters. These Section 401 WQCs contain conditions or restrictions with which the District has to comply. These stipulations are discussed in EIS-Section 5.07. The 1996 EIS for operation and maintenance of the Savannah Harbor Navigation Project examined turbidity levels in CDF discharges and found that a 500 mg/l limit on suspended solids in the CDF discharges is sufficient to minimize impacts to the aquatic environment.

760-JK-400-EV130

Comment: *The three paragraphs within this section fail to sufficiently discuss the floodplains within or immediately adjacent to the project area. Information was lacking on floodplains within or immediately adjacent to the project area and the quantity, functions and values of the floodplains.*

Response: Reference is unclear. There is a discussion of floodplains in Chapter 4- Affected Environment (Sections 4.08) and in Chapter 5-Environmental Consequences of the Proposed Action (Section 5.10) in the EIS. Since there would be no incremental development within the 100-year flood plain and hurricane surge heights would not be measurably affected, the project's direct impact on same is nil. Moreover, after the noted revisions, dredged material would no longer even be placed within the nearshore areas. Hence, any direct effects on storm surge are also nil.

According to the NEPA regulations: Sec. 1502.2 Implementation states the following:

To achieve the purposes set forth in Sec. 1502.1 agencies shall prepare environmental impact statements in the following manner:

(a) Environmental impact statements shall be analytic rather than encyclopedic.

(b) Impacts shall be discussed in proportion to their significance. There shall be only brief discussion of other than significant issues

Floodplain impacts are not significant. The same rationale applies to the proportionality of discussion regarding certain other insignificant or non-existent impacts addressed in the EIS.

760-JK-400-EV131, 760-JK-400-EV132

Comment: *The final sentence in this sections states that "large-scale filling of wetlands within the floodplain are not expected in the future". Large is a relative term. If floodplains are going to be impacted, this impact needs to be accurately quantified. Also, why does the SHEP mitigation plan propose to preserve existing wetlands that are "protected" and under no threat of filling as compensation for the loss of 337 acres of tidal freshwater wetlands?*

Response: If the proposed action was going to adversely impact the adjacent floodplain, this impact should be accurately quantified. However, the referenced sentence in Section 4.08 states:

With the legal protections that have been provided to wetlands, large-scale filling of wetlands within the floodplain are[is] not expected in the future.

This sentence should be sufficient to clarify the subject comment; hence, no revision to the FEIS is necessary. The District has repeatedly emphasized that the proposed action would not adversely impact the present floodplain boundaries.

The District conducted a watershed assessment in the Lower Savannah River Harbor to evaluate specific mitigation measures which could compensate for the potential conversion of freshwater wetlands [223 acres] to its brackish marsh counterpart. This functional assessment concluded the only element of wetland function that would be affected by this species shifting was the fish and wildlife habitat component. To rectify these changes [losses], the District reviewed approved mitigation banks in the Lower Savannah River Watershed and determined there were none with the appropriate tidal, freshwater wetland characteristics. The District determined that the "In-Lieu Fee" program is also functionally unable to provide requisite compensation. The District considered the creation of tidal

freshwater wetlands. However, it was ultimately concluded by the study group that this was not a long-term solution given the high risk of failure.

A Wetland Interagency Coordination Team [consisting of technical experts from USACE and federal/state natural resource agencies] was used to identify acceptable mitigation for the proposed project. USFWS emphasized that mitigation actions must be performed within the basin for wetlands impacts within the SNWR. After deliberation, the Service recommended preservation of a number of sites which were already part of its long-term land acquisition strategy to compliment the SNWR. The District also consulted with the Stakeholder Evaluation Group, including its non-governmental organizations members, to identify other suitable mitigation alternatives. Over the ten year study period, no agency or organization could identify another feasible alternative as mitigation for impacts that would occur as a result of wetland conversion. Therefore, the Team agreed that the most practicable means of mitigating the shift in species composition [freshwater to brackish marsh] resulting from harbor deepening would be the preservation of bottomland hardwoods and upland buffer. The District and the Savannah National Wildlife Refuge have already prepared a list of ecologically valuable properties within the estuary which can further the Refuge's goals and enhance area fish and wildlife resources.

760-JK-400-EV133
Comment: *Section 5.10 Floodplains on page 5-122 states "hurricane modeling indicates that change in the water surface elevations due to the proposed harbor deepening is not significant. What statistical analysis was used to determine if a significant difference exist?*

Response: The District made its floodplain determination after consultation with the Chatham County Emergency Management Agency. As stated in EIS-Section 5.10 and detailed in the GRR-Engineering Appendix, the County indicated that since any elevation increase [attributable to the SHEP] would fall within the 1-foot contour interval, they would not be able to identify any specific location[s] which would be adversely affected by increased surge height.

760-JK-400-EV134
Comment: *Section 5.10 Floodplains on page 5- 122 did not quantify any specific impact to floodplains including shift in community composition or land use.*

Response: See response to previous comment on this issue.

Page 6-8

760-JK-400-EV135
Comment: *Section 5.10 Floodplains on page 5-122 did not provide any information on the secondary impacts to floodplains caused by this project?*

Response: Since the proposed deepening of the harbor does not directly impact floodplains, this section need not be revised.

760-JK-400-EV136
Comment: *In Section 5. 10 Floodplains on page 5- 122, modeling discussed involved storm surge from hurricanes. Was any modeling done to identify the effects of the project to floodplains in normal conditions?*

Response: Hurricane surges would be the conditions for which an effect is most likely to be seen. Since no effect was identified for those maximum case conditions, evaluations of lesser conditions are not warranted.

760-JK-400-137

Comment: *Section 5.10 Floodplains on page 5-122. Was the potential impact to floodplains/riparian wetlands caused by increased ship traffic or ships traveling at increased speeds evaluated?*

Response: The Coastal and Hydraulics Laboratory at the US Army Engineer Research and Development Center studied the potential shoreline impacts resulting from the proposed deepening. This information is found in GRR-Engineering Appendix C [Section 9.0 Shoreline Effects].

760-JK-400-EN22

Comment: *Some of the conclusions made in the documents were sound; however, many were based on unsubstantiated claims. In some cases conclusions were based on existing conditions without determining the impacts of the proposed conditions. Comparisons were made between alternatives which were not the proposed alternative, while ignoring differences in impacts between the existing condition and the proposed alternative. Data which could be used to allow peer review of some of the models was missing or omitted. Some conclusions were based on incomplete models and impacts to some resources were not determined because they were not under the scope of the current study. It remains unclear whether impacts to these resources were determined. Finally, none of the studies examined the impacts resulting from the use of Generation 2 post-panamax vessels within the deepened channel.*

Response: An independent external peer review team [comprised of subject matter experts] provided an in-depth review of the project documents and did not reach the conclusions cited in your comment. Detailed data and analyses are included in the Supplemental Studies Attachment (Attachment 3) to the Engineering Appendix (Appendix C) of the GRR.

The design vessel, Susan Maersk [Generation 2 Post-Panamax vessel] was used in ship simulator and bank erosion studies.

760-JK-400-EN23

Comment: *The documentation does not clearly quantify the impacts to the Confined Sediment Placement/Disposal Facilities, City Front, Ft. Pulaski, and Tybee Island. The conclusions drawn from these studies have not been substantiated and continuation of the NEPA process without knowledge of the potential impacts to these resources would be in error.*

Response: The published bank erosion study [2006] and 2010 update were included in GRR-Engineering Appendix, Supplemental Materials. Those documents describe in detail the potential for erosion impacts at each of the referenced locations. The District has concluded that SHEP would not significantly increase the present erosion rates at those locations.

Page 6-9

760-JK-400-EN24

Comment: *4.07. Terrestrial Resources, p. 4-61, Last paragraph: The section titled Existing Shorelines Adjacent to the Federal Navigation Channel is Section 5.9 in the Tier 2 EIS.*

Response: The FEIS has been revised to correct that error.

760-JK-400-EN25

Comment: *5.9. Existing Shorelines Adjacent to the Federal Navigation Channel, p. 5- 120: This section fails to discuss the analysis, or lack thereof, of the effects of the project on the shoreline along the Confined Sediment Placement/Disposal Facilities as reported in Ship Forces on the Shoreline of the Savannah Harbor Project. Table 20 of the report lists the observed drawdown of seven inbound vessels and eight outbound vessels not the predicted values resulting from the proposed project.*

Response: Protective riprap is has been placed around the margins of confined disposal facilities 13A, 14A, and 14B and is currently being placed around the margins of Jones/Oysterbed Island. This construction is scheduled for completion prior to the proposed deepening. Paragraph 5.09 of the EIS has been revised to reflect the current/completed construction time table. Harbor deepening is not expected to increase erosion of these shorelines. Detailed information is found in the GRR, Appendix C, Attachment 3.

760-JK-400-EN26

Comment: *5.9. Existing Shorelines Adjacent to the Federal Navigation Channel, p. 5-120, 6th paragraph: The Savannah Harbor Expansion Savannah Harbor Expansion Bank Erosion Study was updated in June 20 I 0; the paragraph should indicate this fact.*

Response: The FEIS has been revised to indicate the update to the bank erosion study.

760-JK-400-EN27

Comment: *5.9. Existing Shorelines Adjacent to the Federal Navigation Channel, p. 5-120, Last paragraph: The Savannah Harbor Expansion Savannah Harbor Expansion Bank. Erosion Study-Update indicates that Areas 13A, 13B, and 14 B of the Bight Area were to be protected prior to completion of the proposed project and therefore not studied in the Savannah Harbor Expansion Savannah Harbor Expansion Bank Erosion Study-Update. Has the shoreline protection projects within these three areas been completed? Has the shoreline along the remaining portions of the Confined Sediment Placement/Disposal Facilities (Such as the Jones Island Disposal Area) been completely protected and stabilized? I f unprotected areas remain, the Savannah Harbor Expansion Bank Erosion Study should be updated again to include an analysis of potential impacts to the unprotected areas of the shoreline along the Confined Sediment Placement/Disposal Facilities.*

Response: See previous response 760-JK-400-EN25.

760-JK-400-EN28

Comment: *Did the analysis consider potential sea level rise and its impacts on existing shorelines? Will the areas which are currently protected by hardened shorelines (i.e. jetties and bulkheads), and excluded from this analysis, continue to be protected if sea level rise becomes a reality? The analysis should be updated to include the effects of sea level rise on existing shorelines and quantify the impacts that longer and deeper draft vessels will have at higher, base water levels.*

Response: Sea level rise would be the same in both the future with and without project conditions. It is not considered a function of channel deepening with respect to bank erosion. Erosion due to sea level rise is not addressed by this study.

760-JK-400-EN29

Comment: *5.9. Existing Shorelines Adjacent to the Federal Navigation Channel, p. 5-121, 3rd paragraph: Paragraph states that from 2003 to 2050 there is 3.1 feet of shoreline erosion along Flo Pulaski per year due to ship traffic and in the same sentence it states that only 0.1 foot (1.2 inches) of the erosion is due to ship traffic. Both values cannot be correct.*

Response: The 3.1 feet is total erosion along this part of the unprotected shoreline due to all causes, (not due to ship traffic). The EIS has been updated to agree with study documents.

760-JK-400-EN30

Comment: *5.9. Existing Shorelines Adjacent to the Federal Navigation Channel, p. 5-1 21, 3rd paragraph: Paragraph states that from 2003 to 2050 there is only 0.1 foot (1.2 inches) of erosion along the Ft. Pulaski shoreline due to ship traffic. However, in the last sentence the document reads that up to 2.23 inches of annual erosion could occur by year 2050. Both values cannot be correct.*

Response: The EIS has been updated to agree with the most recent Savannah Harbor Expansion Bank Erosion Study.

Page 6-10

760-JK-400-EN31

Comment: *5.9. Existing Shorelines Adjacent to the Federal Navigation Channel, p. 5-121 , 4th paragraph: The paragraph states that the circulation and wave modeling results indicate that very small changes are anticipated with the proposed deepening on the beaches of Tybee Island. However, the paragraph fails to mention the sedimentation modeling results, or lack thereof, detailed in the report titled Impacts of Savannah Harbor Expansion Project contained in the Engineering Appendix of the GRR. This report indicates that "A complete sediment budget was not produced due to lack of broad coverage for bathymetry, lack of multiple surveys pre-project to establish the baseline, and uncertainty in rates of some key pathways (p. 2-15)." This report was completed in 2006, four years earlier then the submittal of the Tier 2 EIS. A complete sediment budget should be formulated to determine the impacts that the project would have on Tybee Island.*

Response: The report, "Impacts of Savannah Harbor Expansion Project", concluded that the current navigation channel appears to function as a sink for sediments moving from north to south along the Tybee Island shelf. Since channel deepening would have negligible effect on the shelf, an updated sediment budget would not provide any pertinent information. Conceptual sediment budgets are included in Figures 2-31 and 2-32 of the report. These budgets are substantiated by historic maps and surveys, as well as coastal modeling studies.

760-JK-400-EN32

Comment: *5.9. Existing Shorelines Adjacent to the Federal Navigation Channel, p. 5-121, 4th paragraph: The paragraph fails to mention that the shoreline and volume change analysis reported in Impacts of Savannah Harbor Expansion Project did not include the barrier islands along the coastline. The report states that the islands were not studied because they were not part of the "scope of work." If the potential for negative impacts to barrier islands exist then the scope should have been expanded or a separate study should have been conducted to determine potential impacts. If there is potential for negative impacts to barrier islands, the shoreline and volume change analysis should be updated.*

Response: Previous studies concluded that up to 78 percent of erosion of the Tybee Island shelf is attributable to the existing navigation channel. As noted previously, the report, "Impacts of Savannah Harbor Expansion Project", found that the existing channel intercepts nearly all sediment moving from north to south along the shelf. The report "Impacts of Savannah Harbor Expansion Project", 2006 (GRR-Engineering Appendix, Supplemental Materials) determined that the Tybee Island shore and shelf would not be significantly impacted by a harbor deepening. The Tybee shelf is located immediately adjacent to (and down-current from) the navigation channel, it would experience greater impacts than other locations that are more removed from the channel. Since the coastal erosion studies indicated that Tybee shelf would not be significantly impacted by a harbor deepening, it is reasonable to assume to sites located further down-current from the channel would also not be significantly impacted.

760-JK-400-EN33

Comment: *5.9.Existing Shorelines Adjacent to the Federal Navigation Channel, p. 5-121, 4th paragraph: The paragraph fails to mention that the shoreline and volume change analysis reported in Impacts of Savannah Harbor Expansion Project could not adequately determine the impacts to Tybee Island as stated as follows: "Data are lacking to fully quantify the impact of the project on Tybee Island (primarily multiple full coverage surveys prior to the project to establish historic rate and recent surveys to establish present rates) (p. 2-17)." The report indicates that the Tybee Island Shelf is currently deflating at a rate of 220,000 m3/yr and although the full impacts of the project cannot be "full quantified" with the data available, the Report indicates that the major impacts to the Shelf and Barrett Shoals are from "dredging and deepening." The Shoreline and Volume Change Analysis should be completed with the missing data to determine the potential impacts of yet another dredging and deepening project on the Tybee Island Shelf and Barrett Shoals.*

Response: The analyses described in the 2006 report titled "Impacts of Savannah Harbor Expansion Project" (GRR-Engineering Appendix, Supplemental Materials) were sufficient to identify the incremental impacts of the proposed harbor deepening.

760-JK-400-EN34

Comment: *5.9. Existing Shorelines Adjacent to the Federal Navigation Channel, p. 5-121, 2nd and 3rd paragraphs: The conclusions drawn from the results detailed in Ship Forces on the Shoreline of the Savannah Harbor Project, (which is contained as an attachment in the Engineering Appendix) should be reconsidered.*

Response: The findings of the referenced report have been verified and the EIS has been updated to correctly reflect the most recent studies.

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760-JK-400-EN35

Comment: *Ship Forces on the Shoreline of the Savannah Harbor Project. p. 2, 1st paragraph: Page 2 is very optimistic about the "blockage ratio". in areas where the channel lakes up much of the river, such as the U.S. Route 17 crossing, the blocking ratio is much greater than predicted. A vessel with a 160 ft beam (Such as a Generation 2 post-panamax vessel which is predicted to use the channel by 2015, Savannah Harbor Expansion Bank Erosion Study-Update, Appendix B) and a 42.3 ft draft (Allowing for a 10 percent under keel clearance, or 6,768 sq ft), in a channel that's 470 ft wide, 47 ft deep, and has sloped sides at 3: I (22,560 sq ft) the blockage ratio is 30 percent not the 9.5 percent stated as the maximum in the report. The blockage ratios should be revised to include areas where the river is narrow in width and should be updated based on the predicted use of Generation 2 post-panamax vessels (See below).*

Response: The design vessel for this project, the *Susan Maersk*, a Gen 2 post-panamax vessel, was used for the analysis. The ship forces at the shoreline were reanalyzed in the report *2011 Reanalysis of Ship Forces at the Shoreline in Savannah Harbor* (July 2011) which is included in the Engineering Investigations Supplemental Materials. All responses are based on that reanalysis and not the 2007 report. Additional analysis was added to the report to address the blockage ratio in constricted areas. Three cross-sections near the Highway 17 crossing were plotted. The average area at mean tide level is 30630 sq ft and the width at the -20 contour is 662 feet. If the 500 foot navigation channel is deepened to 48-feet, the area will be 33130 sq ft at mean tide. Measured drawdown data and measured speed along with drawdown calculations show that ships typically slow down in this area such that the drawdown from the ship is not greater than 0.6-0.7 feet. Based on the average Gen 2 beam of 142.9 ft and draft of 46.6 ft, blockage will be 0.20. Based on the Schijf equation for drawdown using water level at mean tide, the ship will have to travel at 5.0 knots speed through water to keep the drawdown below 0.7 feet. The pilots have stated they can and have maintained safe navigation at low speeds in this range due to concerns about bank erosion. They plan to continue this practice in the future. During the 2005 field study, one ship was measured at 2.4 knots and several ships were measured at 5.2-5.4 knots. Using the channel area from measured cross sections at Route 17, the blockage ratio in the deepened channel for the design ship (142.9 X 46.6) or the ship referenced by the comment (160 X 42.3) is 0.20 which is the value stated in the 2011 Reanalysis of Ship Forces at the Shoreline in Savannah Harbor (July 2011).

760-JK-400-EN36

Comment: *Also, the assumption that ship forces are essentially dependent on a two dimensional slice of the ship in the channel is also flawed. It is a problem of added mass, which is the mass of water a ship needs to displace to move into a new location within the fluid. Two ships of the same beam but different hull forms have different added mass factors. A very full ship such as a tanker moves more water than a finer bull like a container ship, which moves more water than a naval ship.*

Response: While hull form does have some effect, the Corps bases its analysis on comparing the same ship hull form in both the existing and deepened channel. If hull forms become more efficient in the future, the District's analysis (using the same hull form in existing and future channels) would tend to over-predict ship effects from a deepened channel. The ship forces study focused on container ships rather than tankers, because containerships dominate the fleet in Savannah, tankers calling at Savannah

generally do not use the full project depth, tankers travel slower and short period waves are much less of an issue. The field data used to calibrate the analysis technique was based primarily on container ships, with the same ship forms used for both the existing and deepened channel conditions.

760-JK-400-EN37

Comment: *Ship Forces on the Shoreline of the Savannah Harbor Project, p. 13, 2nd paragraph: The writer bases the drawdown, wave height, and wave power calculations on the facts that panamax vessels will have an increased speed in the deepened channel and that postpanamax vessels will have a decreased speed. The assumption that post-panamax vessels will maintain the same power level and travel at a lower speed seems poor (The lower speed resulting from a deeper draft). The post-panamax vessels would travel at a speed which provides safe maneuverability when traveling the channel. To assume that this speed will always be lower than the current speed and that that the captain or pilot will maintain the same power setting, which may result in a speed which provides low maneuverability, is a poor assumption. The analysis should be based on the actual predicted speeds not the predicted power level.*

Response: The ship forces at the shoreline were reanalyzed in the report *2011 Reanalysis of Ship Forces at the Shoreline in Savannah Harbor* (July 2011) which is included in the Engineering Investigations Supplemental Materials. All responses are based on that reanalysis and not the 2007 report. The revised ship speed model, that did not differ significantly from the 2007 ship speed model, was developed to ensure this and any other comments about ship speed were correctly addressed. Determining ship speed requires knowledge of what power setting will be used, what power settings are available on a ship, and the particulars of restricted speed areas in the channel (such as at Coast Guard and LNG A Gen 1 ship that drafts about 41.2 feet in the existing channel and is loaded to draft 45.6 feet in the deepened channel (10% increase in ship area) in a channel whose cross section area only increases by about 5% will go slightly slower (about 3%) at the same power level but still maintain control at the 11-12 knot speeds used in the evaluation. Ship power is used in the analysis to predict ship speed. Ship power is important because typical ships only have four maneuvering settings or “bells” they can use at Savannah Harbor. At Savannah Harbor and other ports studied by ERDC, pilots almost always used the highest maneuvering setting of “full bell” if. One reason the full bell usage is critical in speed prediction is because there is no higher setting used while in the channel. Additional discussions have taken place between ERDC and the pilots. Along the channel, the ships must control their wakes when passing the Coast Guard Station, LNG facility, and from Old Fort Jackson into the City. In addition, the Right Whale speed restriction (on the entrance channel) that was placed into effect after the 2007 ship forces study affects ship speed 6 months of the year near Tybee and Fort Pulaski. In addition to fixed locations of wake reduction, pilots must control their wake when recreational or other boats are along the shoreline or at the jetties. The effects of all of these wake reduction areas extend well upstream and well downstream because of the required channel distance for a ship to slow down and then speed back up. Discussions with Savannah Harbor pilots have led to the understanding that operational constraints such as wake reduction are the major factor in defining ship speed at most areas along the channel. The two exceptions to operational constraints being the dominant factor are at Tybee Island for 6 months of the year and between the Coast Guard Station and the LNG facility. In these areas, the ships frequently reach their maximum speed for full bell and the deepened channel must be evaluated for speed changes from those occurring with the existing channel. The net result is that many areas of the channel would not see any significant change in speed in a deepened channel. Based on reviewer comments, the ship speed model has been updated to ensure accurate speed prediction when a ship has its draft increased and the channel is deepened. In some cases, deepening the channel is more significant than the draft increase and the ship speed would increase. In other cases, deepening the channel is less significant

than the draft increase and the ship speed would decrease. The Corps' analysis calculated vessel speed based on power setting and vessel characteristics, including draft. The harbor pilots participated in these analyses, and neither the simulations nor the calculations indicated problems with maneuverability with the proposed project. Further discussion of the ship speed model is included in the Final GRR-Engineering Appendix.

760-JK-400-EN38

Comment: *Ship Forces on the Shoreline of the Savannah Harbor Project, p. 20, 2nd paragraph: Wave power, is expected to increase by up tol9 percent along Ft. Pulaski. This is not insignificant. Wave power has to increase substantially as the percentages of larger vessels running with deeper drafts are projected to increase in a channel whose cross sectional area is only increasing by 4 percent. It is assumed that the 19 percent increase was forecasted for a post-panamax vessel, as a full summary of the results of the wave power analysis are not provided in this document. The details of the wave power study need to be made public to allow for peer review of these conclusions.*

Response: Details of the wave study are published in the 2011 Reanalysis of Ship Forces on the Shoreline of the Savannah Harbor Project documents. Based on the updated ship speed and wave models, summing secondary wave power for all ships shows decreased wave power in the deepened channel from both wave equations (see Table 27 in the reanalysis). This is particularly true at Fort Pulaski where the Right Whale restriction on speed has greatly reduced ship speeds 6 months of the year. Fort Pulaski speeds are also affected by the wake reduction requirements at the Coast Guard Station. Based on the 2011 Reanalysis, wave power at Fort Pulaski decreases in the deepened channel. Further discussion of the wave power calculation is included in the Final Report.

Page 6-12

760-JK-400-EN39

Comment: *The document states that the project's effects along the Confined Sediment Placement/Disposal Facilities (p. 24, 1 Sl paragraph) will be the same as along Ft Pulaski, therefore the ship forces along this long section of the river were not modeled. Barring any differences in river width which may exists between the two sections of the river (Wave impacts will be greater in a narrower river as the waves will have less time to decay before reaching the shoreline) the conclusion that wave power will also increase by up to 19 percent along the Confined Sediment Placement/Disposal Facilities is fair. This is a significant increase.*

Response: The 2011 updated analysis examined ship waves, drawdown, and return velocity at the CDFs. The results demonstrated wave power at the CDFs does not increase in the deepened channel.

760-JK-400-EN40

Comment: *The document states that the only effect which needs to be modeled for the shoreline along the City Front is the long period drawdown. However, the document only provides observed drawdown results (Table 21) and not predicted impacts of the project. The predicted drawdown results, as wells as wave power results, should be published for review.*

Response: Observed drawdown was less than 0.6 feet. Drawdown is related to the speed of a vessel, which pilots adjust to prevent damage to moored vessels at City Front. This is the current practice and it is expected to continue with a deepened channel. There was no need to model predicted drawdown

results at City Front, as ships must slow down to prevent adverse wake effects and drawdown. In many cases, they go slower than the speed required to prevent wake effects and drawdown. Tables are included in the final report showing ship speeds to limit drawdown at City Front and ship speeds (by vessel class) required to prevent wake effects at City Front, the CDFs, and Tybee Island. Wave power (by vessel class) predictions are also included for Tybee Island, Fort Pulaski, Coast Guard Station to LNG, and CDF to Old Fort Jackson. Table 18 of the Reanalysis report shows the predicted wave height at City Front for all ships in both the existing and deepened channels. Wave height is small for all ships.

760-JK-400-EN41

Comment: *The study also fails to analyze the predicted drawdown, wave height and wave power increases along the City Front, the Confined Sediment Placement/Disposal Facilities, and Tybee Island resulting from the passage of a Generation 1I post-panamax vessel along the River. As mentioned previously, according to the updated fleet forecasts detailed in Appendix B of the Savannah Harbor Expansion Bank Erosion Study-Update Generation II post-panamax vessels (Which can have beams up to 160 ft) are expected to call by the year 2015. These vessels will displace an even greater amount of water and it doesn't appear that the effects that they will have has been calculated, or at least reported in Ship Forces on the Shoreline of the Savannah Harbor Project or in the Tier 2 EIS. For example, a Generation 2 post-panamax vessel (160ft beam) with 10 percent underkeel clearance will take up 30 percent of the cross section ofthe new 47 ft channel. Current panamax vessels in the current channel only take up 18 percent of the cross section of the channel. Thus, Generation 2 vessels will displace 67 percent more water relative to channel cross section. This cannot amount to a negligible erosion rate, and the conclusion that wave power will be substantially greater is accurate. The effects that the use of Generation 2 post-panamax vessels will have on drawdown, wave height and wave power along the City Front, the Confined Sediment Placement/Disposal Facilities, and Tybee Island should be determined.*

Response: Calculations for the 140 foot beam Gen 2 ships have been included in the Final Report. The study has been updated to address the most recent fleet forecast and the fleet mix predicted to call upon the port with the deepened channel. The predicted impacts from the alternatives have been updated based on this new information.

760-JK-400-EN42

Comment: *Ship Forces on the Shoreline of the Savannah Harbor Project, p. 22, 3rd paragraph: The document indicates that the impact analysis conducted for the Tybee Island shoreline compared the typical (80 percent of design draft) and design draft conditions. The document then states that "in all cases, the design draft ship in the deepened channel had slightly less drawdown then the existing channel." The difference between those two conditions is much less important than the difference in drawdown between the current condition (Vessels traveling at 80 percent draft in the existing channel) and the future condition (Vessels traveling at design draft in tbe deepened channel). Table 15 indicates that post-panamax vessels traveling at typical and high speed will have drawdown increases of 12.9 percent and 5.73 percent, respectively. These are much less then the differences calculated for panamax and sub-panamax vessels. The increase in drawdown for panamax vessels traveling at typical speed is 31.5 percent and the increase for those traveling at high speed is 22.3 percent between existing and future conditions. The increase for sub-panamax vessels traveling at typical speed is 27.2 percent and the increase for those traveling at high speed is 34.4 percent. These increases are not insignificant.*

Response: The statement "The difference between those two conditions is much less important than the difference in drawdown between the current condition (Vessels traveling at 80 percent draft in the

existing channel) and the future condition (Vessels traveling at design draft in the deepened channel)." is not a valid comparison. It proposes to compare a frequently occurring ship in the existing channel to an infrequently occurring ship in the deepened channel. Sailing draft distributions are a valid way of comparing existing and deepened channels. In the 2011 reanalysis, frequently occurring ships in the existing channel were compared to frequently occurring ships in the deepened channel. A comparison was also made of infrequent ships in both channels.

Transverse stern wave height is generally 10-20% greater than the drawdown. The reanalysis shows the same result whether all typical draft ships were used or all large draft ships were used. The sum of the transverse stern wave height squared, which was used herein as a relative indicator of wave power, was less in the deepened channel. This finding was true even if only Gen 1 and Gen 2 ships were summed and compared. Drawdown only increases for Gen1 and Gen2 in the reach between the Confined Disposal Facility and Old Fort Jackson. Even then, less than 6.2% for all cases. The sum for all vessel classes combined would be less drawdown in the deepened channel for this reach as well.
Page 6-13

760-400-JK-EN43
Comment: *Ship Forces on the Shoreline of the Savannah Harbor Project, Tables 16-1 9: The tables should provide the differences between the existing conditions (Vessels traveling at 80 percent draft in the existing channel) and the future conditions (Vessels traveling at design draft in the deepened channel) for the years of 2030 and 2050. The differences in drawdown between the other scenarios matter much less. The updated table should be updated to make these comparisons.*

Response: The comparison has been revised and updated based on the most recent sailing draft distribution. The report also has been revised to compare existing future with-project at median and 95% draft. The Corps believes that the comparison requested in the comment would not provide uniquely important information beyond what is already in the report.

760-JK-400-EN44
Comment: *Ship Forces on the Shoreline of the Savannah Harbor Project. p. 36, Table 9: The ship effects should be recalculated using the actual predicted speeds for post-panamax vessels (not an estimate of the power level), and should show the predicted drawdown, return velocity, and wave height for Generation 2 post-panamax vessels. The same type of table should be developed to show the results of these forces on the shorelines of the Confined Sediment Placement/Disposal Facilities and the City Front. Appropriate cross sectional areas should be used for each of these sections of the River.*

Response: Additional documentation on ship speeds in the channel has been obtained from the Savannah Harbor Pilots Association. The Savannah Harbor pilots provided input on power settings that would be used, power settings available on a ship, and the particulars of restricted speed areas in the channel (such as at the Coast Guard Station and LNG facility) which are critical to determining ship speed. A Gen 1 ship that drafts about 41.2 feet in the existing channel and is loaded to draft 45.6 feet in the deepened channel (10% increase in ship area) in a channel whose cross section area only increases by about 5% will go slightly slower (about 3%) at the same power level but still maintain control at the 11-12 knot speeds used in the evaluation. Ship power is used in the analysis to predict ship speed. Ship power is important because typical ships only have four maneuvering settings or “bells” they can use at Savannah Harbor. Based on documented experience at Savannah Harbor and other ports, pilots almost always used the highest maneuvering setting of “full bell” if possible. One reason the full bell usage is critical in speed prediction is because there is no higher setting used while in the channel. As a result of

reviewer comments, additional discussions have taken place between ERDC and the pilots. Along the channel, the ships must control their wakes at the Coast Guard Station, the LNG facility, and from Old Fort Jackson into the City. In addition, the Right Whale speed restriction on the entrance channel placed into effect after the 2007 ship forces study also affects ship speed 6 months of the year near Tybee and Fort Pulaski. In addition to fixed areas of wake reduction, pilots must control their wake when recreational or other boats are along the shoreline or at the jetties. The effects of all of these wake reduction areas extend well upstream and well downstream because of the required channel distance for a ship to slow down and then speed back up. These discussions with the pilots have led to the understanding that the operational constraints such as wake reduction are the major factor in defining ship speed at most areas along the channel. The two exceptions to operational constraints being the dominant factor are at Tybee Island for 6 months of the year and between the Coast Guard Station and the LNG facility. In these areas, the ships frequently reach their maximum speed for full bell and the deepened channel must be evaluated for ship speed changes from speeds in the existing channel. The net result of all of this discussion is that many areas of the channel would not see any significant change in speed in the deepened channel. The ship speed model has been updated to ensure accurate speed prediction when a ship has its draft increased and the channel is deepened. In some cases, deepening the channel would be more significant than the draft increase and the ship speed would increase. In other cases, deepening the channel would be less significant than the draft increase and the ship speed would decrease. The Final Report includes further discussion of the ship speed model to address reviewer comments. Verification of calculations with 140 foot beam Gen 2 ships is also in the final report.

760-JK-400-EN45

Comment: *Ship Forces on the Shoreline of the Savannah Harbor Project. p. 36, Table 9: As the table appears in the report, the predicted return velocity increase for typical speed panama vessels with the change from 80 percent draft to design draft is 24 percent. The drawdown increase for typical speed panamax vessels is 26 percent. The return velocity increase and drawdown increase for high speed panamax vessels are 30 percent and 35 percent, respectively. The short period bow and stem wave heights for typical and high speed panamax vessels going from 80 percent draft to design draft are 28 percent and 30 percent, respectively. These area substantial increases and should not be hidden within the composite tables which average in the results from the smaller vessels shown in Tables 5 and 9. As mentioned previously, the analysis should be conducted again using predicted speeds and should include an analysis of the impacts of Generation 2 post-panamax vessels using the channel. The results should be updated to clearly indicate that return velocities, drawdowns, and wave heights could increase with the project as shown in the example above.*

Response: The primary factor in increasing wave power is an increase in vessel speed. When the percentage increase in draft exceeds the percentage increase in channel area due to channel deepening, vessel speed typically decreases, with correspondingly less wave power.

The 2011 Reanalysis of Ship Forces on the Shoreline of the Savannah Harbor Project includes updated sailing draft distributions to allow comparison of ships in the existing and deepened channels. The drafts have been updated and the calculations for the 140-foot beam Gen 2 ship have been verified in the final report. Comparisons are based on equal frequency of passage in the existing and deepened channels. Median or 50% exceedance drafts are compared in the existing channel to median or 50% exceedance drafts in the deepened channel to represent a frequently occurring ship. The 95% exceedance drafts are compared in the existing and deepened channel to represent a large ship that occurs less frequently.

760-JK-400-EN46

Comment: *Ship Forces on the Shoreline of the Savannah Harbor Project, p. 43, Table 15: The table heading indicates that it contains return velocity information, however, this data is absent from the table. Table 15 should be updated to include this missing information for public review purposes."*

Response: The table reference to return velocity was a typo and has been corrected in the Final Report. Return velocity at Tybee is not a concern due to the distance from the channel to the shoreline in that location.

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760-JK-400-EN47

Comment: *5.9. Existing Shorelines Adjacent to the Federal Navigation Channel, p. 5-121, 2nd and 3rd paragraphs: The conclusions drawn from the results detailed in Savannah Harbor Expansion Bank Erosion Study-Update, (which is contained as an attachment in the Engineering Appendix) should be reconsidered to address the following concerns with this document.*

Response: The Bank Erosion Study and Ship Forces on Shoreline Study have been updated with additional data that has become available, including the latest Fleet Forecast.

760-JK-400-EN48

Comment: *Savannah Harbor Expansion Bank Erosion Study Update, p. I, 7th paragraph: For 2008, 3,055 calls would have been reduced to only 3,049 calls if the channel is deepened to 48 ft. This is a statistical draw, not a "notable reduction".*

Response: The calculated reduction is small, but worthy of being identified.

760-JK-400-EN49

Comment: *Savannah Harbor Expansion Bank Erosion Study - Update, p. 2, 2nd paragraph and p. 7, 3rd paragraph: "The updated forecast changes in ship length, beam, and speed were evaluated." And "Changes with regard to ship length, width, speed were negligible." It appears that changes in draft were not considered and Generation 2 post-panamax vessels were not included as part of this Study. The Study should be amended to address these significant deficiencies.*

Response: Changes in draft were evaluated using sailing draft distributions. Median or 50% exceedance drafts are compared in the existing channel to median or 50% exceedance drafts in the deepened channel to represent a frequently-occurring ship. The 95% exceedance drafts are compared in the existing and deepened channel to represent a large ship that occurs less frequently. The channel design is based on the Susan Maersk, a Generation 2 post-panamax vessel. The updated evaluation uses the more recent Fleet Forecast developed by the project economists.

760-JK-400-EN50

Comment: *Savannah Harbor Expansion Bank Erosion Study - Update, p. 5, 4th paragraph: The paragraph mentions the increase in wave power at Ft. Pulaski but doesn't mention which vessels and which speeds were used to develop these numbers and how these results are " Included" or utilized within the bank erosion analysis.*

Response: Erosion at Fort Pulaski isn't necessarily the result of ship traffic. Most is the result of tides, flow velocities, nor'easters (wind), drainage, etc. The vessel fleet predicted from economic studies was used in the bank erosion studies. The Pilots state that vessels would run about the same speed in a deepened channel as in the existing channel. The 2011 updated analysis provides details of the Fort Pulaski wave heights and shows that wave power does not increase at Fort Pulaski in the deepened channel.

760-JK-400-EN51

Comment: *Savannah Harbor Expansion Bank Erosion Study Update, p. 6, 1St paragraph: The report lists the average length of98.9 percent of all ships calling from the ERDC report to be 574 ft. It is assumed that these callings are the same as those listed in Table 4 of this report. The average length of the 1,245 callings listed in Table 4 is 869.5 ft, a 51.4 percent increase. This is easily noticeable when 70 percent of the calls were panama vessels with an average length of 951 ft (Table 4). Using the average length of 869.5 ft divided by the average ship speed (19.6 fps) returns a passing time of 44.4 seconds. This number is 126 percent greater than the estimated time of generated wave activity upon the shoreline. The observed wave incident data from the study needs to be made public to allow for peer review of these conclusions.*

Response: The average speed and vessel sizes used in the bank erosion studies were obtained from the fleet forecast. The observation of a difference in passing time is not significant. The time of wave generation per ship multiplied by the number of ships yields an extremely small fraction of time with respect to all events within the defined time frame. The observed incident wave data are included in the Engineering Appendix Supplemental Materials report entitled “Ship Forces on the Shoreline of the Savannah Harbor Project”.

760-JK-400-EN52

Comment: *Savannah Harbor Expansion Bank Erosion Study - Update, p. 7. 3rd paragraph: The percentage of passing time was revised upwards with the measured forces from the ERDC study and other factors and used to estimate the percentage of annual erosion that could be attributed to vessel traffic. This method appears to be using poor science. There is no evidence presented that indicates that the actual percentage of annual erosion couldn't be higher, or lower, for that matter. A different method should be used to estimate the amount of bank erosion attributable to vessel traffic.*

Response: The methods used to estimate bank erosion are based on calculations from observations, existing bank information available, the ERDC wave study, available aerial photography, site visits, fleet forecasts, and economic studies, all collectively considered. Minor variations from the erosion predicted at any specific location are possible. Updates to the fleet forecast have been included in the final Bank Erosion Study.

Page 6-15

760-JK-400-EN53

Comment: *Savannah Harbor Expansion Bank Erosion Study - Update, p. 7, 3rd paragraph: The method used to estimate the impact from vessel traffic in 2030 and 2050 uses equally poor science. Multiplying the year 2003 erosion amount by the change in vessel numbers between 2003 and 2030 and again for 2050 completely ignores changes in vessel length and vessel draft. The Revised Fleet Forecast in Appendix B of the Savannah Harbor Expansion Bank Erosion Study - Update details the increasing use of Generation I post-panamax vessels and the use of Generation 2 post-panamax vessels beginning in 2015. At this point, the effect that vessels have on the Savannah River shoreline is unknown. Also unknown are*

the impacts that longer and deeper draft vessels will have on the shoreline. As mentioned previously, a different method should be used to estimate the amount of bank erosion attributable to vessel traffic.

Response: The methods used to estimate bank erosion are based on calculations from observations, existing bank information available, the ERDC wave study, available aerial photography, site visits, fleet forecasts, and economic studies, all collectively considered. Minor variations from the erosion predicted at any specific location are possible. Updates to the fleet forecast have been included in the final Bank Erosion Study.

760-JK-400-EN54

Comment: *Savannah Harbor Expansion Bank Erosion Study - Update, Appendix B: Consistent use of year 2050 forecast numbers occurs within the document, yet the table in Appendix B only contains forecasts out [0 year 2032. The Appendix should be updated to included forecasts out to year 2050.*

Response: The fleet is forecast to change through 2032. No change is predicted for the fleet between years 2032 and 2065. The table has been updated to show no change.

760-JK-400-EN55

Comment: *Savannah Harbor Expansion Bank Erosion Study - Update. p. 8, 2nd paragraph: The document states that "There appears to be a net reduction of bank erosion due to the proposed deepening effort." As mentioned previously, the science in the study does not support this claim.*

Response: The fleet is forecast to change through 2032. No change is predicted for the fleet between years 2032 and 2065. The table has been updated to show no change.

760-JK-400-EN56

Comment: *Savannah Harbor Expansion Bank Erosion Study Update, p. 8, 4th paragraph: This document states results detailed in the report titled Ship Forces on the Shoreline of the Savannah Harbor Project, and as indicated in a previous comment, the drawdown comparisons should be made between the current condition (Vessels traveling at 80 percent draft in the existing channel) and the future condition (Vessels traveling at design draft in the deepened channel). Comparison s between other scenarios is almost meaningless. The claim that "the Savannah Harbor Deeping will have no significant effect on North Tybee" has yet to be substantiated.*

Response: Sailing draft distributions have been updated that compare ships in the existing and deepened channels. Comparisons are based on equal frequency of passage in the existing and deepened channels. Median or 50% exceedance drafts are compared in the existing channel to median or 50% exceedance drafts in the deepened channel to represent a frequently occurring ship. The 95% exceedance drafts are compared in the existing and deepened channel to represent a large ship that occurs less frequently. The updated report shows that composite drawdown in the channel, return velocity in the channel, and wave height at the Tybee Island shoreline were less than or equal with the deepened channel when compared to the existing channel.

760-JK-400-EN57

Comment: *Savannah Harbor Expansion Bank Erosion Study - Update, p. 9, 2nd paragraph: Table 21 of the report titled Ship Forces on the Shoreline of the Savannah Harbor Project lists the observed drawdown of 15 inbound and 22 outbound vessels as they passed the City Front area. The report says nothing of predicted drawdown expect that it was assumed to "remain unchanged" due to low vessel speeds in the area. Even if speeds remain the same, the percentages of longer vessels with deeper drafts*

are to increase according to the table in Appendix B of the document titled Savannah Harbor Expansion Bank Erosion Study - Update. Therefore, it cannot be assumed that conditions in the area are to remain the same (as obviously they are not with larger vessels passing the area) and the potential effects of the project cannot remain unknown. The effects of the project in the City Front area need to be determined.

Response: The 2011 updated analysis examined ship waves, drawdown, and return velocity along the navigation channel, including the City Front [see GRR, Engineering Appendix, Supplemental Materials]. Specific studies involving ship hull configurations, lengths, speeds, drafts, etc. are not necessary and would not yield significantly different results. In addition, shorelines at the City Front properties are protected by concrete piling supporting walks, parking decks, and Plazas above, behind which the slopes are protected with ballast stone, concrete, and other slope protection, laid directly on grade. The channel in this area would not be widened beyond the existing side slope.

Page 6-16

760-JK-400-EN58

Comment: *2. General, p. 1, 7th paragraph: For 2008, 3,055 calls would have been reduced to only 3,049 calls if the channel is deepened to 48 ft. This is a statistical draw, not a "notable reduction".*

Response: The calculated reduction is small, but worthy of being identified.

760-JK-400-EN59

Comment: *2. General, p. 2, 2nd paragraph and p. 7, 3rd paragraph: 'The updated forecast changes in ship length, beam, and speed were evaluated." And "Changes with regard to ship length, width, speed were negligible." It appears that changes in draft were not considered and Generation 2 post-panamax vessels were not included as part of this Study. The Study should be amended to address these significant deficiencies.*

Response: The channel design is based on the Susan Maersk, a Generation 2 post-panamax vessel. The future fleet was developed by project economists and was used in the 2011 updated reanalysis, which included changes in vessel draft.

760-JK-400-EN60

Comment: *5.Fort Pulaski, p. 5, 4th paragraph: The paragraph mentions the increase in wave power at Ft. Pulaski but doesn't mention which vessels and which speeds were used to develop these numbers and how these results are "included" or utilized within the bank erosion analysis.*

Response: Most wave energies and erosion forces at Fort Pulaski are the result of tides, flow velocities, nor'easters, drainage, exposure to open water of the Atlantic, etc. Changes in the vessel fleet predicted from economic studies, as well as the total erosion measured from all causes, were used for bank erosion studies.

Revised wave power calculations at Fort Pulaski are included in the final report for the wave power associated with each vessel class for both existing and deepened channels. The 2011 reanalysis of ship forces shows that wave power is not increased at Fort Pulaski in the deepened channel.

760-JK-400-EN61

Comment: *5. Fort Pulaski, p. 6, l SI paragraph: The report lists the average length of 98.9 percent of all ships calling from the ERDC report to be 574 ft. II is assumed that these callings are the same as those listed in Table 4 of this report. The average length of the 1,245 callings listed in Table 4 is 869.5 ft, a 51.4 percent increase. This is easily noticeable when 70 percent of the calls were panamax vessels with an average length of 951 ft (Table 4). Using the average length of 869.5 ft divided by the average ship speed (19.6 fps) returns a passing time of 44.4 seconds. This number is 126 percent greater than the estimated time of generated wave activity upon the shoreline. The observed wave incident data from the study needs to be made public to allow for peer review of these conclusions.*

Response: Table 4 has been updated based on the updated fleet forecast. The 574-foot length came from all ships observed in the 1-week field study. The observed incident wave data are included in the Engineering Appendix Supplemental Materials report entitled "Ship Forces on the Shoreline of the Savannah Harbor Project".

Average speed and vessels from the fleet forecast were used for the bank erosion studies. The observation of a difference in time range is not significant. The time of wave generation per ship multiplied by the number of ships yields an extremely small fraction of time with respect to all events within the defined time frame.

760-JK-400-EN62

Comment: *5. Fort Pulaski, p. 7, 3rd paragraph: The percentage of passing time was revised upwards with the measured forces from the ERDC study and other factors and used to estimate the percentage of annual erosion that could be attributed to vessel traffic. This method appears to be using poor science. There is no evidence presented that indicates that the actual percentage of annual erosion couldn't be higher, or lower, for that matter. A different method should be used to estimate the amount of bank erosion attributable to vessel traffic.*

Response: The methods used to estimate bank erosion are based on calculations from observations, existing bank information available, the ERDC wave study, available aerial photography, site visits, fleet forecasts, and economic studies, all collectively considered. Updates to fleet forecast have been considered in the final Bank Erosion Study.

760-JK-400-EN63, 760-JK-400-EN64

Comment: *5. Fort Pulaski, p. 7, 3rd paragraph: The method used to estimate the impact from vessel traffic in 2030 and 2050 uses equally poor science. Multiplying the year 2003 erosion amount by the change in vessel numbers between 2003 and 2030 and again for 2050 completely ignores changes in vessel length and vessel draft. The Revised Fleet Forecast in Appendix B of the Savannah Harbor Expansion Bank Erosion Study Update details the increasing use of Generation 1 post-panamax vessels and the use of Generation 2 post-panamax vessels beginning in 2015. At this point, the effect that vessels have on the Savannah River shoreline is unknown. Also unknown are the impacts that longer and deeper draft vessels will have on the shoreline. As mentioned previously, a different method should be used to estimate the amount of bank erosion attributable to vessel traffic.*

Response: The methods used to estimate bank erosion are based on calculations from observations, existing bank information available, the ERDC wave study, available aerial photography, site visits, fleet forecasts, and economic studies, all collectively considered. Updates to fleet forecast have been considered in the final Bank Erosion Study.

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760-JK-400-EN65

Comment: *5. Fort Pulaski, p. 8, 2nd paragraph: The document states that "There appears to be a net reduction of bank erosion due to the proposed deepening effort." As mentioned previously, the science in the study does not support this claim.*

Response: The methods used to estimate bank erosion are based on calculations from observations, existing bank information available, the ERDC wave study, available aerial photography, site visits, fleet forecasts, and economic studies, all collectively considered. Updates to fleet forecast have been considered in the final Bank Erosion Study.

760-JK-400-EN66

Comment: *6. North Tybee, p. 8, 4th paragraph: This document states results detailed in the report titled Ship Forces on the Shoreline of the Savannah Harbor Project and as indicated in a previous comment, the drawdown comparisons should be made between the current condition (Vessels traveling at 80 percent draft in the existing channel) and the future condition (Vessels traveling at design draft in the deepened channel). Comparisons between other scenarios is almost meaningless. The claim that "the Savannah Harbor Deeping will have no significant effect on North Tybee" has yet to be substantiated.*

Response: Sailing draft distributions have been updated that compare ships in the existing and deepened channels. Comparisons are based on equal frequency of passage in the existing and deepened channels. Median or 50% exceedance drafts are compared in the existing channel to median or 50% exceedance drafts in the deepened channel to represent a frequently occurring ship. The 95% exceedance drafts are compared in the existing and deepened channel to represent a large ship that occurs less frequently. The updated report shows that composite drawdown in the channel, return velocity in the channel, and wave height at the Tybee Island shoreline were less than or equal to the deepened channel when compared to the existing channel.

760-JK-400-EN67

Comment: *7. City Front, p. 9, 2nd paragraph: Table 21 of the report titled Ship Forces on the Shoreline of the Savannah Harbor Project lists the observed drawdown of 15 inbound and 22 outbound vessels as they passed the City Front area. The report says nothing of predicted drawdown expect that it was assumed to "remain unchanged" due to low vessel speeds in the area. Even if speeds remain the same, the percentages of longer vessels with deeper drafts are to increase according to the table in Appendix B of the document titled Savannah Harbor Expansion Bank Erosion Study - Update. Therefore, it cannot be assumed that conditions in the area are to remain the same (as obviously they are not with larger vessels passing the area) and the potential effects of the project cannot remain unknown. The effects of the project in the City Front area need to be determined.*

Response: The Harbor Pilots have given no indication that they expect to alter the manner in which they move vessels past City Front in the future, either with or without project. Since most of the shoreline in that area is protected and the channel would not be widened beyond its existing side slope during harbor deepening, the Corps continues to believe that a detailed assessment of project effects on the shorelines in that location is not needed.

This position is supported by the Corps' expectation that fewer total vessels would be required (compared to the without project condition) with a deepened channel to carry the cargo for a given year.

760-JK-400-EN68

Comment: *Savannah Harbor Expansion Bank Erosion Study - Update, Appendix B: Consistent use of year 2050 forecast numbers occurs within the document, yet the table in Appendix B only contains forecasts out to year 2032. The Appendix should be updated to included forecasts out to year 2050.*

Response: The container fleet is forecast to reach its maximum size [numerically] in 2032. To date, the fleet is predicted to remain constant between 2032 and 2050.

760-JK-400-EN69

Comment: *I. Savannah Harbor Characteristics, p. 2, I S\ paragraph: Page 2 is very optimistic about the "blockage ratio". 10 areas where the channel takes up much of the river, such as the U.S. Route 17 crossing, the blocking ratio is much greater than predicted. A vessel with a 160 ft beam (Such as a Generation 2 post-panamax vessel which is predicted to use the channel by 2015, Savannah Harbor Expansion Bank Erosion Study-Update, Appendix B) and a 42.3 ft draft (Allowing for a 10 percent under keel clearance, or 6,768 sq ft), in a channel that 's 470 ft wide, 47 ft deep, and bas sloped sides at 3: I (22,560 sq ft) the blockage ratio is 30 percent not the 9.5 percent stated as the maximum in the report. The blockage ratios should be revised to include areas where the river is narrow in width and should be updated based on the predicted use of Generation 2 post-panamax vessels (See below).*

Response: The ship forces at the shoreline were reanalyzed in the report *2011 Reanalysis of Ship Forces at the Shoreline in Savannah Harbor* (July 2011) which is included in the Engineering Investigations Supplemental Materials. Additional analysis was added to the report to address the blockage ratio in constricted areas. The design vessel for this project, the *Susan Maersk*, a Gen 2 post-panamax vessel, was used for the analysis. Three cross-sections near the Highway 17 crossing were plotted. The average area at mean tide level is 30630 sq ft and the width at the -20 contour is 662 feet. If the 500 foot navigation channel is deepened to 48-feet, the area will be 33130 sq ft at mean tide. Measured drawdown data and measured speed along with drawdown calculations show that ships typically slow down in this area such that the drawdown from the ship is not greater than 0.6-0.7 feet. Based on the average Gen 2 beam of 142.9 ft and draft of 46.6 ft, blockage will be 0.20. Based on the Schijf equation for drawdown using water level at mean tide, the ship will have to travel at 5.0 knots speed through water to keep the drawdown below 0.7 feet. The pilots have stated they can and have maintained safe navigation at low speeds in this range due to concerns about bank erosion. They plan to continue this practice in the future. During the 2005 field study, one ship was measured at 2.4 knots and several ships were measured at 5.2-5.4 knots.

Page 6-18

760-JK-400-EN70

Comment: *Also, the assumption that ship forces are essentially dependent on a two dimensional slice of the ship in the channel is also flawed. It is a problem of added mass, which is the mass of water a ship needs to displace to move into a new location within the fluid. Two ships of the same beam but different hull forms have different added mass factors. A very full ship such as a tanker moves more water than a finer bull like a container ship, which moves more water than a naval ship.*

Response: While hull form does have some effect, the Corps bases its analysis on the same ship hull form in both the existing and deepened channel conditions. If hull forms become more efficient in the future, the analysis using the same hull form in both the existing and future channels would tend to over-predict ship effects. The ship forces study focused on container ships because containerships

dominate the fleet at Savannah, tankers calling at Savannah do not generally use full project depth, tankers travel slower and short-period waves are much less of an issue. The field data used to calibrate the analysis technique was based primarily on container ships, with the same ship forms being used in both the existing and deepened channel scenarios.

760-JK-400-EN71

Comment: *5. Ship Speed Analysis, p. 13, 2nd paragraph: The writer bases the drawdown, wave height, and wave power calculations on the facts that panamax vessels will have an increased speed in the deepened channel and that post-panamax vessels will have a decreased speed. The assumption that post-panamax vessels will maintain the same power level and travel at a lower speed seems poor (The lower speed resulting from a deeper draft). The post-panamax vessels would travel at a speed which provides safe maneuverability when traveling the channel. To assume that this speed will always be lower than the current speed and that that the captain or pilot will maintain the same power setting, which may result in a speed which provides low maneuverability, is a poor assumption. The analysis should be based on the actual predicted speeds not the predicted power level.*

Response: The ship forces at the shoreline were reanalyzed in the report *2011 Reanalysis of Ship Forces at the Shoreline in Savannah Harbor (July 2011)* which is included in the Engineering Investigations Supplemental Materials. The revised ship speed model, that did not differ significantly from the 2007 ship speed model, was developed to insure this and any other comments about ship speed were correctly addressed. Determining ship speed requires knowledge of what power setting will be used, what power settings are available on a ship, and the particulars of restricted speed areas in the channel (such as at Coast Guard and LNG). A Gen 1 ship that drafts about 41.2 feet existing and drafts 45.6 feet (10% increase in ship area) in a channel whose cross sectional area only increases by about 5% would go slightly slower (about 3%), but still maintain control at the 11-12 knot speeds the District is using in the evaluation. Ship power is used in the analysis to predict ship speed. Ship power is important because typical ships only have four maneuvering settings or "bells" they can use at Savannah Harbor. At Savannah Harbor and other ports studied by ERDC, pilots almost always used the highest maneuvering setting of "full bell" if possible and this is true at Savannah Harbor. One reason the full bell usage is critical in speed prediction is because there is no higher setting used while in the channel. Additional discussions have taken place between ERDC and the pilots. Along the channel, the ships must control their wakes when passing the Coast Guard Station, LNG facility, and from old Fort Jackson into the City. In addition, the Right Whale speed restriction (on the entrance channel) that was placed into effect after the 2007 ship forces study affects ship speed 6 months of the year near Tybee and Fort Pulaski. In addition to fixed locations of wake reduction, pilots must control their wake when recreational or other boats are along the shoreline or at the jetties. The effects of all of these wake reduction areas extend well upstream and well downstream because of the required channel distance for a ship to slow down and then speed back up. Discussions with Savannah Harbor pilots have led to the understanding that operational constraints such as wake reduction are the major factor in defining ship speed at most areas along the channel. The two exceptions to operational constraints being the dominant factor are at Tybee Island for 6 months of the year and between the Coast Guard Station and the LNG facility. In these areas, the ships frequently reach their maximum speed for full bell and the deepened channel must be evaluated for speed changes from those occurring with the existing channel. The net result is that many areas of the channel would not see any significant change in speed in a deepened channel. Based on reviewer comments, the ship speed model has been updated to insure accurate speed prediction when a ship has its draft increased and the channel is deepened. In some cases, deepening the channel is more significant than the draft increase and the ship speed would increase. In other

cases, deepening the channel is less significant than the draft increase and the ship speed would decrease. Further discussion of the ship speed model is included in the Final GRR-Engineering Appendix.

760-JK-400-EN72

Comment: *7. Fort Pulaski Ship Forces Analysis, p. 20. 2nd paragraph: Wave power, is expected to increase by up to 19 percent along Ft. Pulaski. This is not insignificant. Wave power has to increase substantially as the percentages of larger vessels running with deeper drafts are projected to increase in a channel whose cross sectional area is only increasing by 4 percent. It is assumed that the 19 percent increase was forecasted for a post-panamax vessel, as a full summary of the results of the wave power analysis are not provided in this document. The details of the wave power study need to be made public to allow for peer review of these conclusions.*

Response: Details of the wave study are published in the 2011 Reanalysis of Ship Forces on the Shoreline of the Savannah Harbor Project documents. Based on a better understanding of how ships operate and updated ship speed and wave models, the wave power would change along the channel. This is particularly true at Fort Pulaski where the Right Whale restriction on speed has greatly reduced ship speeds 6 months of the year. Fort Pulaski speeds are also affected by the wake reduction requirements at the Coast Guard Station. Based on the 2011 report, wave power at Fort Pulaski does not increase in the deepened channel. Further discussion of the wave power calculation is included in the Final Report.

760-JK-400-EN73

Comment: *The document states that the project's effects along the Confined Sediment Placement/Disposal Facilities (p. 24, l SI paragraph) will be the same as along Ft. Pulaski, therefore the ship forces along this long section of the river were not modeled. Barring any differences in river width which may exists between the two sections of the river (Wave impacts will be greater in a narrower river as the waves will have less time to decay before reaching the shoreline) the conclusion that wave power will also increase by up to 19 percent along the Confined Sediment Placement/Disposal Facilities is fair. This is a significant increase.*

Response: The 2011 updated analysis examined ship waves, drawdown, and return velocity at the CDFs. The results demonstrated wave power at the CDFs does not increase in the deepened channel.

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760-JK-400-EN74

Comment: *The document states that the only effect which needs to be modeled for the shoreline along the City Front is the long period drawdown. However, the document only provides observed drawdown results (Table 21) and not predicted impacts of the project. The predicted drawdown results, as wells as wave power results should be published for review.*

Response: The 2011 updated analysis provides observed and computed drawdown and computed wave height at City Front. The observed drawdown in that location was less than 0.6 ft. Drawdown is related to the speed of a vessel, which pilots adjust to prevent damage to moored vessels at City Front. This is the current practice and it is expected to continue with a deepened channel.

At City Front, ships slow down to prevent adverse wake effects. In many cases, they go slower than the speed required to prevent wake effects. A table is included in the final report showing ship speeds for each vessel class that is required to prevent wake effects at City Front.

760-JK-400-EN75, 760-JK-400-EN76

Comment: *The study also fails to analyze the predicted drawdown, wave height and wave power increases along the City Front, the Confined Sediment Placement/Disposal Facilities, and Tybee Island resulting from the passage of a Generation U post-panamax vessel along the River. As mentioned previously, according to the updated fleet fo recasts detailed in Appendix B of the Savannah Harbor Expansion Bank Erosion Study-Update Generation II post-panamax vessels (Which can have beams up to 160 ft) are expected to call by the year 2015. These vessels will displace an even greater amount of water and it doesn't appear that the effects that they will have has been calculated, or at least reported in Ship Forces on the Shoreline of the Savannah Harbor Project or in the Tier 2 EIS. For example, a Generation 2 post-panamax vessel (160ft beam) with 10 percent underkeel clearance will take up 30 percent of the cross section of the new 47 ft channel. Current panamax vessels in the current channel only take up 18 percent of the cross section of the channel. Thus, Generation 2 vessels will displace 67 percent more water relative to channel cross section. This cannot amount to a negligible erosion rate, and the conclusion that wave power will be substantially greater is accurate. The effects that the use of Generation 2 post-panamax vessels will have on drawdown, wave height and wave power along the City Front, the Confmed Sediment Placement/Disposal Facilities, and Tybee Island should be determined.*

Response: Calculations for the 140-foot beam Gen 2 ships have been included in the Final Report at multiple locations, including City Front, the CDFs, and Tybee Island. The study has been updated to address the most recent fleet forecast and the fleet mix predicted to call at the port with the deepened channel.

760-JK-400-EN77

Comment: *8. Tybee Island Ship Forces Analysis, p. 22, 3rd paragraph: The document indicates that the impact analysis conducted for the Tybee Island shoreline compared the typical (80 percent of design draft) and design draft conditions. The document then states that "in all cases, the design draft ship in the deepened channel had slightly less drawdown then the existing channel." The difference between those two conditions is much less important than the difference in drawdown between the current condition (Vessels traveling at 80 percent draft in the existing channel) and the future condition (Vessels traveling at design draft in the deepened channel). Table 15 indicates that post-panamax vessels traveling at typical and high speed will have drawdown increases of 12.9 percent and 5.73 percent, respectively. These are much less then the differences calculated for panamax and subpanamax vessels. The increase in drawdown for panamax vessels traveling at typical speed is 31 _5 percent and the increase for those trave ling at high speed is 22.3 percent between existing and furure conditions. The increase for sub-panamax vessels traveling at typical speed is 27.2 percent and the increase for those traveling at high speed is 34.4 percent. These increases are not insignificant.*

Response: Sailing draft distributions have been updated that compare ships in the existing and deepened channels. Comparisons are based on equal frequency of passage in the existing and deepened channels. Median or 50% exceedance drafts are compared in the existing channel to median or 50% exceedance drafts in the deepened channel to represent a frequently-occurring ship. The 95% exceedance drafts are compared in the existing and deepened channel to represent a large ship that occurs less frequently.

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760-JK-400-EN78

Comment: *Ship Forces on the Shoreline of the Savannah Harbor Project, Tables 16-19: The tables should provide the differences between the existing conditions (Vessels traveling al 80 percent draft in the existing channel) and the future conditions (Vessels traveling at design draft in the deepened channel) for the years of 2030 and 2050. The differences in drawdown between the other scenarios matter much less. The updated table should be updated to make these comparisons.*

Response: The draft comparison has been revised and updated based on the most recent sailing draft distribution. The report also has been revised to compare existing future with-project at median and 95% draft. The comparison requested in the letter would not provide substantial information beyond what is in the final report.

760-JK-400-EN79

Comment: *Ship Forces on the Shoreline of the Savannah Harbor Project, p. 36, Table 9: The ship effects should be recalculated using the actual predicted speeds for post-panamax vessels (not an estimate of the power level), and should show the predicted drawdown, return velocity, and wave height for Generation 2 post-panamax vessels. The same type of table should be developed to show the results of these forces on the shorelines of the Confined Sediment Placement/Disposal Facilities and the City Front. Appropriate cross sectional areas should be used for each of these sections of the River.*

Response: The primary factor in increasing wave power is an increase in speed. An increase in draft typically decreases speed, with correspondingly less wave power.

The study included in the draft report assumed the percentage draft would be the same for the existing and the deepened channel. Since the 2007 ship forces study, sailing draft distributions have become available that allow better comparison of ships in the existing and deepened channels. The drafts have been updated and the calculations for the 140-foot beam Gen 2 ship have been verified in the final report. Comparisons are based on equal frequency of passage in the existing and deepened channels. Median or 50% exceedance drafts are compared in the existing channel to median or 50% exceedance drafts in the deepened channel to represent a frequently occurring ship. The 95% exceedance drafts are compared in the existing and deepened channel to represent a large ship that occurs less frequently.

760-JK-400-EN80

Comment: *Ship Forces on the Shoreline of the Savannah Harbor Project, p. 36, Table 9: As the table appears in the report, the predicted return velocity increase for typical speed panama vessels with the change from 80 percent draft to design draft is 24 percent. The drawdown increase for typical speed panamax vessels is 26 percent. The return velocity increase and drawdown increase for high speed panamax vessels are 30 percent and 35 percent~ respectively. The short period bow and stern wave heights for typical and high speed panamax vessels going from 80 percent draft to design draft are 28 percent and 30 percent, respectively. These area substantial increases and should not be hidden within the composite tables which average in the results from the smaller vessels shown in Tables 5 and 9. As mentioned previously, the analysis should be conducted again using predicted speeds and should include an analysis of the impacts of Generation 2 postpanamax vessels using the channel. The results should be updated to clearly indicate that return velocities, drawdowns, and wave heights could increase with the project as shown in the example above.*

Response: The primary factor in increasing wave power is an increase in vessel speed. When the percentage increase in draft exceeds the percentage increase in channel area due to channel deepening, vessel speed typically decreases, with correspondingly less wave power.

Since the 2007 ship forces study, sailing draft distributions have become available that compare ships in the existing and deepened channels. The drafts have been updated and the calculations for the 140-foot beam Gen 2 ship have been verified in the final report. Comparisons are based on equal frequency of passage in the existing and deepened channels. Median or 50% exceedance drafts are compared in the existing channel to median or 50% exceedance drafts in the deepened channel to represent a frequently occurring ship. The 95% exceedance drafts are compared in the existing and deepened channel to represent a large ship that occurs less frequently.

760-JK-400-EN81

Comment: *Ship Forces on the Shoreline of the Savannah Harbor Project, p. 43, Table 15: The table heading indicates that it contains return velocity information, however, this data is absent from the table. Table 15 should be updated to include this missing information for public review purposes.*

Response: The table reference to return velocity was a typo. Return velocity at Tybee is not an issue due to the distance from the channel to the shoreline in that location.

760-JK-400-EV138

Comment: *The June 2010 forecast of vessel calls appearing in Appendix B of the Savannah Harbor Expansion Bank Erosion Study Update indicates that fewer vessels will call under the proposed conditions (completed project) than the current conditions (maintaining the 42 ft depth). If this proves to be true, then the chances for invasive species to enter the harbor in ballast water are decreased along with the decrease in vessel calls. The analysis of this subject seems appropriate as well as the conclusion that the vessels entering the Port of Savannah will have to adhere to State and Federal laws regarding ballast water regard less of the depth.*

Response: Concur that if fewer vessels call at the port, the risk of the introduction of invasive species decreases.

Page 6-21

760-JK-400-EV139

Comment: *The 2007 report from the Atlantic Sturgeon Status Review Team lists a seasonal restriction on dredging in the Savannah River between March 16th and May 31st. The DEIS does not appear to address this seasonal restriction in the document.*

Response The seasonal dredging restriction referred to in the 2007 report references the dredging restriction for Striped bass, not Atlantic sturgeon. This dredging restriction is discussed in several places in the EIS.

760-JK-400-EV140

Comment: *The DEIS lacked information that is critical to make an assessment on listed and candidate species, did not substantiate its determination of non-significant impacts when adverse impacts were acknowledged, did not appear to pursue studies to collect the necessary information, and relied upon a significant amount of unsubstantiated assumptions and conclusions to make its determinations. If the assumptions and conclusory statements were based on peer-reviewed or project related studies, the DEIS*

should cite that source as a basis upon which the assessment occurred. Furthermore, the assessment should include all potential impacts from the project, including omitted impacts, e.g., increased boat strikes and wave erosion due to larger ships accessing the port; disruption of habitat continuity; disruption of habitat accessibility; and mitigation impacts.

Response: The discussion on threatened and endangered species is in compliance with ESA. This information [and appropriate citations] is contained in FEIS-Sections 4.09 and 5.11 as well as Appendix B and Appendix Z.

760-JK-400-EV141, 760-JK-400-EV142

Comment: *The shortnose and Atlantic sturgeon are examples of the shortcomings of the assessment of impacts to threatened and endangered species. Shortnose sturgeon and Atlantic sturgeon were grouped together for purposes of assessing impacts from the project. The DEIS justifies the grouping due to their "similarities in habitat use, distribution throughout the proposed action area, foraging behavior and prey base, and subsequent risk of take relative to dredging and trawling operations..... No citations or other reference information was provided to substantiate this decision to group the species. However, other information provided in the DEIS provides information that contradicts the claim that the species are similar enough to group together for impact assessment purposes. For example, the DEIS states that Atlantic sturgeon primarily lead a marine existence and arc therefore more likely to be impacted by hopper dredges than the more estuarine-based shortnose sturgeon. The DEIS states that shortnose sturgeon spawn 100 miles upstream of the project area, but also states that an Atlantic sturgeon larva was found 6.7 km (4 miles) upstream of the project impact area. This information not only suggests that shortnose and Atlantic sturgeon spawn in different areas, it also highlights the possibility that some larva may drift into the project area and may be affected by the upstream increases in salinity that would occur as a part of this project. Additional information should be collected to verify the actual location of Atlantic sturgeon spawning to ensure the project dredging and upstream movement of salinity and decreases in DO will not deleteriously impact Atlantic Sturgeon as its spawning habitat has not been adequately accounted.*

Response: See response to comments 760-JK-400-EV14, 760-JK-400-EV15, 760-JK-400-EV16.

Page 6-22

760-JK-400-EV143, 760-JK-400-EV144, 760-JK-400-EV145

Comment: *The impact summary to the Essential Fish Habitat in Appendix S, acknowledges that the proposed action would have adverse impacts on shortnose sturgeon, an endangered species. Nonetheless, the DEIS dismisses the adverse impacts as non-significant without providing sufficient detail as to how the non-significant status had been applied. The DEIS does not provide an accurate representation of impact. The DEIS states that "the maximum expected reductions in habitat acreage range [sic] of about 11.0 percent or 439.0 acres [with mitigation], depending on channel depth, life stage, and season." First, there is apparently an error in the DEIS narrative as indicated by the out-of-place 'range.' Second, this estimate fails to accurately sum the decreases in habitat that will still be realized even with mitigation. Table 8-13 of Appendix B states that 439 acres of January habitat will be lost for adult shortnose sturgeon alone. An additional 113 acres of August habitat will be lost for adult shortnose sturgeon and another 28 acres of January habitat will be lost for juvenile shortnose sturgeon. The estimated loss in habitat is a minimum projection because it does not include lost habitat that is used during other seasons. Also, shortnose sturgeon use different habitats based upon life stage and*

season. Thus, estimates of habitat loss by month and life stage may be representative, but are not conc1usory as to the total amount of habitat lost.

Response: This section only provides summary information. The details are provided in Appendices C and S [which was referenced in the summary statement].

First, the sentence indicated with the out of place 'range' will be changed in Appendix B as follows: "For Shortnose sturgeon, the maximum expected reductions in habitat acreage would be approximately 11.0 percent [439.0 acres], but actual losses depend on selected channel depth, life stage, and season.

Second, an examination of Table 5-36 and Appendices B and C reveal that project impacts [with mitigation] on the Shortnose sturgeon are already adequately discussed.

Appendix B includes an adequate assessment of sturgeon habitat which would be impacted by SHEP.

760-JK-400-EV146

Comment: *The DEIS also fails to represent impacts to shortnose sturgeon based upon sediment impacts from the project even though substrate preference information is available and substrates will be affected by the project. For example, the 1998 NMFS Final Shortnose Sturgeon Recovery Plan states that "juveniles in the Savannah River use sand/mud substrate in 10-14 m depths (Hall et a!. 1991). Furthermore, the Atlantic sturgeon, for which the DEIS has claimed the shortnose sturgeon is an adequate surrogate for purposes of impact assessment, occupies habitats dominated by gravel and sand substrates (NOAA Fisheries Office of Protected Resources webpage). Presumably, dredging will alter the depth and substrate composition of the river. This impact should be accounted for and quantified in the DEIS.*

Response: In Appendix B Section 8.02.7 [Sturgeon (Atlantic and Shortnose)], the following statement is made: "These migratory ***subadults, as well as adult sturgeon,*** are normally captured in shallow (10-50m) near shore areas dominated by gravel and sand substrate (Stein *et al*., 2004)" ***(bold italics added for emphasis)***. This quote is from the discussion on Atlantic sturgeon and is dealing with subadults and adults, not juveniles. The Hall et al., 1991 quote indicated in the comment is addressing juveniles.

The Corps followed incremental analysis procedures indicated by the Fisheries Interagency Coordination Team. Those procedures did not include specific factors for impacts based on "sediment impacts", including substrate. Similar sedimentation is expected to occur in the navigation channel for both the with and without project condition. Discussions are included in both Appendix B and NMFS' Biological Opinion included in Appendix Z.

760-JK-400-EV147, 760-JK-400-EV148, 760-JK-400-EV149

Comment: *Moreover, the habitat losses may have been further underrepresented by the habitat suitability modeling in the DEIS due to inaccurate assumptions regarding dissolved oxygen levels necessary for habitat use. For example, a baseline level of 3.0 to 4.0 mg/l of dissolved oxygen was used to determine if habitat was available for juvenile and adult shortnose sturgeon. This is a minimum level at which the agencies determined shortnose sturgeon can survive based on laboratory studies of survival. However, these levels do not necessarily indicate the dissolved oxygen level that is necessary for foraging, resting, and moving. For example, the Collins et al. (2001) study of shortnose sturgeon habitat use, cited in the DEIS, reported minimum mean dissolved oxygen levels of 6.36 and 6.45 in areas where adults and juveniles were found, respectively. In the Appendix N documentation, Prescott Brownell, from NMFS requested that a range of suitable habitat thresholds be used for modeling habitat availability.*

The agency panel then redacted his comments from the record without providing an adequate basis for the redaction. The panel decided the current methods were "acceptable for now." This comment would suggest that additional work would be necessary in the future in order to adequately asses the impacts. The narrative does not provide adequate discussion as to why the pass/fail approach was more adequate than the range approach suggested by Mr. Brownell. Moreover, there is no indication of future actions that would be necessary or that any future action was taken in order to compensation for the inadequacies of the pass/fail analysis.

Response: The observed dissolved oxygen values 6.36 and 6.45 mg/l are just that, observed values, not life requisites. The baseline levels indicated in the EIS remain valid.

The habitat suitability criteria for the Shortnose sturgeon were developed by the Fisheries Interagency Coordination Team, which included Dr. Collins and Mr. Brownell. The criteria were based on professional expertise/experience, a review of pertinent literature, and site-specific data for the Savannah River.

Page 6-23

760-JK-400-EV150, 760-JK-400-EV151

Comment: *The DEIS also mentions mitigation, but does not accurately quantify the acres of impact or the quantity of mitigation area with the exception of newly provided access to 20 miles of river upstream of the New Savannah Bluff Lock and Dam at Augusta, Georgia. The DEIS fails to describe the habitat upstream of the dam, its adequacy for sturgeon habitat, its past use by sturgeon, or the successful use of fish ways by shortnose or Atlantic sturgeon. Spawning habitat for shortnose sturgeon in the Savannah River has been documented by Hall et al. (1991) as areas will gravel/sand/log substrate in curves in the Savannah River. Furthermore, the New Savannah Bluff Lock and Dam are located on or about the fall line. The NOAA Atlantic Sturgeon Fact Sheet states that Atlantic sturgeon spawn between the fall line and salt front, suggesting Atlantic sturgeon would not benefit from the proposed mitigation measures. Thus, the use of the fish passage structure as adequate mitigation has not been shown to be sufficient to mitigate the intensity and extent of impacts to shortnose and Atlantic sturgeon.*

Response: The following habitat information was not available when the DEIS was published. However a discussion has been added to FEIS-Appendices B and C.

In the 20-mile study area [Augusta Shoals/Savannah Rapids upstream of the New Savannah Bluff Lock and Dam] substrate data were collected at 57 sites. Forty percent of the sites had a substrate type[s] considered suitable for sturgeon spawning (NMFS 2007) whereas the combined frequency of marginally suitable sites was 37%. The remaining sites [33%] had unsuitable substrates.

Benthic substrate frequency in Augusta Shoals study area

Class	Benthic substrate	SI[1]	Number of Sites	Frequency (%)
1	Mud, soft clay/fines	0.0	0	0
2	Silt, sand (diameter < 2.0 mm)	0.0	7	12
3	Sand, gravel (diameter > 2.0 mm to < 64 mm)	0.5	0	0
4	Cobble/gravel (diameter > 64 mm to < 250 mm)	1.0	3	5
5	Boulder (diameter 250 mm to 4,000 mm)	0.8	20	35
6	Bedrock w/ fissures w/ gravel/cobble mixtures	0.6	21	37
7	Bedrock smooth w/ few fissures or gravel	0.2	6	11

[1]1.0 indicates highest suitability; 0.0 the lowest.

The following link contains the full report of the investigation of Shortnose sturgeon spawning habitat in the Savannah River [Georgia and South Carolina]: http://www.sas.usace.army.mil/plnew.html

In the upper mid-west US, Lake sturgeon have been observed passing both constructed and natural rapids covering an entire river width. Some of these observations were at lesser water depths than are proposed (3.5 to 5.5 feet) for the fish passage at the New Savannah Bluff Lock and Dam (Aadland 2010). The Lake sturgeon is a larger species than the Shortnose sturgeon, so physical passage of the latter should not pose a problem. Adaptive management, attraction flow measures, cost estimates/commitments, and monitoring are described in detail in Appendix D. Post-project, the District would monitor passage of Shortnose sturgeon across the structure to ensure it performs successfully (Appendix D).

The fall line is not a discrete boundary within the river. Instead, it is a transition zone marking the retreat/advance of sea level/geological shorelines. Unless there is specific evidence to the contrary, appropriate reaches within the entire fall line zone would become available for spawning/foraging after construction of the fish passage.

760-JK-400-EV152

Comment: *4.06.1. Invasive Species, p. 4-43, 2nd paragraph: The document should cite the source of the text used for this paragraph. The text appears to be taken from the EPA's Ballast Water Fact sheet found on the Agency's website.*

Response: A reference has been added to the FEIS-Section 4.06.1 regarding invasive species and their relationship to ballast water.

760-JK-400-EV153
Comment: *4.06.1. Invasive Species, p. 4-44, 2nd paragraph: The document states that the Marine Extension Service was "expected to release an Invasive Species Plan for the State of Georgia later in 2008." This document was finalized in October 2009 and is available from the Marine Extension Service's website. The text should be updated to include this fact and to include information contained in the Plan pertinent to invasive species control in ballast water for this project.*

Response: The text in Section 4.06 has been revised to reflect the October 2009 final report.

760-JK-400-EV154
Comment: *4.06.1. Invasive Species, p. 4-44, 4th paragraph: The document should cite the source of the text used for this paragraph. The text appears to be taken from the USCG's Aquatic Nuisance Species Website.*

Response: Section 4.06 has been revised to reflect the source of this information as the website of the United States Coast Guard [Aquatic Nuisance Species].

760-JK-400-EV155
Comment: *4.06.1. Invasive Species, p. 4-44, 5th paragraph: The document states the mandatory practices which must be applied by "all vessels with ballast tanks on all waters of the US." It should be noted that crude oil tankers engaged in coast wide trade, DOD and Homeland Security vessels, and vessels operating exclusively within one COTP zone are excluded from these regulations.*

Response: Section 4.06 has been revised to note that there are some limited exemptions to the ballast water management requirements.

Page 6-24

760-JK-400-EV156
Comment: *4.06.1. Invasive Species, p. 4-45, 5th paragraph: The words "per cent" should be changed to the word percent.*

Response: The text in Section 4.06 has been revised.

760-JK-400-EV157
Comment: *6.08 Threatened and Endangered Species Act - Pg 6-2, 8th para - "A Biological Assessment evaluating the potential impacts of the proposed action on endangered and threatened species has been prepared (Appendix B)". Impacts to adult Shortnose sturgeon habitat is estimated by the Corps to range from 20 to 220 acres, and for juvenile sturgeon from 86 to 373 acres, depending on the channel depth alternative selected. Under the Endangered Species Act, why would the loss of this habitat not be considered a "take", and thus a violation of the Act? Since Atlantic sturgeon also inhabit the Savannah Harbor, and have recently been proposed for listing by NMFS as endangered, the same question applies to that species.*

Response: "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect an endangered species. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of ESA Section 7(b)(4) and Section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not to be considered prohibited taking provided that such taking is in compliance with the terms and conditions of the

Incidental Take Statement in the BO. The incidental take statements for both Shortnose and Atlantic sturgeon can be reviewed in the BO prepared by the NMFS which is included in Appendix Z.

760-JK-400-EN82

Comment: *Has groundwater use in the Upper Floridan aquifer decreased in Georgia and South Carolina as assumed in the model and analysis?*

Response: According to USGS data (USGS SIR 2009-5251), groundwater withdrawals from the Upper Floridan aquifer in the "Red Zone" counties of Chatham and Effingham in Georgia, and Beaufort and Jasper Counties in South Carolina [2000/2004] were as follows [high/low in mgd]:

Chatham	68.15 / 67.00
Effingham	4.62 / 6.85
Jasper	3.34 / 2.65
Beaufort	21.44 / 19.74

Data from the City of Savannah [city wells only] indicate that withdrawals from 2005 through 2010 have remained fairly constant [from 23.5 to 25.5 mgd].

See also response to comment 760-JK-400-EN03.

760-JK-400-EN83

Comment: *Did groundwater withdrawals from the Upper Floridan aquifer decrease by at least 5 MGD between 2006 and 2008 in Georgia?*

Response: According to USGS data (USGS SIR 2009-5251), groundwater withdrawals from the Upper Floridan aquifer in the "Red Zone" counties of Chatham and Effingham in Georgia, and Beaufort and Jasper Counties in South Carolina [2000/2004] were as follows [high/low in mgd]:

Chatham	68.15 / 67.00
Effingham	4.62 / 6.85
Jasper	3.34 / 2.65
Beaufort	21.44 / 19.74

Data from the City of Savannah [city wells only] indicate that withdrawals from 2005 through 2010 have remained fairly constant [from 23.5 to 25.5 mgd].

See also response to comment 760-JK-400-EN03.

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760-JK-400-EN84

Comment: *Groundwater use trends and restrictions by GAEPD are discussed in various sections of the GRR and supporting appendices. There appears to be a lack of corresponding discussion on groundwater use and restrictions by SDHEC in South Carolina.*

Response: The supplemental studies for the Floridan aquifer indicated that pumping in Savannah was the driving force behind the cone of depression in the coastal area. The states, including SC DHEC, did not identify water use restrictions in South Carolina as a useful tool to ameliorate salt water intrusion issues. According to USGS data (USGS SIR 2009-5251), groundwater withdrawals from the Upper

Floridan aquifer in the "Red Zone" counties of Chatham and Effingham in Georgia, and Beaufort and Jasper Counties in South Carolina [2000/2004] were as follows [high/low in mgd]:

Chatham	68.15 / 67.00
Effingham	4.62 / 6.85
Jasper	3.34 / 2.65
Beaufort	21.44 / 19.74

Data from the City of Savannah [city wells only] indicate that withdrawals from 2005 through 2010 have remained fairly constant [from 23.5 to 25.5 mgd].

See also response to comment 760-JK-400-EN03.

760-JK-400-EN85

Comment: *There has been a great deal of effort in characterizing the pore water for the Miocene confining unit and underlying Floridan aquifer. One key question evaluated in the DEIS is the rate of vertical movement through the clay, in particular the area near the mouth of the harbor where I) the confining unit is thinnest; 2) sunace water salinity is greatest; 3) paleochannels are abundant. Were any efforts made to age date the pore water and underlying groundwater from the Upper Floridan aquifer as a more direct measure of transport time?*

Response: No attempt was made to date confining unit pore water or groundwater from the Floridan aquifer. Such analysis was not identified by the resource agency groundwater experts as being critical information.

760-JK-400-EN86

Comment: *1. The groundwater model was used in place of the step drawdown test. Given that the model is developed from available field data and assumptions on characteristics of the aquifers and confining units, it is not at all clear how the model replaces the field test.*

Response: The groundwater modeling results were not intended to replace those of the field pumping test. Instead, the model simulations were performed to validate the previous results obtained from field pumping tests conducted at the Tybee Island test well cluster. The Tybee Island and model simulation tests found that a full aquitard test would require months to pump the necessary volume of water [millions of gallons] from the aquifer. Since little meaningful data would be acquired, this test was not conducted.

760-JK-400-EN87

Comment: *2. It would seem more reasonable to use the model to design an adequate aquitard test that may or may not include pumping directly from the Floridan aquifer, rather than use the model to try and disprove the need to conduct a " trial step-drawing" test altogether.*

Response: The groundwater modeling was not intended to replace the field pumping test. The model simulated pumping test was performed to check the validity of previous results from pumping tests conducted at the Tybee Island test well cluster. Since the Tybee Island tests and the model simulations indicated a full aquitard test would likely require months to pump millions of gallons of water from the aquifer and would acquire little meaningful data, a full aquitard testing was not warranted.

760-JK-400-EN88
Comment: *While the overall conclusion that the impacts to groundwater are not expected to be significant appear reasonably well substantiated, quantifying the increased flow through the confining unit to 3-4 percent does not appear to be well substantiated given the uncertainty in leakance though this unit.*

Response: The intent of groundwater modeling was to bracket a range of vertical hydraulic conductivities which would produce a '*best fit*' with observed/ simulated groundwater heads [and gradients] on a calibrated USGS groundwater scale. Notably, simulated migration of chlorides through the Miocene confining layer appear to be most sensitive to the vertical hydraulic conductivity assigned to the confining layer. After deliberation, a range for vertical hydraulic conductivity [which *best-fit* actual data] was chosen. As verification, both lower and higher conductivity values produced unrealistic heads and chloride concentrations when compared to actual data. [As discussed in the General Re-Evaluation Report for SHEP, Appendix C: Engineering, Supplemental Studies, Potential Ground-Water Impacts to the Upper Floridan Aquifer, June 2007].

Applying the derived range of vertical hydraulic conductivities to the proposed deepened channel length yielded a potential increase of 3% to 4% in vertical flow through the confining clay unit. Importantly, this increased flow applies **only** to the confining unit below/along the actual width of the deepened channel.

Page 6-26

760-JK-400-EN89
Comment: *These potential mitigation measures, in particular the last two, have significant ramifications on water use in the region by reducing overall water availability. The ability to acquire permitted rights in Georgia and presumably South Carolina, including existing permitted rights without replacing them with an alternate source raise significant questions regarding the viability of these conceptual alternatives.*

Response: The potential mitigation alternatives referred to in the comment were conceptual, as stated in the preceding paragraph of the GRR. As was also noted later in the GRR (Section 9) and EIS (Section 5), neither of the measures of concern was adopted in the proposed mitigation plan.

760-JK-400-EN90
Comment: *There are abundant references to past supporting work but there is a lack of specific references to the relevant documents in the DEIS and GRR. This lack of references makes evaluating the supporting information difficult.*

Response: The report has been revised to include the updated chloride impacts study.

760-JK-400-EN91
Comment: *GRR (10Nov10), Page 93, Section 5.7.2: A general discussion of global sea level rise and its expected effect on salinity is provided. However, it is not clear if or how the effect of global sea level rise was evaluated in conjunction with the channel deepening, in particular as it relates to chloride levels at the Abercorn Creek intake as well as other intakes on the river. Specifically, it is not clear how the channel deepening will affect the timing and magnitude of salinity intrusion associated with sea level rise.*

Response: Our analysis of sea level rise impacts on wetlands showed a negative relationship; that is, the greater the sea level rise, the lesser the relative impact of the project (increased salinity) on wetlands. With regard to impacts at the City's water intake, construction of the raw water storage impoundment would mitigate for expected increases in salinity at the intake, including those associated with sea level rise. The Corps also considered potential project impacts on Beaufort-Jasper Water and Sewer Authority's intake on the Savannah River. Since that intake is located well upstream of the City of Savannah's water intake, the Corps expects no increases in salinity due to impacts of the project. The Corps also evaluated the project effects on the magnitude of sea level rise with hurricanes. The analysis indicated that the increases would be small and within the margin of error of Chatham County's hurricane planning guidelines.

760-JK-400-EN92, 760-JK-400-EN93, 760-JK-400-EN94

Comment: *Chloride Model Analysis:*

1. It is not clear what the chloride results presented from the EFDC model used to evaluate potential chloride impacts represent:

- *Average chloride concentrations over a river reach and/or over time?*
- *Cross-section maximum chloride levels?*
- *Tidal maximum?*
- *Another metric?*

2. It is not clear what pumping rate was used in the assessment:

- *Current rate is described as 30 MGD.*
- *Plant capacity is variously described as 62.5 MGD and 75 MGD.*

3. GRR (10Nov10), Page 166, Section 9.8 states that the rate of surface water withdrawal at the Abercorn Creek intake "has been increasing substantially over recent years as the western part of the County has grown rapidly. In addition, the City has been directed by the Georgia EPD to reduce groundwater withdrawals by 11 MGD requiring more surface water use." It is not clear how the expected increase in use at the intake was considered as part of the chloride impact evaluation.

Response: The final reports include an updated chloride impact analysis. The District uses average daily chloride concentrations calculated by the EFDC model, as well as hourly chloride concentrations. That model was calibrated to daily average chloride numbers provided by the City of Savannah. The EFDC model can provide the chloride numbers for any cell within its model grid, but the primary points of interest are the City's water intake on Abercorn Creek (provided most of the calibration data for the model) and the USGS gage at I-95 (used as part of the model calibration). Chloride levels at the City's water intake are the focus of the chloride impact assessment. No other natural resources would be impacted by those chloride concentrations.

As noted in EIS-Section 5.02 , the City initially indicated to the District that it was regularly treating about 30 MGD at the water treatment plant. Later, the City clarified that the plant capacity was 62.5 MGD. Their water withdrawal permit from GA DNR-EPD is for 50 MGD. The analysis of impacts to the water in Abercorn Creek is not sensitive to the amount withdrawn from the river by the City. Their withdrawal is a minor amount in relation to the volume of water in Abercorn Creek that moves past their intake. GA DNR-CRD has stated that if mitigation is needed for adverse impacts to the intake water, the Corps should mitigate at the plant capacity of 62.5 MGD. The 75 MGD capacity noted in the comment is the design capacity for the raw water pumps and not the plant capacity. The difference between the pump capacity and the plant capacity is the rate used to refill the proposed mitigation storage.

As groundwater withdrawals are curtailed by the State, there would be greater reliance on surface water supplies. However, the current intake rates at the Abercorn Creek facility are only a small fraction of the total flow [even during drought periods]. The withdrawal rates could increase to their permitted levels without resulting in adverse environmental impacts.

Page 6-27

760-JK-400-EN95, 760-JK-400-EN96

Comment: *Available input data relating to chloride/salinity changes over tidal cycles and over cross-sectional areas of critical river reaches appear to be sparse to absent. There is reference to proposed or on-going chloride / salinity monitoring, however these does not appear to be any detail on this monitoring effort. Given the highly stratified nature of the chloride distribution in conjunction with tidal effects, understanding the temporal and spatial distribution throughout the estuary may prove critical to evaluating peak chloride levels at the Abercorn Creek intake. Clarification on the existing data and any proposed monitoring would be useful in evaluating potential future impacts at the intake.*

Response: A report that describes the additional data that was collected is included in the final report (GRR-Engineering Appendix, Supplemental Materials). Field data do not show chloride stratification in the vicinity of Abercorn Creek. Stratification is a factor in the lower harbor and upstream through Houlihan Bridge. However, as the river shallows in the vicinity of I-95, the chloride stratification becomes less of an issue. This lack of stratification led to the non-selection of one of the alternative mitigation proposals – which was to place a submerged sill at the entrance to Abercorn Creek to inhibit the upstream movement of the higher salinity bottom layer of water.

A report that describes the additional data that was collected is included in the final report (GRR-Engineering Appendix, Supplemental Materials). EIS-Appendix D describes the post-construction monitoring that would be performed.

760-JK-400-EN97

Comment: *The DEIS evaluates potential effects of chloride/salinity changes at the Abercorn Creek intake. Have potential impacts at other intake structures been evaluated?*

Response: There are no other fresh water intake structures in the vicinity of the Savannah facility. The Beaufort-Jasper Water Authority intake is located further upstream, i.e., closer to the location of the potential alternate intake site. Weyerhaeuser operates an intake at its plant site adjacent to Houlihan Bridge, but it withdraws brackish water for use as once-through cooling water and for firefighting. Although this water source will incrementally increase in salinity, the system was designed to be used with brackish water.

760-JK-400-EN98

Comment: *As a potential mitigation measure, cost for a supplemental water intake approximately 10-miles upstream from the current intake was presented in a document titled "Review and Costs for Supplemental Water Supply - City of Savannah Intake at Abercorn Creek" dated 17 Sep 2009. It is not clear if environmental impacts from this proposed new intake have been evaluated, including the potential in increase salinity in Abercorn Creek further upstream from the current intake location.*

Response: Even at a rate of 62.5 mgd [maximum permitted capacity], the withdrawal is less than 2% of the river flow [Clyo gage]. It is not expected that the location of the alternate intake would have any

measurable environmental impact beyond its initial construction. Additionally, since this alternative was not selected, any potential additional environmental impacts are a moot point.

760-JK-400-EN99

Comment: *DEIS, Page 5-55, Section 5.2.4 - Side-bank storage reservoir options were considered in the GRR. The preliminary design size of the reservoir was to hold a 1-week supply of raw water. It appears for the purpose of evaluating potential locations for the side-hank reservoir a 210 MO capacity was assumed, corresponding to a 30 MOD demand. However, as stated in this section, the plant 'S capacity is 62.5 MOD. In the GRR Attachment 1.1.7, the plant capacity is stated as 75 MGD, 20-percent more than the 62.5 MOD capacity provided in the DEIS. Also, as stated in Section 5.2.3, page 5-51 of the DEIS as well as in appendices to the GRR, demand has increased significantly due to increased growth in the western part of the County. It is also noted in the GRR appendix 1.1.36 that groundwater use from the Upper Floridan aquifer is being cut back by OAEPD, it is not clear if this reduction in groundwater use corresponds to an increase in surface water demand.*

Response: Larger withdrawals of surface water at the City's I&D plant is expected due to groundwater use reductions. The I&D plant has a capacity that is roughly twice its present level of operation. Its withdrawal permit from the State of Georgia is also substantially higher than its present operation. The 75 MGD capacity referenced from the GRR attachment is pump station plant capacity, not treatment plant capacity – which is 62.5 MGD.

760-JK-400-EN100

Comment: *A side bank reservoir with a 210 MG capacity provides only 3 1/3 days of capacity at a plant capacity demand of 62.5 MGD. This is less than half of the stated goal of I-week supply of raw water.*

Response: The initial designs considered would have provided 7 days of water at the current water use rate of 30 MGD. The revised modeling and storage requirement computations account for the hourly variation in chlorides during each day, a significant difference from average daily chloride concentration. The current water impoundment design is intended to match the 62.5 MGD plant capacity.

760-JK-400-EN101

Comment: *It is not clear what analysis was completed to determine that 1-week duration was adequate to address an increase in chlorides. Section 5.2.4, page 5-55 references a "new moon" receding, was this the extent of the evaluation? Were any historical durations considered?*

Response: Chloride levels at the City's intake vary depending on both river flow and tidal conditions. Higher chloride levels occur with low river flows (drought conditions) and large tidal ranges (spring tides). It is well understood that there is a relationship between tides and salt wedge penetration upstream in the estuary. However the current design is based on historic flow and tide data. Withdrawal from the proposed raw water storage impoundment is projected to occur intermittently for up to two weeks.

760-JK-400-EN102
Comment: *Can they accommodate a 440 MG capacity (I-week at 62.5 MGD)?*

Response: The initial designs considered would have provided 7 days of water at the current water use rate of 30 MGD. The raw water storage impoundment and pumps have been redesigned to draw from storage during high tide during chloride intrusion events and partially refill during low tide when chloride concentrations in the river are acceptable.

Page 6-28

760-JK-400-EN103
Comment: *Has an equivalent of a Phase I ESA been completed to establish past Recognized Environmental Conditions?*

Response: The specific tracts have not yet been identified. The general area has been selected and the District has made initial assessments of potential sites to identify items which could screen out a tract and make it undesirable for use as mitigation for this project. An equivalent of a Phase I Environmental Site Assessment would be performed prior to acquisition of the individual properties.

760-JK-400-EN104
Comment: *Has a screening level evaluation for wetlands, threatened and endangered species, historic resources, and similar issues that significantly impacts availability of properties been completed?*

Response: Yes, screening level evaluations of wetlands and threatened and endangered species have been performed of properties considered for acquisition. No resource was identified that would diminish the expected ecological value of a site or preclude its intended use as mitigation. Additional studies would be performed at the time of acquisition to ensure no issue is present that would preclude a site's use as mitigation.

760-JK-400-EN105
Comment: *What is the proposed process that would implement construction of a side-bank reservoir? How will availability of potential sites be maintained?*

Response: This alternative is not being considered for incorporation into the project due to the high real estate and maintenance costs that would be required.

760-JK-400-EN106
Comment: *DEIS Appendix C - Mitigation Planning; page 9. The accuracy of the chloride model is not sufficient to support the stated increase in chloride levels at the City's intake (e.g.; 0.34 percent during very low flows). It is worth noting that the relatively low accuracy of the model is the stated reason the USACE evaluated various mitigation alternatives that included relocating the pump intake and use of side-bank storage.*

Response: A report that describes the additional data that was collected and analyses that were performed is included in the final report (GRR-Engineering Appendix, Supplemental Materials). The model used to estimate future chloride levels has been revised substantially from that which was included in the draft report. The cited percentage increase in chloride levels is no longer applicable. All engineering models contain some uncertainty. The Corps is aware of those uncertainties when it makes decisions based, in part, on information from such models.

760-JK-400-EN107, 760-JK-400-EN108, 760-JK-400-EN109

Comment: *The water quality-related sections of the DEIS include detailed assessments of the project's impacts on dissolved oxygen and chloride concentrations. The analysis relied on models and field testing of mitigation techniques. Much of this information is useful for identifying the potential water quality impacts and mitigation strategies. However, the DEIS understates that uncertainty and risks associated with both the water quality impacts and the proposed mitigation. The DEIS also does not explicitly consider the manner in which the water quality of the harbor is currently being managed and regulated. For example, the DEIS does not address impact of the project on the 20 I 0 draft TMDL for oxygen-demanding substances, nor the related regulatory framework for achieving full compliance of water quality standards.*

Response: The risks and uncertainties of the proposed dissolved oxygen system for Savannah Harbor are fully discussed in the Risk and Uncertainty Analysis [Appendix Q, pages 9-11]. Specifically, an uncertainty analysis of the water quality model was used to assess its reliability. An oxygen demonstration trial verified the efficacy of the Speece Cones to add oxygen to these estuarine waters. Extensive post-construction monitoring would identify whether initial predictions regarding oxygen levels are correct. Given the depth of analysis of this matter, there is little risk to decision-makers regarding the dissolved oxygen issue. Post-project, the adaptive management plan provides a means to change the oxygen injection system, should that be necessary. This could range from increasing the amount of injected oxygen, modifying the oxygen injection equipment, or adding injection sites.

EIS-Section 4.02.2 discusses Surface Water, including South Carolina and Georgia Water Quality Standards, the City of Savannah Water Intake on Abercorn Creek, and the Georgia and South Carolina Water Quality Certifications for the existing Savannah Harbor Navigation Project. These sections identify areas that do not meet the existing water quality standards and the TMDLs that EPA has prepared for the harbor area (fecal coliform and dissolved oxygen). EIS-Section 5.02 discusses impacts to water quality, including dissolved oxygen and chlorides at the City of Savannah's water intake.

The dissolved oxygen analysis for SHEP consisted of model simulations which compared existing to deepened [post-project] conditions. As anticipated, dissolved oxygen in the water column is projected to decrease after deepening without mitigation. This difference is due to salinity changes and resultant stratification. That is, the deepened channel allows the salt wedge to move farther upstream which expands the area of stratification. This, in turn, results in less oxygen reaching the bottom layers of the water column in those locations. The SHEP model simulates this effect accurately. However, all models have a degree of intrinsic risk. This uncertainty is examined in the report, "Development of the Hydrodynamic and Water Quality Models" dated January 2006. Mitigation for the identified potential reductions in dissolved oxygen focused on injecting oxygen at three harbor locations [Front River near IP's waste discharge, Back River upstream of Tidegate, and near the Georgia-Pacific plant on the Savannah River (upstream of I-95)]. As emphasized previously, the oxygen system would only mitigate the effects of post-project deepening [with some small improvements]. However, it is not sufficiently robust to inject enough oxygen so that the harbor would meet water quality standards.

The TMDL model is very similar to the SHEP model. In fact, EPA used the SHEP model for its TMDL application with some minor modifications. The 2010 Draft TMDL was based on the water quality standard which is basically a deficit of 0.10 mg/L in both Georgia and South Carolina. The deficit is calculated using "natural" conditions coupled with the amount of point and nonpoint source load necessary to deplete the deficit. For the 0.10 mg/L DO deficit, the point source TMDL calculated values were essentially the same for both the existing condition and the 6-foot deepening model runs. Therefore, since the dissolved oxygen mitigation for harbor deepening brings the dissolved oxygen

concentrations back to existing conditions, the point source reductions to meet water quality standards should remain unchanged.

The impacts of the SHEP on the dissolved oxygen regime in the Savannah Harbor estuary are discussed in the EIS and in greater detail in the GRR-Engineering Appendix. Based on the potential impacts to dissolved oxygen that would be caused by implementation of the SHEP, the project's mitigation plan includes an oxygen injection system. This system has been designed to remove the incremental impacts of the SHEP on the dissolved oxygen regime in the harbor. Due to the spacing of the system, the dissolved oxygen regime would be improved in over 90 percent of the estuary compared to existing conditions. The mitigation plan also includes various flow re-routing features in McCoy's Cut, Middle River, and Back River to supply that portion of the estuary with additional freshwater to reduce salinity levels. The project also includes a sill in Back River to reduce the amount of saltwater that would move up this tidal stream.

The risks and uncertainties of the proposed dissolved oxygen system for Savannah Harbor are fully discussed in the Risk and Uncertainty Analysis [pages 9-11]. Specifically, a risk analysis of the water quality model was prepared to predict post-project dissolved oxygen levels. As noted, an oxygen demonstration trial verified the efficacy of the Speece Cones to add oxygen to the harbor's estuarine waters. Extensive post-construction monitoring will determine whether initial predictions regarding oxygen levels are correct. Given the depth of analysis of this matter, there is little risk to decision-makers regarding the dissolved oxygen issue. Post-project, the adaptive management plan provides a means to change the oxygen injection system. This could range from increasing the amount of injected oxygen, modifying the oxygen injection equipment, or adding injection sites.

760-JK-400-EN110, 760-JK-400-EN111, 760-JK-400-EN112

Comment: *Much of the DEIS's analysis of potential water quality is based on models that are have some capability to predict "average" dissolved oxygen or chloride conditions, but limited ability to characterize the trends and variability in water quality. Therefore, it is unclear whether the models are accurately predicting the critical conditions for water quality protection. The DEIS provided little indication that model uncertainties were explicitly considered in either predicting impacts or designing mitigation strategies. This is an especially important concern for the mitigation of dissolved oxygen impacts, because the proposed technology is somewhat experimental and of highly uncertain benefit.*

Response: The models used to identify project impacts and develop mitigation plans were calibrated and validated [multiple times] prior to their approval. The approved, calibrated, and validated models are appropriate to identify project impacts and develop mitigation plans. The hydrodynamic and water quality models simulate the complex estuarine dynamics, viz., hourly, daily, and monthly tidal variations, salinity and dissolved oxygen dynamics together with their spatial distribution within the system. The models are applicable over a wide range of conditions including low and high freshwater flow. The model grid incorporates surveyed bathymetry and includes point and non-point pollution sources in the watershed. The grid extends from Clyo, Georgia (river mile 61, USGS stream gage 02198500) downstream through the harbor to Fort Pulaski (river mile 0), and out to 17 miles offshore [Atlantic Ocean]. The model was calibrated and validated using observed data from 1997 to 2006 and has been designed to meet the expectations of the SHEP Water Quality Interagency Coordination Tea, which followed in the footsteps of the modeling technical review group that was established in the late 1990s to oversee the development of a technically valid model for determining SHEP's environmental impacts and attendant mitigation features. The group included representatives from the District, US EPA Region 4, USGS, Georgia DNR-EPD, South Carolina DHEC, and private sector technical modeling experts [tasked with actual model development]. An independent technical review and uncertainty analysis have been

conducted on the models and the resulting comments/concerns were incorporated into the final version. Details regarding the hydrodynamic and water quality model development process, extensive reviews, and uncertainty analysis can be found in the report, "Development of the Hydrodynamic and Water Quality Models for the Savannah Harbor Expansion Project" dated January 2006 [included in the Supplemental Materials to the Engineering Appendix]. Acceptance letters from agencies involved in the modeling technical review group can be found in the document, "Correspondence Regarding Hydrodynamic & Water Quality Model Acceptability" [included the Supplemental Materials to the Engineering Appendix].

The model criteria and generated outputs were designed in concert with the stated needs/concerns of involved federal and state regulatory agencies. The oxygen injection system was never meant to elevate oxygen levels within the project area to the point that applicable water quality standards would be met. Rather, it was designed to make post-project dissolved oxygen levels equal to or greater than status quo conditions.

The dissolved oxygen estimates associated with operation of the Speece Cones are conservative, i.e., system was only assumed to function at 80% of its design efficiency. Moreover, two spare cones are included to provide for periods of maintenance/repair.

760-JK-400-EN113, 760-JK-400-EN114

Comment: *The pending dissolved oxygen TMDL is expected to have a major regulatory and economic impact on both industrial and municipal dischargers, many of which will have to make large capital investments to reduce wasteloads. It tends to be controlled by the location in which attainment of dissolved oxygen concentrations is most difficult. From this perspective, it would not matter if 97 percent of the system experienced oxygen improvements if the critical location(s) experienced degradation, or if the wasteload allocations to achieve full attainment would be lower. The DEIS currently does not allow this determination. Similarly, it is unclear if how the proposed mitigation approach would affect the ability of point source dischargers to use the same technology for TMDL compliance.*

Response: The impacts of the SHEP on the dissolved oxygen regime in the Savannah Harbor estuary are discussed in the EIS and in greater detail in the Engineering Appendix of the GRR. Based on the potential impacts to dissolved oxygen that would be caused by a harbor deepening, the project's mitigation plan includes an oxygen injection system. This system has been designed to remove the incremental impacts of the SHEP on the dissolved oxygen regime in the harbor. Due to the spacing of the system, the dissolved oxygen regime would be improved in over 90 percent of the estuary compared to existing conditions. The mitigation plan also includes various flow re-routing features in McCoy's Cut, Middle River, and Back River to supply that portion of the estuary with additional freshwater to reduce salinity levels. The project also includes a sill in the lower end of Back River to reduce the amount of saltwater that would move up this tidal stream.

While the injection of oxygen into an estuary [to improve dissolved oxygen levels] is a relatively new concept, the technology is not. Admittedly, the oxygen injection system is not designed to produce a large net increase in dissolved oxygen levels; rather, it is intended to raise oxygen levels approximately 0.36-0.43 mg/l. There is little objective doubt that the proposed systems can add oxygen to the project's estuarine waters. This position is verified by the results from a field demonstration of the subject oxygen injection equipment and subsequent water quality modeling of the effects of injection on dissolved oxygen levels [throughout the water column]. The monitoring plan provides for an evaluation of the predictions made with respect to the effects of harbor deepening on dissolved oxygen levels. The Transfer Efficiency Study would determine performance of the oxygen injection system. The

Adaptive Management Plan contains provisions to modify the oxygen injection system [as necessary]. These changes could include increasing the amount of injected oxygen, use of different equipment, altering the locations/number of the oxygen injections sites, etc. Since the system would restore oxygen levels to their present (without project) condition, the SHEP would have no effect on EPA's Draft TMDL. SHEP would have no impact on the ability of any point source discharger to use oxygen injection prior in their treatment plan prior to the discharge.

The applicability of this dissolved oxygen injection technology to/for other users of the Savannah River would be determined by the permitted discharger, the applicable State permitting agency (Georgia DNR-EPD or SC DHEC), and the US EPA.

Page 6-29

760-JK-400-EN115

Comment: *The analysis should be revised to (I) more accurately characterize the uncertainties associated with water quality impacts; (2) more explicitly consider those uncertainties in designing environmentally conservative mitigation strategies; and (3) specifically examine the impact on the project on water quality management of the estuary under the draft 2010 TMDL.*

Response: There is uncertainty attendant to all model predictions as detailed in EIS-Section 8 and Appendix Q. However, in this instance there was an extensive review/deliberation process prior to approval of the SHEP model. There was consensus this state-of-the-art platform is the best available tool for decision-making. Nonetheless, to minimize the impact of data variation, the SHEP tools were employed in a relative manner. Analysis of changes in the system's DO levels based on input adjustments (depths, loads, flows, etc.) was determined to be the most appropriate method to examine potential project impacts. Sensitivity analyses were completed on modeling parameters to help select the most appropriate rates for the model. Visual and statistical comparisons of simulated versus measured values showed acceptable model performance as detailed in the Tetra Tech SHEP Modeling Report and outlined in GRR-Section 7.4 of the Engineering Appendix.

The mitigation design is conservative [and has adaptive management tools available as a secondary safeguard against unforeseen conditions], and a specific objective of the mitigation design was to avoid affecting the 2010 Draft TMDL.

760-JK-400-EV158

Comment: *Affected Environment, p. 4-13, 2nd paragraphs: The description of South Carolina's dissolved oxygen criteria should include elements related to naturally-low oxygen conditions. These elements include a 0.1 mg/L allowable deficit from the natural dissolved oxygen concentration and a 10 percent allowable deficit in the event that it was demonstrated that resident aquatic species would not be adversely affected.*

Response: FEIS-Section 4.022 has been revised.

760-JK-400-EV159

Comment: *Affected Environment, p. 4- 13, section 4.02.04, 4th and 5th paragraphs: These paragraphs do not indicate any difference between class SA and SB waters, and should be revised to indicate the more stringent water quality criteria for class SA waters.*

Response: FEIS-Section 4.022 has been revised to indicate the difference between SA and SB waters.

760-JK-400-EV160

Comment: *Affected Environment, p. 4-14, section 4.02.04, 2nd paragraph: This paragraph incorrectly cites the Georgia D.O. criteria. The criteria listed have been revised, as noted in the third paragraph on this page, so should not be cited using the present tense.*

Response: FEIS-Section 4.022 has been revised to describe the revised D.O. standard.

760-JK-400-EV161

Comment: *Affected Environment, p. 4-13, 2nd and 3rd paragraphs: The description of Georgia's dissolved oxygen criteria should include elements related to naturally-low oxygen conditions. These elements include a 0.1 mg/L allowable deficit from the natural dissolved oxygen concentration and a 10 percent allowable deficit in the event that it was demonstrated that resident aquatic species would not be adversely affected.*

Response: FEIS-Section 4.022 has been revised to provide more detail about the Georgia D.O. standard.

760-JK-400-EV162

Comment: *Affected Environment, p. 4-14, section 4.02.04, 2nd paragraph: This paragraph mentions the 2006 TMDL for Savannah Harbor, but makes no mention that this TMDL is being revised by US EPA Region 4, and that a draft revised TMDL was issued in 2010. Statements such as " ... the Savannah River cannot accept anthropogenic oxygen demanding substances ... " are no longer true given the revised standards and updated TMDL Such statements should be modified to reflect the updated regulatory approach.*

Response: FEIS-Section 4.02.2 has been revised to discuss EPA's 2010 Draft D.O. TMDL.

760-JK-400-EV163

Comment: *Env. Consequences, section 5.2.1 (Dissolved Oxygen), Tables 5-19 through 5-23 and related discussion: The dissolved oxygen modeling results presented here-and the associated discussion--focus on the average dissolved oxygen concentrations in the bottom three layers of the 6-1ayer model. The more appropriate and environmentally conservative approach would be to examine the "critical" DO concentration; i.e., the lowest concentration of the 6 layers, which will usually occur in the bottom layer. This is because the state water quality criteria apply to entire water column without vertical averaging. The present approach underrepresents the project's impacts to oxygen.*

Response: In 2010, the District met with the EPA and the State natural resource agencies to discuss refinement of the water quality analyses and designs of the oxygen injection system. After deliberation, it was agreed that the water quality analyses should examine project effects in the lower half of the water column [three bottom layers of the model grid], rather than just the bottom grid layer. Further, the dissolved oxygen system design should focus its analysis on the bottom half of the water column. It was agreed that this tactic would yield a more representative [if conservative] picture of conditions throughout the water column. However, impacts to Shortnose sturgeon habitat were evaluated solely using values from the model's bottom grid layer. Therefore, these outputs [presented in the EIS] are more narrowly focused on bottom conditions because there is no averaging of values.

Page 6-30

760-JK-400-EV164

Comment: *Env. Consequences, p. 5-42, section 5.2.1 (Dissolved Oxygen): It is stated that "from a general perspective, the [project] would result in insignificant (1-2 percent) increases in the percentage of the harbor's waters with violations of existing water quality standards." It is unclear if this determination was correctly made by considering not only the 4-5 mg/L criteria, but also the maximum 0.1 mg/L allowable deficit from natural dissolved oxygen concentrations. Regardless, this is a misleading metric because of the widespread existing D.O. impairments. It is not recommended to use this metric to summarize general project impacts.*

Response: This section describes dissolved oxygen conditions without mitigation measures. A description of dissolved oxygen conditions with mitigation (Speece cones) is presented in Section 5.02.

760-JK-400-EV165

Comment: *Env. Consequences, p. 5-42, section 5.2.1 (Dissolved Oxygen): The analysis defines a "substantial" impact to dissolved oxygen as a reduction of 0.25 mg/L or more. Given the existing water quality impairment, any measureable reduction of dissolved oxygen is a water quality concern. It is not recommended to arbitrarily define a "substantial" impact or imply that only reductions of 0.25 mg/L or greater are a concern.*

Response: The terminology and degree of dissolved oxygen change deemed “substantial” were developed in coordination with the Water Quality Interagency Coordination Team. The referenced tables show dissolved oxygen conditions without any mitigation measures. A description of dissolved oxygen conditions with mitigation (Speece cones) is presented in Section 5.02.

760-JK-400-EV166

Comment: *Env. Consequences, section 5.2.1 and 5.2.2 (Dissolved Oxygen and related mitigation analysis}--general comment: There appears to be a disconnect between the manner in which the dissolved oxygen-related analysis was performed and the manner in which water quality is managed under existing regulations. USEPA has performed extensive water quality modeling and analysis to support the draft TMDL that was issued in 2010 and will be finalized in 2011. The TMDL is expected to have a major regulatory and economic impacts on both industrial and municipal dischargers, many of which will have to make large capital inveShnents to reduce wasteloads. The analys is in the DEIS does not allow the reader to determine whether the project would make full attainment of water quality standards easier or more difficult.*

Response: The dissolved oxygen analysis for SHEP consisted of model simulations that allowed comparison of existing to deepened [post-project] conditions. As anticipated, dissolved oxygen in the water column is projected to decrease after deepening. This difference is due to salinity changes and resultant stratification. That is, the deepened channel allows the salt wedge to move farther upstream, which increases stratification. This, in turn, results in less oxygen reaching the bottom of the water column. The SHEP model simulates this effect accurately. However, all models have a degree of intrinsic risk. This uncertainty is examined in the report, “Development of the Hydrodynamic and Water Quality Models” dated January 2006. Mitigation for the noted reductions in dissolved oxygen focused on injecting oxygen at three harbor locations [Front River near IP’s wastewater lagoon, Back River upstream of Tidegate, and near Georgia-Pacific on the Savannah River (upstream of I-95)]. As emphasized previously, the oxygen system would only mitigate the effects of post-project deepening

[with some small incidental improvements]. However, it is not sized to inject enough oxygen to make the harbor meet State water quality standards.

The TMDL model is very similar to the SHEP model. In fact, EPA used the SHEP model for its latest TMDL application with only minor modification.

The TMDL was based on the water quality standard which is basically a deficit of 0.10 mg/L in both Georgia and South Carolina. The deficit is calculated using "natural" conditions coupled with the amount of point and nonpoint source load necessary to deplete the deficit. For the 0.10 mg/L DO deficit, the point source TMDL calculated values were essentially the same for both the existing condition- and the 6-foot deepening model runs. Therefore, since the dissolved oxygen mitigation for harbor deepening brings the dissolved oxygen concentrations back to existing conditions, the point source reductions to meet water quality standards should remain unchanged.

760-JK-400-EV167

Comment: *For example, the TMDL tends to be controlled by the location and time at which attainment of dissolved oxygen concentrations is most difficult. From this perspective, it would not matter if 97 percent of the system experienced oxygen improvements if the critical location experienced degradation, or if the wasteload allocations to achieve full attainment would be lower. The analysis should be revised to specifically examine the impact on the project on the critical cells that control wasteload allocations under the draft 2010 TMDL, under critical hydrologic/tidal conditions. This will allow determination of whether the project (with D.O. mitigation) would have a net positive or negative impact on water quality attainment.*

Response: The proposed oxygen injection system would effectively mitigate for reduced dissolved oxygen levels resulting from the proposed harbor deepening, but it would also have a minor positive incidental effect on the harbor's D.O. regime. Because the injection cones are located at different points in the harbor [see previous response and FEIS for details], the models predict there will be an incremental improvement in its overall water quality beyond that necessary to mitigate for SHEP [an increase in over 90 percent of the project effect's area when compared to the status quo]. Further, there is no evidence that SHEP [with mitigation] will affect any of the TMDL predictions [values] being made regarding existing point source loadings. For more details, on EPA's TMDL effort and/or its relationship to the SHEP [Section 4.02] and the noted dissolved oxygen mitigation measures [see Section 4.02 and Section 5.02, respectively].

760-JK-400-EV168

Comment: *Env. Consequences, section 5.2.2 (Mitigation for Impacts to Dissolved Oxygen) general comment: This section lacks detail with respect to the quantitative benefits of the mitigation on dissolved oxygen; i.e. it lacks the information corresponding to the tables in section 5.2. t. This is information is in the GRR Engineering Appendix, but it would be recommended to make section 5.2.1 and 5.2.2 consistent with regard to the type and level of detail of model results presented.*

Response: The model results presented in EIS-Sections 5.02 contain sufficient information for an engaged reader to make a reasoned decision about SHEP's impacts.

Page 6-31

760-JK-400-EV169

Comment: *Env. Consequences, section 5.2.1 and 5.2.2 (Dissolved Oxygen and related mitigation analysis) and Section 5 of Appendix Q (Risk and Uncertainty Analysis}—general comment: The Corps has inappropriately based its assessment of the dissolved oxygen model's capabilities on its ability to predict "'average" conditions, rather the critical conditions. Appendix Q of the DEIS (Risk and Uncertainty Analysis) describes how the dissolved oxygen model is relatively accurate for predicting the 50th percentile dissolved oxygen concentration and general spatial trends. However, it was also indicated that the model was much less accurate for predicting the variability of the dissolved oxygen concentration and the daily minima. DHEC concluded that the model has "limited ability to simulate the variability and trends in the data".*

Response: The hydrodynamic and water quality models employed for SHEP were developed through an iterative process which was closely coordinated among the members of Water Quality Interagency Coordination Team, which followed in the footsteps of the Modeling Technical Review Group that was established in the late 1990s. The groups reviewed numerous interim work products to determine the most applicable models for use with SHEP impact evaluations and mitigation development. Technical modelers from federal and state agencies [Corps, US EPA Region 4, USGS, Georgia DNR-EPD, South Carolina DHEC] together with private sector experts developed/refined the final product. After extensive review, the SHEP model received agency approval. From the beginning it was acknowledged that absolute prediction of dissolved oxygen is impossible because there is uncertainty in the data as well as the model. Nonetheless, there was consensus that this state-of-the-art tool was the best available vehicle for reasoned decision-making. To provide greater certitude, sensitivity analyses were performed on the important modeling parameters to help select the most appropriate correction [parameter] rates for the model.

760-JK-400-EV170

Comment: *Based on the 2010 draft TMDL, the dissolved oxygen metric of concern is not the 50th percentile but the 10th percentile, a value closer to the minimum value. Therefore, it is not clear from the DEIS that the model can accurately predict the dissolved oxygen metrics of greatest concern. Moreover, the DEIS gives no indication that uncertainty in the model was explicitly considered in characterized impacts. It is recommended that the DEIS explicitly address the ability of the model to predict the lower percentile dissolved oxygen concentrations, and make adjustments as to needed to ensure that it is an environmentally conservative analysis. in the meantime, the Corps has undercharacterized the uncertainty of the dissolved oxygen models, and the statement in Appendix Q that "the model's errors in predicting dissolved oxygen levels present little risk for decision-makers" is unwarranted.*

Response: There is uncertainty attendant to all model predictions as detailed in EIS-Section 8 and Appendix Q. However, in this instance there was an extensive review/deliberation process prior to approval of the SHEP model. There was consensus this state-of-the-art platform was the best available tool for decision-making. Nonetheless, to minimize the impact of data variation, the SHEP tools were employed in a relative manner. Analysis of changes in the system's DO levels based on input adjustments (depths, loads, flows, etc.) was determined to be the most appropriate method to examine potential project impacts. Sensitivity analyses were completed on modeling parameters to help select the most appropriate rates for the model. Visual and statistical comparisons of simulated versus measured values showed acceptable model performance as detailed in the Tetra Tech SHEP Modeling Report and outlined in GRR-Section 7.4 of the Engineering Appendix.

More details regarding the hydrodynamic and water quality model development process, extensive reviews, and uncertainty analyses can be found in the report "Development of the Hydrodynamic and Water Quality Models for the Savannah Harbor Expansion Project" dated January 2006. This is included in the Supplemental Materials to the GRR-Engineering Appendix. This report also includes language describing model accuracy for various parameters including dissolved oxygen throughout the Savannah River estuary including Middle and Back Rivers. The model was calibrated and validated using observed data from 1997 to 2006. The model met the expectations of the resource agency modeling experts and is applicable over a wide range of conditions including low and high freshwater flow. The recommendation to improve the model's ability to predict lower percentile DO concentrations is acknowledged, but will not be implemented. The analyses performed and suitability criteria employed were defined and agreed upon by the Cooperating Agencies and the Water Quality Interagency Coordination Team.

760-JK-400-EV171, 760-JK-400-EV172

Comment: *Env. Consequences, section 5.2.1 and 5.2.2 (Dissolved Oxygen and related mitigation analysis) and Section 5 of Appendix Q (Risk and Uncertainty Analysis}—general comment: There have been serious questions raised regarding the whether the proposed, experimental mitigation strategy will be effective. For example, the USGS review of the Speece cone pilot study concluded that the project might not have had any significant effect on DO concentration except near the injection point. The DEIS appears to have largely dismissed this concern based on the uncertain modeling analysis and very limited monitoring evidence. As a result, the DEIS significantly undercharacterizes the risk and uncertainty associated with the dissolved oxygen mitigation.*

Response: The District, in partnership with Georgia Ports Authority, conducted extensive analyses regarding water quality issues. Most germane in this regard would be the demonstration project that established the capability of the Speece Cones to add oxygen to Savannah's estuarine waters without causing adverse impacts. The results of the models are summarized in the *Oxygen Injection Design Report Savannah Harbor Expansion Project*, dated October 2010. The results of the demonstration project are summarized in the *SAVANNAH HARBOR REOXYGENATION DEMONSTRATION PROJECT*, dated January 2008. Both reports are included as part of the GRR-Engineering Appendix supplemental materials. Both the design analyses and the demonstration project verified that Speece Cones are an effective means to restore [and improve] dissolved oxygen post-deepening.

The risks and uncertainties of the proposed dissolved oxygen system for Savannah Harbor are fully discussed in the Risk and Uncertainty Analysis [Appendix Q, page 9-11]. In summary, it was concluded that the model's errors in predicting dissolved oxygen levels present little risk for decision-makers. Moreover, the results of the oxygen demonstration project together with intensive post-construction monitoring will further reduce the uncertainty associated with project implementation. The adaptive management plan also provides the means to make modifications in operating the oxygen injection system. These alterations could range from adjusting the amount of injected oxygen, modifying [or even replacing] the oxygen injection equipment, or adding to the number of sites where oxygen is injected.

Studies by independent engineering firms identified the use of an injection system [Speece Cones] as the most cost-effective method to address decreased dissolved oxygen levels in the post-project harbor. Experienced consultants subsequently used the various hydrodynamic and water quality models to design the specifics for operating the dissolved oxygen system. Preliminary evidence suggests that the programmatic system being proposed would result in a minor net improvement to the estuary's DO

levels. Table 5-28 titled, Percent of Cells with Improvement in D.O. Levels Over Existing Conditions with the D.O. Improvement Systems, demonstrates the extent of improvement to the harbor's DO levels.

A long-term management plan with an adaptive element specific to the mitigation of adverse impacts on dissolved oxygen has been prepared. Appendix D (Monitoring and Adaptive Management Plan) describes the cost estimates for adaptive management funding. These costs are to be viewed as a group, since the needed amount could be expended to modify any of the listed features as long as the expense does not exceed the total identified for Adaptive Management. It should be noted that the costs in the SHEP for mitigation and adaptive management requirements substantially exceed (on a percentage basis) the normal allocation for a more routine Corps of Engineers water resource development project. The SHEP would remain in a construction status (Construction General Funding) until all construction is complete, the post-construction monitoring is completed, and any required adaptive management measures are implemented. If more funds are required to conduct additional monitoring or modify any of the mitigation features associated with the project, these funds would be requested through the annual construction general budget process. Funding requests for mitigation measures receive high priority because they must be secured before project construction can be completed. Following completion of these activities, the project enters operation and maintenance status, which becomes responsible for costs associated with maintaining the mitigation features of the project, e. g., oxygen injection system. Funding requests for mitigation features for projects in the operation maintenance phase receive the Corps highest ranking for funding.

The District intends to request Adaptive Management funds along with the other construction funding (dredging) so that funds would be available for Adaptive Management purposes if/when needed. These funds could be supplemented during annual budget requests for construction general funds. The project is cost-shared and the local sponsor (Georgia Department of Transportation) would also be responsible for providing its annual share of funding. The sponsor, acting through the Georgia Ports Authority, has agreed to set aside, in advance, their cost-shared portion of adaptive management funds in an escrow account upon approval of the project.

760-JK-400-EV173, 760-JK-400-EV174

Comment: *For example, the DEIS gives no indication that uncertainties associated with the mitigation technology or associated modeling analysis were taken into account during the mitigation planning, such as by providing additional DO injection points in case the system is less effective than modeled. The elements that are proposed in Appendix Q to reduce risk primarily consist of references back to the original studies and post-construction monitoring. None of these elements would actually reduce dissolved oxygen impacts in the event that the mitigation strategy was ineffective. It is recommended that the mitigation strategy address the uncertainties of the selected technology in a more direct fashion, and include elements that reduce risk by providing environmentally conservative mitigation designs.*

Response: The adaptive management plan (FEIS-Appendix D) provides the means to make any required changes to the oxygen injection system. This could range from adjusting [increasing] the amount of injected oxygen, modifying the oxygen injection equipment, or adding to the number of injection sites.

Page 6-32

760-JK-400-EV175, 760-JK-400-EV176

Comment: *Env. Consequences, section 5.2.2 (Mitigation for Impacts to Dissolved Oxygen}general comment: Dissolved oxygen injection is a key TMDL compliance strategy for dischargers to the Savannah Harbor. Most of these dischargers are already permitted at or below best practical technology (BPT) wastewater treatment levels, and oxygen injection might be the most cost-effective manner for TMDL compliance. It is unclear whether the use of oxygen injection to mitigate the channel deepening impacts would reduce or substitute for the ability of wastewater dischargers to use this same technology for TMDL compliance. In conjunction with consideration of the project's impact on TMDL compliance (see comment above), it is recommended to explicitly consider how the dissolved oxygen mitigation plan would affect compliance options for existing dischargers, and if so, if this would be accompanied by a significant economic impact to those dischargers.*

Response: The applicability of the subject dissolved oxygen injection technology to other permitted dischargers along the Savannah River would be determined by the individual discharger and the States.

The proposed oxygen injection systems would not alter the compliance requirements of individual dischargers because the SHEP mitigation is designed to have a net zero effect on D.O. levels in the harbor. The project's minimal improvement in D.O. levels is not expected to be sufficient to change any of the point source dischargers compliance requirements.

760-JK-400-EV177

Comment: *Env. Consequences, p. 5-49, section 5.2.2 (Mitigation for Impacts to Dissolved Oxygen). Figure 5-1 8: The accompanying text mentions three locations for dissolved oxygen injection, but the map only shows two locations.*

Response: The IP site on Hutchinson Island would have an east/west component, i.e., it would inject oxygen into both the Front and the Back Rivers from one land-based location.

760-JK-400-EV178

Comment: *Env. Consequences, Section 5 of Appendix Q (Risk and Uncertainty Analysis}—general comment: Even if the dissolved oxygen mitigation works as intended, there would be a risk associated with lack of the funding for the Speece cone operations and maintenance, especially if the mitigation was dependent upon annual funding appropriations. This risk should be stated in Appendix Q. Similarly, this section should explain how this reisk could be reduced, such as by the provision of contingency funding.*

Response: The Corps will document in the project Record of Decision its binding commitment to install, operate, and maintain the oxygen injection system in accordance with the project mitigation plan subject to Congressional appropriation of funds for the project, and will make the oxygen injection system a top priority for annual operation and maintenance (O&M) funds appropriated and received for the project. Successful installation, operation, and maintenance of the DO system is a requirement of several environmental approvals for the project, including Georgia and South Carolina's water quality certifications and the National Marine Fisheries Service Biological Opinion.

760-JK-400-EV179

Comment: *The air quality analysis completed for the proposed project is very comprehensive in that it accounts for air emissions from all cargo-carrying vessels (containerships and other marine vessels) and landside cargo handling equipment at both the GPA and private terminals at the port. Further, emission estimates are provided for criteria pollutants, air toxics and greenhouse gases. Although the project is not subject to conformity determination requirements, the emission inventory completed for this project is similar to the comprehensive emission inventories prepared to satisfy conformity requirements.*

Response: The District acknowledges this comment finding the air quality analysis to be comprehensive.

760-JK-400-EV180, 760-JK-400-EV181

Comment: *While the emission inventory completed for the project is very comprehensive, the emission summary tab les presented in Appendix K have certain shortcomings. The reviewer was not able to calculate and confirm the accuracy of the emissions reported in many of the emission summary tables using the information provided in the descriptions preceding the emission summary tab les. To facilitate a review of the emission estimates, an example calculation should be provided for each primary emission summary table. Additionally, the emission estimates are presented using various terminology to represent vessel trips (e.g., tons per transit, tons per vessel, and ton/call). The use of consistent terminology is recommended.*

Response: In developing the air emission inventory for the Port of Savannah, the District used US Environmental Protection Agency's (EPA's) **"Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, Final Report, dated April 2009"**. This document provided the framework from which air emission estimates were determined for all ocean going vessels, harbor vessels, and land-based equipment.

Example calculations were, in fact, shown. In Appendix K-Section 5.4, the formula [page 13] for calculating vessel emissions was discussed. This was followed by a step by step sample calculation as to how the emissions values found in Table 5-10 were derived.

The terminologies used (tons per transit, tons per vessel, and ton/call) are consistent. The tons per transit deal with those vessel emissions shown in Table 5-8, Travel Time. The tons per vessel is only used when the vessel is berthed or "hotelled" at the terminal. The ton/call is the total of all vessel emissions generated while traveling to the terminal, docking, hotelling, undocking, and leaving the port.

Page 6-33

760-JK-400-182

Comment: *Page 5~105, Section 5.6 - the word "volume" is used in the third sentence and in the second to last sentence of the first paragraph. Because mass emission rates are being referred to in these instances, "amount" or "quantity" should be used in lieu of "volume".*

Response: The word *volume* in Section 5.6 has been replaced by either amount or quantity in the FEIS.

760-JK-400-EV183

Comment: *Page 5-107. second sentence of the first paragraph ~ replace the word "volume" with "amount".*

Response: The word “volume” has been replaced with “amount”.

760-JK-400-EV184

Comment: *Page 5-108, second paragraph - Table 6-4 in Appendix K is referenced comparing port emissions to total emission in Chatham County. The percentages indicated in the second sentence of this paragraph do not match those presented in Table 6-4. The percentage values presented in Table 6-4 and the percentages indicated in this paragraph should be reca1culatcd or checked to confirm their accuracy.*

Response: The percentages in both EIS-Section 5.06 and in Appendix K-Table 6-4 will be recalculated to ensure they are consistent.

760-JK-400-EV185, 760-JK-400-EV186

Comment: *Page 5-109, end of Air Quality section - a discussion is presented to explain why a conformity determination is not required for the project. Simply, a conformity determination is not required because the project location is in an attainment area (and the area is also not a designated maintenance area). This is well covered in the discussion under item a. It is suggested that item b. be deleted since it is not needed to support the conclusion that a conformity determination is not required. Further, a summary of project emissions is not provided in item b. for comparison with prescribed de minimus levcls to confirm that the project emissions are below the de minimus levels.*

Response: Item b has been deleted.

760-JK-400-EV187

Comment: *Page 142, Section 8.2.3 - in recognition that federal projects of this magnitude are typically subject to conformity determinations under the General Conformity or Transportation Conformity regulations, include an introductory statement to indicate that the project is exempt from conformity determination requirements because the project site is located in an area that is designated as an Attainment Area with respect to the National Ambient Air Quality Standards and the project area is not a maintenance area.*

Response: The GRR has been revised to be consistent with the conformity language discussion found in FEIS-Section 5.06 .

Page 6-34

760-JK-400-EV188

Comment: *5.7. 1. I.C. Dredge Plume - Pg 5-112, 2nd para - "Another source of turbidity and sedimentation from hopper dredges is through the deposition of their sediment loads at the placement site". Please discuss the potential impact of this type of turbidity.*

Response: Sediment placement and turbidity impacts at the Savannah Harbor Ocean Dredged Material Disposal Site (ODMDS) are discussed in EIS-Section 5.07.1, Direct Dredging Impacts . US EPA conducted a study on the long-term impacts of sediment placement and turbidity issues at the ODMDS, “*Savannah ODMDS Status and Trends dated May 2006*”. The purpose of this study was stated in the introduction: “*Ocean disposal of dredged materials can affect the environment of a disposal site by disturbing the benthic community and potentially causing long-term reduction of oxygen in the pore waters of the sediments and the overlying waters. Natural oceanographic processes can also be responsible for transporting disposed materials offsite into nearby habitats.*” A number of parameters were sampled at the ODMDS and in adjacent waters: “*To characterize the general water quality associated with the*

dump site, the following water column parameters were sampled: conductivity, dissolved oxygen (DO), salinity, temperature, density, turbidity, % light transmission and Chlorophyll a". In addition to water quality sampling, the following parameters were also tested: sediment chemistry, benthic macroinvertebrate infauna, and sediment particle size. The US EPA study concluded: *When comparing the various study parameters between stations located within the ODMDS and those outside the ODMDS, no significant differences can be found. Table 6 (in the USEPA 2006 study) summarizes the main parameters of this study, demonstrating that no physical, chemical nor biological difference can be seen.*

[The ODMDS is located about 8 miles offshore from Tybee Island (see Figure 3-2). The US EPA approved ODMDS is a 4.26 square mile (or 2,726.4 acres) site and is centered at 31 56' 54" N and 80 45' 34" W].

760-JK-400-EV189

Comment: *5.7.1.1.C. Dredge Plume - Pg 5-112, 5th para - "Dredge-induced water quality conditions will only be short-term and impact a small cross-sectional area of the Savannah River". Please quantify "short-term" and estimate the cross-sectional area to be impacted.*

Response: District monitoring of O&M dredging in Savannah Harbor indicates that water quality effects from an operating dredge do not extend more than halfway across the river or extend more than several hundred feet down-current.

760-JK-400-EV190

Comment: *5.7. 1. 1.c. Dredge Plume - Pg 5-113. 3rd para - "All three shellfish harvesting areas are located a sufficient distance from the dredging in the Savannah River channel that sedimentation and high turbidity would not adversely impact these resources". Please state the distance from the dredging activity to the shellfish areas. Section 5.8.4.3 Confined Disposal Facilities (CDFs),*

Response: Mr. Dominic Guadagnoli, Shellfish Program Leader with the Georgia Department of Natural Resources – Coastal Resources Division provided the figure that shows the two commercial shellfish lease areas and one recreational shellfish harvest area in the project area.

760-JK-400-EV191

Comment: *Page 5-118 - This section discusses the minimal impacts predicted on various resources that utilize the CDFs; however, there is no reference to the work that was done regarding identifying cadmium as a contaminant of potential concern (COPC), primarily presented in the DEIS Appendix M-Final Sediment Quality Evaluation.*

Response: In the sections preceding 5.08 Terrestrial Resources, the impacts of cadmium on terrestrial resources in the CDF's (see 5.04 are discussed. The Sediment Quality Evaluation (Appendix M) and Section 5.04 states: Birds and mammals feeding in the CDF would not be exposed to cadmium-laden sediments (from the Station +16+000 to +45+000 reach) because this material will be covered with uncontaminated sediment. The sequestered cadmium sediments will then remain undisturbed for the remainder of the CDF's usable life. With these stipulations, there should not be any cadmium impacts to terrestrial resources.

760-JK-400-EV192

Comment: *Section 5.13 - Beneficial use of Dredged Sediment, Page 5- 142- " Impacts to fish (including larvae and eggs), shellfish and benthic communities within the near shore sediment placement areas are discussed in 5.7- Marine and Estuarine Resources. No long term adverse impacts are anticipated to any*

fishery resources or benthic communities from the near shore beneficial sediment placement." Section 5.7 does not provide adequate information to support this statement.

Response: Based on input from both GA DNR-CRD and the City of Tybee Island, the District no longer proposes to place new work sediments in the nearshore zone. The dredged material placement plan has been revised to reflect that all sediments excavated from the entrance channel would be deposited in previously-approved areas: the Offshore Dredged Material Disposal Site or an upland confined disposal site. The Final EIS contains the revised sediment placement plan. Please see previous response to this comment (760-JK-400-EV63 and EV 64).

760-JK-400-EV193

Comment: *4.01.2.1 Sediment Quality (potential contaminant impacts) - Pg 4-9, 2nd paragraph "The evaluation found that most of the sediments did not provide an concern for potential contaminant-related impacts associated with the proposed dredging and dredged sediment placement". What screening criteria were used to reach that conclusion?*

Response: This determination was based on the results of sediment sampling and analyses conducted in 1997. Approximately 31 core sediment samples were taken from the channel and at the proposed bend wideners, i.e., essentially the entire area proposed for harbor deepening. Parameters investigated included: metals, PCBs, PAHs, petroleum hydrocarbons, phenols, pesticides, dioxin congeners, cyanide, organotins, and nutrients. Please see Appendix M for a detailed discussion of the findings.

760-JK-400-EV194

Comment: *4.01.2.1 Sediment Quality (potential contaminant impacts) - Pg 4-9, 3rd paragraph - "Polycyclic aromatic hydrocarbons (PAHs) and cadmium were detected in a sample taken at about Station - 75+000B near the old RACON tower where a spill of fuel, batteries and paint lacquer occurred in November 1996. Subsequent sampling conducted in 2005 revealed that sediments at that location do not pose a potential for contaminant-related environmental impacts". What screening criteria were used to reach that conclusion?*

Response: This determination is based on the analysis of additional sediment samples taken at the old RACON tower site in 2005 [Appendix M. Twenty sediment samples were taken in a circular area at distances of 300 meters to 1500 meters from the tower and analyzed for cadmium. No cadmium was detected in any of the samples, with the MDL of 0.30 ppm or less. Four additional samples were taken at 300 meters from the tower. Their low molecular weight totals for detected PAHs ranged from 2.4 to 3.6 ppb whereas high molecular weight totals for detected PAHs ranged from 0.7 to 6.7 ppb [one outlier sample showed a high molecular weight PAH total of 23.6 ppb]. These observed values are well below threshold effect levels for both low molecular weight PAHs (311.7 ppb) and high molecular weight PAHs (655.34 ppb).

Page 6-35

760-JK-400EV195

Comment: *5.4.2.3 Expected Results of Monitoring Cadmium-Laden Sediments - Pg 5-102, 2nd paragraph - " In light of the information summarized above, the dredging and the placement of cadmium-laden sediment in CDF 14A, CDF 14B and covering these sediments with 2 feet of clean sediment is not anticipated to result in adverse impacts to the aquatic environment or biota found in the CDFs". A discussion of the potential impacts on the river's biota from the dispersion of cadmium-laden sediments during dredging is needed.*

Response: The potential impacts of cadmium-laden sediments being dispersed during the dredging process is detailed in FEIS-Chapter 5.

760-JK-400-EV196, 760-JK-400-EV197, 760-JK-400-EV198

Comment: *The Savannah Harbor Expansion Project, if completed as currently described at either 47 or 48 ft of depth, does not likely provide sufficient harbor depth and width necessary to make the Jasper Ocean Terminal a viable project. We now know that over 80 percent of container ship capacity on order is post-panamax in size and will require harbors with 50 feet mean low water and unrestricted two-way ship traffic capability, such as offered by New York, Baltimore, and Norfolk today, to reliably make Panama Canal appointments. Thus, it is likely that investment in the Jasper Ocean Terminal would require a further harbor deepening project to be cost-justified.*

Response: Conjecture that the SHEP would not likely provide sufficient harbor depth and width to make a Jasper Terminal a viable project has no bearing on the proposed action. The economic studies presented in the GRR and EIS indicate that under both scenarios: without and with project conditions, the Garden City Terminal would reach its capacity at 6.5 million TEUs [near 2030]. Upon reaching this build-out capacity, another terminal would have to accommodate future growth in container volumes.

A 50-foot deep channel and unrestricted two-way traffic are not economically necessary for a viable container port. Multiple studies show that the proposed deepening alternatives would result in annual net benefits up to $180 million.

Justification of a Jasper Terminal is outside the authorized purpose of the proposed SHEP. A Jasper Terminal is not presently a realistic alternative to SHEP for reasons explained in other responses.

760-JK-400-EV199

Comment: *If the Savannah Harbor Expansion Project is approved, the cost of dredging the 48 ft channel to the Garden City Terminal and the resultant environmental damage would make it extremely difficult if not impossible to get the additional dredging to 50 ft needed to make Jasper Ocean Terminal viable.*

Response: The environmental impacts resulting from SHEP would not preclude some future harbor deepening. However, a significant future action such as a new container terminal would be dependent on multiple economic considerations and the outcome of a host of very detailed environmental studies.

Also please see previous response.

760-JK-400-EV200

Comment: *DEIS Section 5.17 Aesthetics and Recreational, on page 5-143 fails to evaluate how increase ship traffic or speeds may affect recreational boaters and kayakers along the entire length of the project.*

Response: As the number of vessels calling at the port decreases, potential interaction between recreational boaters and commercial ship traffic should decline. Regardless, recreational vessels in commercial port areas should always exercise extreme caution and observe all public safety and basic boating laws (“The Rules of the Road”).

Page 6-36

760-JK-400-EN116

Comment: *SHIP DRAFT CAPABILITY: The inshore project depth will not support post-panamax traffic except on high tide. The ship draft this project will accommodate will roughly equate to what Charleston can do now. Based on Army Corps channel design standards, which recommend channel depths of 110 percent of ship draft in protected waters, this project will support a 24 hour maximum draft of approximately 42 ½ feet, and 47 feet on high tide, in the inshore channels.*

Response: For the proposed entrance channel extension, the revised vertical motion study report indicates that an inbound (more restrictive than outbound) 47.5-foot draft vessel traveling at 10 knots would have 360 days per year accessibility given 52-feet of depth (Figure 32b). A 47.5-foot draft vessel traveling at 14 knots would have 357 days per year accessibility given 52-feet of water (Figure 32b).

760-JK-400-EN117

Comment: *SHIP SPEED LIMITATIONS: The narrow offshore channels are proven to be untenable for ships at 46 ft draft and greater. The maximum draft these channels can accommodate may be much less, but simulations were only done for 46 ft and 47.5 ft drafts. Additional simulations should be done to determine a viable draft. The findings were that ships at the drafts simulated must maintain speeds not greater than 6 knots. These speeds also require a range of tide that is exaggerated. The study assumed tide range offshore is the same as tide range in the mouth of the river. This is false. Offshore tide lift in this area is roughly 2/3 of the tide lift at Fort Pulaski.*

Response: These two drafts of T=46 and 47.5 ft are the design drafts selected for this study. Low 6 knot speeds were included for reference to illustrate effect of slower speed. The range of speeds in the report is from 6 to 16 knots, in 2 knot increments. The study results do not recommend speeds much slower than 10 knots in offshore portions of channel (with waves and currents) for ship maneuverability and control. The May 2010 draft report has been revised. The Corps contacted NOAA regarding differences in the tidal range offshore. At the furthest point of the channel extension, the tide range is reduced by multiplying the tidal range by factor of 0.91 to 0.94, which does not yield 2/3 of the tide lift at Fort Pulaski but more than 9/10 of the tide lift at Fort Pulaski.

760-JK-400-EN118, 760-JK-400-EN119

Comment: *No simulations were done to verify that ships could maintain sufficient directional control at such slow speeds to safely negotiate the unusually narrow offshore channel design incorporated this project. Narrow offshore channels often require 14 to 18 knots to maintain safe directional control depending on weather and currents. The draft capability of the offshore channels must incorporate a coordinated study to determine vertical ship motions at sufficient navigational speed. Until this study is done, the viability of the offshore channel is indeterminate, except that this report proves it will not support drafts of 46 feet or deeper.*

Response: Appropriate vessel speed is a function of location and conditions. The District agrees that within the entrance channel, slow speeds [six knots] would be problematic. However, Savannah pilots have indicated they are able to maintain sufficient navigational control at ten knots, which complies with NMFS speed restrictions during the whale watch season.

Agree that slow speeds, such as 6 knots, are not viable on the entrance channel. Savannah pilots are able to maintain navigational control at 10 knots, which complies with NMFS speed restriction during whale watch season. The range of speeds in the report is from 6 to 16 knots, in 2 knot increments. The

vertical motion study does not recommend speeds much slower than 10 knots in offshore portions of channel (with waves and currents) for ship maneuverability and control. A speed as fast as 18 knots was used to calculate ship squat, as this information may be useful. In the interest of consistency, the Corps limited the CADET runs to a top speed of 16 knots.

760-JK-400-EN120, 760-JK-400-EN121

Comment: *SHIP TRAFFIC: This project will not support two - way traffic of post-panamax traffic. No simulations were done with two full beam post-panamax ships, so passing has not been verified anywhere in the project. Simulations with smaller ships only identified one passing lane as viable, at Long Island Range. This lane is roughly in the middle of the project, meaning that one inbound may pass one outbound, provided timing two ships 32 miles apart at the start of their planned passing rendezvous can be precisely executed for an exact meeting in a location not longer than 6 1/2 ship lengths. This one marginally adequate passing lane is only viable if lengthened to 8000 feet, according to pilot feedback, requiring additional study.*

Response: The District used the *Susan Maersk* (post-panamax Generation 2) as the design vessel. Final channel dimensions and navigation requirements were developed using the Corps' state-of-the-art Ship Simulator along with input from the Savannah Harbor Pilots Association. These data supersede guidance from Corps of Engineers Design Standards and Procedures outlined in EM-1110-2-1613. The ship simulation confirmed that the new channel could safely accommodate transit of this vessel. The longer design vessel would result in the need for bend wideners in multiple locations. The new channel would allow the design vessel to meet a Panamax vessel at all locations along the channel. Two meeting lanes are included in the inner harbor to provide places where two design vessels could meet when transiting the harbor.

Long Island Range was identified by pilots as a suitable location for constructing a meeting lane [subsequently verified by ship simulation]. Pilots also determined its length [8,000 feet] was appropriate based on vessel speeds and their ability to plan where the meeting would occur.

Page 6-37

760-JK-400-EC16

Comment: *ECONOMIC BENEFIT LIMITATIONS: Economic benefit must account for accurate capabilities. Ships must be lightly loaded to 42 to 47 feet draft, and traffic density is limited to one-way traffic. Full economic benefit as estimated of Post-Panamax shipping is unattainable in this project. The economic limitations of predominantly one-way traffic and light loading would be significant.*

Response: The economic analysis is based on a review of how ships presently operate in Savannah Harbor, as well as how they call at other ports. Therefore, it includes an assessment of the capabilities of the vessels. Concur that many vessels need to light load when their design draft exceeds the depth of the navigation channel. That presently occurs and would continue in the future, but at a lesser extent if the channel is deepened. The potential effects of one-way traffic have been evaluated through use of the HarborSym Model. Details of that analysis can be found in the GRR-Economics Appendix.

760-JK-400-EN122

Comment: *JASPER TERMINAL BENEFIT: This project preempts availability of a South Carolina terminal on the Savannah River, because this project occupies the dredge disposal areas in way of the notionally proposed Jasper Terminal through 2060. No extra dredge material capacity is apparent in the operations and maintenance plan to free up these sites.*

Response: The SHEP's use of CDFs 14A/14B does not necessarily preclude using these areas to construct a container terminal in Jasper County within the project's 50-year economic life. The Georgia Department of Transportation has requested the District release its sediment disposal rights in the subject sites. The District is providing technical information to JPO to identify an alternative location which will replace disposal capacity lost to SHEP as well as mitigation features [marsh restoration] within the footprint of a proposed Jasper Terminal. The District has emphasized to GA DOT and the JPO that it would not consider releasing its disposal easements until development of the property is imminent, i.e. the developer obtains a Section 404 permit, and the developer provides assurance that the Federal government will be made whole for any incremental cost difference for disposal of sediments beyond the Federal standard , . It should be noted that a consultant working for the JPO has stated that the proposed placement of new work sediments [from SHEP construction] on Areas 14A and 14B would save a Jasper Terminal development project over $300 million by raising its elevation to a workable height. Therefore, if SHEP is constructed, it would benefit the development of a Jasper Terminal by significantly reducing initial construction costs.

760-JK-400-EN123, 760-JK-400-EN124, 760-JK-400-EN125

Comment: *This project also will not support navigability parameters to support a viable Jasper Terminal. The Jasper Terminal would only be viable if it can support fully loaded post-panamax ships largely unrestricted. The draft limitations of this project would only allow post-panamax ships that are substantially less than fully loaded. One -way traffic competing with the other terminals in the river would limit ship arrivals such that berth utility at jasper would be severely curtailed. If this project goes forward, and ship traffic density reaches maximum capacity on a one-way channel, there would be no extra capacity to handle increased traffic to a Jasper Terminal, and permitting of a Jasper Terminal would be difficult justify.*

Response: The deepening project is not designed to benefit a notional Jasper Terminal. A consultant working for the JPO has stated that a container terminal in Jasper County would need a 50-foot authorized channel depth. If SHEP is constructed, it would benefit the development of a Jasper Terminal by significantly reducing their initial construction costs. A JPO consultant also recently stated that the proposed placement of new work sediments [from SHEP construction] on Areas 14A and 14B would save the JOT development project over $300 million by raising its elevation to a workable height. Therefore, if SHEP is constructed, it would benefit the development of a Jasper Terminal by significantly reducing initial construction costs.

An ultimate capacity of the navigation channel has not been determined. That number would depend on a variety of factors, including the types of vessels (LNG) in the fleet. The proposed deepening of the channel does not preclude any future studies to address the needs of a future port in Jasper County.

The entrance channel is expected to handle two-way traffic of two design vessels. Therefore, there is no concern about channel capacity in that reach. The capacity of the inner harbor channel to the site of a new terminal would depend on a variety of factors, including the types of vessels (LNG) in the fleet and the length of that reach. The proposed deepening of the channel does not preclude any future studies to address the needs of a future port in Jasper County.

760-JK-400-EN126, 760-JK-400-EN127
Comment: *Within this plan is a projection of some 19 ship arrivals per day. With many of them dependent on the tide given the limited depth, this may be an unsustainable traffic load. Adding the Jasper Terminal would likely overwhelm the traffic density a one-way channel can support. Proceeding with this project may approach the environmental limits this waterway can sustain, leaving little or no capacity to add width or depth necessary to support a truly post-panamax capable Jasper Terminal.*

Response: The HarborSym models accounts for tidal delays and ship traffic for the projected fleet forecast. The results of these simulations indicate that the expected ship traffic can safely navigate the length of the navigation channel.

An ultimate capacity of the navigation channel has not been determined. That number would depend on a variety of factors, including the types of vessels (LNG) in the fleet. The proposed deepening of the channel does not preclude any future studies to address the needs of a future port in Jasper County.

Each project must obtain its own environmental approvals. Since a container terminal in Jasper County is still speculative, the potential environmental impacts resulting from its construction and operation can only be assessed on a conceptual level (not a detailed analysis).

760-JK-400-EN128
Comment: *In order to make a Jasper Terminal viable, a dredging project would have to be designed for full two-way traffic from the terminal to the end of the cannel at sea, with an inshore depth of 50 to 51 feet, and an offshore depth of 55 to 57 feet. This proposed project falls far short of those parameters and provides no utility to South Carolina's terminal expansion plans for the Savannah River.*

Response: The authorization for this project is specifically limited its channel depth to 48 feet or shallower [50 feet for the entrance channel]. Extensive environmental studies would be required for further deepening due to various concerns.

Page 6-38

760-JK-400-EN129
Comment: *Tide range at the seaward end of the project is four feet, at Fort Pulaski is six feet, and at Garden City is eight feet.*

Response: According to NOAA, the tide range at Ft. Pulaski averages 6.92 feet, whereas the tidal range offshore at the ocean entrance of the channel extension is from 6.30 to 6.51 feet.

760-JK-400-EN130
Comment: *Tide lag from the sea buoy to Garden City is one hour.*

Response: Concur.

760-JK-400-EN131
Comment: *Transit time from the sea buoy to Garden City would be three hours, on average.*

Response: Concur.

760-JK-400-EN132

Comment: *The Army Corps of Engineers channel design standards per their engineering manual on channel design, which requires project depths to be ILO percent of the target ship draft in internal waters and 120 percent in exposed waters, is not being adhered to, as is apparent in the draft GRR and DEIS. Therefore, a lesser standard has been assumed to be 108 percent in internal waters and 115 percent in exposed waters for the purpose of these calculations. It should be noted that International Maritime Organization safe navigation standards for navigation mimic the USACE's standards of 110 percent and 120 percent respectively.*

Response: The Savannah Harbor Pilots Association moves vessels through the harbor with a 4-foot underkeel clearance throughout the transit, which is a common requirement for US ports. Depending on the draft of the vessel, use of tides may be required to maintain a 4-foot underkeel clearance throughout the transit. In reference to the "Army Corps design standards" for the depth of a channel, the Corps, ASCE and PIANC all recommend a preliminary or concept design of channel depth in exposed entrance channels using the ratio of channel depth (h) to ship draft (T) of at least h/T =1.2. However, this h/T=1.2 standard is very conservative. A detailed design standard is recommended to conduct more extensive laboratory models, field measurements, numerical model simulations, and/or probabilistic models to refine the required channel depths. The Corps used the CADET program for the vertical ship motion study. That model is a probabilistic or risk-based model which includes probabilities of waves over a 20-year wave hindcast.

760-JK-400-EN133

Comment: *The result of the above assumptions is that an inbound ship will only be afforded 2/3 maximum tidal assistance at some point on their inbound voyage due to the duration of the voyage and the tide lag from the sea buoy to the terminal, and 113 of maximum tidal assistance on outbound voyages. The location of the ship at high tide, the speed of the ship, the length of a particular voyage within the project channel, and the actual tide range on a given day, determine actual tide assistance. The gross average of all these factors based on the above assumptions is 3 1/3 feet average benefit of high tide. For the purposes of this analysis, this has been rounded up to four feet, and therefore, this should be considered a liberal analysis, vice a conservative analysis. The USACE should report their findings and determinations on all of these factors and based economic projections on actual ship drafts this project can accommodate within Army Corps channel design standards.*

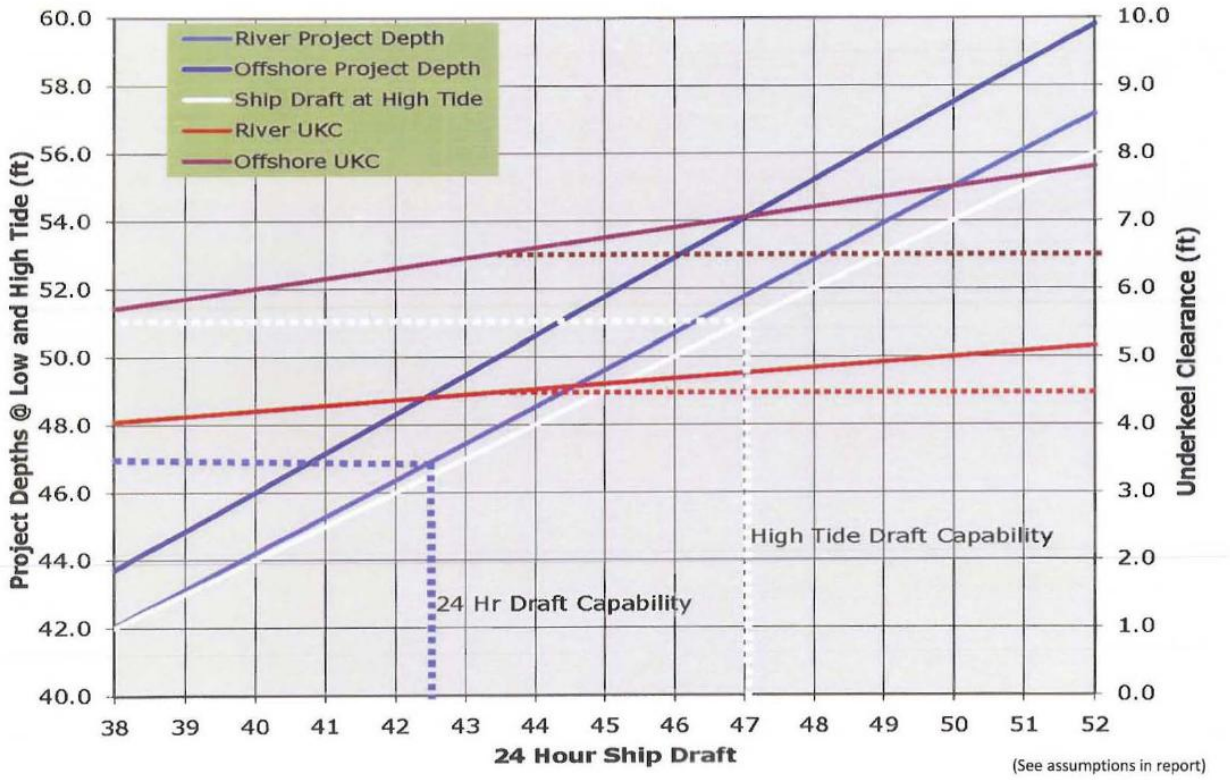
Response: The vertical motion study defines the adequacy of a channel in terms of days of accessibility. An inbound (more restrictive than outbound) 46-ft draft vessel traveling at 10 knots would have 360 days per year accessibility given a 50-ft depth (+1 ft tide) for durations up to 8 hr each day of the 12.5-hr tidal cycle (Figure 30, Table 18, and Table C9), and 364 days a year given a 52-ft depth (+3 ft tide) for durations up to 6 hours each day. A 47.5-ft draft vessel traveling at 10 knots (Figure 34, Table 18, and Table C10) would have 360 days of accessibility at a 52-ft depth, again available for durations up to 6 hours of the 12.5-hr tidal cycle. The economic analysis, however, indicates that ships will rarely call at that depth. Faster ship speeds, longer durations, and deeper depths are possible for both ship drafts, but require "trade-offs" in speed, duration, depth, and days of accessibility. The updated Vertical Motion Study is included in the Final Report. Tidal restrictions were taken into consideration for the fleet forecast though the HarborSym analysis.

Page 6-39

760-JK-400-EN134
Comment:

FIGURE 6-1:

Savannah Draft vs Project



Response: The graph does not include tidal lags and ranges; it only shows drafts and underkeel clearances that correspond to depths based on different h/T ratios. As noted, these h/T ratios are only designed to provide conceptual design guidance, not final designs based on detailed analysis using risk-based models and/or field or lab measurements.

Page 6-40

760-JK-400-EN135

Comment: *Pg.3, para 5: The ships modeled to investigate passing are a Panamax ship with a beam of 106 ft that no longer exists (this particular ship has been scrapped), and a less than Post-panamax ship of only 140 ft beam (post-panamax beam is 160 ft). There is no testing done of two full post-panamax ships passing, so the channel has not been evaluated for post-panamax capacity. In some cases, they have considered a successful run where there was only 25 feet of clearance, indicating a true post-panamax ship would not have been successful.*

Response: There are no standards for the required amount of clearance in ship simulations. The existing channel dimensions can accommodate meeting the deepening design vessel (post-panamax Generation 2; 140' beam) and a smaller vessel. Ship simulation verified, and the Savannah Harbor Pilots Association (SHPA) confirmed, that the channel could be deepened and widened at 2 bends in the inner harbor channel to maintain two-way traffic capability for the design vessel and a smaller vessel. Two meeting areas were also verified in ship simulation and are included to provide for meeting of two design vessels. The simulation included meeting of two design vessels on Bloody Point Range, as well.

760-JK-400-EN136

Comment: *Pg 3, para 7 & 8, Pg 4 Para 14.b & 15, Encl pg. 1 & 4: The inbound runs were reliable only when ranges were used, meaning the channel is only viable in clear visibility. Fog is prevalent in Savannah, as noted in the NOAA Coast Pilot, so dependence on ranges curtails the economic viability of the channel only to the extent of fair weather.*

Response: Although infrequent, if visibility becomes restricted to the point that safe transit of the channel is threatened, ship traffic is prohibited. Given the potential for closure exists under current conditions, it is reasonable to assume this would be the case for the deepened channel as well.

760-JK-400-EN137

Comment: *Pg 4, Para 13 & 14.c, Plates 12 & 14: The conclusion in paragraph 14c that two-way runs were successful is contradicted by paragraph 13 and Plates 12 & 14 that shows a ship left the channel in a passing run. It is also contradicted by the runs for one-way traffic that found that ranges were necessary for reliability.*

Response: During simulation, a vessel may leave the channel for a variety of reasons other than poor design, e.g., pilot error/unfamiliarity, equipment malfunction, etc. Hence, a channel's design is only finalized after multiple model runs are coupled with iterative pilot input. The preference for ranges does not limit the channel to one-way traffic.

760-JK-400-EN138

Comment: *Plate 5: While the ships outbound remained in the channel, the margin of safety was very thin. The report does not state a tolerance for satisfactory.*

Response: In simulation, there are no established standards for clearances/ tolerance for a successful model run.

760-JK-400-EN139

Comment: *Encl, pg. 2, para 4 and 7: There are no simulations of steady steaming in the lengthy ranges offshore with limited width, especially considering the slow speeds necessary to limit squat per item 1.1.16, Vertical Motions. These notes indicate crabbing is common in "most transits". The width offshore is only 560ft. A post-panamax ship of 1050 ft length and 160 ft beam with 10 degrees crab takes up 330 ft of width, effectively doubling the beam. That leaves only 115 ft on each side. No runs evaluated the reliability of this channel in the long straight reaches, despite notes verifying crabbing is common. The narrow width of this lengthy offshore channel needs to be validated.*

Response: There was no request to evaluate the channel's reliability along long, straight reaches. Rather, the areas selected for ship simulation runs were determined based on their difficulty of execution [from harbor pilots' input]. The pilots indicated that cross winds can be a problem, but velocities [which would necessitate crabbing to the degree safe transit was endangered] are rare. There were errors in the vertical motion study dealing with under keel clearance. As a result, the relatively slow vessel speed [in the deepened channel] initially determined as necessary was increased as a result of further analysis.

760-JK-400-EN140

Comment: *Summary: The offshore channel has not been validated as a safe channel for even one-way traffic of a full size post-panamax ship. Two way traffic has not been proven reliable in any segment of the channel, even with ships smaller than full post·panamax. The turn cannot be navigated safely inbound in limited visibility. The economic analysis needs to account for one-way traffic, high probability of ships leaving the channel, and closing the offshore channel in low visibility.*

Response: The offshore channel has already been used safely for two-way traffic of post-panamax ships. Moreover, two-way traffic with design vessels was successfully simulated on Bloody Point Range. Harbor pilots use their experience and professional judgment to determine safety margins during periods of low visibility. There is no basis for an economic analysis which included ships exiting the channel or just one-way traffic. Currently, the existing offshore channel could experience closure just as well as the deepened channel; therefore, there is no need for additional economic analysis for the latter.

760-JK-400-EN141

Comment: *The channel needs to be simulated throughout the entire length with full size postpanamax ships both one way and passing.*

Response: It is neither feasible nor necessary to simulate the entire of length of the channel. Ship simulations focused on critical areas including bends and constricted reaches.

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760-JK-400-EN142

Comment: *Pg 2, para 5, Recommendations: The recommendation for an 8000 ft passing lane in Long Island Channel has not been studied. It is recommended by hypothesis based on the failure of the 7000 ft passing lane.*

Response: The subject recommendation was based on observations from harbor pilots regarding how they were able to use a modeled meeting lane. A channel design based on modeling/ship simulations is more than just hypothesis.

760-JK-400-EN143

Comment: *The Susan Maersk is only 140 ft beam. The project has not yet been studied for full postpanamax traffic. The population of ships greater than 140 ft beam is significant. Already, there are 347 container ships with a beam of greater than 140 ft in the world fleet. This represents 23 percent of the current post-panamax fleet. This population is certain to grow, and this project is not post-panamax capable without verifying the capability to handle full post Panama beam.*

Response: The deepened channel is designed for two 140' beam post-panamax vessels meeting within the designated areas. Ships with a beam width greater than 140' could be restricted to one-way traffic. The economic model accounts for the predicted makeup of the future vessel fleet and any associated delays.

760-JK-400-EN144

Comment: *Enclosures: Almost every pilot recommended the entire Long Island Range be widened, vice just a segment of the Range, to allow for passing, citing that a minimal passing lane requires precise timing for each vessel to arrive in the lane, which is not realistic.*

Response: With no other constraints present, pilots would prefer using the entire length of a range as a meeting lane. However, the cost and environmental impacts of constructing such a feature have to be considered. The meeting lanes were studied by ship simulation to optimize their length [within the noted constraints].

760-JK-400-EN145

Comment: *Plates 18 - 21 and Enclosures: Many pilots refuted the finding that passing in Oglethorpe Range is safe. The simulation runs do not show any appreciable margin of safety, even if the ships technically did not leave the channel. This reduces the passing opportunities to just the Long Island Range.*

Response: The pilots indicated that the proposed meeting lane length [shorter] was feasible because of slower vessel speeds in the noted area. True, one set of pilots did not complete a successful run, but after inspection it was determine that there was a problem with the simulator software. After correction, all of the other runs were successful. No specific tolerance is established to determine a successful simulation run.

760-JK-400-EN146

Comment: *Pg 34, Plate 21: This study shows the Susan Maersk grounds in 6 ft seas in even a 52 ft deep offshore channel, verifying that the channel is not suitable for post-panamax drafts. At most, this simulation shows the channel is suitable for 44.5 foot drafts in 6 ft seas. At 44.5' (which would create only 2 feet of under keel clearance), the Susan Macrsk is limited to some 600 fewer TEU's than fully loaded.*

Response: The *Vertical Motion* report [May 2010] was extensively revised after ERDC received additional data from the shipping lines. In addition, ERDC corrected errors in the CADET code that were noted during the new runs. The results of the latest study comport with the *Navigation Study for Savannah Harbor Channel Improvements* that included the earlier Tracor Hydronautics analysis [September 2004]. The updated analysis [*Vertical Motion Study for Savannah, GA Entrance Channel*, April 2011] includes more data on ship speeds and wave characteristics. It is included in the final report (GRR Engineering Appendix, Attachment 3, Supplemental Studies).

760-JK-400-EN147
Comment: *Pg 18 & Plates 3, 5, 7 & II , 15, 17, 19, 23, 25,27: Jones Island Range failed simulation runs.*

Response: During simulation, a vessel may leave the channel for a variety of reasons other than poor design, e.g., pilot error/unfamiliarity, equipment malfunction, etc. Hence, a channel's design is only finalized after multiple model runs coupled with iterative pilot input. However, a widener was added on the north side of channel based on this set of simulation runs.

760-JK-400-EN148
Comment: *Pg 25: Flats area failed simulation runs.*

Response: During simulation, a vessel may leave the channel for a variety of reasons other than poor design, e.g., pilot error/unfamiliarity, equipment malfunction, etc. Hence, a channel's design is only finalized after multiple model runs coupled with iterative pilot input. However, the channel would be deepened on the existing south toe of the channel based on this set of simulation runs.

760-JK-400-EN149
Comment: *Pg 31: Jones Island Range failed even with a lightly loaded Susan Maersk.*

Response: During simulation, a vessel may leave the channel for a variety of reasons other than poor design, e.g., pilot error/unfamiliarity, equipment malfunction, etc. Hence, a channel's design is only finalized after multiple model runs coupled with iterative pilot input. However, a widener was added on the north side of channel based on this set of simulation runs.

760-JK-400-EN150
Comment: *Pg 32: Flats area failed even with a lightly loaded Susan Maersk.*

Response: During simulation, a vessel may leave the channel for a variety of reasons other than poor design, e.g., pilot error/unfamiliarity, equipment malfunction, etc. Hence, a channel's design is only finalized after multiple model runs coupled with iterative pilot input. However, the channel would be deepened on the existing south toe of the channel based on this set of simulation runs.

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760-JK-400-EN151
Comment: *Pg 36: Recommendations ignored that the Susan Maersk grounded in a 52 ft channel in 6 ft seas. The recommendation that the channel as proposed is satisfactory is unfounded.*

Response: The pilots indicated that the proposed meeting lane length [shorter] was feasible because of slower vessel speeds in the noted area. True, one set of pilots did not complete a successful run, but after inspection it was determine that there was a problem with the simulator software. After correction, all of the other runs were successful. No specific tolerance is established to determine a successful simulation run.

760-JK-400-EN152

Comment: *Anny Corps standards are that the offshore channel will provide for 120 percent depth compared to the target ship draft. On this measure, a 49 ft deep offshore channel will accommodate drafts up to 41 feet on low tide. Economic analyses must consider this limitation. The capacity of a typical 7000 TEU ship is some 200 TEU per foot of draft, so the capacity of a 7000 TEU ship limited to 6.5 less than full load draft foregoes 1300 TEU, or 19 percent of its cargo capacity.*

Response: The Savannah Harbor Pilots Association moves vessels through the harbor with a 4-foot underkeel clearance throughout the transit, which is a common requirement for US ports. Depending on the draft of the vessel, use of tides may be required to maintain a 4-foot underkeel clearance throughout the transit. In reference to the "Army Corps design standards" for the depth of a channel, the Corps, ASCE and PIANC all recommend a preliminary or concept design of channel depth in exposed entrance channels using the ratio of channel depth (h) to ship draft (T) of at least h/T =1.2. However, this h/T=1.2 standard is very conservative. A detailed design standard is recommended to conduct more extensive laboratory models, field measurements, numerical model simulations, and/or probabilistic models to refine the required channel depths. The Corps used the CADET program for the vertical ship motion study. That model is a probabilistic or risk-based model which includes probabilities of waves over a 20-year wave hindcast. The economic analysis of this project took into consideration requirements for underkeel clearance.

760-JK-400-EN153

Comment: *This is a draft report. The project should be based on completed reports.*

Response: The final report was used by the District and is included in the GRR Engineering Appendix, Attachment 3, Supplemental Materials.

760-JK-400-EN154

Comment: *Pg 65: The simulated ship squats and grounds at speeds as low as 10 knots in channels deeper than the proposed. 10 knots has been found to be too slow to maintain control of a ship in a narrow channel subjected to ocean currents and waves. Maintaining control of the ship at 10 knots in a 550 ft wide channel needs to be studied carefully. 14 knots is widely considered the lowest safe speed to maintain control in confined offshore channels.*

Response: The Savannah Harbor Pilots Association was consulted concerning their mode of operation in the entrance channel. The Pilots confirmed they are able to pilot vessels at 10 knots, which is required by Coast Guard regulation during right whale season.

760-JK-400-EN155

Comment: *Pg 73: This shows that the channel only has viability for a fully loaded ship in a 49 ft channel 70 days a year at ten knots, an unsafe speed. A safer speed of 14 knots has zero days of viability.*

Response: The first draft of the CADET vertical motion report was revised after Maersk provided proprietary data on its ship's parameters/lines. Additionally, errors were corrected regarding how the code for the CADET program was compiled. The updated version of the report is available for inspection. The Savannah Harbor pilots routinely observe a 10 knot speed restriction on the entrance channel during the right whale season.

760-JK-400-EN156
Comment: *This report verifies that the offshore channel cannot support 46 ft draft or 47.5 ft draft.*

Response: The Savannah Harbor Pilots Association moves vessels through the harbor with a 4-foot underkeel clearance throughout the transit, which is a common requirement for US ports. Depending on the draft of the vessel, use of tides may be required to maintain a 4-foot underkeel clearance throughout the transit. In reference to the "Army Corps design standards" for the depth of a channel, the Corps, ASCE and PIANC all recommend a preliminary or concept design of channel depth in exposed entrance channels using the ratio of channel depth (h) to ship draft (T) of at least h/T =1.2. However, this h/T=1.2 standard is very conservative. A detailed design standard is recommended to conduct more extensive laboratory models, field measurements, numerical model simulations, and/or probabilistic models to refine the required channel depths. The Corps used the CADET program for the vertical ship motion study. That model is a probabilistic or risk-based model which includes probabilities of waves over a 20-year wave hindcast. The project economic analyses takes into consideration the fact that vessels do not operate at full draft all of the time. The vertical motion study defines the adequacy of a channel in terms of days of accessibility. The revised report indicates that an inbound (more restrictive than outbound) 46-foot draft vessel traveling at 10 knots would have 345 days per year accessibility given 50-feet of water (Figure 30) with no tidal restriction. It would have 365 days a year of accessibility given 52-feet of water, which is available for 7 hours of the 12.5-hour tidal cycle. A 47.5-foot draft vessel traveling at 10 knots would have 347 days of accessibility at 51-feet of water, which is available for durations of up to 8 hours of the 12.5 hour tidal cycle.

760-JK-400-EN157
Comment: *This report does not address channel depths as shallow as 49 feet, which is proposed. It does not evaluate the ability to maintain control of the vessels at slow speeds. It does not derive a maximum safe draft that is reliable most of the year (350 days plus).*

Response: The final report was revised after additional data was received from Maersk on ship lines and errors in CADET program were corrected. The shallowest project depth studied for the entrance channel is 50 feet. The associated project depth for the inner harbor channel is 48 feet. Tables can be used to determine to address the 49-foot channel depth, as well. Ship control at 10 knots has been noted previously by the pilots. The revised report completed in March 2011 discusses maximum safe depths for design drafts of 46 and 47.5-feet.

760-JK-400-EN158
Comment: *This report does verify that this project is not suitable for post-panamax traffic.*

Response: The channel design is based on ship simulations that confirm suitability for post-panamax traffic [with 140' beam width].

760-JK-400-EN159
Comment: *A full-length simulation run needs to be conducted of a 160 ft wide ship at 47.5 feet draft at 6 knots as suggested here, or higher sped without inducing excessive squat, throughout the narrow 550 ft wide offshore channels. Controllability and under keel clearance must both be verified. A maximum safe draft for this channel should be derived and used as a basis for economic evaluations.*

Response: The design vessel [used for simulation/economics] is a post-panamax 140' beam vessel. The under keel clearance has been verified through the vertical motion study. It is not necessary to simulate the entire of length of the channel. Ship simulations focused on critical areas including bends and constricted reaches.

760-JK-400-EN160

Comment: *Paragraph 1.1: The projection for how much maintenance material needs to be handled each year is not substantiated. Past actual volumes dredged are reported to be less than the optimal volumes to keep pace with shoaling, but the amount reported for optimal maintenance, 6.225 million cubic yards (CY) is not substantiated.*

Response: The noted dredging volumes have been substantiated via the harbor's long-term records. In the Engineering Appendix under Section 12.4 "Summary of Operation and Maintenance Impacts", Tables 12.4-2, 12.4-3, and 12.4-4 depict the annual O&M increase due to expansion and the annual O&M project cost after expansion for the 46-, 47-, and 48-foot projects. These tables indicate that for the 47-foot project $13M has been budgeted for dredging purposes. However, to maintain the harbor completely an additional $13.8M [$26.8M total] would be necessary.

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760-JK-400-EN161, 760-JK-400-EN162, 760-JK-400-EN163

Comment: *The November 2010 ACOE Savannah District channel surveys show that all three offshore ranges have shallow quarters, as much as I Y: feet shy of project depth. Seven of thirteen river ranges have shallow quarters, as much as 4 feet shy of project. Over half of the Kings Island turning basin is 8 to 18 feet shy of project depth. This indicates that a significant amount of maintenance dredging is being deferred. It is entirely possible that some of this shoaling has reached equilibrium depth, having been deferred for so long, and, therefore, the current state does not indicate a linear progression of annual shoaling rates. It is safe to assume that with an improved channel, deferring maintenance as has been done in the past will no longer be tolerable, and therefore, annual maintenance dredged material will certainly increase. Due to the pattern of deferred maintenance and current shoaling, historical maintenance dredging data bears no credible indication of future annual demand, other than to indicate that proper maintenance dredging will greatly exceed historical dredging projects which have failed to keep pace with shoaling.*

Response: Inadequate funding for maintenance dredging is a problem nationwide and is not unique to Savannah Harbor. The Corps is presently prioritizing maintenance dredging to assure that high volume harbors are properly maintained.

Savannah Harbor is maintained by two annual dredging contracts. Annual funding typically has been about $13M. For FY 2011, the District received approximately $12.5M. The dredging contracts use a format that allows for the efficient use of additional funds that may be obtained during the year so that this money can be used with minimal contract execution delay. For the inner harbor, the 2011 dredging contracts are limited to the critical locations excavated in 2010, but do not address all shoaling areas along the river. No advance maintenance is included and the Kings Island Turning Basin would not be dredged to its full authorized depth.

For the entrance channel, dredging costs have significantly increased [2010 costs have doubled] due to the movement of hopper dredges into the Gulf of Mexico to deal with the BP oil spill. Only half of the

annual dredging program will be accomplished this year, which will require the remaining work to be moved into next year [if sufficient funding is obtained].

As stated earlier, the District has 40 years of O&M dredging history on which to base its sediment analysis/quantitative predictions. To date, the average is approximately 6.2 million cubic yards per year. This is the amount on which the DMMP bases its work plan. The District has no reason to doubt this long term average, and no commenter has provided any peer-reviewed analyses that indicate otherwise.

As part of the new work dredging for SHEP, the O&M material that has accumulated would be removed to provide a clear template. It is possible that the channel would experience atypical [larger] quantities of O&M materials for a short period after a harbor deepening. However, the District sees no reason to believe that the long term average would not revert to the mean [6.2 million cubic yards] observed over the last 40 years.

Historical dredging volumes include a long period of record under varying conditions and the average shoaling rate has remained relatively constant. After initial dredging of maintenance material during project construction, it is anticipated that shoaling will continue at historic rates.

There have been numerous changes to the harbor over the 1971-2011 period, e.g., widening, Tidegate/Sediment Basin construction, cessation of operating the Tidegate, irregular maintenance of the Sediment Basin, and deepening of the harbor from -38 feet to -42 feet. Throughout all those events, the amount of maintenance sediment has remained relatively constant, with only its deposition location changing. Hence, the allegation that historical maintenance rates have little relevance to future dredging needs is factually incorrect.

760-JK-400-EN164, 760-JK-400-EN165

Comment: *Table 3; Predicted O&M Volumes: This table projects maintenance dredging through 2060. It shows dependence on sites 138, 14A, and 148, which extend throughout the area notionally considered for an eventual Jasper County, SC marine terminal. The existing channel, unimproved, would likewise depend on the entire Jasper terminal site for annual maintenance perpetually. The Jasper terminal site is occupied by maintenance disposal demand indefinitely. With the increased maintenance load of a deeper channel, projected over an indefinite period, South Carolina's opportunities to develop a terminal on the Savannah River are even more obstructed.*

Response: The SHEP will use CDFs 14A/14B [the latest proposed site for a Jasper terminal] to deposit excavated material since it is the least-cost, environmentally acceptable alternative. However, this decision does not necessarily preclude using these areas to construct a Jasper Terminal within the SHEP's 50-year economic life. The Georgia Department of Transportation has requested the District release its sediment disposal rights in the subject sites. The District is providing technical information to assist JPO in identify replacement disposal capacity and mitigation features [marsh restoration] within the footprint of the proposed Jasper Terminal. The District has emphasized to GA DOT and the JPO that it would not consider releasing its disposal easements until development of the property is imminent, i.e. the developer obtains a Section 404 permit, and the developer provides assurance that the Federal government will be made whole for any incremental cost difference for disposal of sediments beyond the Federal standard. It should be noted that a consultant working for the JPO has stated that the proposed placement of new work sediments [from SHEP construction] on Areas 14A and 14B would save the JOT development project over $300 million by raising its elevation to a workable height. Therefore,

if SHEP is constructed, it would benefit the development of a Jasper Terminal by significantly reducing initial construction costs.

The dredged material management plan (DMMP) for the harbor is required to show 50-years of capacity and reflect current conditions. As such, it has been updated to show relevant maintenance dredging information through 2066. For the Corps to release its easements on the subject sites for development, alternative dredged material disposal site[s] would need to be identified by JPO for use by the Savannah Harbor Navigation Project to replace lost capacity. The CDFs are essentially surrounded by sensitive marsh habitat; therefore, in-kind replacement of CDFs 14A/14B in the immediate vicinity will be extremely difficult.

The amount of O&M dredged material for the 50-year life of the project has been calculated for CDFs 14A /14B. This amount has been given to Moffatt and Nichol [engineering firm hired by the JPO] for project development. The subject sites would only be relinquished after the lost capacity has been replaced. Currently, DMCAs 14A and 14B are at a slightly higher elevation than the surrounding marsh. Placement of new work would raise the sites to a level required for the construction of a dock. The total volume of O&M sediments are not expected to increase substantially if the harbor is deepened as proposed.

760-JK-400-EN166, 760-JK-400-EN167

Comment: *The comparison to Charleston fails to take into account the salinity difference between the ports. Post - Panamax ships would sink approximately one foot as they enter the brackish water of the Savannah River. This phenomenon does not exist in Charleston where draft changes due to salinity are negligible. The other factor that differs is that the transit time is so long in Savannah that high tide only offers assistance for a portion of the transit. Even with the time lag between high tide at the sea buoy and high tide well into the port, and the higher amplitude of the tide inside the port, the ship will not be able to keep up with high tide throughout, and will be at half tide or worse at some point in the transit. Therefore, the tide only allows for an additional 4 \ /2 feet of draft in optimal conditions. These factors contribute to the estimated potential of this channel project allowing only for the existing draft capability of the channel in Charleston, even though this project is two feet deeper.*

Response: The lesser density of freshwater [harbor complex] compared to saltwater [open ocean] results in a ship's draft increasing by 2.8 % [see EM1110-2-1613, page 6-29]. For a draft T=47.5 ft, this equates to an increase in draft of 1.33 feet for pure freshwater. For brackish water, the draft will increase approximately half of this amount, or 0.67 feet. The Savannah Harbor Pilots Association confirmed that the difference in draft between the entrance channel and the Garden City Terminal is 20 cm or 0.66 feet. All drafts reported by the Savannah Harbor Pilots Association are referenced to a fresh water datum; therefore, the presence of salinity would only serve to reduce the under keel requirement.

Tidal delays were considered as part of the economic analysis of the project. Routinely, pilots use their professional judgment and training to take advantage of the tide. The vertical motion study report [revised] indicates that an inbound [more restrictive than outbound] 47.5 foot draft vessel traveling at 10 knots would have 365 days per year accessibility given 54.5 feet of water (Figure 32b). A vessel with a 47.5 foot draft traveling at 14 knots would have 360 days per year accessibility given 54.5 feet of water (Figure 32b). The inbound transit presents the worst-case condition relative to vertical ship motions. The report does not draw comparisons between Port of Savannah and Charleston.

760-JK-400-EN168, 760-JK-400-EN169

Comment: *The traffic density this project can support is severely constrained by the predominantly one-way capability. This limitation was documented in the Anny Corps' letter to the Savannah Pilots on March 28, 2002: "The channel was not designed for full two· way traffic for the design ship at all times." Given that the width is static, and is not afforded any benefit of tidal assistance, if the channel is only wide enough for one-way traffic some of the time, it is only wide enough for one-way traffic all the time for the design ship. It has also been noted, the design ship is not a full size post Panamx ship. The nearby Port of Charleston is currently wide enough for full post-panamax traffic all the time.*

Response: Although the channel is not designed for full two-way traffic [all times / locations / conditions] for the design ship, the channel is not restricted to one-way traffic for the design ship. Design vessels would continue to meet in the entrance channel as well as the two designed meeting lanes in the inner harbor. The channel would still be able to accommodate two-way traffic for the design vessel and a smaller vessel except in the Bight and turns where [by design] meeting will not take place.

The design vessel for the project is the Susan Maersk. It has a 140' beam and represents the largest class vessel expected to call at Savannah regularly. The channel's dimensions would allow two design vessels to meet [pass one another] at designated areas. On those rare occasions when larger width vessels call, the channel may be restricted to 1-way traffic at the discretion of the harbor pilots.

Page 6-44

760-JK-400-EN170

Comment: *Therefore, the combined utility of this project would bring the ship handling capability of the Port of Savannah to roughly a one-way equivalent of the existing Port of Charleston Economic and alternative studies should reflect this.*

Response: Comparisons with the Port of Charleston are not a part of the report objectives.

760-JK-400-EV201

Comment: *As noted in Section 5.20, Protection of Children and Environmental Justice, Federal agencies are required by Executive Order 12898 to identify and address "disproportionately high and adverse human health and environmental effects . .. on minority populations and low· income populations in the United States." Section 5.20, on Page 5· 145, Paragraph 4 references figures that " ... show the location of various poverty levels" in an area of Jasper County " ... where the Garden City Terminal is located and most of the effects of the existing container terminal are experienced." The text further states " ... that the closest area with the highest poverty level (40-100 percent) is located roughly a mile from the terminal", and this " . . . same area as being the closest one with the highest category of minorities (40-100 percent)." It is not clear in the text why this area is the focus of the analysis, rather than the area that may be potentially affected by the proposed action and alternatives. If the area identified on Figures 5-54 and 5-55 encompasses the region of influence, or area potentially affected by the proposed action and alternatives, it should be clearly stated as such in the text, if it does not, then the analysis needs to encompass that affected area, which needs to be defined based on the geographic extent of air quality and other impacts associated with the proposed action and alternatives that could potentially have adverse human health and environmental effects on minority populations and low· income populations.*

Response: Under both the without- and with-project conditions, the Corps expects the Garden City Terminal to reach its build-out capacity near 2030 when the total number of TEUs processed reaches 6.5 million. This annual capacity will be constrained by the following factors: size of the terminal, the number of gates that provide access to the property, the number and size of the berths, the number and size of the container cranes, the number of jockey trucks that move the containers within the terminal, how the containers are stacked within the terminal, and the number of railroads that service the terminal and the frequency of their trains. It is projected that without deepening, more vessels would be required to transport this volume of cargo whereas with channel deepening, the total number of vessels decreases as they would be able to load/unload without current draft constraints. No incremental increase in cargo is expected to occur as a result of the proposed harbor deepening. As a result, the number of containers that transit the areas surrounding the port would remain a zero sum [compared to the status quo]. Hence, overall landside impacts outside the Garden City Terminal, e.g., noise, air emissions [including air toxics], and traffic, would not be increased as a result of the proposed deepening. The project's economic benefits accrue from the use of larger, more cost-effective container ships, not an overall increase in the number of containers.

760-JK-400-EV202, 760-JK-400-EV203

Comment: *Additionally, Section 5.20 does not define what low-income population was assessed as part of the environmental justice analysis. It would appear from the text to be the segment of the population with the highest category of people at or below the poverty level (40 -100 percent), but that is not clear from the text. It is also not clear if the low-income population included in the environmental justice analysis comprised all people at or below the poverty level. The analysis should identify and assess disproportionately high and adverse effects on minority and low-income populations. Based on the mapping on Figures 5-54 and 5·55, it appears that minority and low-income populations may be closer to the project than one mile. What is not clear from the evaluation and needs to be included is an assessment (more than merely a statement) of whether or not minority and low-income populations (not the highest category of minority and low-income populations) are disproportionately affected by any adverse human health and environmental effects of the proposed action and alternatives.*

Response: FEIS-Section 5.19 was revised to define [what constitutes a] low income populations.

See response to above Comment.

Page 6-45

760-JK-400-EV204, 760-JK-400-EV205

Comment: *Section 5.20 also states that Executive Order 13045 requires that Federal agencies "identify and assess environmental health risks and safety risks that may disproportionately affect children;" and are required to "ensure that its ... activities ... address disproportionate risks to children that result from environmental health risks or safety risks." Figure 5-56 of the EIS shows the locations of schools, hospitals and child care facilities in the project area. It is presumed that the identification of these facilities is intended to represent locations where children would be exposed to environmental health risks or safety risks from the proposed action and alternatives. This is not clearly stated, however, but needs to be if that is the intent. There may be other locations in the affected area where children could be present and at risk, and they would include outdoor recreational areas (e.g., ball fields, playgrounds) and residential areas (for pre-school children not in child care facilities or all children present in residential areas if project activities would occur after school hours, for example, or during the weekend). If these areas exist in the area potentially affected by project activities, then they need to be included in the analysis.*

Response: Figure 5-59 shows the location of those facilities where children may be exposed to environmental health- or safety risks from the proposed action.

Figure 5-59 adequately displays the at-risk locations for children in the project area.

760-JK-400-EV206

Comment: *Moreover, with regard to the evaluation under E.O. 13045, Section 5.20, Paragraph 1 on Page 148 states that « ... schools, hospitals and child care facilities ... arc dispersed throughout the community and arc not located disproportionately near the navigation channel." The disproportionate or non-disproportionate location of facilities, however, is not what needs to be evaluated. The analysis needs to identify and assess the effects of the proposed action on children and whether or not children may suffer disproportionately from environmental health risks and safety risks when compared to the adult portion of the population.*

Response: FEIS-Section 5.19 was revised to provide more information on the demographics of children (below the age of 18) in the Garden City Terminal area. The potential effects of air emissions (criteria pollutants/air toxics) from port traffic and SHEP related sourceswas also disclosed.

760-JK-400-EV207, 760-JK-400-EV208

Comment: *Section 5.20 concludes on Page 5- 149, Paragraph I that "[t]he dredging activities, including deposition of the dredged sediment, will not have significant impacts on any populations, including minority populations and low-income populations." The basis for this conclusion is unclear from the text in Section 5.20 prior to this statement. The document needs to indicate the basis for this conclusion, i.e., whether it is from the results of air quality and other impact analyses of the proposed action and alternatives. If from air quality analyses, the document needs to explain how this conclusion was derived, as Section 5.6, Air Quality, indicates that the assessment of impacts on air quality " ... did not include a detailed dispersion modeling assessment of air emissions of the alternatives", nor did it include " ... a risk-based assessment of the health effects associated with the proposed project".*

Response: Section 5.19 includes a "Summary of Project Effects on EJ Populations and Children" which concludes that : t*he Corps evaluated potential project impacts of the proposed harbor deepening and found that the information shows that the proposed action would not cause disproportionately high and adverse impacts on minority populations, low-income populations, or children.*

Under both the without and with project conditions, the District expects the Garden City Terminal to reach its maximum annual capacity near 2030 [6.5 TEUs]. This annual capacity will be constrained by the following factors: size of the terminal, the number of gates that provide access to the property, the number and size of the berths, the number and size of the container cranes, the number of jockey trucks that move the containers within the terminal, how the containers are stacked within the terminal, and the number of railroads that service the terminal and the frequency of their trains. Moreover, there is the prediction that without deepening, more vessels would be required to transport the cargo expected to move through the port. With deepening, the total number of vessels would decrease, as they would be able to load/unload without the current constraints of draft.

No incremental increases in cargo are expected to occur as a result of the proposed harbor deepening. Since the number of containers per year [with-/without project] is a zero sum, no landside changes in emissions would occur as a result of the deepening. Air emissions [including air toxics], and traffic would not be increased as a result of the proposed deepening. Overall air emissions in the port may even

decrease slightly as a result of the project; consequently, there is no technical need to conduct a detailed analysis of emission dispersal. Given this overall decrease in emissions (including air toxics), violations of the National Ambient Air Quality Standards (NAAQS) violations are very unlikely. Therefore, a risk based assessment of the health effects associated with the proposed action will not be conducted.

Page 7-1

760-MR-400-EV209

Comment: *5.1.2.2 impacts Without Mitigation - Pg 5- 12. 2nd para - "Tidal freshwater marshes located outside the SNWR are subject to development threats and could be filled if the owner obtained a Department of the Army Permit". Please explain in detail the belief that those wetlands are threatened by development.*

Response: The District as well as regional planning entities forecast that the Savannah Harbor, and areas surrounding the SNWR, will continue to experience population growth, industrial/commercial development, and changes in land use. In addition to the industrial developments that have been permitted by the District in recent years, the US Geological Survey, Water Science Center (GaWSC) commented on the large number of industrial facilities and associated impacts that are anticipated on lands in close proximity to the Georgia Ports Authority and the SNWR. The proposed preservation of up to 2,245 acres ensures aquatic resources on the associated properties will be protected in perpetuity. The preserved land would provide additional buffer so that any future development in the vicinity will not result in a secondary and/or indirect impact to existing Refuge lands. There is also a threat that changes in adjacent land use will also have a detrimental impact on the SNWR. For example, a Public Notice published by the Charleston District, Corps of Engineers on September 28, 2009 requested comment on a proposal from a private landowner to alter the hydrology within a relict rice impoundment [485 acres] via diversion of tidal flows. The entire property [693 acres] would then be used as a mitigation bank. Presently, this parcel provides stop-over benefits to migratory waterfowl similar to those provided by Refuge lands. Conversion to saltmarsh lessens its waterfowl potential and potentially results in crowding on adjacent preferred habitat. There is the immediate implication that birds could shorten their stay in the area and result in the populations that the Refuge currently serves resuming their migration with less rest. The expected effects of the proposed regulatory action on the SNWR have not been quantified, but the proposed project is an example of the continued threat that manipulation of adjacent lands poses to the SNWR and the resources it protects/fosters. Acquisition and preservation of the proposed 2,245 acres (maximum) as mitigation for SHEP would provide additional buffer and protection from this type of activities. The mitigation lands would include a restrictive covenant/conservation easement with subsequent conveyance to the USFWS.

760-MR-400-EV210

Comment: *6.11 Executive Order 11990 (Protection of Wetlands) - Pg 6·3, 6th para - "A small amount of saltmarsh and brackish marsh (14.08 acres) would be lost through excavation of the turning basin and two wideners", The Corps estimates that approximately 1200 acres of tidal freshwater wetlands could be converted to another wetland type without mitigation, and over 300 acres of tidal freshwater wetlands will be impacted after mitigation. The Corps proposes as mitigation the preservation of existing tidal freshwater wetlands that are not under imminent threat of loss. How is that in compliance with Executive Order 11990, and how is that consistent with "no net loss"?*

Response: Without implementation of the flow diversion structures, the 47-foot alternative would indirectly impact up to 1,177 acres of tidal freshwater marsh. However, use of Flow Rerouting Plan 6A reduces the resulting impact to 223 acres. The District conducted a functional assessment of freshwater marsh aquatic resources relative to their potential impact [from SHEP]. A watershed assessment was also performed to identify and evaluate potential mitigation options to compensate for SHEP impacts. Ultimately, up to 2,245 acres adjacent to the SNWR were identified for preservation. These lands would be conveyed to USFWS as compensation for freshwater wetland impacts [species shifts]. This acreage complies with the 2008 Final Mitigation Rule. The District's functional assessment, watershed assessment, and evaluation of impact was the basis of the conclusion that SHEP complies with Executive Order 11990 (please see responses specific to the functional assessment and watershed assessment; Appendix C – Mitigation Planning, Section VII Consideration of the 2008 USACE/USEPA Mitigation Rule has also been updated with this information).

760-MR-400-EV211

Comment: *5.2.2 Mitigation for Impacts to Dissolved Oxygen - Pg 5-48, 2nd para - "Identified the use of Speece cones as the specific technique to inject oxygen into the water, although another land-based technique might be found later that could be more cost-effective." Where has this technology been employed to the degree needed for the SHEP and what was the result?"*

Response: Speece Cones have been widely used in industrial settings and several environmental applications. However, this is the first time that Speece Cones have been used in tidal systems to improve dissolved oxygen in a harbor. See also other responses on this issue.

760-MR-400-EV212

Comment: *5.3.2 Mitigation for Impacts to Fisheries - Pg 5-91 - Adding a table to this section that identifies the quantity of fish habitat lost (by species) versus the quantity of habitat expected to be gained (by species) through mitigation would be helpful to understanding the magnitude of the potential impact.*

Response: The requested tables are 5-36 through 5-41 in EIS-Section 5.03. This material is also included in Appendix C.

760-MR-400-EV213

Comment: *6.04 Magnuson-Stevens Fishery Conservation and Management Act - Pg 6-2, 2nd para - "Conversion of freshwater marshes to brackish would require mitigation for all channel depths except the 44-foot project. Mitigation would be accomplished through the flow rerouting and preservation of wetlands in the Savannah River estuary". There appears to be no analysis of impacts to the plant and animal communities that reside in and adjacent to the streams that will have freshwater diverted from them, and no analysis of mitigation if impacts are likely to occur. Mitigation in the form of existing wetlands preservation does not comply with "no net loss of function and value", a basic principal of the Corps' Section 404 regulatory program.*

Response: Appendix S provides the details of the EFH assessment and Appendix C supplies details on the mitigation plan. For the 15.68 acres of estuarine emergent wetlands lost to excavation, in-kind mitigation would be provided by restoring 40+ acres of wetlands in the Savannah Harbor environs. A portion of the restoration (11+ acres) is considered advance mitigation and will be available for District use should the need arise in the future operation/maintenance of the Savannah Harbor Navigation Project.

Without mitigation, the hydrodynamic related changes would impact 1,177212 acres of freshwater wetlands (Table 3-6 in Section 3.0 and EIS-Appendix C) for the 47-foot alternative. However with mitigation, the hydrodynamic related changes would be minimized to 223 acres. No net loss of wetland [functions] was the original goal, but methods to avoid/minimize SHEP impacts had been exhausted as well as restoration/enhancement of existing environmental functions. At this point, the next mitigation step is preservation as a means of addressing expected project impacts. The details of the preservation effort are indicated in Appendix C, Section V, C.

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760-MR-400-EV214

Comment: *5.22 Mitigation - Pg 5-157, 3rd para - "The project includes design features to avoid environmental impacts as well as features that reduce the amount of impacts that otherwise occur". The design features and features that reduce impacts should be identified in the text, or provide a reference to another section of the DEIS where those features are discussed in detail.*

Response: The design features that reduce species change impacts consist of the diversion structure at McCoys Cut, the closure structure at the western end of McCoys Cut, closure of Rifle Cut, and the sill/broad berm in Back River below the Tidegate. Figure 5-11 illustrates their locations. A complete discussion of these flow rerouting measures is in Appendix C.

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760APB-MR-76-EV01

Comment: *Section 5.04.2.A. Line 5. How and to what degree will lighting affect sea turtles? Will it increase the likelihood of a take?*

Response: Lighting is only an important concern with sea turtles during the hatching season. Bright lights [onshore] often disorient the hatchlings causing them to move inland instead of out to sea. There are no on-shore activities associated with the SHEP that would adversely affect sea turtles. As a requirement of the BO, all lighting aboard hopper dredges and hopper dredged pumpout barges operating within 3 nm of sea turtle nesting beaches is limited to the minimal lightning necessary to comply with US Coast Guard and/or OSHA requirements during the nesting and hatching season. All non-essential lighting on the dredge is minimized to reduce illumination of the water to minimize potential disorientation effect on female turtles approaching the nesting beaches and sea turtle hatchlings making their way seaward.

760APB-MR-76-EV02

Comment: *Section 5.04.2.0. Has the use of a bed leveler been cleared by NOAA? Endangered species surveys should be conducted prior to use. How will the project determine if use of a hopper dredge would result in equal or greater take of endangered species?*

Response: The use of bed levelers to clean up high spots in the entrance channel was requested as a part of the Biological Assessment (BA). The use of bed levelers in the entrance channel was approved by the NMFS in the BO based on their belief that it is unlikely that turtles may be adversely affected by bed-leveling activities to clean up high spots.

760APB-MR-76-EV03

Comment: *Section 5.04.2.E. The narrative states that noise above ISO dB is the level of a take. However, noise levels above 150 dB and below 180 dB are proposed to be allowed under monitoring even though they are above the level of a take. This is counterintuitive and against a tenant of the ESA, which is to prevent a take of an endangered species.*

Response: The 150 dB and 180 dB values (from the quote in italics) came from ATM (2000) and was not intended to represent the dredging noise levels anticipated for the proposed project. The following quote from page 121 of Appendix B indicates the anticipated noise levels: *"According to Clarke et al. (2002), hopper dredge operations had the highest sustained pressure levels of 120-140 dB among the three measured dredge types; however, this measurement was taken at 40 m from the operating vessel and would likely attenuate significantly with increased distance from the dredge. Based on: (1) the predicted noise impact thresholds noted by Richardson et al. (1995), (2) the background noise that already exists within the marine environment, and (3) the ability of marine mammals to move away from the immediate noise source, noise generated by bucket, cutter head, and hopper dredge activities will not affect the migration, nursing/breeding, feeding/sheltering or communication of large whales."* This and other similar information is discussed throughout much of Appendix B.

760APB-MR-76-EV04

Comment: *Section 6.00.f. Authorization of the sites through LTMS in 1996 does not preclude the need for study and assessment in this EIS. Since 1996, additional species have been listed as threatened or endangered. In addition, these areas may currently be used by protected species. If, in fact, the allowable timeframe in the L TMS was indeterminate, the L TMS process is flawed.*

Response: As noted in Appendix B, the dredged material placement plan serves as the updated documentation for both new work and O&M sediments. Because of concerns voiced by GA DNR and City of Tybee Island, the plan has been revised to remove the nearshore placement sites from use. All new work sediments excavated from the entrance channel would be deposited in previously-approved areas: the Offshore Dredged Material Disposal Site or an upland confined disposal site. The FEIS details the revisions to the sediment placement plan. Although the nearshore areas off Tybee Island will not be used for placement of new work material from the SHEP, Section 5 and Appendix B contain discussions of the impacts that would be expected to occur if that plan of action were pursued.

760APB-MR-76-EV05

Comment: *Page 46, 4th paragraph states "The proposed action does not plan to place any excavated sediment ... on any upland beaches ... " (emphasis added) The project should specify whether it will or will not. The words 'does not plan' suggest that it may occur at a later date if the plans change. This impact is not assessed in the EIS and should therefore be changed to either state that it will not occur or that it may occur and address the environmental impacts of the action.*

Response: No new work sediment sediment would be placed on the upland beaches at Tybee Island. In addition, the District no longer proposes to place construction sediments in the nearshore for beneficial purposes [feeder berms]. As discussed in previous responses, suitable maintenance material from the completed project could be placed directly on Tybee Beach or in the nearshore are off Tybee Island and in sites adjacent to the entrance channel (See Figure 3-3).

The Base Plan (the plan which is the most cost efficient and meets all applicable environmental standards) for the disposal of dredged material from the first portion of the inner harbor and the entrance channel is to place that material into the Jones Island/Oysterbed Island CDF or the ODMDS.

However, suitable maintenance material could be placed directly on the beach at Tybee Island or into the nearshore areas off Tybee Island as shown in Figuure 3-3 providing a cost-sharing sponsor was willing to pay the additional costs associated with placing the material into these areas over the Base Plan costs.

760APB-MR-76-EV06
Comment: *Page 46, 2nd to last paragraph, line 2. EROC Mearshore should be corrected to read ERDC Nearshore.*

Response: This correction has been made.

760APB-MR-76-EV07
Comment: *Section 7.01, 4th Paragraph. The text discusses how the increase in salinity and decreased 00 will remain downstream of the 1-95 bridge. How does this compare to existing levels? It is difficult to assess impact when the document does not state how this is a change from existing conditions.*

Response: The anticipated changes in both dissolved oxygen and salinity are well documented in FEIS-Section 5.02. FEIS-Table 5.23 presents summary information on changes in dissolved oxygen and Section 5.03 presents anticipated impacts to fishery resources resulting from changes in salinity and dissolved oxygen.

760APB-MR-76-EV08
Comment: *Section 7.02.2 (c). The assessment does not account for the loss of salt marsh due to increased wave action from the larger ships that will be using the channel.*

Response: The District examined the effects of wave activity on adjacent shorelines [GRR, Appendix C, Section 9.0] and concluded that deepening the navigation channel would not affect the present erosion rate for the inner harbor shoreline. Therefore, no additional wetlands impacts are expected to occur due to SHEP-related wave activity.

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760APB-MR-76-EV09
Comment: *Section 7.02.5 (c & d). The last paragraph of section c and the first paragraph of section d are contradictory. Section c states that "[i]ncreases in ship traffic are expected to occur in the future ..... Section d then states "the number of vessels ... is expected to decrease ... " Which is it? The data to back up this information should also be cited in order to substantiate the claim.*

Response: Section 7.02.5, paragraphs c. and d. have been revised as necessary to address issues associated with ship traffic. As discussed previously, after deepening, vessel traffic would decrease as ships are able to load/unload more deeply without the present constraints of draft.

760APB-MR-76-EV10
Comment: *Section 7.02.7 (c). The document states that sediment deposition would be conducted in a manner to not interfere with nesting terns. There is no detail provided to substantiate this claim. Has a monitoring plan been developed in order to determine the location of nests prior to deposition of sediments? Will deposition occur near nesting terns? If so, how close? If CDF's are being used for breeding, feeding, and loafing for any listed species, the relevant laws related to protection of sensitive*

species would apply and mitigation should be required if the disturbance of the sensitive species habitats are not authorized by the specific law that protects the sensitive species.

Response: All new work dredged sediment would be placed in the EPA-approved Ocean Dredged Material Disposal Site or an existing upland confined disposal facility (CDF). Management of the CDFs for birds has been and will continue to be in accordance with the Long-Term Management Study [LTMS]. In essence, the LTMS [1996] dictates that when a CDF is in use, it will experience an alternating wet and dry phase, of three years respectively. Thus, about half the CDFs are wet and the other half dry at any given time, but there are always CDFs available for breeding, feeding, and loafing. The CDFs are monitored for colonial beach nesting birds and Black-necked Stilts. The dredger is required to set his head section in a manner which will minimize initial/subsequent nest flooding. Water is also held in the CDFs to induce the Stilts to nest at the highest elevations [periphery] to minimize potential chick losses if disposal operations occur later in the rearing season.

760APB-MR-76-EV11

Comment: *Section 7.02.9 (d). Has a monitoring plan been developed? What monitoring protocol will be used and how will it be used in order to ensure adequate habitat is available during the project for nesting? If the entire area is disturbed in a short period of time, it is highly unlikely that any habitat will be available for nesting during the project.*

Response: Plans to protect nesting terns in the CDFs have been in place for years. The Long-Term Management Study (LTMS) included the establishment of "bird islands" in some of the CDFs with specific features which facilitate nesting of terns and other shorebirds. Water levels in the CDFs are maintained at levels which permit the birds to use the raised islands for nesting, but limit access for most non-avian predators. The areas are also monitored [District wildlife biologist] to ensure that water levels do not endanger the nests/young chicks.

760APB-MR-76-EV12

Comment: *Section 7.02.10 (c). Lines 6 and 7. There is nothing in the document to substantiate this claim. A reference should be cited.*

Response: The avoidance statement was made based on recurrent field observations, but no specific reference is available. The sentence will be revised to reflect that the vibrations from the heavy equipment appear to be sensed by some species, allowing them to elude danger.

760APB-MR-76-EV13

Comment: *Section 7.02.11 (c). Have any nest surveys been completed near the impact areas? Surveys should be completed prior to determination of no impact.*

Response: No bald eagle nests have been observed on any of the subject CDFs.

760APB-MR-76-EV14

Comment: *Section 7.02.14 (c). The document does not consider or mention the impacts from saltwater intrusion into freshwater, thereby reducing available habitat. The reduction in available freshwater habitats is an impact that must be considered.*

Response: In fact, increased salinity and loss of freshwater habitats was considered extensively. As indicated in the BATES, the SHEP would primarily affect palustrine, estuarine, and marine habitats. Construction of the fish bypass at New Savannah Bluff Lock and Dam would provide access to historic spawning habitats at the Augusta Shoals for the Shortnose sturgeon.

760APB-MR-76-EV15

Comment: *Section 7.02.15 (c). The document states that sediment deposition would be conducted in a manner to not interfere with nesting yellow crowned night herons. There is no detail provided to substantiate this claim. Has a monitoring plan been developed in order to determine the location of nests prior to deposition of sediments? Will deposition occur near nesting areas? If so, how close?*

Response: All dredged material would be placed in the EPA-approved Ocean Dredged Material Disposal Site or an existing upland confined disposal facility (CDF). Management of the CDFs for birds has been and will continue to be in accordance with the Long-Term Management Study [LTMS]. In essence, the LTMS [1996] dictates that when a CDF is in use it will experience an alternating wet and dry phase, of three years respectively. Thus, about half the CDFs are wet and the other half dry at any given time, but there are always CDFs available for breeding, feeding, and loafing. The CDFs are monitored for colonial nesting birds and Black-necked Stilts. The dredger is required to set his head section in a manner which will minimize initial/subsequent nest flooding. Water is also held in the CDFs to induce the Stilts to nest at the highest elevations [periphery] to minimize potential chick losses if disposal operations were to occur later in the rearing season.

760APB-MR-76-EV16

Comment: *Section 7.02.17 (b). The document states that no gopher frogs have been observed at the CDFs, but does not provide any reference to a study that has looked for the frogs. Information should be provided as to which studies would have been expected to document gopher frogs had they been present. Non-presence cannot be determined by a lack of study.*

Response: Appendix B-Section 7.00 has been revised. CDFs 12A, 13A, 13B, 14A, 14B, and Jones/Oysterbed are located in South Carolina. The gopher frog has ecological value, but since it is not federally-listed threatened or endangered, a detailed survey is not warranted. In addition, all areas that would be physically impacted (e.g. CDFs, ship channels) have been previously disturbed and are recurrently in use. Thus, they are not likely to harbor sensitive/reclusive species.

The SC Department of Natural Resources, Heritage Trust Program indicated that there have been "no known occurrences" of gopher frogs located in the subject CDFs (Personal Communication, 1 March 2011, Ms. Julie Holling, SC Department of Natural Resources, Heritage Trust Program).

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760APB-MR-76-EV17

Comment: *Section 7.02.20 (c). If the habitat requirement is similar to what is found in the estuary, then surveys should be conducted in impact areas to demonstrate absence from the habitats. It is impossible to determine impact without knowing whether or not it exists in the impact areas.*

Response: The American oystercatcher has ecological value, but since it is not federally listed threatened or endangered, a detailed survey is not warranted. Although water bird colonies are located in areas [CDFs, ship channels] that would be physically impacted by SHEP, the American oystercatcher has not been documented in these environs.

760APB-MR-76-EV18

Comment: *Section 7.02.21 (c). If the habitat requirement is similar to what is found in the estuary, then surveys should be conducted in impact areas to demonstrate absence from the habitats. It is impossible to determine impact without knowing whether or not it exists in the impact areas.*

Response: State-listed sensitive species have ecological value, but since they are not federally listed as threatened or endangered species, a detailed survey was not warranted. In addition, all areas that would be physically impacted [CDFs, ship channels] have been previously disturbed and are not likely to harbor sensitive species.

760APB-MR-76-EV19

Comment: *Section 7.02.22 (c). [f the habitat requirement is similar to what is found in the estuary, then surveys should be conducted in impact areas to demonstrate absence from the habitats. It is impossible to determine impact without knowing whether or not it exists in the impact areas.*

Response: This species has ecological value, but since it is not federally-listed threatened or endangered, a detailed survey is not warranted. In addition, all areas that would be physically impacted [CDFs, ship channels] have been previously disturbed and are not likely to harbor sensitive species.

760APB-MR-76-EV20

Comment: *Section 7.03.Savannah River. The document states that the overall effect on the river and its fisheries are not expected to be significant. The impact on fisheries was not adequately addressed considering the fact that over 400 acres of habitat is expected to be lost to the shortnose sturgeon alone. In addition, the lost habitat may have been underrepresented by the modeling. For example, a baseline level of 4.5 mg/l of dissolved oxygen was used to determine if habitat was available for shortnose sturgeon. This is a minimum level at which the agencies determined shortnose sturgeon can survive, but does not necessarily indicate the dissolved oxygen level that is necessary for foraging, resting, and moving. For example, the Collins et al. (2001) study ofshortnose sturgeon habitat use cited in Section 8.02.7 of this appendix, reported minimum mean dissolved oxygen levels of 6.36 and 6.45 in areas where adults and juveniles were found, respectively.*

Response: The criteria, data, and model outputs presented in the FEIS are sufficient to evaluate impacts under the different project alternatives. The habitat suitability criteria used in the model runs were defined and agreed upon by the Cooperating Agencies and the Fisheries Interagency Coordination Team. Recent model runs were performed for juvenile sturgeon with the salinity tolerance adjusted from <= 4 ppt to <=14.9 ppt. The revised modeling results are incorporated into the Final EIS.

The District conducted studies and worked in conjunction with a Fisheries Interagency Coordination Team (of which NOAA Fisheries was a member) to identify critical species and acceptable habitat criteria for each life stage. The results of the extensive analyses and mitigation planning, including fish passage at New Savannah Bluff Lock and Dam, flow re-routing, and addition of dissolved oxygen, have minimized impacts to Shortnose Sturgeon habitat. The fisheries studies/analyses identified by the Fisheries

Interagency Coordination Team have been completed and the results/conclusions thereof have adequately evaluated the impacts of the various project alternatives.

As noted in DEIS-Section 5.03.2, the Cooperating Agencies and the Fisheries Interagency Coordination Team could not identify measures within the estuary that could completely restore Shortnose Sturgeon habitat. As a result, the team agreed [2007] that passage around the New Savannah Bluff Lock and Dam would compensate for habitat losses by increasing access to the sturgeon's historic upstream spawning areas at the Augusta Shoals.

760APB-MR-76-EV21

Comment: *The habitat use information, in conjunction with agency comments reported on page 128 #4, 2nd paragraph in Appendix N, again suggests the habitat modeling overrepresented the available habitat for sturgeon by denoting it all as equally beneficial at the 4.5 mg/1 dissolved oxygen threshold and thus failed to quantify the intensity of the impact to the fisheries. In the Appendix N documentation, Prescott Brownell, from NM.FS requested that a range of suitable habitat thresholds be used for modeling habitat availability. The agency panel then redacted his comments from the record without providing an adequate basis for the redaction. The panel decided the current methods were "acceptable for now." This comment would suggest that additional work would be necessary in the future in order to adequately asses the impacts. The narrative does not provide adequate discussion as to why the pass/fail approach was more adequate than the range approach suggested by Mr. Brownell.*

Response: The habitat suitability criteria that were used to assess habitat availability for a particular fish species, including Shortnose sturgeon, were developed by the Fisheries Interagency Coordination Team. These criteria were based on its member's professional expertise/experience, pertinent literature, and site specific data for the Savannah River. Comments made during the process remain available for inspection; however, further deliberation sometimes resulted in a change of opinion by ICT members [the NMFS representative in this particular instance].

760APB-MR-76-EV22

Comment: *Additional questions as to the validity of the fisheries assessment are based on the habitat models and their interpretation for impact determination. On page 132 of Appendix N. the memorandum for the record states that other fish were not modeled for habitat suitability because the Corps did not wish to spend the time modifying existing models and they would instead use other species as surrogates. Avoidance of spending time developing models is a suspect reason for not pursuing the assessment of some species. This is especially true when no documentation, reference, or justification was given as to the acceptability of using modeled species as surrogates for those species that were not modeled. Furthermore, the completed models were not used to extrapolate the potential impacts to species that were not modeled when determining potential impacts.*

Response: It is a common/accepted practice in modeling development to use a limited number of species. However, the species selected should adequately represent the range of impacts anticipated for the action. The selected species in this instance meet that test.

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760APB-MR-76-EV23
Comment: *Section 7.04. The note on Rafinesque's big-eared bat states that some bottomland hardwood tress could be affected by salinity. Other sections of the document state that upland areas will not be affected by the project; however, this area highlights that effects may occur in upland areas. The potential effects should be investigated in greater detail in order to provide quantifiable impacts for the assessment of loss of habitat for this species.*

Response: This species has ecological value, but since it is not federally listed threatened or endangered, a detailed survey is not warranted. Because bottomland hardwoods recurrently flood [typically on a seasonal basis], they are not generally characterized as uplands.

760APB-MR-76-EV24
Comment: *Section 7.04.2 (c). If the habitat requirement is similar to what is found in the estuary, then surveys should be conducted in impact areas to demonstrate absence from the habitats. It is impossible to determine impact without knowing whether or not it exists in the impact areas.*

Response: CDFs 12A, 13A, 13B, 14A, 14B, and Jones/Oysterbed are located in South Carolina. The barrel floater has ecological value, but since it is not federally-listed threatened or endangered, a detailed survey is not warranted. In addition, all areas that would be physically impacted (CDFs, ship channels) have been previously disturbed and are recurrently in use. Thus, they are not likely to harbor species requiring a structured environment.

The SC Department of Natural Resources, Heritage Trust Program indicated that there have been "no known occurrences" of barrel floaters inhabiting the subject CDFs (Personal Communication, 1 March 2011, Ms. Julie Holling, SC Department of Natural Resources, Heritage Trust Program). This information has been added to EIS-Appendix B.

760APB-MR-76-EV25
Comment: *Section 7.04.5 (c). If the habitat requirement is similar to what is found in the estuary, then surveys should be conducted in impact areas to demonstrate absence from the habitats. It is impossible to determine impact without knowing whether or not it exists in the impact areas.*

Response: All of the CDFs to be used for this project (12A, 12B, 13A, 13B, 14A, 14B, and Jones/Oyster bed) are located in South Carolina. The Carolina slab shell has ecological value, but since it is not federally-listed threatened or endangered, a detailed survey is not warranted. In addition, all areas that would be physically impacted (e.g. CDFs, ship channels) have been previously disturbed and are not likely to harbor sensitive species.

The SC Department of Natural Resources, Heritage Trust Program indicated that there have been "no known occurrences" of the Carolina slabshell in these CDFs (Personal Communication, 1 March 2011, Ms. Julie Holling, SC Department of Natural Resources, Heritage Trust Program). This information has been added to Appendix B of the EIS.

760APB-MR-76-EV26, 760APB-MR-76-EV27
Comment: *Section 7.04.7 (c). 2nd paragraph. The narrative states that ship encounters with pygmy sperm whale are extremely rare, but do not provide a reference or other information to substantiate this claim. The data to back up this information should also be cited in order to substantiate the claim. The*

last paragraph of section c and the first paragraph of section d are contradictory. Section c states that "[i]ncreases in ship traffic are expected to occur in the future ... " Section d then states "the number of vessels ... is expected to decrease ... " Which is it? The data to back up this information should also be cited in order to substantiate the claim.

Response: Information was added to Section 7.04.7 of EIS-Appendix B to explain why ship encounters with the pygmy sperm whale are expected to be extremely rare.

760APB-MR-76-EV28

Comment: *Section 7.04.8 (c). If the habitat requirement is similar to what is found in the estuary, then surveys should be conducted in impact areas to demonstrate absence from the habitats. It is impossible to determine impact without knowing whether or not it exists in the impact areas.*

Response: All of the CDF's to be used for this project (i.e., 12A, 12B, 13A, 13B, 14A, 14B, and Jones/Oyster bed) are located in South Carolina. The yellow lamp mussel has ecological value, but since it is not federally listed threatened or endangered, a detailed survey is not warranted. In addition, all areas that are to be physically impacted (CDFs, ship channels) have been previously disturbed and are not likely to harbor sensitive species.

The SC Department of Natural Resources, Heritage Trust Program indicated that there have been "no known occurrences" of the yellow lamp mussel in these CDFs (Personal Communication, 1 March 2011, Ms. Julie Holling, SC Department of Natural Resources, Heritage Trust Program). This information has been added to EIS-Appendix

760APB-MR-76-EV29

Comment: *The narrative also provides 2c sections and 2d sections that have different impact and effect determinations. Which apply here?*

Response: This section has been revised.

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760APB-MR-76-EV30

Comment: *Section 7.04.9 (c). If the habitat requirement is similar to what is found in the estuary, then surveys should be conducted in impact areas to demonstrate absence from the habitats. It is impossible to determine impact without knowing whether or not it exists in the impact areas.*

Response: All of the CDFs to be used in this project (12A, 13A, 13B, 14A, 14B, and Jones/Oyster bed) are located in South Carolina. The dwarf siren has ecological value, but since it is not federally listed threatened or endangered, a detailed survey is not warranted. In addition, all areas that would be physically impacted (CDFs, ship channels) have been previously disturbed and are not likely to harbor sensitive species.

The SC Department of Natural Resources, Heritage Trust Program indicated that there have been "no known occurrences" of the dwarf siren in these CDFs Personal Communication, 1 March 2011, Ms. Julie Holling, SC Department of Natural Resources, Heritage Trust Program). This information has been added to EIS-Appendix B.

760APB-MR-76-EV31

Comment: *Section 7.04.11 (c). If the habitat requirement is similar to what is found in the estuary, then surveys should be conducted in impact areas to demonstrate absence from the habitats. It is impossible to determine impact without knowing whether or not it exists in the impact areas.*

Response: All of the CDFs to be used for this project (i.e., 12A, 13A, 13B, 14A, 14B, and Jones/Oyster bed) are located in South Carolina. The eastern floater has ecological value, but since it is not federally listed threatened or endangered, a detailed survey is not warranted. In addition, all areas that would be physically impacted (CDFs, ship channels) have been previously disturbed and are not likely to harbor sensitive species.

The SC Department of Natural Resources, Heritage Trust Program indicated there have been "no known occurrences" of the eastern floater in these CDFs (Personal Communication, 1 March 2011, Ms. Julie Holling, SC Department of Natural Resources, Heritage Trust Program). This information has been added to EIS-Appendix B.

760APB-MR-76-EV32

Comment: *Section 7.04.15 (c). If the habitat requirement is similar to what is found in the estuary, then surveys should be conducted in impact areas to demonstrate absence from the habitats. It is impossible to determine impact without knowing whether or not it exists in the impact areas.*

Response: All of the CDF's to be used for this project (i.e., 12A, 13A, 13B, 14A, 14B, and Jones/Oyster bed) are located in South Carolina. The eastern creek shell has ecological value, but since it is not federally listed threatened or endangered, a detailed survey is not warranted. In addition, all areas that would be physically impacted (CDFs, ship channels) have been previously disturbed and are not likely to harbor sensitive species.

The SC Department of Natural Resources, Heritage Trust Program indicated that there have been "no known occurrences" of the eastern creek shell in these CDFs (Personal Communication, 1 March 2011, Ms. Julie Holling, SC Department of Natural Resources, Heritage Trust Program). This information has been added to EIS-Appendix B.

760APB-MR-76-EV33

Comment: *Section 7.04.16 (c). If the habitat requirement is similar to what is found in the estuary, then surveys should be conducted in impact areas to demonstrate absence from the habitats. It is impossible to determine impact without knowing whether or not it exists in the impact areas.*

Response: All of the CDF's to be used for this project (i.e., 12A, 13A, 13B, 14A, 14B, and Jones/Oysterbed) are located in South Carolina. The water hyssop has ecological value, but since this species is not federally listed threatened or endangered, a detailed survey is not warranted. In addition, all areas that would be physically impacted (CDFs, ship channels) have been previously disturbed and are not likely to harbor sensitive species.

The SC Department of Natural Resources, Heritage Trust Program indicated that there have been "no known occurrences" of the Coastal Plain water hyssop being found in these CDFs (Personal Communication, 1 March 2011, Ms. Julie Holling, SC Department of Natural Resources, Heritage Trust Program). This information has been added to EIS-Appendix B.

760APB-MR-76-EV34

Comment: *Section 7.04.21 (c). If the habitat requirement is similar to what is found in the estuary, then surveys should be conducted in impact areas to demonstrate absence from the habitats. It is impossible to determine impact without knowing whether or not it exists in the impact areas.*

Response: All of the CDFs to be used for this project (12A, 13A, 13B, 14A, 14B, and Jones/Oysterbed) are located in South Carolina. The grassland arrowhead has ecological value, but since it species is not federally listed threatened or endangered, a detailed survey is not warranted. In addition, all areas that would be physically impacted (CDFs, ship channels) have been previously disturbed and are not likely to harbor sensitive species.

The SC Department of Natural Resources, Heritage Trust Program indicated that there have been "no known occurrences" of the grassland arrowhead in these CDFs (Personal Communication, 1 March 2011, Ms. Julie Holling, SC Department of Natural Resources, Heritage Trust Program). This information has been added to EIS-Appendix B.

760APB-MR-76-EV35

Comment: *Section 7.04.22 (c). If the habitat requirement is similar to what is found in the estuary, then surveys should be conducted in impact areas to demonstrate absence from the habitats. It is impossible to determine impact without knowing whether or not it exists in the impact areas.*

Response: All of the CDFs to be used for this project (12A, 13A, 13B, 14A, 14B, and Jones/Oysterbed) are located in South Carolina. The Florida yellow-eyed grass has ecological value, but since it is not federally listed threatened or endangered, a detailed survey is not warranted. In addition, all areas that would be physically impacted (CDFs, ship channels) have been previously disturbed and are not likely to harbor sensitive species.

The SC Department of Natural Resources, Heritage Trust Program indicated that there have been "no known occurrences" of the Florida yellow-eyed grass in these CDFs (Personal Communication, 1 March 2011, Ms. Julie Holling, SC Department of Natural Resources, Heritage Trust Program). This information has been added to EIS-Appendix B.

760APB-MR-76-EV36

Comment: *Section 7.04.23 (c). If the habitat requirement is similar to what is found in the estuary, then surveys should be conducted in impact areas to demonstrate absence from the habitats. It is impossible to determine impact without knowing whether or not it exists in the impact areas.*

Response: All of the CDFs to be used for this project (12A, 13A, 13B, 14A, 14B, and Jones/Oysterbed) are located in South Carolina. The acid swamp yellow-eyed grass has ecological value, but since it is not federally listed threatened or endangered, a detailed survey is not warranted. In addition, all areas that would be physically impacted (CDFs, ship channels) have been previously disturbed and are not likely to harbor sensitive species.

The SC Department of Natural Resources, Heritage Trust Program indicated that there have been "no known occurrences" of the acid swamp yellow-eyed grass in these CDF's (Personal Communication, 1 March 2011, Ms. Julie Holling, SC Department of Natural Resources, Heritage Trust Program). This information has been added to EIS-Appendix B.

760APB-MR-76-EV37

Comment: *Section 7.04.24 (c). If the habitat requirement is similar to what is found in the estuary, then surveys should be conducted in impact areas to demonstrate absence from the habitats. It is impossible to determine impact without knowing whether or not it exists in the impact areas.*

Response: All of the CDFs to be used for this project (12A, 13A, 13B, 14A, 14B, and Jones/Oysterbed) are located in South Carolina. The slender leaved dragon head has ecological value, but since this species is not a federally listed threatened or endangered species, a detailed survey is not warranted. In addition, all areas that would be physically impacted (CDFs, ship channels) have been previously disturbed and are not likely to harbor sensitive species.

The SC Department of Natural Resources, Heritage Trust Program indicated that there have been "no known occurrences" of the slender leaved dragon head in these CDFs (Personal Communication, 1 March 2011, Ms. Julie Holling, SC Department of Natural Resources, Heritage Trust Program). This information has been added to EIS-Appendix B.

760APB-MR-76-EV38

Comment: *Section 7.04.25 (c). If the habitat requirement is similar to what is found in the estuary, then surveys should be conducted in impact areas to demonstrate absence from the habitats. It is impossible to determine impact without knowing whether or not it exists in the impact areas.*

Response: All of the CDFs to be used for this project (i.e., 12A, 13A, 13B, 14A, 14B, and Jones/Oysterbed) are located in South Carolina. The hairy fever tree has ecological value, but since it is not federally listed threatened or endangered, a detailed survey is not warranted. In addition, all areas that would be physically impacted (CDFs, ship channels) have been previously disturbed and are not likely to harbor sensitive species.

The SC Department of Natural Resources, Heritage Trust Program indicated there have been "no known occurrences" of the hairy fever tree in these CDFs (Personal Communication, 1 March 2011, Ms. Julie Holling, SC Department of Natural Resources, Heritage Trust Program). This information has been added to EIS-Appendix B.

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760APB-MR-76-EV39

Comment: *Section 7.05.Savannah River. The document states that the overall effect on the river and its fisheries are not expected to be significant. The impact on fisheries was not adequately addressed considering the fact that over 400 acres of habitat is expected to be lost to [he shortnose sturgeon alone. In addition, the lost habitat may have been underrepresented by the modeling. For example, baseline levels of3.5 to 4.0 mg/I of dissolved oxygen was used to determine if habitat was available for adult shortnose sturgeon. This is a minimum level at which the agencies determined shortnose sturgeon can survive, but does not necessarily indicate the dissolved oxygen level that is necessary for foraging, resting, and moving. For example, the Collins et al. (200 I) study of shortnose sturgeon habitat use cited in Section 8.02.7 of this appendix, reported minimum mean dissolved oxygen levels of 6.36 and 6.45 in areas where adults and juveniles were found, respectively.*

Response: The criteria, data, and model outputs presented in the FEIS are sufficient to evaluate the impacts associated with each project alternative. The habitat suitability criteria used in the model runs were defined and agreed upon by the Cooperating Agencies and the Fisheries Interagency Coordination

Team. Recent model runs were performed for juvenile sturgeon with the salinity tolerance adjusted from <= 4 ppt to <=14.9 ppt. These revisions to the original modeling results are incorporated into the Final EIS.

The District conducted its own studies and worked in conjunction with a Fisheries Interagency Coordination Team (of which NOAA Fisheries was a member) to identify critical species and acceptable habitat criteria for each life stage. The results of the extensive analyses and mitigation planning together with structural measures such as the fish passage at New Savannah Bluff Lock and Dam, flow re-routing, and addition of dissolved oxygen, have minimized impacts to Shortnose Sturgeon habitat. All fishery studies/analyses identified by the Fisheries Interagency Coordination Team as necessary to evaluate the impacts of the various project alternatives have been completed.

As noted in DEIS-Section 5.03.2, the Cooperating Agencies and the Fisheries Interagency Coordination Team could not identify measures within the estuary that could completely restore Shortnose Sturgeon habitat. As a result, the team agreed [2007] that passage around the New Savannah Bluff Lock and Dam would compensate for habitat losses by increasing the sturgeon's upstream range an additional 20 miles.

760APB-MR-76-EV40

Comment: *The habitat use information, in conjunction with agency comments reported on page 128 #4, 2nd paragraph in Appendix N, again suggests the habitat modeling overrepresented the available habitat for sturgeon by denoting it all as equally beneficial at the 4.0 mg/l dissolved oxygen threshold and thus failed to quantify the intensity of the impact to the fisheries. In the Appendix N documentation, Prescott Brownell, from NMFS requested that a range of suitable habitat thresholds be used for modeling habitat availability. The agency panel then redacted his comments from the record without providing an adequate basis for the redaction. The panel decided the current methods were "acceptable for now." This comment would suggest that additional work would be necessary in the future in order to adequately asses the impacts. The narrative does not provide adequate discussion as to why the pass/fail approach was more adequate than the range approach suggested by Mr. Brownell.*

Response: The habitat suitability criteria that were used to assess habitat availability for a particular fish species, including Shortnose sturgeon, were developed by the Fisheries Interagency Coordination Team. These criteria were based on its member's professional expertise/experience, pertinent literature, and site specific data for the Savannah River. Comments made during the process remain available for inspection; however, further deliberation sometimes resulted in a change of opinion by ICT members [the NMFS representative in this particular instance].

760APB-MR-76-EV41

Comment: *Additional questions as to the validity of the fisheries assessment are based on the habitat models and their interpretation for impact determination. On page 132 of Appendix N, the memorandum for the record states that other fish were not modeled for habitat suitability because the Corps did not wish to spend the time modifying existing models and they would instead use other species as surrogates. A voidance of spending time developing models is a suspect reason for not pursuing the assessment of some species. This is especially true when no documentation, reference, or justification was given as to the acceptability of using modeled species as surrogates for those species that were not modeled. Furthermore, the completed models were not used to extrapolate the potential impacts to species that were not modeled when determining potential impacts.*

Response: It is a common/accepted practice in modeling development to use a limited number of species. However, the selected species should adequately represent the range of impacts anticipated for the action. The selected species in this instance meet that test.

760APB-MR-76-EV42
Comment: *Section 8.02.1, The section header misspelled Bachman's warbler. Backman's should read Bachman's.*

Response: The Table of Contents, Section 8.02.1 and Section 8.02.1 (a) 3, have been revised from "Backman's warbler" to "Bachman's warbler".

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760APB-MR-76-EV43
Comment: *Section 8.02.1 (c). This sections states that no upland habitats will be adversely affected by the proposed action. This is contradictory to information provided in a note in section*

Response: The comment is incomplete; terrestrial resources are addressed in detail in EIS-Sections 4.07 and 5.08.

760APB-MR-76-EV44
Comment: *Section 7.04. The note on Rafinesque's big-eared bat states that some bottomland hardwood tress could be affected by salinity. Will upland habitats be affected or not?*

Response: Bottomland hardwoods could be affected by salinity changes, but modeling indicates that such impacts are not to be expected. No upland habitats, per se, will be physically impacted by the proposed construction.

760APB-MR-76-EV45
Comment: *Section 8.02.2 (b). What does the term 'the areas' refer to in lines 7, 8, and 9. It is unclear from the text and therefore impossible to determine what the impacts would be.*

Response: The word "areas" refers to the CDFs.

760APB-MR-76-EV46
Comment: *Section 8.02.2 (c). The document does not adequately address the impacts of the project on the wood stork. Impacts to the CDFs, which are currently being used as feeding areas for an endangered species should be quantified and mitigated. More detail should be provided about these impacts, the recovery period, and the habitats that will result from the project.*

Response: The following information has been added to FEIS-Appendix B, Section 7.02. 7(c) and referred to in Section 8.02.2: Management of the CDFs for birds has been and will continue to be in accordance with the Long-Term Management Study [LTMS/1996]. In this instance, the LTMS dictates that when a CDF is in use it will experience an alternating wet and dry phase, of three years respectively. Thus, about half the CDFs are wet and the other half dry at any given time, but there are always CDFs available for breeding, feeding, and loafing.

Based on information developed in Appendix B, the Corps determined that construction of the SHEP "may affect, but is not likely to adversely affect the Wood stork". The USFWS has concurred with this determination. Their report is included in Appendix Z.

760APB-MR-76-EV47
Comment: *Section 8.02.3 (c) 1. The narrative is lacking in providing references that substantiate the factual claims in the document. The data to back up this information should be cited in order to substantiate the claims that impacts will be minimal.*

Additional detail should be provided to indicate the degree to which habitat would be affected during the project and the amount of habitat that will remain unimpacted at anyone point in time. Phrases such as "[O]nly a small portion of the forging habitat is directly affected at any point in time during sediment placement and adjacent habitat is still available ..... does not provide adequate specificity to assess impacts. Additional detail should be provided on benthic recolonization rates to substantiate the as yet unsubstantiated recolonization claims in the document.

Response: After coordination with GA DNR-CRD and the City of Tybee Island, the dredged sediment placement plan has been revised. New work sediments excavated from the entrance channel would now be deposited only in previously-approved areas: Offshore Dredged Material Disposal Site or an upland confined disposal site. The FEIS includes the revised sediment placement plan. Appendix B has been revised accordingly to reflect the exclusion of near shore placement of new work sediments. It should be noted that the USFWS concurred with the the Corps findings that the SHEP "may affect, but is not likely to adversely affect the Piping plover". The report of the USFWS is included in Appendix Z.

760APB-MR-76-EV48
Comment: *Section 8.02.3 (d) I. The word 'we' should be deleted.*

Response: The word "we" has been removed from the text in Section 8.02.3 (d) 1.

760APB-MR-76-EV49
Comment: *Section 8.02.4 (d). The document does not consider the effects that the larger ship traffic, that will result because of this project, may have on manatees. In its current form, the impacts section is inadequate to address potential impacts.*

Response: With deepening, the total number of vessels would decrease (when compared to without project conditions) as vessels would be able to load/unload without the present constraints of draft. Therefore, fewer ships would call on the port. Further, manatees are generally found in shallow water (<20 feet deep), whereas large ships are confined to the much deeper navigation channel. For these reasons, ship traffic is not expected to impact manatees any more than under existing conditions [worst case].

760APB-MR-76-EV50
Comment: *Page 136. The narrative does not discuss how the increase in boat traffic or deposition of material in the nearshore area of Tybee Island will affect loggerhead sea turtles. Failing to discuss all potential impacts suggests this analysis is inadequate.*

Response: With deepening, the total number of vessels would decrease (when compared to without project conditions), as vessels would be able to load/unload without the current constraints of draft.

Therefore, as fewer vessels would be calling on the Port of Savannah, shipping is not expected to impact sea turtles any more than under existing conditions [worst case].

After coordination with GA DNR-CRD, the dredged sediment placement plan has been revised. Material from the entrance channel would only be placed in previously-approved areas: Ocean Dredged Material Disposal Site or an existing upland confined disposal facility. Since no beach disposal will occur, sea turtle nesting activities would be unchanged from the status quo.

760APB-MR-76-EV51
Comment: *Page 148. Conservation Measures (a). 2nd Paragraph line 2. The document credits turtle deflecting dragheads with significantly minimizing the risk of sea turtle take. No references or sources have been cited to substantiate this claim. Since the avoidance of take claims stated later depend upon this assertion, the avoidance claims are not valid unless this claim is substantiated.*

Response: Appendix B has been changed as follows: Since its inception, turtle deflecting drag heads have been used on almost all hopper dredges operating in the South Atlantic. This device has significantly reduced the risk of sea turtle take (Nelson and Shafer 1996; Clausner et al. 2004; Dickerson et al. 2004).

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760APB-MR-76-EV52
Comment: *Page 154. A. 4. Are the dates correct? Will the observer only be onboard in December and March? The first paragraph of Section A states the dredging will occur from December through March. If an observer is only present for 2 of the 4 months, how will compliance with protocol be ensured?*

Response: The dates shown in paragraph A. 4 of Appendix B, Section 8.02.6 have been revised to state -- 1 December through 31 March. The text in the FEIS was corrected.

760APB-MR-76-EV53
Comment: *Page ISS. C. first paragraph, last sentence. An assessment in 1996 is not valid today due to changes in the endangered species list and in the environment. The areas should again be assessed for potential endangered species impacts.*

Response: The impacts of the SHEP on threatened and endangered species are fully addressed in the EIS. The USFWS has submitted a report on their findings with respect to those species for which they have responsibility, and the NMFS has submitted their BO. These documents are included in Appendix Z.

760APB-MR-76-EV54
Comment: *Section 8.02.7. Shortnose sturgeon and Atlantic sturgeon are grouped together for purposes of assessing impacts from the project. The narrative justifies the grouping due to their "similarities in habitat use, distribution throughout the proposed action area, foraging behavior and prey base, and subsequent risk of take relative to dredging and trawling operations ... " No citations or other reference information was provided to substantiate this decision to group the species. Other information provided in the appendix provides information that contradicts the claim that the species are similar enough to group together for impact assessment purposes. For example, on Page 170, last paragraph, the narrative states that Atlantic sturgeon primarily lead a marine existence and are therefore more likely to be impacted by hopper dredges than the more estuarine based shortnose sturgeon. The first sentence of the*

second paragraph on Page 174 also states that the habitat ranges for shortnose and Atlantic sturgeon are slightly different. In addition, the SRT 2007 report states that not all rivers that support Atlantic sturgeon, support shortnose sturgeon. This information again reiterates the differences between the two species, the need to assess them independently, and the shortcomings of an assessment that assesses them together.

Response: The Shortnose and Atlantic sturgeon are sufficiently similar to be considered together. This conclusion is based on their habitat use, distribution throughout the proposed action area, foraging behavior/prey base, and subsequent risk of take relative to dredging/trawling operations. Information on these species can be obtained from the following link and other sources. http://sero.nmfs.noaa.gov/pr/sturgeon.htm. See also other responses on this issue.

760APB-MR-76-EV55

Comment: *Page 157, 1st paragraph, Unsubstantiated claims are made throughout this paragraph without any reference materials, peer-reviewed or otherwise, cited.*

Response: The reference is (NMFS, 1998a) as stated at end of the paragraph. This document has gone through an agency technical review process and an independent external peer review**.**

760APB-MR-76-EV56

Comment: *Page 157, 2nd paragraph, specifically lines 1-7. Unsubstantiated claims are made throughout this paragraph without any reference materials, peer-reviewed or otherwise, cited.*

Response: References are provided throughout the paragraph, and as stated in the previous comment, the document has undergone the agency technical review process and an independent external peer review.

760APB-MR-76-EV57

Comment: *Page 160, present conditions, I sl paragraph. The use of 4.0 mg/l continues to be used in spite of the information provided by Collins et al. 2001 that mean DO levels in sturgeon habitat use areas were 6.45 and greater. The claim that prolonged exposure to low oxygen levels may not produce acute impacts to fish is unsubstantiated by any outside reference materials. This use of 4.0 mg/l is a minimum level at which the agencies determined shortnose sturgeon can survive, but does not necessarily indicate the dissolved oxygen level that is necessary for foraging, resting, and moving. The agency comments reported on page 128 #4, 2nd paragraph in Appendix N, again suggests the habitat modeling overrepresented the available habitat for sturgeon by denoting it all as equally beneficial at the minimum dissolved oxygen threshold and thus failed to quantify the intensity of the impact to the fisheries. In the Appendix N documentation, Prescott Brownell, from NMFS requested that a range of suitable habitat thresholds be used for modeling habitat availability. The agency panel then redacted his comments from the record without providing an adequate basis for the redaction. The panel decided the current methods were "acceptable for now." This comment would suggest that additional work would be necessary in the future in order to adequately asses the impacts. The narrative does not provide adequate discussion as to why the pass/fail approach was more adequate than the range approach suggested by Mr. Brownell.*

Response: The criteria, data, and model outputs presented in the EIS are sufficient to evaluate the impacts associated with each project alternative. The habitat suitability criteria used in the model runs were defined and agreed upon by the Cooperating Agencies and the Fisheries Interagency Coordination Team.

The second paragraph was based on previous discussions within the Shortnose Sturgeon section. A citation has been added to the 3rd paragraph referencing the Case Document/Environmental Assessment Application Number 200801520 for a Department of the Army Permit requested by the Georgia Ports Authority [U.S. Army Corps of Engineers, Savannah District, 2003]. The reference has been added to the literature cited section.

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760APB-MR-76-EV58
Comment: *Page 160, present conditions, paragraphs 2 and 3. Information provided is unsubstantiated by any outside reference materials and are therefore considered baseless for assessing impacts.*

Response: The second paragraph was based on previous discussions within the Shortnose Sturgeon section and the references previously cited (Secor and Gunderson, 1998, Niklitschek and Secor, 2000, and Flournoy et. al. 1992). The references have been cited in the text.

760APB-MR-76-EV59
Comment: *Page 164, threats, paragraph I, line 2. Information provided is unsubstantiated by any outside reference materials and are therefore considered baseless for assessing impacts.*

Response: A reference for information on Threats, Appendix B, Section 8.02.7 was added.

760APB-MR-76-EV60
Comment: *Page 170, Dredging methods and associated impacts, line 7. The SRT 2007 report states that habitat loss due to dredging is not just a short-term impact to foraging and refuge habitat. Atlantic sturgeon rely upon deep holes for refugia and are substrate dependent fish. If the bottom of the river is dredged to create an anoxic, uniform bottom without substrate diversity the effects on Atlantic sturgeon would be detrimental over a long-term period.*

Response: The original and deepened channel would have the same alignment and maintenance frequency. Therefore, the substrate diversity will remain essentially unchanged. Since the deepened channel would follow the existing alignment, no natural deep hole refugia [elsewhere within the estuary] would be physically altered. EIS-Sections 5.02 and Appendix C discuss the oxygenation system which would mitigate for reductions in dissolved oxygen levels.

760APB-MR-76-EV61
Comment: *Page 171, Section B, Line 4. What does fairly low mean? The impacts should be quantified and substantiated. Even a single take is not allowed under the ESA unless a permit has been issued.*

Response: Historically hydraulic [cutterhead] dredging has had very little effect on either adult or juvenile Shortnose sturgeon. In fact, there are only five documented cases [page 171] of this kind of take, and none occurred during dredging operations for Savannah Harbor. The NOAA Biological Opinion provides an acceptable number of takes of Shortnose sturgeon by this project.

760APB-MR-76-EV62

Comment: *Page 171, Section B, Lines 4-6 state that eggs and larval sturgeons 100 miles upstream where hydraulic dredges are proposed? Are hydraulic dredges proposed upstream from the project area? If not and the sentence is inaccurate it should be corrected. If it is intended to state that eggs and larval*

sturgeon are located 100 miles upstream from the project area and therefore are outside of the area where hydraulic dredges are being used it is inaccurate.

Response: It is generally agreed that Shortnose sturgeon larvae are not prevalent in the project effect's area (ATM, 2003). This is evidenced by the fact that no Shortnose sturgeon larvae were found during a 2-year investigation of the Savannah River estuary. A single Atlantic sturgeon larva was found at approximately RKM 41 during an ichthyoplankton study (Reinert et al. 1998), but the harbor is only maintained to RKM 34.3.

760APB-MR-76-EV63
Comment: *Page 160 of this document, first paragraph, last line, states that an Atlantic sturgeon larva was found 6.7 km (4 miles) upstream of the project impact area. This information suggests that some larva may drift into the project area. Additional information should be collected to verify the actual location of Atlantic sturgeon spawning to ensure the project dredging and upstream movement of salinity and decreases in DO will not deleteriously impact Atlantic Sturgeon.*

Response: In addition to existing information, an extensive monitoring study in the southeastern U.S. is being funded by NOAA on the Atlantic and Shortnose sturgeon. This effort began in the spring of 2011 and is scheduled to last for 5 years. The work in the Savannah River is being performed by SCDNR. http://www.nmfs.noaa.gov/pr/conservation/states/funded.htm. See also previous responses on this issue.
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760APB-MR-76-EV64
Comment: *Page 175. Indirect impacts. The impacts to refuge habitat are actually likely to be long·term impacts according to the SRT 2007 report. In addition, the loss of deep holes with sufficient levels of DO are likely to result in unavailable habitat in which sturgeon may be able to survive, but will not utilize due to inadequate levels of DO.*

Response: The proposed oxygen injection system would restore and marginally increase [post-project] dissolved oxygen levels in the estuary. Further, the hydrodynamic and water quality model studies gave no indication that after deepening low dissolved oxygen levels would preclude Shortnose sturgeon use of the Savannah River. In fact, the modeling indicates that Shortnose sturgeon habitat in the critical summer months would be improved.

760APB-MR-76-EV65
Comment: *Page 175. Benthic foraging, First paragraph, Line 7. Unsubstantiated claim about benthic recolonization.*

Response: The citation (EA, 2008) has been added.

760APB-MR-76-EV66
Comment: *Page 175. Benthic foraging, First paragraph, Line 8. Unsubstantiated claim without a reference cited.*

Response: A reference has been added to the subject section (Appendix B, Section 8.02.7.).

760APB-MR-76-EV67
Comment: *Page 175, Second paragraph, Lines 6 and 13. Unsubstantiated claim without a reference cited.*

Response: References are provided throughout the paragraph.

760APB-MR-76-EV68
Comment: *Page 176, Line 2. Unsubstantiated claim without a reference cited.*

Response: References are provided throughout the paragraph.

760APB-MR-76-EV69
Comment: *Page 176, Second paragraph, First sentence. Unsubstantiated claim without a reference cited.*

Response: References are provided throughout the paragraph.

760APB-MR-76-EV70
Comment: *Page 176, Second paragraph, Second and third sentences. A correlation between river flow and season does not equate to a correlation between natural community shifts and river flow rates. The logic is flawed in this assertion and it may not be accurate.*

Response: The referenced report (Ray, 1997) contains ample information regarding the correlation of benthic assemblages with flow- and seasonal variation.

760APB-MR-76-EV71
Comment: *Page 176. Impacts from cadmium-laden sediment. 200 paragraph. The text suggests that exposed clay would prohibit benthic recolonization. This statement contradicts earlier assertions that benthos would recolonize quickly.*

Response: There is nothing in the subject report to suggest that Miocene clays exposed after dredging would prohibit benthic colonization. The referenced paragraph merely states the rationale for evaluating potential impacts to benthic communities in areas with cadmium-containing clays. The report discusses benthic communities located in different substrate types [to include Miocene clays] that occur along length of the project. Benthic communities in the harbor/channel are routinely disturbed during dredging operations, but these opportunistic species quickly re-colonize the eroded sediments that are deposited on top of in situ material.

760APB-MR-76-EV72
Comment: *Page 177. First paragraph, lines 5-7 suggest that 28% of the substrate surface is a minor fraction of the system. 28% of the channel bottom is not minor.*

Response: Concur; a percentage of 28 [channel bottom clay particle fraction] is not minor. The referenced studies show bioaccumulation in organisms residing within high cadmium sediments are well below potential effect's levels.

760APB-MR-76-EV73

Comment: *Page 177. Section B. First line. The line claims extensive studies have been conducted, but cites none. Only two studies are included below and neither appears to deal directly with fishes that may be found in the Savannah River.*

Response: The references for the cited information are: Wilber and Clarke, 2001 and Newcombe and Jensen, 1996.

760APB-MR-76-EV74

Comment: *Page 177. Section B, Second paragraph, second sentence. Unsubstantiated claim without a reference cited.*

Response: The second sentence of the paragraph has been revised to add a reference to the EIS-Section 5.07.1- Dredging Impacts. Additional discussions can be found in Appendix B.

760APB-MR-76-EV75

Comment: *Page 179, second paragraph. Line 11 claims fish could use different habitat upstream in order to avoid increased salinity. The studies cited throughout the text and in literature cited by the text highlight the necessary use of estuarine habitats by shortnose and Atlantic sturgeon. Excluding these fish from the necessary habitats is a substantial impact that cannot be mitigated by the assumption that the fish can simply avoid saline habitats.*

Response: As noted in DEIS-Section 5.03.2, the Cooperating Agencies and the Fisheries Interagency Coordination Team could not identify measures [structural/nonstructural] within the estuary that would adequately restore Shortnose sturgeon habitat lost to SHEP construction impacts. As a result, the Team agreed [2007] that a fish bypass around the New Savannah Bluff Lock and Dam would compensate for losses within the estuary by providing access to 20 additional miles of upstream spawning/foraging habitat.

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760APB-MR-76-EV76

Comment: *Page 180. The document explains that since no additional habitat can be modified to make it suitable for sturgeon, the project can mitigate impacts by adding upstream habitats. The addition of upstream habitats may be beneficial for some of the life stages of sturgeon, but it is not a substitute for the necessary nursery areas that will be lost due to the project. There is no evidence to suggest the sturgeon will utilize or benefit from the upstream areas or that any benefits would mitigate deleterious impacts from the loss of estuarine habitats.*

Response: As noted in DEIS-Section 5.03.2 of the Draft EIS, the Cooperating Agencies and the Fisheries Interagency Coordination Team could not identify measures within the estuary that could completely restore Shortnose sturgeon habitat lost to SHEP construction impacts. As a result, the Team agreed [2007] that a fish bypass around the New Savannah Bluff Lock and Dam would compensate for losses within the estuary by providing access to 20 additional miles of upstream spawning/foraging habitat.

Page Appen. C-1

760APC-MR-25-EV01
Comment: *Section 2, Pages 1-5. Fails to discuss what steps were taken to avoid wetland and many other impacts described within Section 5 of the DEIS.*

Response: As indicated in Appendix C, "Mitigation Planning," the first step in avoiding wetland impacts was selection of the channel design. The project design maintains the existing side slopes and extends them downward, rather than maintaining the existing bottom width and extending the side slopes outward. The major effect of this decision is a reduction in the amount of dredging that would be required on the side slopes and removal of the need for a uniform increase in top width of the dredged channel. This minimizes impacts to adjacent high ground/structures located along the riverbank, including adjacent marsh fringe. The second step in avoiding and minimizing wetland impacts is implementation of flow alteration structures (see Appendix C). Without the flow alteration structures, approximately 1,177 acres of freshwater marsh would be converted [shifted] to a more brackish marsh community type. By implementing flow-altering measure 6A, this shift would be reduced to only 223 acres. Thus, flow rerouting plan 6A satisfies both avoidance and minimization conditions by sustaining 954 acres of freshwater marsh that otherwise would have experienced some degree of vegetative conversion.

760APC-MR-25-EV02
Comment: *Section 3, Page 9, Summary Table. States that salt marsh impacts would be - 15.68 acres. A negative impact suggests that there would be a net gain in salt marsh, which is not the case. In addition to the negative impact issue, the quantity of the impact does not match what is provided in Section 5 of the DEIS.*

Response: The negative value reported in the "Summary of Hydrodynamic Impacts" table reflects an acreage loss (excavation) or impact (vegetative shift) specific to that wetland type. FEIS-Section 5 has been updated to reflect a 15.68 acre loss of brackish marsh associated with direct project impacts [dredging activities].

760APC-MR-25-EV03
Comment: *Section 4, Page 11. This project should not result in a net loss of wetlands of any type. Preserving existing wetlands should not count as part of the mitigation unless a direct threat can be shown for each and every site.*

Response: While SHEP is a large project with national implications, its implementation [with the proposed mitigation] will result in a "no net loss of wetland functions". Indirect impacts associated with the proposed deepening have been minimized to a species shift [change in dominance] for up to 223 acres of freshwater marsh and 740 acres of saltmarsh. The District conducted a functional assessment for these impacted wetlands within the project effect's area based on salinity changes. The results of this evaluation demonstrated that the differentiation between salt- and brackish marsh [recommended by the Wetland Interagency Coordination Team for use in the EIS] was narrowly defined. The salinity range used in the SHEP model to differentiate between brackish marsh (0.6-4 ppt) and salt marsh (> 4ppt) was restrictive, given that brackish marsh salinities have been reported with a range from 0.5-10 ppt (NOAA, 2010) and in other estuarine systems from 0.5-17 ppt (Judd and Lonard, 2004). Thus, the salinity range used to quantify salt marsh in the area of potential effect (i.e., > 4 ppt) may over-estimate the amount of saltmarsh in the system and under-estimate the amount of brackish marsh.

Consequently, the actual shift of salt- to brackish marsh [post-construction] may be negligible, when taking into account observed species tolerances in wetland environments together with salinities commonly associated with a brackish marsh (i.e., range between 5 and 10 ppt).

Given the wide salinity ranges reported in literature for brackish marsh systems, the inherent variability in salinity that exists for all estuarine systems, and the modeling results that report post-deepening salinity concentrations consistent with the aforementioned range, it was concluded the 730-acre value [conversion of salt- to brackish marsh] may represent the worst case. Actual vegetative shifts are unlikely to be identifiable *in situ* within the project effect's area. Regardless, the District elected to use an inclusive [most conservative] approach in its assessment of project-related effects and incorporated the noted salt- and brackish marsh conversion value in its calculation of minor impacts.

The conversion of up to 223 acres of freshwater wetland to brackish marsh represents the only significant wetland conversion that is likely to be noticeable if the harbor is deepened to 47-feet . It is important to reiterate that the 223 acres of impact to freshwater wetlands would be a change rather than a loss. The District's calculation of the number of acres of freshwater wetland that have the potential to convert to brackish marsh is based on a shift in the location of 0.5 ppt salinity, a traditional rule-of-thumb for differentiating between freshwater marsh and brackish marsh. However, data reported in the literature for Savannah Harbor suggest that a shift in vegetation (from freshwater marsh to brackish marsh) in this estuary does not occur until salinity concentrations approach 2.5 ppt (Latham et al., 1994). Even at oligohaline marsh sites with average salinity concentration of 2.1 ppt, a discriminant function (DF) analysis revealed that only in 47% of cases was there a correct pairing of environmental variables with vegetative species composition and dominance. At those same oligohaline sites, 37% of the vegetative species composition and dominance were more closely aligned with a freshwater classification (Latham et al., 1994).

The District's salinity value that denotes a defined shift from freshwater to brackish marsh (i.e., 0.5 ppt) is approximately five times lower than traditionally seen with 100% vegetative shifts *in situ* within the Lower Savannah Watershed (Latham et al., 1994) and other coastal marsh systems in the southeastern United States (NOAA, 2010). Thus, many of the existing freshwater emergent plant species, and associated ecological parameters, would likely be sustained in areas predicted to experience salinity concentrations in the range of 2.5 ppt. For those areas that do transition to more brackish characteristics, traditional ecological functions associated with all emergent wetland systems would continue (see functional assessment response).

To ensure the indirect impacts are well characterized, the District adopted a post-construction monitoring plan to evaluate/quantify the degree of wetland conversion that actually occurs. In its Adaptive Management Program, the District also proposed acquisition/preservation of additional wetlands if monitoring demonstrates that wetland impacts were under-predicted.

The District has provided a functional assessment in the FEIS that objectively and quantitatively evaluates the functional losses due to excavation of wetlands and conversion of wetland types. In addition, Savannah District's Regulatory Standard Operating Procedure [SOP] was used to assess functional losses due to excavation of wetlands, as well as the conversion of wetland types that may occur as a result of the SHEP. The Wetland ICT concurred with use of the SOP to quantify impacts and the associated mitigation.

In summer 2003, a Wetland Interagency Coordination Team (ICT) was assembled to assist in analyzing potential wetland impacts from the SHEP. The team [agency wetland experts from US EPA, USFWS,

NMFS, GA DNR, SC DNR, and SC DHEC] identified an acceptable technical approach to determine wetland impacts. They also identified their information needs to review the EIS. Since creation of the team, the District hosted seven meetings of the ICT. During those meetings, methods for evaluating functional losses and mitigation alternatives for wetland impacts were proposed and discussed at length. After every meeting, the District prepared a Memorandum for Record (MFR), which was provided to all members of the ICT.

The Corps conducted an Agency Technical Review (ATR) to assess the use of Savannah District's SOP as a tool in the development of a mitigation plan for SHEP. The ATR was lead by the National Deep-Draft Navigation Planning Center of Expertise. Actual analysis was performed by experts at the Corps' Engineering Research and Development Center in Vicksburg, MS. The ATR sought to determine if the SOP was an appropriate method to ascertain the preservation acreage needed to compensate for impacts resulting from the SHEP. The ATR also evaluated the assumptions and calculations that the Savannah District used in applying the SOP for the SHEP. The SOP was used to determine the amount of preservation acreage necessary to offset the remaining impacts ONLY after avoidance, minimization, and restoration measures had been applied. After extended deliberation, the ATR concurred with using the SOP to determine the amount of preservation acreage needed. Moreover, it considered the Savannah District's application of the SOP to be reasonable in quantifying impacts together with the associated mitigation that would be required.

A USFWS Fish and Wildlife Coordination Act Report, dated August 2010 concurred with use of the SOP, which calculated a need to preserve 2,245 acres in parcels adjacent to the SNWR . The Service provided updates to the SOP calculations in Appendix A of the report. The District concurred with use of the updated SOP worksheets and adopted the results of those calculations for use in the EIS. In its Adaptive Management Program, the District also proposed acquisition of additional wetlands if monitoring demonstrates that wetland impacts were under-predicted.

As detailed in other response sections and the EIS, deepening the harbor to a 47-foot depth would result in a conversion of the dominant vegetative species typically observed in up to 223 acres of freshwater marsh [freshwater to brackish marsh scenario]. Likewise, the 47-foot depth would convert the dominant vegetative species typically observed in 740 acres of saltmarsh [saltmarsh to brackish marsh scenario]. Nonetheless, dominant saltmarsh species like *Spartina alterniflora* would still be observed in areas which have salinities that define a brackish marsh. However, the basic wetland functions typically associated with these systems would not be materially changed. A comparison of potential changes in elements of wetland function for both conversion scenarios is provided below.

Changes in Wetland Function as a Result of Wetland Conversion

Elements of Wetland Function	Freshwater to Brackish Marsh (Approximately 223 acres)	Saltmarsh to Brackish Marsh (Approximately 740 acres)
Water Purification	Negligible	Negligible
Flood Protection	Negligible	Negligible
Shoreline Stabilization	Negligible	Negligible
Groundwater Recharge	Negligible	Negligible
Streamflow Maintenance	Negligible	Negligible
Retention of Particles	Negligible	Negligible
Surface Water Storage	Negligible	Negligible
Subsurface Storage	Negligible	Negligible
Nutrient Cycling	Negligible	Negligible
Values to Society	Negligible	Negligible
Fish and Wildlife Habitat	Minor Adverse	Negligible

As illustrated above, the only indirect effect the 47-foot project would have on the function of these wetlands systems would be associated with fish and wildlife habitat. All other elements of wetland function associated with predicted shifts in wetlands classification would be negligible as a result of the anticipated increase in salinity. Areas of the Savannah Harbor identified as saltmarsh or brackish marsh support similar fish and wildlife species. Any anticipated conversion of saltmarsh to a brackish marsh system would have a negligible impact on the overall function of the wetland system. The District recognizes that a comparison of fish and wildlife habitat between freshwater and brackish marsh systems yields fewer similarities. However, the conversion in fish and wildlife habitat would still be minor when considering the total wetland function. Post-project there would also be some freshwater vegetation in areas now categorized as brackish marsh.

The proposed preservation of up to 2,245 acres consists of bottomland hardwoods, maritime forest, and uplands dominated by deciduous forest and re-growth. The bottomland hardwoods are classified as palustrine, forested, broad-leaved deciduous systems that are both temporarily and seasonally flooded. Preserving these areas would ensure their wildlife habitat is protected in perpetuity. Moreover, the additional lands would buffer the SNWR from future threats of development, i.e., changes in land use would not occur immediately adjacent to existing areas of the Refuge containing emergent wetlands. Thus, the acquisition and preservation of up to 2,245 acres of wetland and upland buffer provides a functional replacement for the minor conversion of the only wetland function [i.e., fish and wildlife habitat] that would be expected as a result of the 223 acre freshwater to brackish marsh conversion [See Table 1]. In conclusion, the District has determined that the functional assessment conducted for all wetland areas proposed for impact and mitigation satisfies the no-net-loss of function criterion.

The harbor deepening project would require the excavation of 15.68 acres of brackish marsh [after implementation of all possible avoidance and minimization measures]. These marsh areas are subject to periodic flooding as a result of daily tides. Their vegetative communities are a monoculture of smooth cordgrass [Spartina alterniflora] . Approximately 7.3 acres (47%) of the total brackish marsh acreage to be excavated is subject to the wave action of passing ships. As a result of this perturbation, these areas exhibit vegetation densities which are significantly less than typically observed in this community type.

Patches of bare, course-grain sand and mudflat are integrated throughout the patches of *Spartina alterniflora* in these locations. Given the sparse presence of vegetation, it would appear that these areas are challenged, somewhat degraded, and do not possess the same degree of primary productivity as observed in robust, densely-vegetated, saltmarsh systems located elsewhere in coastal Georgia.

Mitigation of the 15.68 acres would be accomplished by restoring approximately 29 acres of brackish marsh. The District used its Regulatory SOP to determine the exact number of acres that would be required for restoration [See Appendix A at the end of the Mitigation Appendix].

Historically, the District's Regulatory Division and members of the Interagency Review Team (IRT), which includes USEPA, USFWS, NMFS, and GADNR representatives, have authorized the creation of saltmarsh as mitigation to offset permitted projects located in this coastal habitat type. The table below identifies five projects in Chatham County where saltmarsh creation was used as mitigation. Typically, a ratio of 2 acres created to 1 acre impacted has been used.

Projects impacting Saltmarsh and the Associated Saltmarsh Mitigation

Project Name	USACE File Number	Saltmarsh Impacts (Acres)	Saltmarsh Creation (Acres)
Slip One- Hutchinson Island	200501453	0.28	0.56
Hardin Canal Drainage	200600393	0.27	0.54
Skidaway Narrows Emergency Access	200600909	0.56	0.56
Skidaway Road Drainage Improvements	200601249	0.52	0.75
SLNG-Slip Construction	200200640	3.24	7.5

The proposed restoration of 28.75 acres of brackish marsh as mitigation for SHEP impacts to 15.68 acres would be a ratio of 1.8:1 [acres restored to acres impacted]. The ratio is roughly the same as for other [previous/similar] authorized projects that impact saltmarsh. The District's SOP confirmed this value, given the area of impact and the subject marsh's current function/integrity.

In support of this site-specific mitigation, it is important to note that the 42 acres of contiguous, restored brackish marsh would include construction of tidal creeks creating edge effect which will have more ecological value than the marsh proposed for excavation. Furthermore, the proposed mitigation site is non-segmented, located "in basin" [north of the Federal Navigation Channel], and incorporates a strip of trees to separate it from the harbor; all factors which makes it an ideal mitigation option for replacing the impacted marsh acreage.

Finally, this mitigation alternative was selected after consideration of the 2008 Final Mitigation Rule. Presently, there are no mitigation banks in coastal Georgia that are approved to sell saltmarsh or brackish marsh credits. Additionally, the In-Lieu Fee program has not been updated or approved by the District and Interagency Review Team (IRT) to provide compensation for impacts to saltmarsh or brackish marsh. Thus, site-specific mitigation represents the only course of action for mitigating impacts to the subject 15.68 acres of brackish marsh. Adaptive management would require planting *Spartina alterniflora* if the site does naturally re-vegetate at colonization rates indicated in Table 5-2 of the FEIS. Annual monitoring reports would be prepared for seven years and provided to a Wetland Interagency Coordination Team (ICT). If the restoration site does not meet the success criteria illustrated in Table 5-

2, the ICT would recommend corrective actions [e.g., new planting requirements, increased sprig densities, etc.] to achieve compliance with the reported values in Table 5-2. The need for corrective action(s) would be determined and/or implemented annually with agency involvement and concurrence. If at the end ofseven years the plant density at the restored marsh is not within 10% of the reference site, the ICT would be consulted for a determination on how to proceed [see updated Appendix C-Mitigation Planning]. The District has determined that the functional assessment [conducted for all brackish marsh areas proposed for direct impact and mitigation] satisfies the no functional net loss criterion.

760APC-MR-25-EV04

Comment: *Section 4, Page 15, 2nd Paragraph. Flow rerouting was proposed as a method to reduce the impacts to freshwater marshes, but what are the direct and indirect impacts associated with the planned alternatives? Deepening existing cuts should be considered an impact to subaqueous bottoms. Filling cuts should be considered a fill of subaqueous bottoms and potentially a fill of intertidal wetlands adjacent to the open water. These impacts should be determined and enumerated. These impacts should be mitigated as part of this project.*

Response: The measures to reduce impacts to freshwater marshes were extensively investigated by the District and subsequently coordinated with its state/federal resource agency partners. The various team representatives from these resource agencies reached consensus regarding the proposed mitigation options. The direct effects of constructing the flow rerouting features was considered in the Section 404(b)(1) Evaluation.

760APC-MR-25-EV05

Comment: *Section 4, Page 30, 7th Paragraph. States "the Contractor shall provide an Environmental Monitoring Plan for the job site, including land, water, air, and noise monitoring. Special emphasis shall be provided for the monitoring of wildlife resources (manatees and marine mammals)." What about other wildlife resources (i.e. shortnose sturgeon)?*

Response: The FEIS and BATES include protective measures for Shortnose sturgeon that the Corps would use if blasting is used to remove the Tidegate structure. If blasting is required to remove the Tidegate end walls, the Corps would coordinate blasting plans with the NMFS and the USFWS.

760APC-MR-25-EV06

Comment: *Section 4, Page 31, 1st Paragraph. Monitoring periods for manatee before after the blast should be lengthened.*

Response: The criteria indicated in Appendix C are sufficient to protect the manatee. However, as stated in the previous response, the Corps would re-coordinate any proposed blasting plans with the NMFS and the USFWS.

760APC-MR-25-EV07

Comment: *Section 4, Page 32, 3rd Paragraph. The paragraph states that if a manatee or marine mammal is injured or killed during blasting, all blasting operations shall be suspended and shall not resume until the contractor obtains written permission from the Contracting Officer. The District will coordinate the take with the NMFS to determine the appropriate course of action." What preparations will be in place to save any manatee or marine mammal wounded during the blast?*

Response: Measures to save injured manatees would be coordinated with NMFS.

760APC-MR-25-EV08

Comment: *Section 4, Page 33, 2nd Paragraph. The paragraph states that the Marsh Succession Models were not ultimately used to evaluate the mitigation proposals. If this model was used to predict the impacts, the same model should be used to predict the benefits of the mitigation proposals. How was the wetland mitigation alternatives evaluated to confirm that the freshwater wetland impacts would be reduced from 1,212 acres to 337 acres without the use of the model?*

Response: The Marsh Succession Model and EFDC models were designed to identify the extent of marsh conversion expected to occur with each SHEP depth alternative. The District also conducted a functional assessment for wetland areas that would be affected [directly/indirectly] by each project alternative, including the magnitude of impact. The proposed mitigation sites were also functionally assessed. The results of all these studies unequivocally concluded that all SHEP impacts have been appropriately mitigated and just as importantly there would be no net loss of wetland function. Appendix C – Mitigation Planning, Section VII has been updated to provide this information.

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760APC-MR-25-EV09

Comment: *Section 5, Page 49, 1st Paragraph. The paragraph states that the proposed restoration site is currently "high ground." Has a wetland delineation been confirmed for the proposed site to determine how much of the site is currently a wetland and how much is non-wetland? Portions of the site which are currently a wetland under normal conditions (the site was last fined at least 20 years ago) should not be included within the proposed restoration acreage. If wetlands exist within the proposed restoration area and were counted as part of the restoration acreage, then the proposed wetland restoration acreage should be reduced accordingly.*

Response: Prior to starting any restoration activities at Disposal Area 1S, the District would survey the entire site [approximately 45 acres overall] to document the extent to which it is currently vegetated with brackish and saltmarsh species. Portions that are dominated by marsh vegetation [fringes] would not be subject to grading. The early site investigations revealed an interior parcel [approximately 42 acres] that can easily be graded/contoured to restore 40.3 acres of saltmarsh habitat - an amount that would more than satisfy the compensatory mitigation needs for direct impacts to the 15.68 acres lost to excavation. The restoration includes a stipulation [part of the adaptive management plan] which would require planting juvenile *Spartina alterniflora* plants if the site does not revegetate naturally at the rate of colonization indicated in Table 5-2 of the FEIS. Annual monitoring reports would be generated over a period of seven years and provided to a Wetland Interagency Coordination Team (ICT). If the restored marsh does not meet the success criteria illustrated in Table 5-2, the ICT would identify and/or recommend corrective actions. These would include modifying planting techniques, equipment requirements, sprig densities, regarding, filing, or other tested measures which would achieve compliance with the mandated percentages [Table 5-2]. If the restored marsh still does not meet the success criteria, then the ICT would continue to identify and/or make recommend corrective actions. The need for corrective action(s) would be determined and/or implemented annually with agency involvement and concurrence. If at the end of seven years the plant density at the restored marsh is not within 10% of the reference site, the ICT would be consulted for a determination on how to proceed (see updated Appendix C-Mitigation Planning).

760APC-MR-25-EV10

Comment: *Section 5, Page 49, 2nd Paragraph. How will the proposed restoration site be protected from invasive species such as Phragmites australis if left to revegetate naturally?*

Response: Table 39 in Appendix Cspecifies the criteria which will be used to determine if wetland growth in Disposal Site 1S is occurring at an acceptable rate. The plan has been revised to include monitoring for invasive species [especially common reed and Chinese tallow tree] together with measures to control such species should they prove problematic.

It is unlikely that invasive species like *Phragmites australis* would extensively colonize the restoration site given the density of *Spartina alterniflora* seed stock in its immediate vicinity. Likewise, the salinity range in the surrounding area is conducive to supporting lush growth of *Spartina alterniflora*. The development of the restored marsh would also include an adaptive management plan, which would require the planting of juvenile *Spartina alterniflora* plants if the site does not naturally revegetate with the rate of colonization indicated in FEIS-Table 5-2. The plan would also include measures for removal of invasive species. Annual monitoring reports would be generated and provided to a Wetland Interagency Coordination Team (ICT). If the restored marsh does not meet the noted success criteria, the ICT would identify corrective actions, including altering planting requirements and associated sprig densities. The need for corrective action(s) would be determined and/or implemented annually with agency involvement and concurrence. If at the end of seven years the plant density at the restored marsh is not within 10% of the reference site, the ICT would be consulted for a determination on how to proceed (Please see updated Appendix C-Mitigation Planning).

760APC-MR-25-EV11

Comment: *Section 5, Page 53, 2nd Table. The table indicates that 730 acres of saltmarsh will be impacted by the project. However, the 3rd paragraph on page 110 indicates that the impacts are to brackish marshes. Both cannot be correct.*

Response: This comment actually references Appendix C rather than Section 5. Appendix C has been modified to reflect that approximately 740 acres of saltmarsh would be converted to a brackish marsh.

760APC-MR-25-EV12

Comment: *Section 5, Page 53, 2nd Table. What method was used to determine the location and quantity of impacts to brackish or saltmarsh (see previous comment)? This method should be discussed in the document and the location and quantity of impacts at each location should be made available for public review.*

Response: The method to determine the quantity of impacts to freshwater and saltmarsh species is described in Section 5 (Section 5.01.2). A figure has been added to show the acres of freshwater tidal marsh expected to undergo species shifts, and detailed information about the location and acres of expected impacts for all habitat types are included in Appendix C of the EIS and the Supplemental Materials of the Engineering Appendix of the GRR.

760APC-MR-25-EV13

Comment: *Section 5, Page 53, 2nd Table. The document clearly states that the natural resource agencies in Georgia require that "acceptable mitigation should consist of at least 50 percent restoration." If the impacts are actually to saltmarsh, then the proposed restoration is out-of-kind restoration. Is this acceptable to the State?*

Response: The SHEP has received Section 401 Water Quality Certification and Coastal Zone Management Consistency from the State of Georgia. Therefore, the proposed mitigation for wetland impacts is acceptable to the State of Georgia. Additionally, the District provided all reviewers a functional assessment to determine the wetland areas directly/indirectly affected by the project together with an analysis of the magnitude of this impact. The proposed mitigation sites have been carefully evaluated. The results of these assessments verify that the proposed impacts are mitigated appropriately and overall there would be no net loss of wetlands function. See also Appendix C, VII Consideration of 2008 USEPA/USACE Mitigation Rule, which addresses the broad definition of in-kind as applied to tidal marsh.

760APC-MR-25-EV14

Comment: *Section 5, Page 53, 1st Paragraph. How are the flow altering methods restoring 1,068 acres of brackish marsh? The mitigation plan details how these methods would reduce the impacts to freshwater wetlands, but makes no mention of how these methods also perform brackish marsh restoration. As mentioned in a previous comment, the proposed flow altering features would actually result in impacts themselves. The plans involve filling subaqueous bottoms, dredging subaqueous bottoms, and potential filling of intertidal wetlands adjacent to plugs and weirs. The document should clearly indicate how it was determined that these flow altering plans actually restore impacted marshland. The location of the proposed restoration areas should be included in the document and made available for public review. The restoration areas should be monitored as part of the mitigation plan.*

Response: Section 5 describes how the District's SOP was used to derive the credit values assigned to both wetland impacts and wetland mitigation scenarios. The wetland restoration value is actually a composite of the vegetative conversion from freshwater marsh to brackish marsh (i.e., 223 acres) and saltmarsh to brackish marsh (740 acres). When these two values are summed together, the resulting acreage of emergent wetland (presented in Appendix C as 964 acres) is more closely aligned with brackish marsh. Post-construction, the District would establish 12 monitoring sites to examine vegetative shifting in the transitional areas.

USACE characterized the emergent wetland areas that are subject to vegetative conversion as a result of the harbor deepening. This information, coupled with the modeling results, were used in quantifying indirect impacts to freshwater and saltmarsh. During the project's pre-construction phase, these areas would be further examined [one year]. Monitoring of marsh vegetation would also occur during the three-six year period of construction and post-construction. For this period of time [up to 15 years], the subject marsh sites would be characterized with respect to vegetation composition. Tidal sample stations installed at these marsh sites would record water surface elevation, specific conductance of surface waters that flood the marsh and its root zone, and water depth on a regular basis. The recorded data would be downloaded monthly. The USGS Florida Fish and Wildlife Cooperative Research Unit is expected to perform this work [via SHEP funding].

760APC-MR-25-EV15

Comment: *Section 5, Page 69, 1St Paragraph. The agencies could not determine any impact that could restore or enhance sturgeon habitats. The proposed project will undoubtedly result in a take of the endangered shortnose sturgeon and the candidate Atlantic sturgeon which is proposed to be listed as endangered. As a part of the Endangered Species Act, the project would likely need to receive an incidental take permit. If an incidental take permit was issued, the USACE would be required to submit a habitat conservation plan. The habitat conservation plan would have to address the likely impacts of the*

project, steps the USACE will take to minimize and mitigate the impact, alternative considered and why the USACE did not pursue them further.

Response: As discussed in a previous response, the NMFS has prepared a BO which includes incidental take statements for both the Shortnose and Atlantic sturgeon including any project requirements. The BO is included in Appendix Z.

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760APC-MR-25-EV16

Comment: *Section 5, Page 69, 2nd and 3rd Paragraphs. The USACE proposes the installation of a fish passage structure around the New Savannah Bluff Lock and Dam (NSBLD) in order to provide additional available habitat to the shortnose sturgeon. However, the DEIS hasn't provided any assurances that shortnose sturgeon historically used the habitat upstream of the NSBLD, that the shortnose sturgeon can and would navigate the fish passage structure, or that, even if sturgeon had historically used the habitat, the habitat above the NSBLD is currently of the quality that would provide benefits to sturgeon. Of important note, the proposed listing rule for Atlantic sturgeon states that measures "such as fish passage have not proven beneficial to Atlantic sturgeon, as they do not regularly use existing fish passage devices, which are generally designed to pass pelagic fish. To date, only four Atlantic sturgeon have been documented to have passed via a fish lift." Thus, there is no indication that the fish passage structure would adequately mitigate for the inevitable hann caused to shortnose sturgeon.*

Response: The use of the Savannah River above the NSBL&D as spawning habitat for various species of anadromous fish including Shortnose and Atlantic sturgeon prior to mainstream dam construction is well-documented. Additional information has been added to the FEIS concerning the suitability of potential spawning habitat above NSBL&D.

The use of fish passage structures has a long/successful history. In the upper mid-west U.S., the Lake sturgeon has been observed passing both constructed and natural rapids covering an entire river width. Some of these observations were at lesser water depths than are proposed (3.5 to 5.5 feet) for the fish passage at the New Savannah Bluff Lock and Dam (Aadland 2010). The Lake sturgeon is a larger species than the Shortnose so physical transit of the latter should not pose a problem.

The DEIS proposed a horseshoe rock ramp design as the fish passage structure to be constructed at NSBL&D to mitigate for Shortnose sturgeon habitat that would be lost in the lower Savannah River because of construction of the SHEP. However, based on comments received on that design during coordination of the DEIS, the Corps conducted a workshop in April 2011 to further evaluate potential fish passage structures that could be constructed at NSBL&D. As a result of that workshop and further coordination with the resource agencies, the off-channel rock ramp design is the proposed fish passage structure. As stated in the BO, the goal of the fish passage alternative is to achieve at least 75 percent upstream passage effectiveness for both Shortnose and Atlantic sturgeon, at least 85 percent downstream passage effectiveness, and cause no serious injury to sturgeon that come into contact with the passage or dam structures. It should be noted that the NMFS supports construction of this fish passage structure at NSBL&D. It should also be noted that construction of this fish passage structure at the NSBL&D is one of the reasonable and prudent measures outlined in the BO.

Post-project, the District will monitor the passage of Shortnose sturgeon through the structure to ensure it performs successfully (Appendix D). If passage does not meet expectations, fish passage could

be improved by (1) altering flows in the fish bypass to improve attraction/passage, or (2) modifying the fish passage rock ramp.

760APC-MR-25-EV17

Comment: *Section 5, Page 98, 1 st Parab1faph. Neither the DEIS or this document provide any documentation that shortnose sturgeon used habitat above the NSBLD or that the availability of this habitat would adequately compensate for the lost habitat that is used by sturgeon during different seasons and during different life stages than more upstream habitats.*

Response: As noted in DEIS-Section 5.03.2, the Cooperating Agencies and the Fisheries Interagency Coordination Team could not identify measures [structural/nonstructural] within the estuary that would adequately restore Shortnose sturgeon habitat lost to SHEP construction. As a result, the Team agreed [2007] that a fish bypass around the New Savannah Bluff Lock and Dam would compensate for losses within the estuary by providing access to 20 additional miles of upstream spawning/foraging habitat. As stated in a previous response, the NMFS who has responsibility for the protection and recovery of Shortnose sturgeon is supportive of this mitigation feature, and its construction is a requirement of the BO issued for the project.

760APC-MR-25-EV18

Comment: *Section 5, Page 99, I st Paragraph. The appendix states that the agencies noted the fish passage structure was the only method that could effectively compensate for the predicted loss in sturgeon habitats. On the contrary, the agencies didn't appear to state that the fish passage structure would effective compensate for impacts. The agencies seemed to state that they could not think of any other compensation in the estuary and that the fish passage structure was the only mitigation measure that had been proposed that may provide some compensation. In the documentation provided in the agency correspondence appendix, the agencies did not mention that the fish passage structure would effective compensate for the predicted loss in sturgeon habitats.*

Response: After a great deal of deliberation, the fish passage at New Savannah Bluff Lock and Dam was judged to be the best means to mitigate for loss of sturgeon habitat. NOAA concurred that the bypass would provide suitable mitigation for SNS impacts in their Biological Opinion. Post-construction, the District would monitor passage of Shortnose sturgeon through the structure to ensure it performs as intended (Appendix D).

760APC-MR-25-EV19

Comment: *Section 5, Page 99, 2nd Paragraph. What if the fish passage structure is paid for by other funding and cannot be used by this project as mitigation? No other mitigation has been proposed. This constitutes a substantial risk that should be addressed.*

Response: The property on which the fish passage would be constructed is primarily owned by the Corps of Engineers. Use of additional property would be necessary for access. Since it would be essential to SHEP mitigation, the property would not be used for any other purpose.

Page Appen. C-4

760APC-MR-25-EV20

Comment: *Section 5, Page 103, 2nd Paragraph. The calculation of costs needed for the stocking program appears to be flawed and may underrepresent the actual amount of costs needed for the stocking program. The cost determination assumes that the start-up of the hatchery is directly proportional to the amount of fish that would be produced i.e., that only a percentage of the $3.1 million initial expense is required to get the stocking program underway. Has the GA DNR·WRD provided information to verify that the percentage assumption provides an adequate amount of payment for stocking? There are probably economies of scale that would preclude the direct ratio apportionment proposed by the Corps.*

Response: The GA DNR-WRD's DEIS comment letter [January 24, 2011] did not dispute the costs indicated in Appendix C.

760APC-MR-25-EV21

Comment: *Section 9, Page 114, Monitoring shortnose sturgeon distribution. Both shortnose and Atlantic sturgeon should be monitored given their respective status under the Endangered Species Act and the take of these species that will occur as a result of this project. Monitoring should include distribution as well as abundance determinations. Monitoring that does not include abundance information will not provide adequate information to determine if the project is resulting in population decreases.*

Response: Issues/concerns about monitoring the Atlantic sturgeon did not surface during the development of the mitigation plan; however, if it is subsequently listed as a federally endangered species, the District would reevaluate potential project impacts to the species. As discussed in a previous response, monitoring of the passage of Atlantic sturgeon at the fish passage structure at NSBL&D will be conducted as required by the BO.

760APC-MR-25-EV22

Comment: *Section 9, Page 114, Monitoring fish passage at NSBLD. What would result if sturgeon do not use the fish passage structure? Adequate mitigation would not be provided.*

Response: The use of fish passage structures has a long/successful history. In the upper mid-west US, the Lake sturgeon has been observed passing both constructed and natural rapids covering an entire river width. Some of these observations were at lesser water depths than are proposed (3.5 to 5.5 feet) for the fish passage at the New Savannah Bluff Lock and Dam (Aadland 2010). Lake sturgeon is a larger species than the Shortnose so physical transit of the latter should not pose a problem. Adaptive management, attraction flow measures, cost estimates/commitments, and monitoring are described in detail in Appendix D. Post-project, the District would monitor the passage of Shortnose sturgeon through the structure to ensure it performs successfully (Appendix D). If passage does not meet expectations, fish passage could be improved by (1) altering flows in the fish bypass to improve attraction/passage, or (2) modifying the fish passage rock ramp (Appendix D).

760APC-MR-25-EV23

Comment: *Appendix A, Page 149, 2nd Table. The table indicates that a value of 0.3 was used for the threat category for the preservation sites. The document fails to justify the use of this elevated value. The second-to-last paragraph on page 123 indicates that "adjacent lands" are being logged and/or developed for residential use. The document does not indicate that these lands are directly adjacent to the tidal wetlands proposed for preservation or speaks of how these lands (if developed and/or logged) will directly affect the proposed preservation area. The document itself indicates that the threat must be demonstrable and it fails to do so. A value of 0, for no threat, or 0.1, for low threat, should be used in the preservation worksheet or the document should be revised to demonstrate how the proposed preservation areas, are themselves, at a moderate level of threat. A lower threat value would require that additional land be acquired for preservation.*

Response: The District consulted with the USFWS to obtain the latest information on the location of properties that the Refuge seeks to acquire/preserve to expand the SNWR's boundaries. Priority would be given to acquisition of large bottomland hardwood tracts located at higher elevations in the estuary that would not be affected by the proposed harbor deepening. Sites that are presently government-owned or which possess a conservation easement would not be considered. The District evaluated the proposed preservation mitigation [sites] using the five criteria identified in the 2008 Mitigation Rule. Specifically, 33 CFR 332 (h) (1) (i-v) states, "*Preservation may be used to provide compensatory mitigation for activities authorized by DA [permits] when all the following criteria are met: (i) The resources to be preserved provide important physical, chemical or biological functions for the watershed; (ii) The resources to be preserved contribute significantly to the ecological sustainability of the watershed. In determining the contribution of those resources to the ecological sustainability of the watershed, the district engineer must use appropriate quantitative assessment tools, where available; (iii) Preservation is determined by the district engineer to be appropriate and practicable; (iv) The resources are under threat of destruction or adverse modifications; and (v) The preserved site will be permanently protected through an appropriate real estate or other legal instrument (e.g., easement, title transfer to state resource agency or land trust).*"

Based on our analysis and coordination with the natural resource agencies that participated in the ICT, the District has:

(i) concluded that the preserved lands must provide important physical, chemical and biological functions for the SNWR , the Savannah Harbor, and the Lower Savannah Watershed [see response to request for Functional Assessment]; and

(ii) the preserved lands must contribute to the sustainability of the watershed by ensuring the functions of bottomland hardwood wetlands on these properties are sustained in perpetuity and the SNWR would be protected with a significant area of land that will function as a buffer in perpetuity. The preservation tracts would also enhance lands already within the SNWR by functioning as a buffer; and

(iii) for the reasons identified in (i) and (ii), the District Engineer has determined that preservation of these 2,245 acres is appropriate and practicable; and

(iv) The District as well as regional planning entities forecast that the Savannah Harbor and areas surrounding the SNWR will continue to experience population growth, industrial/commercial development, and changes in land use. In addition to the industrial developments that have been permitted by the District in recent years, the US Geological Survey, Water Science Center (GaWSC)

commented on the large number of industrial facilities and associated impacts that are anticipated on lands in close proximity to the Georgia Ports Authority and the SNWR. Preservation of the 2,245 acres ensures aquatic resources on the associated properties will be protected in perpetuity. The preserved land would provide additional buffer so that any future development in the vicinity would not result in a secondary and/or indirect impact to existing Refuge lands. There is also a threat that subtle changes in adjacent land use would also have a detrimental impact on the SNWR. For example, a Public Notice published by the Charleston District, Corps of Engineers on September 28, 2009 requested comment on a proposal from a private landowner to alter the hydrology within a relict rice impoundment [485 acres] via diversion of tidal flows. The entire property [693 acres] would then be used as a mitigation bank. Presently, this parcel provides stop-over benefits to migratory waterfowl similar to those provided by Refuge lands. Conversion to saltmarsh lessens its waterfowl potential and potentially results in crowding on adjacent preferred habitat. There is the immediate implication that birds could shorten their stay in the area and result in the populations that the Refuge currently serves resuming their migration with less rest. The expected effects of the proposed regulatory action on the SNWR have not been quantified, but the proposed project is an example of the continued threat that manipulation of adjacent lands poses to the SNWR and the resources it protects/fosters. Acquisition and preservation of the proposed 2245 acres as mitigation for SHEP would provide additional buffer and protection from this type of activities. The mitigation lands will include a restrictive covenant/conservation easement with subsequent conveyance to the USFWS.

When reviewing the preservation worksheet and the "Degree of Threat" factor, it is important to note that the District did not use the highest value [i.e., 0.5] available for this calculation. Use of the "High" Degree of Threat value would have resulted in a greater "Sum of m Factors" calculation, which, in turn, would have ultimately reduced the required preservation acreage that was needed. Alternatively, the District chose to describe the Degree of Threat as "Moderate" which more accurately [but conservatively] reflects the current trends in the vicinity of the SNWR.

Although the "Degree of Threat" factor was defined as "Moderate", the District, USFWS, and other entities anticipate that the Savannah Harbor and areas in the vicinity of the SNWR will continue to experience population growth, industrial/commercial development, and changes in land use. The District evaluated development trends within five miles of the Savannah National Wildlife Refuge for the last 15 years. In those 15 years, authorization of approximately 170 regulatory permits has resulted in more than 230 acres of wetland impacts. In recent years, several industrial developments have been constructed in the vicinity of the SNWR, e.g., a Target distribution facility was constructed three years ago which converted approximately 42 acres of pristine, maritime forest and wetland.

The other Federal and State natural resource agencies did not disagree with the "Degree of Threat" factor used in the SOP calculations when they commented on the Fish and Wildlife Coordination Act Report. The District believes the use of 0.3 as a "Degree of Threat" factor is justified and satisfies the requirements for using preservation as mitigation [as defined in the 2008 Mitigation Rule].

760APC-MR-25-EV24

Comment: *Appendix A, Page 149, 2nd Table. The table indicates that the values for in-kind and out-of-kind replacement are 0.6 and 0.2, respectively. The previous table indicates that these are the only options available for use within the preservation worksheet. However, a value of 0.4 was used within the preservation worksheet. If there are uplands included within the preservation area (as page 123 indicates there are), their acreage should be excluded from the preservation total, or at least included as out-of-kind replacement. The preservation worksheet should be updated and the required acreage purchased as compensation for the project should be adjusted accordingly.*

Response: The District provided a functional assessment in the FEIS that objectively and quantitatively evaluates the functional losses due to excavation of wetlands and conversion of wetland types. Savannah District's Regulatory Standard Operating Procedure [SOP] similarly evaluated the same functional losses and wetland type conversion [post-construction]. The Wetland ICT concurred with use of the functional assessment/SOP to quantify impacts and the associated mitigation.

The following is provided as background: In 2003, the District assembled a Wetland Interagency Coordination Team (ICT) to assist in analyzing SHEP's potential wetland impacts. The team consisted of agency wetland experts from US EPA, USFWS, NMFS, GA DNR, SC DNR, and SC DHEC. The agencies identified an acceptable technical approach to determine wetland impacts, as well as their information needs to review the EIS. Since creation of the team, the District hosted seven meetings of the ICT, during which methods for evaluating functional losses and mitigation alternatives for wetland impacts were proposed and discussed at length. After every meeting, the District prepared a Memorandum for Record (MFR), which was provided to all members of the ICT.

The Corps also conducted an Agency Technical Review (ATR) to assess the utility of the District's Regulatory SOP as a tool in developing a mitigation plan for SHEP. The ATR was lead by the National Deep-Draft Navigation Planning Center of Expertise. Actual analysis was performed by experts at the Corps' Engineering Research and Development Center in Vicksburg, MS. The ATR sought to determine if the SOP was an appropriate method to ascertain the preservation acreage needed to compensate for impacts resulting from the SHEP. The ATR also evaluated the assumptions and calculations that the District used in applying the SOP for SHEP. The SOP was used to determine the amount of preservation acreage necessary to offset the remaining impacts ONLY after avoidance, minimization, and restoration measures had been applied. After these deliberations, the ATR concurred with using the SOP to determine the amount of preservation acreage needed. Moreover, it considered the Savannah District's application of the SOP to be reasonable in quantifying impacts together with the associated mitigation that would be required.

A Fish and Wildlife Coordination Act Report, dated August 2010 concurred with use of the SOP. Final calculations determined the need to preserve 2,245 acres in parcels adjacent to the SNWR . The USFWS provided updates to the SOP calculations in Appendix A of the report. The District concurred with use of the updated SOP worksheets and adopted the results of those calculations for use in the DEIS. In its Adaptive Management Program, the District also proposed acquisition of additional wetlands if monitoring demonstrates that wetland impacts are under-predicted.

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760APC-MR-25-EV25

Comment: *Numerous figures within Appendix C do not have essential components like north arrows, scales or legends.*

Response: Figures in the FEIS are revised to make them more readable and more clearly convey the intended information.

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760APD-MR-28-EV01

Comment: *Section 3.Goals of an Adaptive Management Plan, p. 7, 2nd Paragraph: The document indicates that the first goal of the adaptive management plan is evaluating the accuracy of the predicted environmental impacts. Post-construction, the goal should be to determine if the mitigation features are adequate to compensate for the impacts. This should be achieved with field results and not with predictive models. In situ conditions indicate whether the mitigation features are adequate or inadequate.*

Response: Please refer to the Post-Construction Monitoring and Acceptability Criteria Sections in Appendix D. The field data collected, ranges of predicted values at water quality monitoring stations determined during pre-construction, and the hydrodynamic and water quality models using observed river flows would be the main tools which would be used to determine how the project is performing and if the impacts are generally as expected. Even though the potential impacts of the project were evaluated under a likely range of conditions, the actual circumstances experienced after construction will be somewhat different from those used for evaluation in the project's feasibility phase. Consequently, the monitoring data will be used to evaluate the response of the system to the mitigation features. In addition, the hydrodynamic and water quality models would be used to examine post-project performance under actual conditions, e.g. high/low flows, drought, or some combination of these. The Corps and the resource agencies would use the modeling data (after any necessary post-construction recalibration of the models) and compare those data to actual field results to determine whether the Savannah Harbor estuary is responding to SHEP as expected. The hydrodynamic and water models would be used to evaluate project performance once a year for ten years as part of the post-construction monitoring.

760APD-MR-28-EV02

Comment: *Section S.B.Physical, p. 7, 1st Paragraph: The document indicates that the preconstruction monitoring "will better define the complex interactions between the estuarine ecosystem and the quantity and quality of water available." If these interactions are unknown, how were the potential impacts determined in the Tier 2 EIS? These interactions should be understood prior to permit issuance as the potential impacts may still remain undetermined.*

Response: Statements in Appendix D did not mean to indicate the complex interactions occurring in estuarine ecosystems are unknown. Rather, it sought to explain that the Hydrologic Monitoring Plan serves as the framework to define these complex interactions more definitively. The Plan's formulation was benefitted by long-term hydraulic data collected in the Savannah Harbor estuary.

760APD-MR-28-EV03

Comment: *Section S.B.Physical, p. 7, 2nd Paragraph: The document indicates that the hydrologic and water quality monitoring data will be used to update the models, pre-construction. Who would determine if the model warrants an update?*

Response: The performance of the hydrodynamic and water quality models would be assessed/recalibrated [once during pre-construction and twice during post-construction monitoring] to maximize their accuracy. All model work [modifications/updates] is subject to review by the Cooperating Agencies and the state natural resource partners.

760APD-MR-28-EV04

Comment: *Section S.B.Physical, p. 7, 2nd Paragraph: If a calibration is warranted of the predictive models, prior to construction, and the models predict greater impacts then permitted, would a permit modification be acquired prior to the beginning of impacts?*

Response: The models are not being updated/assessed to provide additional pre-project impact predictions. Rather, the main purpose of this exercise is to narrow the range of model uncertainty. As inherent risk decreases, predictions become more accurate in term of evaluating the project's performance and how its mitigation measures are functioning [both during and after construction]. To accomplish this end, model runs would be conducted comparing field measurements to model predictions for the various parameters being evaluated. As discussed in a previous response, the performance of the hydrodynamic and water quality models would be assessed/recalibrated [once during pre-construction and twice during post-construction monitoring] to maximize accuracy. At the end of this assessment, the uncertainty range would be lessened to the maximum practical extent.

760APD-MR-28-EV05

Comment: *Section S.B.Physical, p. 7, 3m Paragraph: Would the State of South Carolina have a chance to determine the location of proposed groundwater monitoring wells, as the Floridan aquifer extends into southern South Carolina.*

Response: Chloride levels would be monitored by four groundwater wells [of which two are already installed]. The SC DNR has reviewed all of the plans for this aspect of the project and has made no specific requests regarding the location/design of these wells.

760APD-MR-28-EV06

Comment: *Section S.B.Physical, p. 7, 3m Paragraph: The document indicates that chloride levels will be monitored in ''up to four" groundwater monitoring wells annually in the preconstruction phase. However, in section S.C.S on page 13, the document indicates that no fewer than "four" wells will be monitored. Also, section S.C.S indicates that the wells will be monitored four times a year, the text in section S.B should indicate this fact.*

Response: The text mentioned in Appendix D has been revised to indicate that the SHEP groundwater monitoring would involve the installation of four wells.

760APD-MR-28-EV07

Comment: *Section S.B.Physical, p. 8, 1 st Paragraph: Do the applicants plan to monitor the distribution of Atlantic sturgeon as well? The Atlantic sturgeon has been confirmed in the Savannah River and has been proposed to be listed as endangered in the South Atlantic DPS which contains the project area.*

Response: Please see previous response regarding monitoring of Atlantic sturgeon.

760APD-MR-28-EV08

Comment: *Section S.C.Biological, p. 13, 1st Paragraph: Do the applicants plan to monitor the distribution of Atlantic sturgeon as well? The Atlantic sturgeon has been confirmed in the Savannah River and has been proposed to be listed as endangered in the South Atlantic DPS which contains the project area.*

Response: Please see previous response regarding monitoring of Atlantic sturgeon.

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760APD-MR-28-EV09
Comment: *Section 5.C.Biologica1.2, p. 13, 15t Paragraph: The monitoring should also include drift larval surveys for larva entering the project area. With the proposed salinity increases, the larva entering the project area from upstream may not survive, and their loss should be considered an impact.*

Response: The work described in Appendix D is designed to evaluate the movement/distribution of adult and juvenile Shortnose sturgeon in the Savannah Harbor estuary. This work did not include larval surveys for sturgeon, since its traditional spawning grounds are located over 100 miles upriver, outside the project's area of effects.

760APC-MR-28-EV10
Comment: *Section 5.C.Biologica1.2, p. 13, 1st Paragraph: Please indicate the amount implied when it is determine that sturgeon "intensively" use an area. If the substrate is not "intensively" used is it not recorded? The substrate type should be recorded for each observation.*

Response: The study would involve capturing and tagging Shortnose sturgeon [adults and juveniles] followed by tracking the released fish. The exact number of tagged fish has not yet been determined. The subject term, "intensively", refers to those estuarine locations where sturgeon carry out most of their activities throughout the year. Since the purpose of the study is to identify the primary use areas of adult and juvenile Shortnose sturgeon, there is no need to sample substrate for every tracking observance.

760APD-MR-28-EV11
Comment: *Section 5.C.Biologica1.3, p. 14, I st Paragraph: The document indicates that up to 25 shortnose sturgeon would be collected and implanted with transmitters. Is there a minimum number proposed? There should be imposed minimum used to provide validity to the data.*

Response: The final details of the scope of work would be determined based on coordination between the District, the entity actually performing the work, and the US Fish and Wildlife Service to maximize the validity/value of the data collected.

760APD-MR-28-EV12
Comment: *Section 5.C.Siologica1.3, p. 14, 2nd Paragraph: Substrate type should also be recorded for each observation.*

Response: The goal of this particular study is to evaluate fish movement in the environs of the New Savannah Bluff Lock and Dam, as well as migration patterns during the spawning season. Substrate sampling is not required to achieve this objective.

760APD-MR-28-EV13
Comment: *Section 5.D.Reporting, p. 14, 1st Paragraph: The text should be revised to replace the word "which" for the word "where" and the word "become" for the word "becomes."*

Response: The requested changes have been made to the text in Appendix D.

760APD-MR-28-EV14

Comment: *Section 6.C. Details of the Monitoring, p. 17, 15t Paragraph: The document indicates that "not all monitoring that was included in the Pre-Construction monitoring will be duplicated each year during the construction period." Please indicate which monitoring will not be included during the construction phase.*

Response: Monitoring during SHEP's pre- and construction phases is essentially similar, with the notable exception that the former includes intensive examination of selected parameters over a lunar cycle during the summer. This sampling would be repeated during years one and four of the post-construction monitoring.

760APD-MR-28-EV15

Comment: *Section 6.C. Details of the Monitoring, p. 18. 2nd Paragraph: Please explain what constitutes a "large/unforeseen increase."*

Response: The term "large/unforeseen increases" has been removed from the FEIS. The latest model results conclude SHEP would increase chloride levels at the City Of Savannah's water intake on Abercorn Creek during low flows and high tides. The District intends to monitor chloride levels at the intake both during and after construction.

760APD-MR-28-EV16

Comment: *Section 6.D.Reporting, p. 19, 2nd Paragraph: If the monitoring indicates that unforeseen or unpermitted exceedences are occurring, this data should be made available for review by all applicable State and Federal agencies when the exceedences are observed and should not be held until the annual or final reports.*

Response: As stated in Appendix D, real-time data from the eight continuous water quality monitors would be available to resource managers and the public through the USGS National Water Information System Web (NWIS Web) software. The District would also post monitoring information on its public website as it becomes available.

760APD-MR-28-EV17

Comment: *Section 7.A.Goals, p. 20, 5th and 6th Paragraphs: Does the monitoring at the nearshore sediment placement sites include monitoring of benthic repopulation for two or three years?*

Response: The use of the Tybee Island nearshore placement sites for placement of new work sediments has been removed from the project. All new work sediment removed from the entrance channel would be deposited in the Jones/Oysterbed CDF or the Offshore Dredged Material Disposal Site. As stated in previous responses, maintenance material from the first part of the inner harbor channel and the entrance channel could be placed in the nearshore off Tybee Island in the future provided a separate cost-sharing sponsor is willing to pay the additional costs to have the material placed there. The Corps is committed to conducting cultural resource and hard bottom surveys in these areas prior to initially placing dredged material in these sites. Benthic surveys would not be conducted.

760APD-MR-28-EV18

Comment: *Section 7.D.Reporting, p. 25, 1st Paragraph: If the monitoring indicates that unforeseen or unpermitted exceedences are occurring, this data should be made available for review by all applicable State and Federal agencies when the exceedences are observed and should not be held until the annual or final reports.*

Response: Please see previous response concerning the availability of real time data from the continuous water quality monitors.

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760APD-MR-28-EV19
Comment: *Section S.B.Monitoring During Construction, p. 28, 2nd Paragraph: Please define "well outside." If the impacts are exceeding those permitted then these exceedences should be reported to all applicable State and Federal agencies when the exceedences are observed.*

Response: There are no "permits" required for the SHEP which contain specific criteria relative to parameters of concern. Water quality certification and coastal zone consistency have been received from both the States of Georgia and South Carolina. Generally, water quality certifications from both states require the Corps to proceed with a project in a manner so as to not violate applicable water quality standards.

The federal/state resource agencies would be furnished the results of the monitoring effort conducted during the pre-construction, construction, and post-construction phases. Additionally, continuous real-time data would be available to resource managers and the general public through the USGS National Water Information System Web. As described in the Monitoring Plan, the Cooperating Agencies and the state resource agencies can consult with the District at any time the results become a concern. Consequently the phrase "impacts that are well outside the range of those expected" has been replaced by "impacts that cause concern".

760APD-MR-28-EV20
Comment: *Section 8.B.Post-Construction Monitoring, p. 28, 2nd Paragraph: Establishing a threshold values during and post-construction would better protect natural resources and preserve water quality. They should be a goal or standard and they would provide all applicable State and Federal agencies with an "action" threshold and may reduce cumulative impacts.*

Response: The District intends to use the methods described in the Monitoring Plan, Adaptive Management Plan, and Long-Term Management Plan [see Appendix D]. Please refer to Section 8 of Appendix D which describes Performance Measures and Acceptability Criteria and Section 9 of Appendix D which details how Adaptive Management decisions will be made.

760APD-MR-28-EV21
Comment: *Section 8.B.Post-Construction Monitoring, p. 29, 3rd Paragraph: Additional mitigation should be required if losses are greater than those described in the EIS, and not dependent on the observed flow conditions.*

Response: The hydrodynamic and water quality models would be used in conjunction with the field data to evaluate how the project is performing and in determining the adequacy of the mitigation features. Data from model runs, per se, would be compared with same using conditions measured in the field for various parameters. If the model results are within its established uncertainty range, both the project and the model would be deemed to be performing as expected, and no modifications would be warranted.

To date, the Monitoring and Adaptive Management plan has provided the necessary framework to address SHEP's impacts and is sufficiently flexible to allow for future adjustments to its associated mitigation features.

760APD-MR-28-EV22

Comment: *Section 9.B.Decision Process, p. 30, 1st Paragraph: The paragraph states that if through monitoring it is determined that impacts are "well outside the range of those expected" then the Corps would consult with the Cooperating Agencies to identify what actions may be appropriate. What amount constitutes "well outside?" If the permitted impacts are exceeded then addition mitigation should be proposed. The threshold amount should be the permitted amount and not the "expected" amount. Finally, the Corps should revaluate the impacts if they are exceeding the permitted amount and not wait for the Cooperating Agencies to begin the process. The Cooperating Agencies should be notified if exceedences are observed after each monitoring period.*

Response: The first paragraph on Page 30 refers to adaptive management decisions that could occur during the construction phase of the project. This paragraph has been revised to reflect that meetings between the District, Cooperating Agencies and state natural resource agencies are not restricted to the annual meeting [usually] held at the anniversary of the monitoring period. If concerns surface, a coordination meeting could be held at any mutually agreeable date. This paragraph has also been revised to explain the full range of options that would be available if impacts or concerns are observed during the construction monitoring period. These options include a change in the monitoring plan to address a particular concern, evaluations of a particular concern using the updated hydrodynamic and water quality models, a modification to a mitigation feature of the project, and cessation of construction until the concern is resolved [if necessary]. Additional information has been added to detail the specifics of the decision process [for the post-construction monitoring period].

760APD-MR-28-EV23

Comment: *Section 9.B.Decision Process, p. 30, 2nd Paragraph: Response should not be delayed until the post-construction monitoring period is completed if impacts exceed those permitted. If the mitigation features are not meeting their goals during the monitoring period action should be taken when deficiencies are observed. The applicants should not delay 4 years to act for exceedences which are observed in year 1.*

Response: Information has been added to Appendix D to explain the adaptive management process for the post-construction monitoring period.

760APD-MR-28-EV24

Comment: *Section 9.B.Decision Process, p. 31, 2nd Paragraph: Expecting complete agreement by the Cooperating Agencies for an adaptive measure to be implemented is unrealistic. The text indicates that an additional year of monitoring is possible but that it would reduce the funds to implement the adaptive measures. If the project has impacts which exceed those permitted, or if the final impacts remain unclear, then monitoring should continue. If the cost of the monitoring or adaptive measures exceeds the funds reserved then additional funds should be secured by the applicant. Monitoring or mitigation should not be reduced if permitted impacts have been exceeded or a determination on exceedences is reasonably attainable.*

Response: Appendix D has been revised to indicate that monitoring of an adaptive management measure would be conducted for two years, or longer if the agencies determine that to be prudent. If

the expected costs of monitoring and/or adaptive management measures increase substantially, the District would seek the additional funds through its normal budget process.

760APD-MR-28-EV25
Comment: *Section 9.B.Decision Criteria, p. 31, 1st Paragraph: This section should be changed to section 9.C Decision Criteria. The section titled Decision Process is section 9.B.*

Response: Appendix D has been revised to better describe the decision processes that will occur during the construction and post-construction monitoring.

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760APD-MR-28-EV26
Comment: *Section 10.B.Components of Approved Adaptive Management Plan, p. 33, 2nd Paragraph: The fish passage improvements at the NSBL&D does not provide greater habitat for the sturgeon as compensation for the impacts. It provides a means to which the sturgeon could access potential habitat if they navigate the NSBL&D correctly.*

Response: As noted in DEIS-Section 5.03.2, the Cooperating Agencies and the Fisheries Interagency Coordination Team could not identify measures within the estuary that would reasonably restore/enhance Shortnose Sturgeon habitat. Therefore, the team agreed [2007] construction of a fish passage around the New Savannah Bluff Lock and Dam would compensate for losses in the estuary by providing access to an additional 20 miles of upstream foraging/spawning habitat.

760APD-MR-28-EV27
Comment: *Section 10.B.Components of Approved Adaptive Management Plan, p. 33, 2nd Paragraph: The text indicates that "acquisition of additional bottomland hardwoods/freshwater wetlands would compensate for additional impacts to freshwater marshes beyond those that are predicted in the EIS." This is "out-of-kind" mitigation and does not constitute replacement. This form of mitigation does not satisfy "no net loss" as the preservation of non-threatened wetlands does not compensate for those impacted by the project.*

Response: The acquisition of up to 2,245 acres of land adjacent to the SNWR would provide sufficient compensatory mitigation for the expected impacts to wetlands. In its Adaptive Management Program, the District proposed acquisition of additional wetlands if monitoring demonstrates that the conversion acreage is under-predicted. To support this approach, the District conducted a functional assessment for wetland areas that would be subject to vegetative conversion; the assessment also provides an analysis of the magnitude of impacts that would occur. The District has provided a functional assessment for the proposed mitigation sites. The results of these assessments conclude that the proposed impacts are mitigated appropriately and overall there would be no net loss of wetland functions [to include fish/wildlife habitat values]. Regardless, all habitat impacts are adequately compensated by the proposed mitigation. This analysis was used in conjunction with the 2008 Mitigation Rule and confirms that that the District was justified in its use of preservation mitigation in this particular instance.

760APD-MR-28-EV28

Comment: *Section 10.B.Components of Approved Adaptive Management Plan, p. 34, 2nd Paragraph: If the impacts from the project have exceeded those permitted, and the adaptive management funds listed on page 34 have been exhausted, then additional funds should be made available by the applicant to provide additional mitigation. The funds listed on page 34 should not limit the response if impacts exceed those permitted.*

Response: The table includes reasonable estimates for adaptive management costs. If unforeseen impacts result in a need for more adaptive management, the funding level does not preclude requesting additional funds. Additional funds would be required to be justified and requested from both the local sponsor and the federal government. As mentioned in the paragraph, there will be some flexibility to shift the available funds to the mitigation area with greater need.

Page Appen. H-1

760APH-MR-16-EV01

Comment: *This Appendix was formatted following 40 CFR 230, the 404(b)I Guidelines. It generally contains all the necessary components of this regulation except for a mitigation component, which may be contained elsewhere in the Project's documentation.*

Response: The mitigation component of the project can be found in Appendix C – Mitigation Planning.

760APH-MR-16-EV02

Comment: *Page 15, para. 6 - Refers to other fill activities on the project ..... are associated with the various mitigation features of the project." "which is designed to minimize the increase in upstream salinity levels resulting from harbor deepening." Thus, espousing the value of the discharges as mitigative measures. The negative impacts of these fill activities are not considered. Is there mitigation proposed for impacts caused by the mitigation?*

Response: The District does not plan to provide mitigation for all fill-related activities associated with construction of the SHEP's mitigation features, viz., sediments used to construct the plug in Rifle Cut, construction of the diversion structure at McCoys Cut, construction of the broad berm in the Sediment Basin, and construction of the boat ramp in Back River. These fill-related activities result in material being placed on unconsolidated water bottoms. For mitigation features which remain submerged, mitigation would not be required since the functions associated with water bottoms would remain the same [just at lesser depth]. Conversely, the plug in Rifle Cut would result (over the long term) in a mudflat/marsh which would constitute a net gain in aquatic function/values associated with essential fish habitat. Finally, the boat ramp will be constructed within the footprint of the Tidegate [after its removal]. Demolition and subsequent construction activities would result in the loss of 8.48 acres of brackish marsh / saltmarsh, but these impacts will be among those mitigated by constructing brackish marsh habitat within sediment disposal site 1S. After deliberation, the District determined that the loss/benefit associated with the activities is essentially a zero sum.

760APH-MR-16-EV03

Comment: *Page 17, para. 3 - Again, measures proposed to minimize impacts of increased salinity up the river, i.e., discharged of dredged material, are lauded as largely beneficial ....*

> *"The discharge of dredged and fill sediments associated with the Savannah Harbor Expansion Project will actually be an integral part of minimizing these impacts."*

Response: The District determined that placement of fill to construct the mitigation features would be an integral part of minimizing impacts associated with changes in salinity levels [post-construction].

760APH-MR-16-EV04

Comment: *Page 20, para. 3 - A number of references are made to significant changes in substrate elevation in the nine nearshore areas. Have these depth modifications been modeled regarding hydrodynamics and sediment transport at the mouth of the river?*

Response: After publication of the DEIS, a decision was made to eliminate the use of nearshore sediment placement sites for new work material. Hence, with the exception of the ODMDS, all excavated material will be placed in existing CDFs. As stated previously, the nearshore sites shown in Figue 3-3 could be used for maintenance material in the future. The location of these sites has been developed over time based on input received from the LTMS study, the 2003 ERDC modeling studies, and subsequent coordination with various agencies and the City of Tybee Island during the SHEP study process.

760APH-MR-16-EV05

Comment: *Page 20, para. 6 - "Net loss of environmental value is expected to be minimal."Regard the discharge of dredged material back into waters as part of the mitigation, this has not been shown.*

Response: The District does not plan to provide mitigation for all fill-related activities associated with construction of the SHEP's mitigation features, viz., sediments used to construct the plug in Rifle Cut, construction of the diversion structure at McCoys Cut, construction of the broad berm in the sediment basin, and construction of the boat ramp in Back River. These fill-related activities result in material being placed on unconsolidated water bottoms. For mitigation features which remain submerged, mitigation would not be required since the functions associated with water bottoms would remain the same [just at lesser depth]. Conversely, the plug in Rifle Cut would result (long term) in a mudflat/marsh which would constitute a net gain in aquatic function/values associated with essential fish habitat. Finally, the boat ramp will be constructed within the footprint of the Tidegate [after its removal]. Demolition and subsequent construction activities would result in the loss of 8.48 acres of brackish / saltmarsh, but these impacts will be among those mitigated by constructing a brackish marsh habitat within sediment disposal site 1S. After deliberation, the District determined that the loss/benefit associated with these activities is essentially a zero sum.

760APH-MR-16-EV06

Comment: *Page 21 , para. I - Refers to conducting benthic studies on the Tybee shelf prior to performing proposed discharges associated with habitat modifications here as part of the proposed mitigation. This is the first mention of conducting a site specific study on an area proposed for impact as part of the mitigation plan and should be a practice carried out on all other discharge locations.*

Response: Placement of new work sediment in the nearshore sites near Tybee Island is no longer an element of the SHEP project. All sediment excavated from Station 4+000 to 0+000, and from the entrance channel would now be placed in the Offshore Dredged Material Disposal Site (ODMDS) or an existing upland confined disposal facility. A Section 103 Evaluation of the sediment has been conducted to ensure compliance with the EPA Ocean Dumping Regulations. Prior to the start of dredging the entrance channel extension, which was redesigned to be a 37,680- foot-long by 600-foot-wide channel located on a different alignment, the District would determine if any hard bottoms are located within the footprint of this channel extension. Locations identified for placement of mitigation features at the upper reaches of the harbor are unconsolidated water bottoms, an environment that is uniform and ubiquitous in that area. No additional benthic studies are proposed on water bottoms in discharge locations.

760APH-MR-16-EV07

Comment: *Page 21, para. 5 - Discussion ofbenn construction off Tybee Island and "no significant changes in current patterns and water circulation are expected". Have adequate studies been done to support this statement? Are these berms resources that where historically located here but have eroded because of anthropogenic or storm activity?*

Response: The project no longer proposes to construct berms in the Tybee Island nearshore area using new work material. The dredged sediment placement plan has been revised and placement of all sediments excavated from the entrance channel would be deposited in previously-approved areas: either in the Offshore Dredged Material Disposal Site or an upland confined disposal site. Please see previous response (760APH-MR-16-EV04) regarding how the locations of the berms were determined. The FEIS has the details of the revised sediment placement plan. Figure 3-3 shows the sites where maintenance material could be placed into the nearshore off Tybee Island.

Page Appen. H-2

760APH-MR-16-EV08

Comment: *Page 22, para. 2 and 3 - Again, statements such as, "No net loss of environmental value" and "The discharge of dredged and fill material into waters of the United States associated with the Mitigation Plan would minimize the upstream salinity increases ... " appear to be unsubstantiated and do not adequate address impacts caused by the mitigation itself, respectively.*

Response: This comment has already been addressed in previous responses.

760APH-MR-16-EV09

Comment: *Page 23, para. 7 - CONTAMINATION DETERMINATION - Sec comments in the Appendix M (Sediment Quality Evaluation).*

Response: This comment refers to another comment provided by the author. The Corps' response is with the other comment.

760APH-MR-16-EV10

Comment: *Page 24, para. 1- CONTAMINATION DETERMINATION - References three rounds of sediment sampling but starts out summarizing the second round that was conducted in 2005 with no summary of the first round. Please summarize the first round (i.e., 1997) here as well for comprehension/organization purposes.*

Response: The following information from the Executive Summary of Appendix M has been added to Appendix H. "In 1997, sediment core samples were collected and examined for sediment physical and chemical properties. The sampling area covered the entire area proposed for harbor deepening, extending from deep water in the ocean to the Kings Island Turning Basin (Station 103+000). Parameters investigated included metals, PCBs, PAHs, petroleum hydrocarbons, phenols, pesticides, dioxin congeners, cyanide, organotins, and nutrients.

The evaluation found that most of the sediments provided no reason for concern over potential contaminant-related impacts associated with the proposed dredging and dredged sediment placement. However, three potential issues were identified.

One issue involved sediments near the old RACON Tower site. Subsequent sampling conducted in 2005 revealed that sediments at that location do not pose a potential for potential contaminant-related environmental impacts."

760APH-MR-16-EV11

Comment: *Page 32, para. 7 - AQUATIC ECOSYSTEM AND ORGANISM DETERMLNATIONS - See comments on T&E and fisheries/sturgeon from Travis and JPD.*

Response: This comment refers to other comments provided by the author. The Corps' response is with the other comments.

760APH-MR-16-EV12

Comment: *Page 33, para. I - AQUATIC ECOSYSTEM AND ORGANISM DETERMINATlONS, Fish, Crustaceans, Mollusks and Other Aquatic Organisms in Food Web - "The project would not involve any discharge of dredged or fill material into areas with high concentrations of shellfish." "Side scan sonar and benthic surveys would be conducted during the design phase to confirm this initial conclusion." These measures seem adequately protective. How and who will review the results of the additional studies and determine if impacts to benthics will be minimal?*

Response: Side scan sonar and benthic surveys were originally proposed for the nine nearshore sites proposed for sediment placement. However, as noted previously, those sites will no longer be used for placement of new work sediments. All sediments from Station 4+000 to Station -97+680 would be placed in the ODMDS or an upland confined disposal site. The Corps would conduct side scan sonar and hard bottom surveys in the areas shown in Figure 3-3 if the nearshore sites off Tybee Island are ever used for placement of maintenance material.

760APH-MR-16-EV13

Comment: *Page 33, para. 4 - AQUATIC ECOSYSTEM AND ORGANISM DETERMINATIONS, Special Aquatic Sites - What alternatives were evaluated regarding replacement of the 337 acres of tidal freshwater marsh besides other than preservation?*

Response: A watershed assessment was conducted in the Lower Savannah River Harbor to evaluate specific mitigation measures which could compensate for the conversion of freshwater wetlands 223 acres] to its brackish marsh counterpart. This assessment concluded the only element of wetland function that would be materially affected by this conversion was its fish and wildlife habitat component. To rectify these losses, the District reviewed approved mitigation banks in the Lower Savannah River Watershed, but determined there were none with the appropriate tidal, freshwater

wetland characteristics. The District and Interagency Coordination Team decided that the "In-Lieu Fee" program is functionally unable to provide the requisite compensation. Creation of freshwater, tidal wetlands was considered; however, it was ultimately concluded by the study group this was not a long-term solution given the high risk of failure.

A Wetland Interagency Coordination Team (ICT) [consisting of technical expert representatives from USACE and federal/state natural resource agencies] sought to identify acceptable mitigation for SHEP. At the outset, USFWS stated that mitigation actions must be performed within the basin for impacts to wetlands located within the SNWR. The Service suggested preservation of lands as a possible solution and recommended sites that are part of its long-term lands acquisition strategy to compliment the SNWR. The Stakeholder Evaluation Group, including its Non-governmental Organizations (NGOs) members was consulted to determine if they could identify any suitable mitigation options. Over the 10-year study period, no agency/organization could identify another feasible alternative as mitigation for impacts that would occur as a result of the wetland species shifts. Therefore, the District proceeded with identifying preservation sites.

The Corps' Agency Technical Review (ATR) assessed the use of the Savannah District's Regulatory SOP to develop a mitigation plan for SHEP. The ATR was lead by the National Deep-Draft Navigation Planning Center of Expertise; technical work was performed by Corps experts at the Engineering Research and Development Center in Vicksburg, MS. The ATR evaluated the SOP to determine if it had the capabilities to ascertain the preservation acreage needed to compensate for SHEP impacts. The ATR also commented on whether the assumptions/calculations used in its application were reasonable in determining mitigation needs. The SOP was only used to determine the amount of preservation acreage necessary to offset the remaining impacts AFTER development of avoidance, minimization, and restoration features. The ATR concurred with use of the SOP to determine the amount of preservation acreage needed and considered the District's application of the SOP to be reasonable in quantifying impacts and required mitigation.

The USFWS provided a Fish and Wildlife Coordination Act Report [August 2010]. In that report, the USFWS concurred with use of the SOP, which calculated a need to preserve 2,245 acres of land adjacent to the SNWR for the 47-foot alternative. The Service provided updates to the SOP calculations in Appendix A of the report. The District concurred with use of the updated SOP worksheets and adopted their results for use in the EIS. In its Adaptive Management Program, the District proposed acquisition of additional wetlands if monitoring demonstrates impacts are under-predicted.

After a great deal of deliberation, a consensus was reached that the most appropriate and practicable means of mitigating the resultant species shift is the preservation of approximately 2,245 acres of bottomland hardwoods and upland buffer. USFWS and the Savannah National Wildlife Refuge (SNWR) have prepared a prioritized acquisition list of ecologically valuable properties available within the estuary which can further Refuge's goals and enhance the area's fish and wildlife resources.

760APH-MR-16-EV14

Comment: *Page 34, para. 4 - Potential Effects of Human Use Characteristics - This section should address the relocation of the municipal water intake and effects of the project on commercial and recreational fisheries. Alternatively, refer to sections where these issues are addressed.*

Response: Additional modeling efforts were conducted to confirm/refine the chloride impact predictions. A raw water storage impoundment would be constructed in lieu of relocating the City of Savannah's water intake on Abercorn Creek. The results of that work are included in the FEIS. EIS-Section 5.17 discusses the effects on recreational and commercial and fisheries.

760APH-MR-16-EV15

Comment: *Page 35, para. I - 8.0 DETERMINATION OF CUMULATIVE EFFECTS ON THE AQUATIC ECOSYSTEM - This section defers to Appendix L for the write up on cumulative impacts. This presentation is inconsistent with other sections in this Appendix that makes following the flow (and thus comprehension) of the data very difficult. Contamination Determination (6.4), for example, provides significant discussion on the ecorisk assessment performed as well as referencing Appendix M "Sediment Quality Evaluation."*

Response: The statement that "There are no known adverse cumulative impacts associated with any of the placement sites designated to be used for dredged or fill material" is based on the findings/determinations in Sections 5,6, and 7 of Appendix H as well as Appendix L. Most of the dredged material associated with SHEP would be discharged into existing CDFs or the ODMDS. A relatively small amount [dredged material] would be used to construct some of the project's mitigation features, e.g., the sill in Back River, etc. Some fill material (clean sand and rock) would be used to construct the structure to divert river flow at McCoys Cut and provide closure for the western arm of McCoys and Rifle Cuts. Material (concrete) removed from the Tidegate abutments may also be used to create fish habitat in Back River, Little Back River, etc.

Page Appen. H-3

760APH-MR-16-EV16

Comment: *The 404(b)I Appendix does not contain the following information, as applicable, nor does it refer to other DEIS documentation that address the following material required under 40 CFR Part 230, Subpart J "Compensatory Mitigation for Losses of Aquatic Resources"*

§ 230.91 Purpose and general considerations.
§ 230.92 Definitions.
§ 230.93 General compensatory mitigation requirements.
§ 230.94 Planning and documentation.
§ 230.95 Ecological performance standards.
§ 230.96 Monitoring.
§ 230.97 Management
§ 230.98 Mitigation banks and in-lieu fee programs.

The Water Quality Monitoring Plan Attachment in the Appendix fulfills part of the Monitoring requirement under 230.97, above. Practically speaking, however, this plan should be contained within Appendix D, "Monitoring & Adaptive Management Plan".

Response: As long as the Section 404(b)(1) Evaluation contains all the information required pursuant to 40 CFR 230, the District views its format as being of lesser importance, i.e., organization has no particular relevance to the analysis of the data. However, to avoid any confusion, the Section 404(b)(1) Evaluation will be thoroughly reviewed to ensure that it contains all the required information and revised as appropriate in the FEIS. A reference to the Water Quality Monitoring Plan that is included as an attachment to the Section 404(b)(1) Evaluation (Appendix H) will also be added to Section 1 of the Monitoring and Adaptive Management Plan appendix.

Page Appen. K-1

760APK-MR-15-EV01
Comment: *On pages 14 - 32, the reviewer was not able to calculate the emissions reported in many of the emission summary tables using the information provided in the descriptions preceding the emission summary tables. To facilitate a review of the emission estimates, an example calculation should be provided for Tables 5-10, 5-11, 5-12, 5-13, 5-19, 5-20, 5-21, 5-26, 5-29, 5-31 and 5-38.*

Response: The EIS did include example calculations. Section 5.4 of Appendix K details the formula provided by EPA [2009] for calculating emissions generated by ocean going vessels. This was followed by a step by step demonstration of how the District calculated the emissions' values found in the noted Tables.

760APK-MR-15-EV02
Comment: *Nitrogen oxides are referred to as "NOX", "NOx", "NOli" and "N02" throughout the appendix in various text sections, tables, and figures. A single acronym (e.g., "NOx") should be used throughout the appendix.*

Response: The District revised the FEIS to use a single acronym for nitrogen oxides [NOx].

760APK-MR-15-EV03
Comment: *The word "volume" is used numerous times starting on page 36 and through the end of the appendix to refer to the amount or quantity of mass emissions estimated (e.g., second sentence in the last paragraph on page 36, first and second paragraphs on page 45, and second sentence of the second paragraph on page 72, etc.). Because mass emission rates are being referred to in these instances, "amount" or "quantity" should be used in lieu of "volume".*

Response: The District removed the word "volume" in Appendix K and replaced it with either "amount" or "quantity".

760APK-MR-15-EV04
Comment: *Page 13 - the "Slow / Dead Slow" mode presented in Table 5-8 does not correspond with any of the mode categories presented in Table 5-6. The same mode terminology or designations should be used throughout both tables.*

Response: The District included the "Slow/Dead Slow" mode category in Table 5-6.

760APK-MR-15-EV05
Comment: *Pages 14 - 16 - the emission estimates shown in Tables 5-10 through 5-13 are presented as "tons per transit" or "tons per vessel". Also, the term "vessel call" is used in the preceding sections (e.g., Tables 4-1 through 4-4) and tug emissions are presented on a " ton/call" basis in Tables 5-19, 5-20 and 5-21. The use of consistent terminology is recommended to avoid confusion.*

Response: The different terminologies (tons per transit, tons per vessel, and ton/call) are necessary to describe how the calculation [total tonnage/year] is derived. The "tons per transit" designation deals with those vessel emissions [shown in Table 5-8] generated during travel time. The "tons per vessel" term is only used when the vessel is berthed or "hotelled" at the terminal. The "ton/call" is the total of

all OGV vessels emissions produced traveling to the terminal, docking, hotelling, undocking, and then leaving the port.

760APK-MR-15-EV06
Comment: *Page 18 - the emission formula presented on this page to calculate tug emissions is not clear and should be reformatted or revised.*

Response: The formula used to calculate tug emissions [in the harbor] has been revised/clarified.

760APK-MR-15-EV07
Comment: *Page 38 - CHE emissions for 2010 arc presented in Table 5-48 and 5-49; however, the estimates for the Toplifts and the Empty Container Handlers indicate FY07 estimates. Most likely the reference to FY07 is incorrect and should be deleted.*

Response: The reference to FY07 is incorrect [Appendix K-Tables 5-48 and 5-49] and has been removed in the FEIS.

Page Appen. K-2

760APK-MR-15-EV08
Comment: *Page 43 - a unit designation for the emission estimates provided in Table 5-60 is not provided as part of the table heading.*

Response: Unit designations are now provided for the emission estimates found in Table 5-60.

760APK-MR-15-EV09
Comment: *Page 44 - GPA vehicle fleet emissions are summarized in Table 5-62 for Calendar Year 2007. The tons of emissions indicated for the vehicle fleet are very low. It is recommended that the vehicle fleet emission calculations be checked to ensure they are not in error.*

Response: The emissions values for the port's vehicle fleet [Table 5-62] have been verified.

760APK-MR-15-EV10
Comment: *Page 45 - in the first paragraph, Table 5-61 is incorrectly referenced as showing the relationship of air toxic pollutants to other pollutants. Table 5-61 is presented on Page 44 and summarizes GPA's vehicle fleet by vehicle category.*

Response: The District revised the text in the first paragraph on page 45 to indicate that Tables 5-63A and 5-63B show the relationship of the port's air toxics data [2008] to that of the NEI [2002 and 2005].

760APK-MR-15-EV11
Comment: *Page 46 - 58 - the emission tables presented as Table 5-64 through 5-76 summarize emissions of28 individual pollutants designated as air toxic pollutants. In the last row of these tables, the air toxic emissions are summed and reported as totals for each equipment category. This last row should be deleted since air toxic pollutants are normally viewed on an individual basis and not collectively with respect to air quality considerations. However, it would be appropriate (if desired), to sum the rows to show the totals for each individual air toxic pollutant.*

Response: The District revised Tables 5-64 through 5-76 to show the total for each of the 28 individual air toxics.

760APK-MR-15-EV12

Comment: *Page 59, Section 5.18 - in the third paragraph, the method used to generate emission estimates are described for methane (CH4) and nitrous oxide (N20), which are greenhouse gases (GHGs). Emissions of these GHGs arc incorrectly calculated from the CO2 estimates by applying their respective global warming potential factors of21 and 310. Theses global warming factors are used to quantify CO2 equivalent (CO2e) emissions when emission rates of CH4 and N20 are known. Considering that CH4 and N20 emissions are not quantified in the preceding sections and are expected to be only 2 percent of the total GHG emissions, it is suggested to revise and simplify this section (Section 5.18) by including only the CO2 emission estimates in the discussion and in Table 5-77 shown on pages 60-61.*

Response: Section 5.18 Greenhouse Gases (CHGs) in Appendix K and Table 5-77 has been revised in the FEIS.

760APK-MR-15-EV13

Comment: *Page 66, Section 6.0 - the last sentence of the first paragraph indicates a total of 10 emission sources were evaluated. However, the table which follows this sentence shows a total of 14 entries and one of these entries, "air toxics," should be removed because air toxics are pollutants and not an emission source nor an emission generating activity. This sentence should be revised to indicate 13 emission sources and the "air toxics" entry should be deleted from the table.*

Response: The last sentence in the first paragraph has been revised to indicate that “air toxics” are not an emission source. There are only 13 emission sources at the port. The term, “air toxics”, has been removed from the table following the first paragraph.

760APK-MR-15-EV14

Comment: *Page 70 and Page 71 - Figure 6-4 and Figure 6-5 appear to be identical yet they are supposed to present emissions under different conditions (i.e .• with and without the 4 7/48-foot harbor deepening).*

Response: Appendix K-Figures 6-4 and 6-5 [pages 70 and 71] have been reviewed/clarified to ensure that these figures accurately represent the baseline condition of a -42 foot depth channel [no-action] compared to the -47/-48 foot depth alternatives.

Page Appen. K-3

760APK-MR-15-EV15

Comment: *Page 96 - the first paragraph below Table 6-7 provides the total CO2 emissions for a steam electric plant in Savannah. However, no direct comparison is made between the CO2 emissions associated with this facility and the Port.*

Response: The CO2 emissions produced by the coal-fired Kraft Steam Electric Plant have been compared to those generated by the port.

Page Appen. L-1

760APL-MR-51-EV01

Comment: *With the projected large scale port expansion that may be implemented, it would be advisable to assess the effects on induced growth within the Savannah area. The area will likely require enhanced transportation but also will require increased community service support plus a growth of local industrial and commercial activity. A cumulative analysis of how growth was stimulated by port development in the past, currently and will be in the future could affect upcoming planning decisions.*

Response: Increases in container volumes are expected regardless of whether harbor deepening occurs. The proposed project is not expected to result in an increase in the number of containers that pass through Savannah Harbor in a given year. Because the same number of containers are expected to be transported under both with- and without- project conditions, a traffic study is not warranted.

760APL-MR-51-EV02

Comment: *The cumulative impacts of the Confined Disposal Facilities may be warranted. The specific concern is that if the CDFs in Jasper County are continued in use there may be a point in time when these sites would become unsuitable or infeasible for other uses. In particular, future development at one of these sites for a marine terminal as an environmentally preferable option could be obviated by onerous reclamation requirements owing to a need to remove or treat very large amounts of disposed dredge materials.*

Response: The continued deposition of dredged sediments in existing Sites 14A and 14B is the least-cost, environmentally-acceptable alternative for the proposed SHEP. However, use of these sites would not preclude construction of the Jasper Terminal. In fact, the JPO's consultant observed that placing new work sediments on Areas 14A/14B would save the sponsors of a terminal development project over $200 million by raising its elevation to a workable height. Therefore, if SHEP is constructed, it could benefit the development of a terminal at a Jasper site by significantly reducing its initial construction costs.

Page Appen. L-2

760APL-MR-51-EV03

Comment: *Historic Basis - Pg 10, 2nd para - "Federal and State natural resource agencies agreed that 1999 would provide the baseline condition for wetlands under which this harbor deepening should be considered." What is the basis for establishing 1999 as the base year? Large acreages of wetlands within the project area experienced substantial impacts from a variety of actions prior to 1999, and they need to be considered in the cumulative affects analysis.*

Response: The Wetlands Interagency Coordination Team recognized the importance of establishing baseline conditions [amount and types of marsh remaining in the Savannah Harbor estuary between the I-95 crossing and Back River] for the Corps to identify and analyze potential project impacts to wetlands. The Wetlands ICT recommended the Corps use 1999 as the baseline for wetland impact analyses.

760APL-MR-51-EV04

Comment: *Past Actions/Stresses - Pg 10, 3rd para - "All of these deepening projects allowed the freshwater interface to migrate farther upstream." Given this statement, why would the cumulative loss of wetlands due to channel deepening not he included in the Cumulative Affects analysis?*

Response: Much of the historic "marsh loss" associated with the Savannah Harbor Navigation Project can be attributed to the construction and long-term use of its confined disposal facilities. Movement of the saltwater wedge upstream [because of previous harbor improvements [deepening] did not necessarily result in marsh loss, but rather conversion of freshwater marsh to its brackish/salt marsh counterparts. According to estimates from the US Fish and Wildlife Service (Page 21-Appendix L), there were approximately 12,000 acres of tidal freshwater marsh in the Savannah Harbor estuary in 1875, of which half were gone by 1974. Using the present long term average rate of sea level rise in Savannah (3 mm/yr), the estuary has experienced a 1.3 foot increase in sea level since 1875. Although there were other factors involved (development, etc.), harbor improvements and sea level rise were responsible for much of the noted species shifts [change in dominance from freshwater to more saline community types].

760APL-MR-51-EV05

Comment: *Present Actions/Stresses - Pg 13, 4th para - "The District expects to begin the rehabilitation in the summer 0[2010 and complete it in FY 2012." The rehabilitation refers to the water control structures in the Freshwater Control System. Has that work begun yet?*

Response: Yes, the work within the SNWR has been completed.

760APL-MR-51-EV06

Comment: *Future Actions/Stresses - Pg 14, 3rd para - "Another potential impact to upstream salinity levels and thus the SNWR is the proposed Jasper County Marine Terminal." If this proposed project is considered to be feasible enough for inclusion in the cumulative impacts analysis, then why is it not feasible enough to be considered an alternative to the SHEP?*

Response: A container terminal located in Jasper County was included in the alternatives' analysis [port options]. Please see the following sections in the GRR: Section 6.7, Evaluation of Alternative Structural Measures; Section 12.1.1, Jasper County Terminal Sensitivity Analysis; and EIS-Appendix O, Formulation of Alternatives Appendix.

760APL-MR-51-EV07

Comment: *Incremental Impact - Pg 14, 4th para - This discussion on the effects of past harbor deepening projects and their resultant increases in upstream salinity levels should include statements regarding the magnitude and significance of those cumulative impacts.*

Response: Indirect Impacts to tidal freshwater marsh from past harbor improvements can be determined by reviewing the US Fish and Wildlife estimates of historical freshwater tidal marsh acreages in Savannah Harbor on page 21. According to estimates from the US Fish and Wildlife Service (Page 21-Appendix L), there were approximately 12,000 acres of tidal freshwater marsh in the Savannah Harbor estuary in 1875, of which half were gone by 1974. Using the present long term average rate of sea level rise in Savannah (3 mm/yr), the estuary has experienced a 1.3 foot increase in sea level since 1875. Although there were other factors involved (development, etc.), harbor improvements and sea level rise were responsible for much of the noted species shifts [change in dominance from freshwater to more saline community types].

760APL-MR-51-EV08

Comment: *Past Actions/Stresses - Pg 23, 2nd para - "Over time some tidal freshwater marsh has been converted to either brackish or saltmarsh because of increased upstream salinity levels caused by deepening of the harbor." The use of the word "some" to quantify the historic losses of tidal freshwater*

marsh within Savannah Harbor that actually numbers in the hundreds of acres understates the magnitude and significance of the cumulative impacts.

Response: Appendix L readily acknowledges that previous harbor improvements have moved the saltwater/freshwater interface upstream and are a major factor in conversion of tidal freshwater marsh to brackish marsh or saltmarsh in Savannah Harbor. In this case the use of the word, "some", means not all.

760APL-MR-51-EV09

Comment: *Present Actions/Stresses - Pg 26, 4th para - "Those areas of tidal freshwater marsh outside of the SNWR could be filled after obtaining a Department of the Army Permit; such a permit would require mitigation for these impacts but not replacement of tidal marsh." Why would the Corps of Engineers issue permits for filling remaining tidal freshwater marsh within the Savannah River estuary knowing the history of that resources ' considerable destruction and the value of the remaining resource to the ecology of the watershed? Also, given the Corps' tenant of "no net loss of function or value" for wetland losses, why would wetlands replacement not be required?*

Response: Section 404 of the Clean Water Act regulates the discharge of dredged or fill material into waters of the United States [including wetlands]. USACE is the agency delegated the regulatory authority to evaluate these land disturbing activities. A USACE permit can be issued which authorizes the permitee to impact wetlands and/or other aquatic resources. This has occurred in the vicinity of the SNWR and there is the potential that additional permits could be issued. However, the number of future permit applications which will be submitted for consideration is unknown. Moreover, the District cannot speculate on the number of permit actions or type(s) of impact that would be authorized. Issuance of a USACE permit is not guaranteed. Savannah District evaluates a permit application/associated mitigation plan on its individual merits and then renders a decision.

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760APL-MR-51-EV10

Comment: *Capacity to Withstand Stress - Pg 27, 2nd para - "Tidal freshwater marshes exist in a very specific environment and are greatly controlled by ground elevation, river and tidal flows, and salinity levels. Maintaining salinity levels that are 0.5 ppt or less is critical to their survival" Please explain how the above statement relates to the subject heading of Capacity to Withstand Stress.*

Response: The ability of a resource to withstand stress can be a function of its capability to live under a broad range of environmental conditions, or whether its survival is dependent on maintenance of a narrow set of conditions. The discussion of the requirement of tidal freshwater marshes for narrow ranges in ground elevation, river and tidal flows, and salinity levels is quite pertinent.

760APL-MR-51-EV11

Comment: *Present Actions/Stresses - Pg 33, 4th para - "All marsh in the Savannah estuary is protected from development by the provisions of Section 404 of the Clean Water Act." This statement appears contradictory to the assertion that preservation of freshwater wetlands is appropriate mitigation for expected wetland losses within SNWR because they (the wetlands that would be preserved) are under threat of development. Please explain.*

Response: All wetland and marshes are protected by the provisions of Section 404 of the Clean Water Act. The lands that would be purchased and preserved as mitigation for impacts to tidal freshwater

marsh are not marsh community types, but these sites are predominantly freshwater wetlands which fall under the purview of Section 404 regulations. An evaluation of the elements of wetland function affected by the shift of freshwater to brackish marsh revealed that the fish and wildlife habitat component would experience a minor impact [remainder are unchanged]. The proposed preservation lands consist of bottomland hardwoods, maritime forest and uplands dominated by deciduous forest and re-growth. The bottomland hardwoods are classified as palustrine, forested, broad-leaved deciduous systems that are both temporarily and seasonally flooded. Although bottomland hardwoods [in private ownership] are considered wetlands from a regulatory standpoint, they could be subject to such activities as timber harvest.

Preserving these areas would ensure their wildlife habitat values are protected in perpetuity. The acquisition and preservation of these lands would provide a functional replacement for the minor loss of wildlife habitat that occurs with the species shift from a freshwater- to brackish marsh.

The District and resource agencies have documented that land use changes are occurring in the immediate vicinity of the Savannah National Wildlife Refuge (SNWR). The areas proposed for preservation are susceptible to the same developmental threat. USACE is the agency delegated the regulatory authority to evaluate these land disturbing activities. A USACE permit can be issued which authorizes the permitee to impact wetlands and/or other aquatic resources. This has occurred in the vicinity of the SNWR and there is the potential that additional permits could be issued.

The District as well as regional planning entities expect Savannah Harbor and areas surrounding the SNWR will continue to experience population growth, industrial/commercial development, and changes in land use. In addition to the industrial developments that have been permitted by the District in recent years, the US Geological Survey, Water Science Center (GaWSC) commented on the large number of industrial facilities and associated impacts that are projected on lands in close proximity to the Georgia Ports Authority and the SNWR. Preservation of 245 acres ensures aquatic resources on the associated properties will be protected in perpetuity. The preserved land would provide additional buffer so that any future development in the vicinity will not result in a secondary and/or indirect impact to existing Refuge lands. There is also a threat that subtle changes in adjacent land use will also have a detrimental impact on the SNWR. For example, a Public Notice published by the Charleston District, Corps of Engineers on September 28, 2009 requested comment on a proposal from a private landowner to alter the hydrology within a relict rice impoundment [485 acres] via diversion of tidal flows. The entire property [693 acres] would then be used as a mitigation bank. Presently, this parcel provides stop-over benefits to migratory waterfowl similar to those provided by Refuge lands. Conversion to saltmarsh lessens its waterfowl potential and potentially results in crowding on adjacent preferred habitat. There is the immediate implication that birds could shorten their stay in the area and result in the populations that the Refuge currently serves resuming their migration with less rest. The expected effects of the proposed regulatory action on the SNWR have not been quantified, but the proposed action is an example of the continued threat that manipulation of adjacent lands poses to the SNWR and the resources it protects/fosters. Acquisition and preservation of the proposed 2,245 acres as mitigation for SHEP would provide additional buffer and protection from this type of activities. The mitigation lands would include a restrictive covenant/conservation easement with subsequent conveyance to the USFWS.

760APL-MR-51-EV12

Comment: *Present Actions/Stresses - Pg 34, 1st para - "Those who have obtained permits have been required to avoid wetland impacts where practicable and to provide in-kind mitigation where wetland losses are unavoidable." For its unavoidable wetland impacts from SHEP, the Corps is proposing to*

purchase existing wetlands that are under no threat of development and preserve them by having the acreage incorporated into SNWR. Why would the Corps consider that to be in-kind mitigation?

Response: The mitigation for direct wetland impacts associated with the SHEP is referenced on page 34 [not species shifting from tidal freshwater to brackish/salt marsh]. Specifically, the direct wetland impacts of the SHEP consist of the loss of 15.68 acres of marsh resulting from excavation required for the Kings Island Turning Basin improvements, construction of the meeting lanes, and removal of the Tidegate structure abutments. In-kind mitigation for these impacts would be provided by restoring 40+ acres of marsh in Disposal Area 1-S.

The 2008 Final Mitigation Rule describes the need for a functional assessment of impacted waters of the US as well as the aquatic resources proposed for mitigation. The Rule also stresses the need for a watershed assessment and provides mitigation selection criteria. The District Engineer considered all these elements during the deliberative process to determine appropriate mitigation for SHEP.

The functional assessment concluded that the differentiation between salt marsh and brackish marsh recommended by the Wetland Interagency Coordination Team was restrictive. Specifically, the salinity range used in the SHEP model to differentiate between brackish marsh (0.6-4 ppt) and salt marsh (> 4ppt) was narrow. Brackish marsh salinities in the vicinity have been reported with a range from 0.5-10 ppt (NOAA, 2010) and in other estuarine systems from 0.5-17 ppt (Judd and Lonard, 2004). An earlier assessment of wetland vegetation in the Savannah estuary reported a salinity range of 5-10 ppt for brackish marsh systems (ATM, 2003). Thus, the salinity range used to quantify salt marsh in the area of potential effect (i.e., > 4 ppt) may over-estimate the amount of saltmarsh in the system and under-estimate the amount of brackish marsh. As such, the described conversion of salt marsh to brackish marsh, which would occur as a result of harbor deepening, may be minimal when taking into account vegetative characteristics for wetland environments with associated salinities commonly associated with a brackish marsh (i.e., range between 5 and 10 ppt).

Given the wide range of salinity reported in literature for brackish marsh systems, the inherent variability in salinity that exists for all estuarine systems, and the modeling results that report post-deepening salinity concentrations consistent with the aforementioned range, it was concluded that conversion of 740 acres of saltmarsh to brackish marsh [47-feet option] is unlikely. Actual vegetative shifts may not be identifiable *in situ*. That said, the District elected to be conservative in its assessment of the potential for project-related effects and considered the entire saltmarsh and brackish marsh conversion in its calculation of minor impacts.

The conversion of 223 acres of freshwater wetland to brackish marsh represents the only significant wetland effect that is likely to be noticeable if the harbor is deepened to 47-feet . As noted previously, the ecological values of the impacted 223 acres of freshwater wetlands would not be completely lost. Instead, those acres would be converted to brackish marsh. The District's calculation of the number of acres of freshwater wetland that have the potential to be converted to brackish marsh is based on a shift at a given location of 0.5 ppt salinity, a traditional rule-of-thumb for differentiating between freshwater marsh and brackish marsh. However, data reported in the literature for Savannah Harbor suggest that a shift in vegetation (from freshwater marsh to brackish marsh) in this estuary does not occur until salinity concentrations approach 2.5 ppt (Latham et al., 1994). Even at oligohaline marsh sites with average salinity concentration of 2.1 ppt, a discriminant function (DF) analysis revealed that only 47% of cases resulted in the correct pairing of environmental variables with vegetative species composition and dominance. At those same oligohaline sites, 37% of the vegetative species

composition and dominance were more closely aligned with a freshwater classification (Latham et al., 1994).

The District's salinity value that denotes a defined shift from freshwater to brackish marsh (i.e., 0.5 ppt) is approximately 5 times lower than has traditionally been observed with 100% vegetative shifts *in situ* within the Lower Savannah Watershed (Latham et al., 1994) and other coastal marsh systems in the southeastern United States (NOAA, 2010). Thus, many of the existing freshwater emergent plant species, and associated ecological parameters, will likely be sustained in areas predicted to experience salinity concentrations in the range of 2.5 ppt. For those areas that transition to more brackish characteristics, they would continue to provide the traditional ecological functions associated with all emergent wetland systems (please see functional assessment response and Appendix C-Mitigation Planning; Section VII).

The District conducted a watershed assessment in the Lower Savannah River Harbor to evaluate specific mitigation measures which could compensate for the conversion of freshwater wetlands to its brackish marsh counterpart. This functional assessment concluded the only element of wetland function that would be affected by this conversion was the fish and wildlife habitat component. To rectify these losses, the District reviewed approved mitigation banks in the Lower Savannah River Watershed, but determined there were none with the appropriate tidal, freshwater wetland characteristics. The District determined that the "In-Lieu Fee" program is functionally unable to provide the requisite compensation. The District considered the creation of freshwater, tidal wetlands. However, it was ultimately concluded by the study group that this was not a long-term solution given the high risk of failure.

33 CFR 332.2 (h)(2) of the Final Mitigation Rule States, *"Where preservation is used to provide compensatory mitigation, to the extent appropriate and practicable, the preservation shall be done in conjunction with aquatic resource, restoration, establishment and/or enhancement activities. This requirement may be waived by the district engineer where preservation has been identified as a high priority using a watershed approached described in paragraph (c) of this section, but compensation ratios will be higher."* After a great deal of deliberation, a consensus was reached that the most appropriate and practicable means of mitigating the resultant species shift is the preservation of approximately 2,245 acres of bottomland hardwoods and upland buffer. USFWS and the Savannah National Wildlife Refuge (SNWR) have a prioritized acquisition list of ecologically valuable properties available within the estuary which can further Refuge's goals and enhance the area's fish and wildlife resources.

The latest version of the Refuge's Acquisition Plan is dated July 2007 and is included in the document titled "Final Environmental Assessment and Land Protection Plan; Proposed Expansion of Savannah National Wildlife Refuge". The document characterizes the lands proposed for preservation in the areas identified as Mill Creek and Abercorn Island. The properties comprising the Mill Creek, Abercorn Island, and Eastern Boundary areas are characterized as wetlands and upland. The wetlands are classified as bottomland hardwood forest, dominated by old-growth oaks, cypress, sycamore and sweetgum. The sites are both temporarily and seasonally flooded and/or forested wetland. Thus, the proposed preservation of 2,245 acres of wetlands and upland buffer adjacent to the SNWR constitutes "in basin" mitigation. USFWS previously identified the ecological value of those properties and believes they would be valuable additions to, and advance the goals of, the Savannah Refuge.

Although elements of the properties proposed for preservation are "out-of-kind," the Final Mitigation Rule provides for use of "out-of-kind" mitigation in certain circumstances where the mitigation is determined to be ecologically important. 33 CFR 332.3 (e)(2) of the Final Mitigation Rule states, "*In*

general, in-kind mitigation is preferable to out-of-kind mitigation because it is most likely to compensate for functions and services lost at the impact site. If the district engineer determines, using the watershed approach in accordance with paragraph (c) of this section that out-of-kind compensatory mitigation will serve the aquatic resource needs of the watershed, the district engineer may authorize the use of such out-of-kind compensatory mitigation. The basis for authorization of such out-of-kind mitigation must be documented in the administrative record for the [permit] action." Areas proposed for preservation constitute the last virgin mixed, bottomland hardwoods remaining in the State of Georgia and one of few such areas remaining in the southeastern United States (Refuge Acquisition Plan-2009). The USFWS advocated for the acquisition and preservation of these properties as acceptable mitigation for impacts associated with the SHEP. The Fish and Wildlife Coordination Act Report states that proposed preservation would provide suitable mitigation for the project's impacts to wetlands.

760APL-MR-51-EV13

Comment: *Capacity to Withstand Stress - Pg 34, 3rd para - "The philosophy of the Corps of Engineers and state wetland protection programs is a "no net loss" of wetlands policy. Please explain how the Corps' use of wetland preservation in its proposed mitigation plan for SHEP is consistent with its philosophy of "no net loss".*

Response: Please review the previous response to see how the SHEP mitigation plan associated with indirect impacts to wetlands satisfies the 2008 Mitigation Rule and is consistent with the "no net loss" philosophy.

The harbor deepening project would also result in direct impacts to 15.68 acres of saltmarsh. These impacts would ONLY result after all possible avoidance and minimization measures have been applied. In brief, these marsh areas are subject to periodic flooding as a result of daily tides and are a monoculture of smooth coordgrass [*Spartina alterniflora]*. Approximately 7.3 acres (47%) of the total saltmarsh acreage that would be excavated is subject to the perturbations of wave action from passing ships. Thus, these areas exhibit vegetation densities significantly less than typically observed in a pristine marsh. Patches of bare, course-grain sand and mudflat are integrated throughout the areas of *Spartina alterniflora* in these locations. Given the sparse presence of vegetation, it would appear that these areas are challenged, somewhat degraded, and do not possess the same degree of primary productivity as observed in robust, densely-vegetated, saltmarsh systems located elsewhere in coastal Georgia.

Mitigation of the 15.68 acres would be accomplished by restoring approximately40+ acres of saltmarsh. The District used the Regulatory SOP to determine the exact number of acres (28.8) that would be required for restoration (See Appendix A-Mitigation Appendix). Historically, the USACE-Regulatory Division and members of the Interagency Review Team (IRT) [USEPA, USFWS, NMFS, and GADNR representatives] have agreed to saltmarsh creation as mitigation. Data obtained from the Savannah District-Regulatory Division identified five projects in the Lower Savannah Watershed where saltmarsh creation served as mitigation [typically on a ratio of 2 to 1= acres created/acres impacted, see following Table].

Projects impacting Saltmarsh and the Associated Saltmarsh Mitigation

Project Name	USACE File Number	Saltmarsh Impacts (Acres)	Saltmarsh Creation (Acres)
Slip One- Hutchinson Island	200501453	0.28	0.56
Hardin Canal Drainage	200600393	0.27	0.54
Skidaway Narrows Emergency Access	200600909	0.56	0.56
Skidaway Road Drainage Improvements	200601249	0.52	0.75
SLNG-Slip Construction	200200640	3.24	7.5

The proposed restoration of 28.75 acres [subset of the 40+ total] of brackish marsh as mitigation for impacts to 15.68 acres would be a ratio of 1.8:1 (acres restored to acres impacted). The ratio derived for the SHEP project provides roughly the same mitigation ratios as the other noted projects. Savannah District's use of the SOP confirmed that the amount of proposed mitigation was appropriate given the areal extent of impact and the current function/integrity of the impacted marsh.

Site specific mitigation would be ill-advised given the impacted area's exposed location. It is important to note that any comparably sized subset of the 40+ acres of contiguous, restored saltmarsh [which includes development of tidal creeks] would have more ecological value than the degraded, poorly functioning marsh along the navigation channel. Thus, the large, non-segmented size of the mitigation area, coupled with its "in basin" location along with incorporation of a strip of trees to separate it from the harbor, make it an ideal mitigation option for replacing the impacted marsh acreage. After considering all of the facts, the District concluded that there would be no net loss of wetland function.

760APL-MR-51-EV14

Comment: *Incremental Impact - Pg 34, 5th para - "The SHEP would result in the loss of 3.0 acres of brackish marsh and 12.68 acres of saltmarsh. When compared to the total amount of brackish marsh and saltmarsh in the Savannah Harbor estuary, this loss might seem insignificant. However~ it is the incremental impact of many small losses over time that can lead to significant adverse impacts to a resource." Please include a statement of the magnitude and significance of this incremental impact.*

Response: While the States of Georgia and South Carolina have large expanses of salt/ brackish marsh, any loss of these community types is considered important because of the long-term threat of cumulative impacts. The SHEP mitigation plan involves the restoration of 28.8 acres of marsh in former Disposal Site 1S to satisfy the mitigation requirements of the SHEP (15.68 acres of impact). See Appendix L for further discussion regarding the significance of the incremental impact.

760APL-MR-51-EV15

Comment: *Mitigation - Salt Marsh and Brackish Marsh - Pg 35, 1 st para - "Over time this site would be expected to re-vegetate with estuarine emergent wetlands (brackish marsh). Not planting the site with appropriate marsh vegetation leaves open the distinct possibility that the site will be colonized by Common Reed (Phragmites sp) or other undesirable plants. Please explain why planting with appropriate vegetation is not being proposed.*

Response: Previous reconnaissance of the restoration area suggests that *Spartina alterniflora* is abundant in the surrounding area [ample seed stock]. Thus, it would be prudent [cost-effective] to allow this native species an initial opportunity to naturally colonize the site. However, in the event the restoration site does not naturally vegetate at the rate stipulated in the Adaptive Management Plan, sprigging with juvenile plants would be performed (see previous responses and Appendix C-Mitigation Plan of the FEIS). The plan also includes measures for removal of invasive species. Annual monitoring reports would be generated. Corrective actions would be implemented with agency involvement/concurrence in the unlikely event of problems.

760APL-MR-51-EV16

Comment: *Pre-construction Monitoring - Pg 35, 5th para - "Monitoring of wetland vegetation for one year". Please explain the purpose and expected value of monitoring for one year.*

Response: The one-year of pre-construction monitoring would provide baseline wetland data in the 12 wetland sites to be monitored before inner harbor dredging commences, and the salinity regime begins to change.

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760APL-MR-51-EV17

Comment: *Monitoring During Construction - Pg 35, 6th para - "The same monitoring activities described above would be continued throughout the construction process, which is estimated to take 3-4 years". The Corps has indicated in other sections of this OEIS that construction of the SHEP is dependent upon receipt of funding from Congress. Given the uncertainty of a continuous funding stream that would allow the project to be completed in 3-4 years, how would the monitoring plan and costs be adjusted if construction were to stretch over a longer period of time?*

Response: Monitoring would continue throughout the period of construction, even if the projected 3-4 year period is exceeded. However, monitoring activities are linked to construction and would cease if construction was halted for a significant period of time due to a lack of funding.

760APL-MR-51-EV18

Comment: *Past Actions/Stresses - Pg 39, 2nd para - "In addition to loss of riverine habitat, much of the fishery habitat in the Savannah River estuary has also been lost or adversely affected". This statement is in stark contrast to the last paragraph on Pg 41 where results of a UGA study on the temporal and spatial distribution of estuarine fishes in the Savannah River estuary showed that the estuary supports a diverse and abundant fish community. Please clarify the apparent discrepancy.*

Response: There is no conflict between these two statements. Fishery habitat in the Savannah Harbor has suffered from historical development, including the clearing of large expanses of bottomland hardwoods for rice production together with more recent filling of wetlands for harbor/industrial development. However, despite these long-term perturbations, the remaining habitat supports a diverse and abundant fishery.

760APL-MR-51-EV19

Comment: *Present Condition - Pg 41, 1st para - "The shortnose sturgeon is the only endangered fish in the Savannah Harbor estuary". While that is a true statement at the moment, the National Marine Fisheries Service proposed in November 2010 that the Atlantic Sturgeon be listed as an endangered species under the Endangered Species Act. The Public Comment Period on the proposed listing closes in*

early January 2011, and the Atlantic Sturgeon may well be added to the Endangered Species List before the SHEP completes the NEPA and permitting processes. The potential impacts on Atlantic Sturgeon from the SHEP should be addressed in this DE IS (the Atlantic Sturgeon is acknowledged as an imperiled species in the I Sl paragraph of page 43 in this appendix), or in a supplemental EIS at a later date when the species is listed.

Response: The EIS does address impacts to Atlantic Sturgeon. Although the Atlantic sturgeon has not been listed as endangered, this species was included in the BATES prepared on the project. The NMFS determinations in regards to potential SHEP impacts on the Atlantic Sturgeon can be found in their BO which is in Appendix Z.

760APL-MR-51-EV20

Comment: *Future Actions/Stresses - Pg 46, 3rd para - "A marine terminal has been proposed for Jasper County, South Carolina". Including the proposed Jasper Terminal in the discussion of cumulative impacts acknowledges that it is a* reasonably *foreseeable activity. Why then is it not also appropriate to evaluate the Jasper Terminal as a reasonable and feasible alternative to the SHEP?*

Response: A new container terminal in Jasper County was an alternative considered during the SHEP NEPA and CWA alternatives analysis. See previous responses on this issue. The District considered three locations in Jasper County, SC for a "Jasper Terminal". Appendix O is one part of the EIS/GRR that describes this work and the conclusions. It should be noted that Appendix O was completed in 2005, before the term "Jasper" was used to describe the new terminal, so Appendix O makes no named reference to the "Jasper Terminal."

760APL-MR-51-EV21

Comment: *Incremental Impact - Pg 47, 2nd para - "Average river flows were determined to be the most representative of conditions that would be expected over the longterm". Why would a modeling analysis of predicted impacts not be more meaningful based on low flow rather than on average flow?*

Response: The modeling approach [as detailed in the report] provided meaningful data; hence, a change is not warranted. Details regarding the hydrodynamic and water quality model development process, its extensive reviews, and the uncertainty analysis can be found in the report titled "Development of the Hydrodynamic and Water Quality Models for the Savannah Harbor Expansion Project" [2006]. It is included in the Supplemental Materials to the Engineering Appendix. This report also includes language describing model accuracy for various parameters including salinity and dissolved oxygen throughout the Savannah River estuary [including Middle and Back Rivers]. The model met the expectations of the modeling technical review group and is applicable over a wide range of conditions, including low/high freshwater flows.

760APL-MR-51-EV22

Comment: *Incremental Impact - Pg 47, 2nd para - "Fish habitat modeling was used to identify areas in the harbor where suitable habitat exists as well as how that habitat would change under various harbor deepening alternatives". Was any ground-truthing of areas in the harbor predicted by the model to be suitable fish habitat to confirm the model's accuracy?*

Response: The habitat suitability criteria used to assess available habitat for the chosen fish species [including Shortnose sturgeon] were developed by the Fisheries Interagency Coordination Team. These criteria were based on professional expertise/experience, pertinent literature, and site specific data for

the Savannah River. The Team compared the predicted locations of suitable habitats within the harbor to literature that describes the locations where the various species were recently found. As a result of such an analysis, NOAA Fisheries recommended a specific change in the salinity criteria for juvenile Shortnose sturgeon so the model would better reflect known occurrences. The ICT concurred in the revision and the Corps revised its modeling to use the new criteria.

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760APL-MR-51-EV23

Comment: *Incremental Impact - Pg 48, 1st para - "Without mitigation, model studies indicate that there would be no effect on American shad habitat". What was done to confirm the accuracy of model predictions?*

Response: The habitat suitability criteria used to assess available habitat for the chosen fish species [including American shad] were developed by the Fisheries Interagency Coordination Team. These criteria were based on professional expertise/experience, pertinent literature, and site specific data for the Savannah River. The Team compared the predicted locations of suitable habitats within the harbor to literature that describes the locations where the various species were recently found. As a result of such an analysis, NOAA Fisheries recommended a specific change in the salinity criteria for juvenile Shortnose sturgeon so the model would better reflect known occurrences. The ICT concurred in the revision and the Corps revised its modeling to use the new criteria.

760APL-MR-51-EV24

Comment: *Incremental Impact - Pg 48 - The discussion on Incremental Impact ends on this page with no conclusion offered on the magnitude and significance of the cumulative impacts of the river's fisheries. Please add a discussion on this.*

Response: The importance of the various marsh types in the Savannah Estuary and the cumulative impacts of past harbor improvements on these resources are fully disclosed in Appendix L. The last sentence in the first paragraph on Page 48 of the DEIS, Appendix L merely emphasizes this point. The importance of marsh as fishery habitat is further evidenced by the restoration of 28.8 acres of marsh in Disposal Area 1S which will provide the required mitigation for the 15.68 acres of marsh that would be directly impacted by SHEP.

760APL-MR-51-EV25

Comment: *Alternatives to Mitigate for Cumulative Impacts - Pg 48, 2nd para, 5th bullet " Restoring conditions in the estuary that are favorable to spawning of Striped bass to support the recovery of that species". How does stocking of striped bass achieve this objective, since the incremental loss of striped bass spawning habitat is unaffected by stocking?*

Response: As explained, the seven mitigation objectives provide the means to compensate for anticipated fishery impacts on the Savannah River. The Fisheries Interagency Coordination Team could not identify ways to improve, restore, or create spawning habitat for Striped bass in the estuary. Consequently, stocking of Striped bass fingerlings was determined to be the best means of replacing fish that might be lost in the younger stages of life because of increased salinity levels in their spawning area. Fingerlings are capable of moving to areas with desired habitat conditions. It should also be noted that construction of the proposed fish bypass structure at New Savannah Bluff may also benefit the species by providing access to additional spawning habitat.

760APL-MR-51-EV26

Comment: *Alternatives to Mitigate for Cumulative Impacts - Pg 51, 6th para " Consequently, implementation ofa stocking program was deemed to be the most effective means of mitigating for the remaining loss of Striped bass habitat associated with each alternative deepening plan". Its unclear how adding striped bass to a river with reduced Striped bass habitat will be able to sustain the fishery, and how that is considered to be acceptable mitigation. Please explain.*

Response: Striped bass are a component of the recreational sport fishery in the lower Savannah River. Stocking of fingerlings would replace fish otherwise lost because of a project-related reduction in spawning, egg, and/or larvae habitat.

760APL-MR-51-EV27

Comment: *Alternatives to Mitigate for Cumulative Impacts - Pg 52, 2nd para - "Determining the appropriate level of stocking was accomplished by the SHEP study team in coordination with the Georgia DNR-WRD". Fishery resources in a river that is the common boundary between two states are shared resources of both states. Was the SC DNR involved in Striped bass mitigation development?*

Response: The South Carolina DNR was involved in discussions involving mitigation for loss of Striped bass habitat.

760APL-MR-51-EV28

Comment: *Issue - Pg 54, 3rd para - "These issues are addressed in Section 5 of the EIS, and while they are major issues, the SHEP study team did not believe they warranted a cumulative impact type of analysis". Both NEPA and CEQ guidelines on cumulative impacts analysis requires that issues identified during Project Scoping as being major need to be included in the cumulative impacts analysis. Temperature gradients in the estuary and chloride levels in Abercorn Creek were identified as major issues during Scoping. Therefore they need to be included in the discussion of cumulative impacts.*

Response: While formation of temperature gradients in the Savannah Harbor is a concern from the standpoint of estuarine functioning, it is not an important issue in terms of the SHEP analysis. The SHEP would have a negligible effect on the temperature regime in Savannah Harbor.

Identification of potential significant cumulative impacts was accomplished through preparation of the Cumulative Impact Analysis (EIS-Appendix L). As directed by the CEQ Guidelines, the cumulative impact analysis should “focus on truly meaningful effects”. The impacts included in the cumulative impact analysis were limited to those which met this test. Based on the District’s knowledge of the type and level of likely project effects, temperature gradients and chloride levels in Abercorn Creek were not included. Temperature gradients were not an issue of concern because the SHEP would have only the most minimal impact on same. A cumulative impact analysis of chloride levels at the City of Savannah’s water intake on Abercorn Creek would produce no new information. Namely, increased chloride levels in the upper Savannah Harbor can be attributed to just a few causative factors: previous harbor improvements, upstream point source discharges, droughts, and spring tides.

760APL-MR-51-EV29

Comment: *Issue - Pg 54, 5th para - "Dissolved oxygen concerns relating to harbor deepening can be divided into three issues: (1) as the channel depth increases, the ability of oxygen to reach the river bottom decreases, causing lower average concentrations of dissolved oxygen at the bottom, (2) as the channel prism .... throughout the water column". The decrease in DO levels at the river bottom has the potential to change both the benthic and plankton communities, which in turn may negatively impact the fish community. These impacts and their linkage should be discussed.*

Response: The proposed dissolved oxygen systems would restore and marginally increase dissolved oxygen levels [post-construction] in the estuary. The restoration of dissolved oxygen levels [to at least the status quo] should eliminate potential changes in benthic or plankton communities otherwise attributable to SHEP.

760APL-MR-51-EV30

Comment: *Issue - Pg 54, 5th para - "Lower dissolved oxygen concentrations also reduce the ability of the estuary to handle the point and non-point source loads of pollutants entering the estuary". The SHEP's lowering of dissolved oxygen levels in the harbor effectively reduces the harbor's ability to sustain a higher aggregate TMDL. That could result in higher costs to point-source dischargers who would have their TMDL lowered because of SHEP's impact on the harbor DO levels. This point should be discussed.*

Response: The project includes an oxygen injection system to mitigate for incremental reductions in dissolved oxygen attributable to the various alternative channel depths. Since adverse impacts associated with reduced dissolved oxygen have been addressed, any concerns about the Savannah Harbor Draft TMDL mitigation are eliminated. The project's proposed oxygen injection system would restore dissolved oxygen levels to what they would be without the project. Because of the wide spacing of the oxygen injection systems, much of the estuary would experience a minor increase in dissolved oxygen levels as a result of the project.

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760APL-MR-51-EV31

Comment: *Geographic Scope - Pg 55, 1st para - "Evaluation of impacts to the dissolved oxygen regime is critical because this segment of the river is on the State of Georgia's Section 303(d) list as impaired for dissolved oxygen". What is the status of that river segment under SC water quality criteria for dissolved oxygen?*

Response: SCDHEC identifies portions of the Savannah River estuary (Savannah River at US 17) as not meeting state standards for Fecal Coliform and Zinc (2010 Section 303(d) list). It does not identify the area as not meeting the dissolved oxygen standard.

760APL-MR-51-EV32

Comment: *Historic - Pg 55, 5th para - "In addition, since water quality in the harbor is - at a minimum not degrading - but likely to be stable or improving as tighter discharge standards are instituted and new industrial controls implemented, the present day conditions will be used as the baseline for this analysis". This does not follow NEP A nor CEQ guidelines on how impacts to specific resources arc to be evaluated for cumulative impacts.*

Response: As part of the cumulative impact assessment, the past, present, and reasonably foreseeable future impacts were examined. A historical, qualitative account of water quality is provided in Appendix

L. However, this descriptive information cannot be evaluated to the same degree/confidence as the quantitative, analytical data that has been acquired in recent years. Therefore, the use of present day conditions as a baseline is justified since any attempt to comparatively analyze qualitative and quantitative data sets could not be done objectively. These baseline data were used with predictive models to describe reasonably foreseeable future impacts [degree/kind] more accurately; this in turn provides a more rigorous analysis of cumulative impacts.

760APL-MR-51-EV33

Comment: *Past Actioons/Stresses - Pg 57, 1st para - "Monitoring indicates that the effects of this resuspension on dissolved oxygen levels are small, temporary, and localized". What monitoring? What is the reference for this statement?*

Response: Operation of a hydraulic dredge results in re-suspension of sediments which may, in turn, reduce dissolved oxygen levels in the harbor. However, this perturbation is relatively small in magnitude, transient, and localized. This is an objective characterization based on actual monitoring data, i.e., the District is required to monitor oxygen levels in the vicinity of dredge during the summer months when D.O. levels are normally lower.

760APL-MR-51-EV34

Comment: *Past Actions/Stresses - Pg 57, 4th para - "Overall, the studies revealed that this procedure does not degrade the quality of the river to unacceptable levels". The studies need to be referenced. Are state water quality standards (either Georgia or SC) violated?*

Response: The following are references for the subject studies: 1. Final Report: Evaluation of Agitation Dredging, Savannah Harbor Ecosystem Restoration Study; Prepared by Applied Technology and Management; March 29, 2002. 2. Environmental Impact of Agitation Dredging at Southern Bulk Industries Terminal, East Coast Terminals and Wood Chip Exporting Facility, Savannah Harbor; Prepared by Skidaway Institute of Oceanography, May 1, 1993.

760APL-MR-51-EV35

Comment: *Past Actions/Stresses - Pg 57, 4th para - "This procedure is not performed when background dissolved oxygen levels in the river are at or below Georgia water quality standards". Is the procedure performed when dissolved oxygen levels in the river are at or below SC water quality standards?*

Response: Agitation dredging in the Savannah Harbor is only conducted in Georgia state waters.

760APL-MR-51-EV36

Comment: *Present Condition - Pg 57, 5th para - "Water quality in the harbor is generally good". This statement is inconsistent with the another sentence in that paragraph that says "The dissolved oxygen levels can drop to concentrations that do not adequately support aquatic life". This discrepancy should be rectified.*

Response: Water quality in the Savannah Harbor is generally good for most [approximately nine months] of the year. However, summer temperatures often depress dissolved oxygen levels to concentrations which stress aquatic life. This perturbation varies throughout the harbor and is a recurrent rather a constant problem during the summer months.

760APL-MR-51-EV37

Comment: *Present Condition - Pg 58, 1st para - "'This segment of the river failed to meet the dissolved oxygen use designation based on data collected in the summers of 1997 and 1999 (EPA 2006)." If there is recent data on summertime DO levels in that segment of the river, it should be referenced.*

Response: These reference data were used by EPA in 2006 to establish the Savannah Harbor TMDL. There should have been no inference that this information is inclusive of all water quality data available for the Savannah Harbor.

760APL-MR-51-EV38

Comment: *Present Actions/Stresses - Pg 59, 3rd para - "Model results from the EPA TMDL study for Savannah Harbor indicate that the Savannah Harbor Navigation Project has resulted in a 1 mg/l depression of dissolved oxygen in the upper water column". What is the magnitude of DO depression in the lower water column?*

Response: The referenced EPA document [2006] did not provide information concerning depression of oxygen concentrations [in the lower portion of the water column] attributable to the Savannah Harbor Navigation Project. A complete discussion of dissolved oxygen impacts and associated mitigation measures can be found in FEIS-Section 5.02.

Page Appen. L-7

760APL-MR-51-EV39

Comment: *Present Actions/Stresses - Pg 59, 4th para - "If the background levels are at or below Georgia water quality standards, the dredging is not performed. This ensures that activities will not be conducted which would further exacerbate stressful conditions for wildlife". There seems to be an inconsistency here. Maintenance dredging is not performed if the DO is near or below water quality standards, but the Corps proposes to construct a project that (without mitigation, and maybe even with mitigation) would permanently worsen the DO problem.*

Response: Mitigation for the project includes operation of an oxygen injection system that would remove the incremental impacts of the deepening alternatives on the dissolved oxygen regime in Savannah Harbor. Dissolved oxygen conditions during future maintenance dredging activities would be the same or improved from those currently observed [irrespective of season].

760APL-MR-51-EV40

Comment: *Incremental Impact - Pg 66 - The discussion on incremental Impact ends on this page with no conclusion offered on the magnitude and significance of cumulative impacts to the river's dissolved oxygen from past, present and future projects. Please add a discussion on this.*

Response: The discussion of SHEP's incremental impacts on dissolved oxygen presented in this section is adequate.

760APL-MR-51-EV41

Comment: *Alternatives to Mitigate for Cumulative Impacts - Pg 66, 3rd para - "Basically, these plans reduce the anticipated increase in salinity levels by reducing salt water flows into Back, Little Back, and Middle Rivers, while providing more freshwater inflow to these streams". Was consideration given to the likelihood that the freshwater inflow could include high oxygen-demanding organic materials from the large acreages of wetlands in the upstream part of the basin?*

Response: The predominant source of high oxygen-demanding substances in the harbor is the marshes that surround the rivers in the estuary. Point source discharges in upriver areas do contribute to D.O. problems in the estuary (EPA TMDL), but the major factor is the organics that are flushed from the marshes as part of the daily tidal exchange. The water quality studies performed for the SHEP and the analyses performed by EPA for its Dissolved Oxygen TMDL provided enlightening information on this subject.

760APL-MR-51-EV42

Comment: *Alternatives to Mitigate for Cumulative Impacts - Pg 67, 2nd para - "This device was originally used to add oxygen to the bottom of lakes to enhance downstream fisheries". Where has this technology been successfully used on a scale commensurate with the SHEP? If it hasn't, then reliability is a significant issue, and the mitigation plan, which relies so heavily on the speece-cone technology for the success of other mitigation plan elements, is also significant issue.*

Response: While the injection of oxygen into an estuary [to improve dissolved oxygen levels] is a relatively new concept, the technology has been used in industrial applications for decades. There is little objective doubt that oxygen injection can add oxygen to Savannah's estuarine waters. This position is verified by the results from the 2007 field demonstration of the subject oxygen injection equipment and subsequent water quality modeling of the effects of injection on dissolved oxygen levels [throughout the water column]. While effective, the oxygen injection system used in the 2007 Demonstration Project did not raise dissolved oxygen levels a great deal over a large portion of the harbor. A major remaining issue is whether the injected oxygen would spread sufficiently throughout the estuary to compensate for the effects of a deeper channel. The same models that predict the adverse impacts of a deeper harbor are the ones that the Corps used to design the dissolved oxygen systems to remove those impacts.

The monitoring plan includes a comparison of the model's predictions with what actually occurs in the harbor with respect to dissolved oxygen levels. The Transfer Efficiency Study would determine how well the oxygen injection systems add oxygen to the water column. The Adaptive Management Plan contains provisions to modify the oxygen injection system [as necessary]. These changes could include increasing the amount of injected oxygen, use of different equipment, altering the locations/number of the oxygen injections sites, etc.

760APL-MR-51-EV43

Comment: *Alternatives to Mitigate for Cumulative Impacts - Pg 67, 4th para - "The costs for operating the oxygen injection systems are based on their continued operation for a period of 4 months per year". However, the modeling results show that DO levels are expected to be below standards for more than 4 months a year. Why wouldn't the oxygen injection system be operated during each month that oxygen is expected to be below state standards?*

Response: As discussed in EIS-Appendix C, the oxygen injection system would be operated from 15 June through September to provide the identified pounds of oxygen per day needed to meet the mitigation requirement of the channel depth implemented.

760APL-MR-51-EV44

Comment: *Alternatives to Mitigate for Cumulative Impacts - Pg 68, Table 11 - Under the column labeled Scenario Description, the various incremental depth projects are listed, from a deepening project of2 feet (44-foot depth in the channel), to a deepening project of6 feet (48-foot depth in the channel). However, the DE IS acknowledges that under any of the channel deepening alternatives being considered, there would be 2 feet of allowable over-depth dredging and 4 feet of advanced maintenance added to each alternative. This means that the 44-foot channel alternative is actually a 50-foot channel, and the 48-foot alternative is actually a 54-foot channel. None of these depths were modeled with respect to their anticipated impacts on 001 fisheries, sediment disposal, etc. This should be done to accurately assess the project's true impacts to the Savannah Harbor.*

Response: Advanced maintenance dredging is used throughout much of the harbor because the channel experiences fairly rapid shoaling. Savannah Harbor's existing depth measurements and its expected bathymetry were used in the development of the predictive models.

Page Appen. L-8

760APL-MR-51-EV45

Comment: *Incremental Impact - Pg 78 - The discussion on Incremental Impact ends on this page with no conclusion offered on the magnitude and significance of cumulative impacts to the groundwater resources from past, present and future projects. Please add a discussion on this.*

Response: The impacts of previous Savannah Harbor dredging on the rate of saltwater intrusion into the Upper Floridan aquifer are discussed on page 76 of Appendix L, whereas the dredging effects that would occur if the SHEP is implemented are noted on page 78. Study results predict that the timing of chloride breakthrough into the Upper Floridan aquifer will not be significantly affected by reducing the thickness between its confining layer and the deepened channel bottom. Similarly, the proposed dredging is projected to have only minimal impacts on water quality in production wells that tap the Upper Floridan aquifer in and around the City of Savannah.

760APL-MR-51-EV46

Comment: *Issue - Pg 79, 1st para - "Right whales, sea turtles, West Indian manatee and Shortnose sturgeon are species that are protected by Federal law that are commonly thought of as being at risk from harbor operations". Atlantic sturgeon should also be acknowledged here since NMFS has proposed listing the species as Endangered under the Endangered Species Act.*

Response Although Atlantic sturgeon are not yet listed as an endangered species, the impacts of the SHEP on this species was addressed in the BATES. The BATES was submitted to the NMFS, and they have provided a BO which addresses SHEP impacts to Atlantic surgeon.

760APL-MR-51-EV47

Comment: *Present Condition - Pg 82, 3rd para - "Although the Savannah River Shortnose population is considered to be improving since the species was placed on the endangered species list in 1967, the apparent low level of recruitment remains a major concern". What is the reference for the shortnose sturgeon population being considered to be improving?*

Response: The statements in this section were based on information in the Shortnose Sturgeon Habitat Suitability Model Review (Callahan 2003), which includes the statement "However, high adult to juvenile

ratios indicate low recruitment and an artificially elevated adult population from stocking (Collins and Smith 1993, Collins et al. 2002)."

760APL-MR-51-EV48

Comment: *Present Actions/Stresses - Pg 86, 211d para - "Maintenance of the Savannah Harbor Project is believed to have only minimal impacts on the Shortnose sturgeon in Savannah Harbor". What is the reference for this statement?*

Response: This conclusion is based on the information in Appendix B.

760APL-MR-51-EV49

Comment: *Capacity to Withstand Stress - Pg 86, 3rd para - Given the uncertainties expressed in this paragraph on the proposed project's multiple potential impacts on the Shortnose sturgeon, why would the project not have a high likelihood of violating the Endangered Species Act? Where is the discussion of SHEP compliance with the Endangered Species Act?*

Response: Appendix B addresses SHEP compliance with the Endangered Species Act. Information concerning project impacts on Shortnose sturgeon has been added to Appendix L with respect to the findings of the BO prepared by the NMFS

760APL-MR-51-EV50

Comment: *Incremental Impact - Pg 88, 8th para - "A, Conceptual plans have been developed to construct a major container terminal in Jasper County, South Carolina". Since the Jasper Terminal has been developed to the conceptual level, why is it not considered a reasonable and feasible alternative to the SHEP?*

Response: The District considered multiple sites in Jasper County as alternatives to the proposed project. Please see GRR-Section 6 and 12, GRR-Appendix D, EIS-Section 3, and EIS-Appendix O. Please also see other responses on this issue.

760APL-MR-51-EV51

Comment: *Incremental Impact - Pg 89 - The discussion on Incremental Impact ends on this page with no conclusion offered on the magnitude and significance of cumulative impacts to endangered species resources from past, present and future projects. Please add a discussion on this.*

Response: The decline of Shortnose sturgeon is attributable to many factors, but none is more important that the loss of its upstream habitat. Appendix L provides an historic account of this and other endangered species in Savannah Harbor and details the reason[s] for their decline. Harbor deepening would not affect the Shortnose sturgeon's spawning habitat, since that habitat is located over 100 miles upstream from the SHEP's area of effect. The excavation would adversely impact sturgeon winter habitat in the lower Savannah River and benefit adult sturgeon summer habitat. The project-induced impact is caused by an increase in upstream salinity levels. While no critical habitat for Shortnose sturgeon has been designated in the Savannah River, the importance of protecting [and even improving] the habitat for all resident species in the lower Savannah River is obvious.

The text on Page 91 of Appendix L, Incremental Impacts, has been revised. "Although no portion of the Savannah River estuary has not been declared official critical habitat under the Endangered Species Act…" has been changed to "Although no portion of the Savannah River estuary has been declared official critical habitat under the Endangered Species Act…"

Page Appen. M-1

760APM-DC-03-EV01

Comment: *The risk evaluation of residual cadmium in the bottom of the water way after dredging required several "tiers" of evaluation to get to an acceptable risk conclusion. They needed to advance their risk assessment approach to a Tier III bioavailability study in benthic organisms to detennine the site-specific uptake of cadmium from sediments. The reported body burdens of cadmium and nickel increased in a dose-response type relationship. Table 37 provides summary of the toxicity reference value (TRY) derivation to identify a. No Observable Adverse Effect Level (NOAEL) concentration to support a 1.12 mg/kg concentrations in benthos as protective. The TRY derivation presented in the document does not present a strong case for selection of the species used to basis for TRV selection. A detailed description of the results of the benthic survey supporting the selection of representative species would strengthen this section. The NOAEL TRY selection currently appears to be the weakest portion of the evaluation. The ecological risk assessment used standard methodology to estimate potential adverse effects to the surrounding ecosystem. Estimates of potential exposure to fish and upper-trophic aquatic receptors were calculated from concentrations in benthic tissue. The risk assessment concluded that cadmium in benthos do not pose a risk to upper trophic receptors.*

Response: Aquatic bioaccumulation studies were performed by EA Engineering, Science, and Technology and are found in the EIS [Appendix M]. EPA protocols recommended using Sand worms (*Nereis virens*) and the Blunt-nosed clam (*Macoma nasuta*) [both borrowing animals] in this instance. At the end of these bioaccumulation studies, both species were placed in distilled water and allowed to purge. After preparation [freezing/grinding], tissue samples were analyzed for contaminant uptake.

The results of this sediment quality evaluation are found in FEIS [Appendix M]. The conclusions of the aquatic bioaccumulation study are found in Tables 36 and 37 as well as in Sections 4.2.4, 4.2.5, and 5.4. In summary, they are, "***bioaccumulation in high cadmium sediments were found to be well below potential levels of effect. Therefore, potential environmental impacts through bioaccumulation of cadmium by benthic organisms are expected to be minimal".***

Table 37 shows NOAELs for cadmium and nickel to demonstrate that the worms used for the bioaccumulation study would not be expected to have their growth affected by the metal levels in the sediments in which they were grown. The 1.12 mg/kg concentration in benthos was meant to be protective in that it demonstrated that metal uptake by the worm should not be affected by the observed tissue levels in the worm. Since the low level of metal uptake observed in the worm was below NOAEL values, uptake inhibition by sediment metal levels would not be expected. Therefore, the worms would be considered to be growing normally and the observed low uptake values would be considered valid for predicting uptake by benthos in general.

Because few invertebrate species are available with which to conduct bioaccumulation predictions, the actual benthos residing in the DMCAs was not considered of major importance and no benthic surveys were performed. EPA/Corps procedures recommend the use of standard benthic organisms for sediment testing to allow better interpretation of the data and comparison between locations. The results from the laboratory worm bioaccumulation are used in the project impact prediction, no matter what species reside in the DMCAs. An NOAEL toxicity reference value is of little value for benthic bioaccumulation predictions if used to predict whether particular benthics can survive and grow in an area. The issue is whether the benthics expected to be present in an area can uptake metals and pass those metals on to bird that consume the benthics. Examination of bioaccumulation in standard representative benthic species allows those predictions to be made.

Page Appen. M-2

760APM-DC-03-EV02

Comment: "*The last major eco-risk assessment evaluation was on dry sediments used for levee and flood control construction. Cadmium in dried sediments appear much more bio available to plants and animals. Capping is the approach for control for "wet" sediments and keeping cadmium sediments out of the rotation management plan for use in levee and food control structure construction and repair is the mitigation. The plan proposes monitoring to evaluate the potential uptake of cadmium into plants, the monitoring plan should be carefully planned with respect to decision triggers. EA and the Corps of Engineers has differences in the calculation and interpretation of Ecological Quotients (EQs). The Corps (CENOW-HX-S) defines their approach to interpreting the EQ based on USEPA Interim Superfund Guidance in Section 4.2.3.7. of the report, however, a detailed description of the EA interpretation of the EQ is not provided. A detailed review of the approach applied by EA would need to be made to offer an opinion on the difference in interpretations between the approaches used by CENOW-HX-S and EA."*

Response: EA Engineering, Inc. [EA] was not asked to evaluate the ecological quotients (EQ) approach used by CENOW-HX-S; hence, no detailed assessment exists. Rather, EA was tasked to perform a risk assessment [using site-specific data] of the consequences [short- and long-term] to avian species that feed on organisms living in soils having elevated cadmium levels [bioaccumulation concerns].

760APM-DC-03-EV03

Comment: *Overall the evaluation is comprehensive, but does not appear to be overly in depth in the toxicity assessment for benthics.*

Response: There was no need for the sediment quality evaluation to examine toxicity levels, per se, for benthic organisms residing in the DMCAs. The salient issue is bioaccumulation in these species and, more importantly, how this phenomenon would similarly affect the birds which prey on them.

Page Appen. N-1

760APN-DC-01-EV01

Comment: *An email between Heinz Mueller and Brenda Willet at the Corps on 3/29/2010 (page 32-33) suggests that the model to marsh proposal may not have been approved by the Water Division, but simply approved based on the lack of a response. Is this the case? Was the proposal ever approved or formally disapproved? The final approval status should be part of the public record.*

Response: The subject comment refers to an email dated 3/29/10; this contradicts page 32-33 of Appendix L which shows the email was dated 3/29/07. The 3/29/07 email date is the correct reference. The approval is documented in the same email chain on page 31 of Appendix L in an email from Mr. Heinz Mueller (EPA) to Mr. Bill Bailey (District). In his email, Mr. Mueller states that EPA-Region 4 concurs with the proposed approach.

Page Appen. Q-1

760APQ-DC-13-EV01

Comment: *Page I. Section 2A. The DEIS did not include field studies to gather more information on Atlantic sturgeon even though the DEIS admitted there was a paucity of information about the sturgeon and it is a candidate species that has a proposed listing of endangered.*

Response: In addition to existing information, an extensive monitoring study in the southeastern US is being funded by NOAA on the Atlantic and Shortnose sturgeon. This effort began in the spring of 2011 and is scheduled to last for five years. The work in the Savannah River is being conducted by SCDNR. http://www.nmfs.noaa.gov/pr/conservation/states/funded.htm. As information becomes available, NOAA and the Corps will consider it. The NMFS BO collects and analyzes the relevant known information about the Atlantic sturgeon.

760APQ-DC-13-EV02

Comment: *Page 2, 1st Paragraph. The appendix states that abundance information was satisfied by the studies. On the contrary, no solid estimates of short nose sturgeon abundance was determined by the studies in the Savannah River even though varying abundance estimates have been proposed. In addition, no abundance information is known for Atlantic sturgeon in the Savannah River.*

Response: See previous response.

760APQ-DC-13-EV03

Comment: *Page 2. Section B, 1st Paragraph. The appendix states that the agencies approved all of the models as acceptable for determining environmental impacts. However, the NMFS did express concern about the use of "acceptable vs. unacceptable" for determining available habitat for fish in the river and in the alternative proposed a gradient of scores in order to indicate the varying level of impact and available habitats. After much discussion NMFS conceded that the use of "acceptable vs. unacceptable" was okay for now. This would indicate that NMFS deemed it to be insufficient for a final determination of impacts to the fisheries resources in the river.*

Response: The habitat suitability criteria used in the model runs were developed, and refined by the Fisheries Interagency Coordination Team [NMFS was a participating member]. NMFS did not indicate in its EIS comments [in reference to habitat suitability] that the use of the metric – "acceptable/unacceptable" was too vague.

760APQ-DC-13-EV04

Comment: *Page 3, Last paragraph. The appendix states that the use of multiple species will eliminate reliance on a narrow view of the ecosystem, thereby reducing the risk of not identifying a critical impact. The use of multiple species for impact assessment does provide breadth and depth of impact analysis. However, if the biological variables used in the impact assessment are flawed, the impact assessment is not an accurate representation of the total impacts. For example, the DO levels used to assess the acceptable habitat for shortnose sturgeon were determined as those levels at which shortnosc sturgeon could survive in a laboratory setting. The DO values were much lower than DO values collected in a shortnose sturgeon habitat association study conducted in the Savannah River. Thus, the use of lower DO values than what the shortnose sturgeon would utilize would overestimate the acceptable habitat in the river after the project is constructed.*

Response: The habitat suitability criteria that were used to assess available habitat for the chosen fish species were developed by the Fisheries Interagency Coordination Team. These criteria were based on professional expertise/experience, pertinent literature, and site specific data available for the Savannah River. In the absence of specific information to the contrary, the amount of available habitat cited in the EIS is deemed to be correct.

760APQ-DC-13-EV05

Comment: *In Section 3 page 6. With the exception USFWS none of the resource agencies provided specific comments on the uncertainties associated with the salinity model. Why? The USFWS stated, " ... we believe that salinity prediction performance is adequate to use in project planning. However, we must reiterate that there continues to be a limited understanding and modeling ability of the velocity and flow dynamics in the Middle River, Little Back River and Back River. This limitation will cause some uncertainty regarding salinity and water quality predictions for mitigation alternatives that involve channel modifications in the Savannah River system." We concur with the USFWS statement and believe this opinion is likely shared by other resource agencies. The Corps should consider refining the model, collecting additional data and developing a more specific contingency plan.*

Response: SRMC's concurrence with USFWS statements presented in EIS-Appendix Q EIS is acknowledged. See previous responses on this issue.

Page Appen. Q-2

760APQ-DC-13-EV06

Comment: *Page 4, 2nd Paragraph, line 17. The appendix states that criteria used to determine the acceptability of fish habitat were on the conservative side. As stated in the comment above, the use of lower DO values than were documented in known fish use areas is not a conservative estimate, but instead provides an overrepresentation of available fish habitat.*

Response: The habitat suitability criteria that were used to assess available habitat for the chosen fish species were developed by the Fisheries Interagency Coordination Team. These criteria were based on professional expertise/experience, pertinent literature, and site specific data available for the Savannah River. In the absence of specific information to the contrary, the amount of available habitat cited in the EIS is deemed to be correct.

760APQ-DC-13-EV07

Comment: *Page 4, Section 3, 1'\ Paragraph. This will provide information that tells you how bad one dredging alternative is compared to other dredging alternatives, but it doesn't tell you how bad a dredging alternative is compared to a different non-dredging project. The DEIS doesn't consider other true alternatives that would allow shipping, but with less impacts. For example, there is no mention of any other ports that could be used without the need for the extensive upriver dredging.*

Response: See previous responses regarding alternatives.

760APQ-DC-13-EV08

Comment: *Page 6. USFWS quote. The USFWS has accepted the use of the salinity model in project planning. Note: project planning should not include the detailed impact determination and mitigation modeling and monitoring that will need to be completed for endangered species consultation and incidental take permitting process, which is likely to be necessary due to the likelihood that the project will impact instream habitat to the degree that it will result in the take of a threatened or endangered species.*

Response: Appropriate endangered species consultation for this stage of the SHEP has been completed. The US Fish and Wildlife Service concurred in the project's expected impacts to endangered species under its oversight under the ESA. Their letter report is included in Appendix Z. The BO prepared by the NMFS for the SHEP is also included in Appendix Z.

760APQ-DC-13-EV09

Comment: *Page II , 1st Paragraph. Did the USGS review the supplemental report to ensure the report addressed the concerns the USGS expressed about the previous draft. No mention is made that the USGS received the supplemental report or agreed with the findings.*

Response: The USGS reviewed the MACTEC supplemental report and provided comments in a letter dated April 13, 2009. MACTEC provided responses to the comments in the final version of the supplemental report, dated August, 2009.

760APQ-DC-13-EV10

Comment: *Page II, Section B, 3rd Paragraph. How much was the DO improved? Did the DO improvement corroborate the levels proffered in the DEIS? No mention is made as to how the DO improvement compared to that which has been provided as a basis for adequate mitigation.*

Response: The results of the 2007 demonstration project are summarized in the *SAVANNAH HARBOR REOXYGENATION DEMONSTRATION PROJECT [*2008]. The report, [prepared for GPA by MACTEC] is included as part of the GRR-Engineering Appendix supplemental materials. Both the design analyses and the demonstration project verify that the Speece Cones would be an effective means to restore [incremental amounts of] dissolved oxygen in the estuary.

760APQ-DC-13-EV11

Comment: *Page II, Section B, 4th Paragraph. The text claims that monitoring will reduce the risks associated with the effectiveness of the DO improvement system. Monitoring will not reduce the risk of the effectiveness of the DO improvement system. It will reduce the risk of not noticing a non-functional DO improvement system. A reduction in risk associated with effectiveness would be reduced via a proposal of alternative technologies that would also be effective. None have been discussed here as a fallback.*

Response: The risks and uncertainties of the proposed dissolved oxygen system for Savannah Harbor are fully discussed in the Risk and Uncertainty Analysis [Appendix Q, pages 9-11]. Specifically, a risk analysis of the water quality model was prepared to predict post-project dissolved oxygen levels. An oxygen demonstration trial verified the efficacy of the Speece Cones to add oxygen to Savannah's estuarine waters. Extensive post-construction monitoring would determine whether initial predictions regarding oxygen levels are correct. Post-project, the adaptive management plan includes a means to make any required changes to the oxygen injection system. This could range from increasing the amount of injected oxygen, modifying the oxygen injection equipment, or adding injection sites.

760APQ-DC-13-EV12

Comment: *Page 12, Section 7A, 2nd Paragraph. Second to last sentence re: acceptable vs. unacceptable. In the case of shortnose sturgeon, the team ignored the field data collected on shortnose sturgeon habitat use in the Savannah River when determining acceptable DO levels. Ignoring the data from the river resulted in a DO threshold level far below that in which sturgeon are typically found thus creating undue risk that the models underestimated the impacts to fish, specifically demersal sturgeon that arc potentially the most at risk to depressed DO levels.*

Response: The habitat suitability criteria that were used to assess available habitat for the chosen fish species, including Shortnose sturgeon, were developed by the Fisheries Interagency Coordination Team.

These criteria were based on professional expertise/experience, pertinent literature, and site specific data for the Savannah River. Data were neither ignored nor impacts underestimated.

Page Appen. Q-3

760APQ-DC-13-EV13

Comment: *In the last sentence of Section 4A, The Corps states that they consider the wetland impact acreages to be valid within +/- 50 acres. This is too large of a margin of error. The models should be refined and or additional data needs to be collected to reduce the margin of error.*

Response: The margin of error is within acceptable limits, i.e., there is no need to refine the models further or collect additional data. The rationale for selection of the EFDC model is described in EIS-Section 5.01.2. In brief, the EFDC hydrodynamic model captures more wetland impacts [at all depth alternatives] than its Marsh Succession counterpart. Given the SHEP's high interest profile, potential long-term environmental consequences to the Savannah estuary, and its national economic importance, the District elected to choose the more inclusive/conservative estimating tool.

Similarly, a conservative approach was taken regarding the functional assessment to address the likelihood of vegetative shifting resulting from salinity changes in salinity. The functional assessment concluded that the differentiation between salt marsh and brackish marsh recommended by the Wetland Interagency Coordination Team was restrictive. Specifically, the salinity range used in the SHEP model to differentiate between brackish marsh (0.6-4 ppt) and salt marsh (> 4ppt) was narrow. Brackish marsh salinities in the vicinity have been reported with a range from 0.5-10 ppt (NOAA, 2010) and in other estuarine systems from 0.5-17 ppt (Judd and Lonard, 2004). An earlier assessment of wetland vegetation in the Savannah estuary reported a salinity range of 5-10 ppt for brackish marsh systems (ATM, 2003). Thus, the salinity range used to quantify salt marsh in the area of potential effect (i.e., > 4 ppt) may over-estimate the amount of saltmarsh in the system and under-estimate the amount of brackish marsh. As such, the described conversion of salt marsh to brackish marsh, which would occur as a result of harbor deepening, may be minimal when taking into account vegetative characteristics for wetland environments with associated salinities commonly associated with a brackish marsh (i.e., range between 5 and 10 ppt).

Given the wide range of salinity reported in literature for brackish marsh systems, the inherent variability in salinity that exists for all estuarine systems, and the modeling results that report post-deepening salinity concentrations consistent with the aforementioned range, it was concluded that conversion of 740 acres of saltmarsh to brackish marsh [47-feet option] is unlikely. In fact, actual vegetative shifts may not be identifiable *in situ*. That said, the District elected to be conservative in its assessment of the potential for project-related effects and considered the entire saltmarsh and brackish marsh conversion in its calculation of minor impacts.

The conversion of 223 acres of freshwater wetland to brackish marsh represents the only wetland effect that is likely to be noticeable if the harbor is deepened to 47-feet . As noted previously, the ecological values of the impacted 223 acres of freshwater wetlands would not be completely lost. Instead, those acres would convert to brackish marsh. The District's calculation of the number of acres of freshwater wetland that have the potential to convert to brackish marsh is based on a shift in the location of 0.5 ppt salinity, a traditional rule-of-thumb for differentiating between freshwater marsh and brackish marsh. However, data reported in the literature for Savannah Harbor suggest that a shift in vegetation (from freshwater marsh to brackish marsh) in this estuary does not occur until salinity concentrations approach 2.5 ppt (Latham et al., 1994). Even at oligohaline marsh sites with average salinity

concentration of 2.1 ppt, a discriminant function (DF) analysis revealed that only 47% of cases resulted in the correct pairing of environmental variables with vegetative species composition and dominance. At those same oligohaline sites, 37% of the vegetative species composition and dominance were more closely aligned with a freshwater classification (Latham et al., 1994).

The District's salinity value that denotes a defined shift from freshwater to brackish marsh (i.e., 0.5 ppt) is approximately 5 times lower than what has traditionally been observed with 100% vegetative shifts *in situ* within the Lower Savannah Watershed (Latham et al., 1994) and other coastal marsh systems in the southeastern United States (NOAA, 2010). Thus, many of the existing freshwater emergent plant species, and associated ecological parameters, would likely be sustained in areas predicted to experience salinity concentrations in the range of 2.5 ppt. Those areas that transition to more brackish characteristics would continue to provide the traditional ecological functions associated with all emergent wetland systems (please see functional assessment response).

To ensure the indirect impacts are well characterized, the District would implement a post-construction monitoring plan to evaluate/quantify observed wetland conversion. The Adaptive Management Program proposes acquisition of additional wetlands if monitoring demonstrates that wetland impacts were under-predicted.

Page Appen. R-1

760APR-DC-02-EV01

Comment: *Section 8, Page 18, 1st Paragraph. The document states that the District believes there will be no significant environmental impact; however, the use of the disposal area was not reviewed in the DEIS. The DE IS simply states that the area was approved in 1996 and therefore environmental review of the disposal area was not necessary. Dependence upon an environmental review completed in 1996 is not adequate given the probability of changed circumstances as well as the new listing of a substantial number of threatened and endangered species since 1996.*

Response: DEIS-Appendix B has a detailed description of the proposed use of the ODMDS. The FEIS was revised to reflect input from GA DNR-CRD and the City of Tybee Island. That is, the dredged sediment placement plan has been updated to reflect placement of new work material solely in the ODMDS/CDFs.

The Corps' determination that there would be no significant environmental impacts associated with use of the ODMDS is based on a review of information concerning both the material to be dredged and the ODMDS. Based on this review, the Corps concluded that the new work material proposed to be placed in the ODMDS is substantially the same as the substrate at the ODMDS and that the new work dredged material is far removed from existing and historical sources of pollution to provide reasonable assurance that the material has not been contaminated by pollution. Although the Corps has developed information indicating that the material meets the exclusionary criteria from further testing, all evaluations are being conducted to fully satisfy the requirements of Section 103 of the Marine Protection, Research, and Sanctuaries Act of 1972 (MPRSA). Sampling and evaluation requirements will be completed prior to the start of construction.

760APR-DC-02-EV02

Comment: *Page 19, Subsection b(i). See above comment.*

Response: See previous response.

Page Appen. S-1

760APS-DC-33-EV01
Comment: *Page 5, Section 2. Unsubstantiated claims about the absence of habitats in the project impact area. References or field work should be cited to corroborate this claim.*

Response: Additional EFH assessment information on oyster reefs, shell banks, and intertidal flats has been added to Appendix S.

760APS-DC-33-EV02

Comment: *Table 3-1 . The column headings are unclear. Column 2 appear to be total acres affected. Column 3 appears to be non-wetland acres affected. However, it is not readily discernible based on the information.*

Response: The Table has been revised for clarity.

760APS-DC-33-EV03
Comment: *Page 6. First line. The narrative states that 14.08 acres could be considered wetlands. Are they or aren't they wetlands? Has a study been completed to verify any of the information? How do you know that the remaining 15.92 acres is high ground 1fno wetland delineation has been performed.*

Response: As shown in the revised Table 3-1 in Appendix S, the amount of brackish marsh that would be impacted by SHEP excavation requirements is 15.68 acres. The District used an inclusive, elevation-based GIS analysis together with a site reconnaissance to determine the SHEP's direct wetland impacts [via excavation]. Prior to construction, the District will verify the reported acreage [15.68 acres] of brackish marsh by conducting site-specific wetland delineations. Given the subject area's topography [and multiple field inspections], there is little reason to expect that this figure will change substantially. If there is a minor adjustment in the impact acreage, the sum of r Factors remains unchanged (See Appendix A of Appendix C- Mitigation Planning) and the corresponding acreage of required brackish marsh restoration would be recalculated. The available acreage for marsh restoration at the restoration site (i.e., 40+ acres) would be more than sufficient to compensate for any slight adjustment.

760APS-DC-33-EV04
Comment: *Figure 3-1. The image is of such poor quality that it is not legible for review.*

Response: Figure 3-1 has been replaced to clearly show the areas that would be excavated as a result of the Kings Island Turning Basin expansion.

760APS-DC-33-EV05
Comment: *Figure 3-2. Most of the image is missing precluding review.*

Response: Figure 3-2 has been revised to clearly show the excavation requirements between Stations 85+000 and 87+000.

760APS-DC-33-EV06
Comment: *Figure 3-3 is not cited in the text and does not include a legend. It is impossible to tell what this figure is trying to convey.*

Response: Figure 3-3 has been revised and labeled to clearly show the excavation requirements associated with removal of the Tidegate endwalls.

760APS-DC-33-EV07
Comment: *Page 10. Section 3.2- The document skips any discussion of avoidance or minimization of impacts. It does not discuss how the project was assessed for modifications to avoid or minimize impacts. Rather it assumes the project will move forward and begins a discussion of how it will be mitigated.*

Response: Discussions concerning avoidance and minimization are included in Appendix C titled "Mitigation Planning." The first step in avoiding wetland and EFH impacts was selection of the channel design. The project design would maintain the existing side slopes and extend them downward, rather than maintaining the existing bottom width and extending the side slopes outward. The major effect of this decision is a reduction in the amount of dredging that would be required on the side slopes and removing the need for a uniform increase in top width of the dredged channel. This minimizes impacts to adjacent high ground, structures located along the riverbank, and the marsh fringe.

The second step in avoiding and minimizing wetland impacts is the implementation of flow alteration structures (see Appendix C). Without the flow alteration structures, approximately 1,177 acres (47-foot channel) of freshwater marsh could shift to more a more brackish marsh species assemblage. By implementing flow-altering measure 6A, only 223 acres (maximum) of freshwater marsh is at risk. Thus, the flow altering measure 6A satisfies both avoidance and minimization elements by maintaining 954 acres of freshwater marsh that would otherwise experience some degree of vegetative conversion.

760APS-DC-33-EV08
Comment: *Typically, part of the NEPA process involves an alternative project that does not involve that which is proposed, but still accomplishes some or all of the project purpose. In this DEIS, the only options that are presented are variants of the same project. The presentation of a single project does not allow for sufficient evaluation of the environmental impact of a project under NEPA.*

Response: See previous responses regarding alternatives.

760APS-DC-33-EV09
Comment: *Page 11. Will the mitigation area provide fish access at an adequate level to replace the value of the essential fish habitat lost due to project impacts?*

Response: The marsh restoration would replace the wetlands which would be lost to various construction activities attendant to harbor deepening. The "feeder" creek is an added enhancement feature to this restoration design. The feeder creek would allow fish ready access to the interior portions of the site.

760APS-DC-33-EV10
Comment: *A common thread throughout this document is the failure to relate the project impacts and mitigation to the actual effects on fish and fish access to these areas.*

Response: The document continually relates project impacts in the estuary to the natural resources associated with those locations, including fish habitat and water quality.

760APS-DC-33-EV11
Comment: *Figure 3-4. poor quality figure, no key. No discussion of water elevations in ditch versus the wetland. Difficult to determine exactly where this area is located without an inset map.*

Response: Figure 3-4 has been replaced to clearly show the restoration site at Disposal Area 1S.

Page Appen. S-2

760APS-DC-33-EV12
Comment: *Page 13, Section 4.1 - This section actually only provides one full sentence and one table discussion of project impacts. The narrative avoids discussion of the degree to which salinity will move upstream, any avoidance or minimization efforts, or methods of determining the amount of impact. The narrative's focus on mitigation measures without discussing impacts, avoidance, and minimization suggests the Corps has not adequately addressed ways to reduce impacts and it simply using the DE IS to justify the project that it has been authorized to construct.*

Response: The statement is taken out of context. Immediately following the cited Section (4.1), the following Section (4.2) details the project's impacts together with the minimization and avoidance measures which were examined. Section 4.1, as indicated by the title of the table, is a summary of the findings based on the discussion immediately following.

760APS-DC-33-EV13
Comment: *Page 15. Table 4-3 is not referenced in the text.*

Response: Table 4-3 is not specifically referenced in the paragraph that precedes it. However, the paragraph does contain a sentence (lines 4-5) that states "…the Corps developed the dual approach shown below". A revision has been made in the FEIS to clarify this issue.

760APS-DC-33-EV14
Comment: *Page 16. Under what flow scenarios was the model conducted? Did it account for field-truthed conditions? Did it account for boat wake effects?*

Response: Marsh acreage [net] which would be adversely impacted by the project is shown under several flow-altering mitigation plans [EIS- Appendix S [Table 4-4]. The assumptions used in the run period [March - November 1997] for this model analysis were average/typical river flows with no sea level rise. For more information regarding model run scenarios and mitigation plan development, see Section 7.0 of the Engineering Appendix. The model was verified using a variety of techniques, including comparing predicted outputs to observed field conditions. The model development and calibration report include both the hydrodynamic and water quality modeling results along with calibration and confirmation periods. The model was calibrated using the period with the most comprehensive data set [Summer of 1999]. The model confirmation used data from 1997 [Summer] and USGS long-term data [January 1, 1997 through December 31, 2003]. The model calibration report prepared by Tetra Tech is titled "Development of the Hydrodynamic and Water Quality Models for the Savannah Harbor Expansion Project" and is included in the Supplemental Materials to the Engineering Appendix of the GRR.

The model applications met the expectations of the model review team [consisting of members from state/federal agencies]. The model code, modeling results [in both time series and statistical formats], and a database [containing model comparison data] were made available for peer review/comment. Acceptance letters from agencies involved in the model review group can be found in the document titled "Correspondence Regarding Hydrodynamic & Water Quality Model Acceptability" which is included the Supplemental Materials to the Engineering Appendix of the GRR. Ultimately, the hydrodynamic and water quality models produced defensible, accurate, and transferable information which state/federal agencies used to make reasoned decision[s] regarding the acceptability of the SHEP proposal. In a related matter, onshore impacts of shipping traffic were evaluated in a separate report titled, "Ship Forces on the Shoreline of the Savannah Harbor Project" which is included in the Supplemental Materials to the Engineering Appendix of the GRR .

760APS-DC-33-EV15

Comment: *Page 17. The bullet points intermix impact and mitigation discussions. Much of this text actually describes the impact, but the unclear delineation of the two makes this document difficult to read and understand.*

Response: This section has been revised for clarity purposes.

**APS, pg. 18, 2nd paragraph, 5th line: "which would likely adverse wetlands located there" has been revised to "which would adversely affect wetlands located there".

760APS-DC-33-EV16

Comment: *Pages 28-30. Table 4-5 through 4-11 are labeled as x-foot deepening alternative. This is misleading and difficult to follow given the balance of the appendix and the DEIS refers to the alternatives as 4x-foot alternative.*

Response: Tables 4-5 through 4-9 show the effectiveness of the various flow rerouting plans for each of the five channel deepening alternatives evaluated. Tables 4-10 and 4-11 provide a comparison of the costs for the various flow rerouting plans for the 44-foot and 48-foot projects, respectively.

760APS-DC-33-EV17

Comment: *Page 32. Paragraph 2, line 8. The mitigation includes enlarging a creek. The document should include this as an impact that should be mitigated by the mitigation plan. No discussion of mitigation for impacts due to mitigation is offered.*

Response: The comment references a section of Appendix S – EFH (p. 32, paragraph 2) that describes a potential mitigation site the District evaluated. Its preliminary design included extending a tidal creek through the parcel to create a freshwater wetland system. It was concluded that the concept did not have a good chance of success, so this site/concept was ultimately rejected.

760APS-DC-33-EV18

Comment: *Page 34, Paragraph 1, lines 11-13. The text discusses using the Corps standard operating procedures (SOP) in order to quantify the ecological impacts including the type, duration, and preventability. Very little detail, if any, is provided in the document to show the type, duration, and preventability of any impacts proposed by this project.*

Response: The EFH assessment in Appendix S was prepared in accordance with the procedures established by NOAA to meet the requirements of The Magnuson-Stevens Fishery Conservation and

Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267). In addition to the EFH assessment, impacts on fishery resources as a result of the proposed action are discussed in EIS-Section 5.03.

The SOP referred to in your comment is the Savannah District Regulatory Standard Operating Procedure for determining compensatory mitigation for wetland losses. Although Appendix S has a discussion of how that SOP was used for the SHEP, a more detailed discussion can be found in Appendix C,

760APS-DC-33-EV19
Comment: *Page 35. The text discusses how the SOP was used to assess the impact to wetlands and the acres of mitigation realized in the mode1. It does not, however, at any time put the loss of wetland or the replacement of wetland in the context of fisheries. The entire purpose of this section is to address essential fish habitat and at no time does the document discuss how fish populations will be affected by the destruction of essential fish habitat or the accessibility of the newly created essential fish habitat.*

Response: The EFH assessment in Appendix S was prepared in accordance with the procedures established by NOAA to meet the requirements of The Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267). In addition to the EFH assessment, impacts on fishery resources as a result of the proposed action are discussed in EIS-Section 5.03.

760APS-DC-33-EV20
Comment: *Page 37, 2nd to last line. The text should reference Figure 4-12. It is difficult to follow the text and figures without proper citations.*

Response: Figure 4-12 (now Figure 4-11) has been revised to more clearly show possible lands that could be acquired, and the Table is referenced in the text.

760APS-DC-33-EV21
Comment: *Page 39. Section 5.1*

Response: The references cited are Wilber and Clarke, 2001 and Newcombe and Jensen, 1996.

Page Appen. S-3

760APS-DC-33-EV22
Comment: *The lack of information on sturgeon is a critical information gap that precludes adequate assessment of the potential for impact.*

Response: The EIS contains data on both the Shortnose and Atlantic sturgeon. Both of these species were considered in the BATES prepared on the project. The BO prepared by the NMFS contains a complete discussion of anticipated project impacts on the Shortnose and Atlantic sturgeon and reasonable and prudent measures to minimize those impacts.

In addition to existing information, an extensive monitoring study on the Atlantic and Shortnose Sturgeon is being funded by NOAA within the southeastern US. The effort began in the spring of 2011 and is scheduled to last for five years. The work in the Savannah River is being conducted by SCDNR. http://www.nmfs.noaa.gov/pr/conservation/states/funded.htm. As information becomes available, NOAA and the Corps will consider it.

760APS-DC-33-EV23
Comment: *Section 5.1, 2nd paragraph, lines 9 - 13. The information included in this sentence are unsubstantiated by any other study or reference material. Citations should be included. For example, how can the inference be made that the suspended sediment loads would likely be uniform without having data to corroborate that information? How would the sediment interact with the salt wedge that otherwise restricts mixing?*

Response: Additional information has been added to FEIS-Section 5.1, regarding how the sediments interact with the advancing salt wedge together with other factors which affect mixing.

760APS-DC-33-EV24
Comment: *Page 40, 1st full paragraph. How far upstream will the salinity increase? This is crucial information for assessing impacts on essential fish habitat, but it is impossible to determine this information from the text.*

Response: The salinity increases experienced by specific upstream reach would vary by the proposed depth alternative. The hydrodynamic model outputs detailed these results, and the EFH Evaluation Appendix presents a summary. For detailed information on salinity increases within the estuary, please see the GRR, Appendix C, Attachment 3.

760APS-DC-33-EV25
Comment: *Page 41, 1 st full paragraph. The dates listed in lines 7 and 10 do not appear to be accurate. It is difficult to know which dates were actually modeled and what the respective dates are intended to represent.*

Response: The basic dissolved oxygen impact analyses used typical summer drought river flow conditions (those observed in August 1999). A normal river flow condition (those observed in August 1997) was also evaluated as well as several other scenarios described in the paragraph.

760APS-DC-33-EV26
Comment: *Page 45. The Corps used a 0.25 mg/l decrease in DO as the determination of DO violations. However, this document is intended to asses essential fish habitat. The Corps has not shown how a 0.25 mg/l decrease relates to essential fish habitat and the fish that the habitat is intended to harbor. This is an example of the continual disconnect between use of the model to calculate a result with little discussion as to the meaning of the inputs or outputs as they relate to fish in the harbor.*

Response: The criteria for these model runs were developed by the Water Quality Interagency Coordination Team to assess incremental changes in dissolved oxygen resulting from implementing different channel depths. The water quality modeling data were also used to determine the need for and location[s] of dissolved oxygen systems to mitigate project effects. These modeling data were just one of the multiple components used in developing the essential fish habitat assessment.

760APS-DC-33-EV27
Comment: *Tables 5-3 through 5-7 do not appear to be referenced correctly in the corresponding text. The disorganization of the document makes review difficult.*

Response: The text has been revised to clearly describe the information in Tables 5-3 through 5-7.

760APS-DC-33-EV28
Comment: *Page 51, Section 5.3, 3rd paragraph. Line 7. - The screens should also be size to minimize impingement of fish. No sources have been cited to substantiate the velocity of flow being proposed. No estimates have been made of the species that may be entrained or impinged by the system and the mitigation that would be required for that mortality.*

Response: Additional studies are not needed to provide estimates of entrainment or impingement of aquatic organisms. Screen size will keep flow velocities from exceeding 0.5 foot per second which is the standard measure used to minimize entrainment of aquatic larvae.

760APS-DC-33-EV29
Comment: *Page 52. Line 1. The text references Table 5-4 for the desirable oxygen levels. Table 5-4 does not include oxygen levels. It is impossible to asses this information with incorrect citations.*

Response: The text has been revised to reflect that this information is in Table 5-8.**760APS-DC-33-EV30**

Comment: *Page 54, 1st paragraph, last line. Table appears to be incorrectly cited in the text.*

Response: The text in Appendix S has been revised to indicate that Table 9 should be referred to.

760APS-DC-33-EV31
Comment: *Page 57. Section 9.0. The text dismisses the mapped hardbottom areas without completing any assessments prior to doing so and does not provide any remedial actions that will be taken if a hardbottom area is found. Will the channel be moved? A voidance should be considered prior to mitigation.*

Response: The likelihood of live hard bottoms located in the alignment [fairway] of the channel extension is minimal given the scarcity of this community type off the coast of Georgia. However, the District would complete a benthic survey of the channel extension area (Stations -60+000 to -97+680) prior to the start of construction. In turn, the survey results will be coordinated with NMFS for its review/comment. In the unlikely event live hard bottoms are located in the subject area, the District would consult with NMFS to develop an appropriate course of action.

Page Appen. S-4

760APS-DC-33-EV32
Comment: *Page 60. Section I. - The text dismisses the mapped hardbottom areas without completing any assessments prior to doing so and does not provide any remedial actions that will be taken if a hardbottom area is found. Will the channel be moved? A voidance should be considered prior to mitigation.*

Response: The likelihood of live hard bottoms located in the alignment [fairway] of the channel extension is minimal given the scarcity of this community type off the coast of Georgia. However, the District will complete a benthic survey of the channel extension area (Stations -60+000 to -97+680) prior to the start of construction. In turn, the survey results will be coordinated with NMFS for its review/comment. In the unlikely event live hard bottoms are located in the project area, the District will consult with NMFS to develop an appropriate course of action.

760APS-DC-33-EV33

Comment: *Page 63. Section 11 .0 - The impact summary states that the proposed action would have adverse impacts on an endangered species, an important game fish species, and two types of marshes, presumably upon which many species of fish depend. Nonetheless, the text dismisses the adverse impacts as non-significant without providing sufficient detail as to how the non-significant status had been applied. Furthermore, the assessment provided little information as to how the project will impact essential fish habitat from an accessibility perspective. The mitigation of essential fish habitat through the restoration of inaccessible marsh habitats or the purchase of woodland does not provide adequate replacement for the essential fish habitats that will be lost due to this project.*

Response: This section is only a summary and is not intended to provide details. The details are provided in the body of Section 5.0 of the FEIS and Appendices C and S and are referenced in the summary statement.